DESCARTES AND HIS CRITICS ON SPACE AND VACUUM

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Abstract

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This study is an interpretation of Descartes’ theory of space and vacuum. Descartes famously holds that space is identical to matter, and that a vacuum or empty space is logically impossible. These positions earned Descartes a great deal of criticism from philosophers during the seventeenth and eighteenth centuries. Two main strands of criticism are dealt with here. First, Descartes was charged with dogmatism for holding that rival notions of space were inconceivable, a position for which he seems to have no good arguments. Second, some philosophers claimed that Descartes is guilty of inconsistency: his position on the vacuum, they said, was incompatible with his theory of the metaphysics of extended substance. This dissertation comprises a comprehensive interpretation of Descartes’ treatment of space and vacuum, particularly in the Principles of Philosophy (1644). A new reading of the discussion of place and space in Principles Part II is articulated and defended; the result is a fundamental rethinking of what Descartes means by the claim that body and space are identical. This reinterpretation provides the basis for the culminating point of the study. Descartes’ position on the vacuum is discussed in relation to a number of different understandings of what a vacuum might be. The different
arguments he offers concerning the vacuum are analyzed and related to each other.

Two chapters are devoted to objections raised by Arnauld, Henry More, and Spinoza. The implications of these objections for Descartes’ theory of extended substance are pursued in these chapters, and direction for further research on this topic is discussed in an appendix. The central thesis argued here is that Descartes’ position on space and vacuum is more plausible in its context than has been recognized. It turns out that Descartes takes great care to address the strengths of his opponents’ positions on space and vacuum, and that he has an argument for his view involving an appeal to ontological economy or simplicity. His position on this topic, which is commonly taken to be a paradigmatic example of dogmatism, is argued for more plausibly, and more responsibly, than has previously been recognized.
For my wife Julie
CONTENTS

Introduction ...................................................................................................................... 1

Chapter One: Descartes on the Concept of a Space ................................................... 14

Chapter Two: Against the Vacuum ........................................................................... 46

Chapter Three: Descartes’ Critics I: Arnauld and Henry More ............................... 96

Chapter Four: Descartes’ Critics II: Spinoza .............................................................. 127

Chapter Five: Matter and Space according to the Order of Reasons ....................... 165

Appendix: The Metaphysics of Extended Substance in Descartes ......................... 208

Bibliography ................................................................................................................. 223
INTRODUCTION

Descartes famously holds that body and space are identical, and that an empty space or vacuum is logically impossible. Perhaps it would be better to say that he infamously holds these views; certainly there was no lack of criticism directed toward them, even by his followers, in the seventeenth and eighteenth centuries. Locke offers a fairly typical response in the Essay, in his discussion of the idea of space or extension:

There are some that would persuade us, that Body and Extension are the same thing; who either change the Signification of Words, which I would not suspect them of, they having so severely condemned the Philosophy of others, because it hath been too much placed in the uncertain meaning, or deceitful obscurity of doubtful or insignificant Terms.¹

Locke drives home his point here by referring to Descartes’ criticism of the Scholastic Aristotelians—these are the “others” who based their philosophy on “doubtful or insignificant Terms.” The point, then, is that the Cartesian position is based on nothing but a stipulated definition. Locke goes on to enumerate the ways in which our actual idea of space differs from that of body. This is not an idiosyncratic line of thought on Locke’s part. Among the major early modern philosophers there are few who do not think that Descartes’ position on space and vacuum is either badly argued, hopelessly dogmatic, or both. Among those who do accept the Cartesian

position on the vacuum, most find this incompatible with other aspects of his
metaphysics of extension: Spinoza is a notable example, but some important
Cartesians fit the description as well.

This study aims to provide an interpretation of these notorious theses in
Descartes, chiefly as they are articulated in the Principles of Philosophy. Some
crucial aspects of Descartes’ view on space and matter have been misunderstood, and
once this has been remedied the case for his position against the then-available
alternatives is significantly strengthened. Moreover, it turns out that Descartes can
plausibly resist the charges of Spinoza and others that his theory of extended
substance is incompatible with his position on the vacuum.

Before specifying in more detail the context, content and aims of the
following chapters, it is important to clarify what this study does not address. The
question of the existence or possibility of the vacuum is well-known as a historical
battleground between rationalism and empiricism, broadly speaking. Descartes and
Pascal on the barometer, Hobbes and Boyle on the air pump; there is a long history of
taking these debates as case studies for the conflict between different approaches to
natural philosophy.² This study addresses criticisms of Descartes’ position, but
focuses on those which engage Descartes largely on his own terms, rather than those
which call into question the whole project of rationalist natural philosophy. This does
not rule out some who are normally classified as empiricists; some objections from

² In the recent decades the literature has embraced a more nuanced view of these debates, a
view influenced by the suspicion of naïve or dogmatic empiricism in the history and philosophy of
science. For a good discussion of Pascal and Descartes, see Daniel Garber, Descartes’ Metaphysical
Boyle debate is Stephen Shapin and Simon Schaffer, Leviathan and the Air Pump: Hobbes, Boyle and
Locke will receive sustained discussion here. Debates about the place of experiment in natural science, however, are not the topic of this study.

Descartes’ views on space have also been examined and criticized with respect to his physics. For example, the issues brought up by Newton in his famous scholium on space and time in the *Principia*, or by Leibniz and Clarke in their equally famous correspondence, are relevant in assessing Descartes’ views on space taken broadly, notwithstanding the risk of anachronism in interpretation. Generally, it is important to ascertain the degree to which Descartes’ laws of motion are compatible with his rejection of a body-independent space. A recent monograph by Edward Slowik addresses these and related topics, with an eye towards reconstructing, as far as possible, a plausible and coherent relational space-time theory to accompany Descartes’ physics.3 The present study, however, is concerned with a different set of arguments. Descartes’ explicit treatment of space and place deals only with general features of bodies and motion, rather than the particular demands of any developed physics, and it is the former that is addressed here. To the extent that Descartes is defended in this study, it is not an assessment of his physics or the spacetime theory it requires.

Descartes’ position on space and vacuum is supposed to be a result of his definition of matter or body, so it is worthwhile to sketch out some of the relevant background within the Cartesian corpus. A conception of matter as having only geometrical features, as mere extension, is a persistent feature of Descartes’ thought, 

from the early *Rules for the Direction of the Mind* (1628) all the way through to the *Principles* (1644). In the *Regulae* this is tied up with Descartes’ ambitions for a universal method of problem-solving. Extension is something like a maximally intelligible medium in terms of which problems can be reformulated, classified and solved, if possible. It is contested whether there is any significant continuity between the methodology described in the *Regulae* and the more schematic rules proposed in later works such as the *Discourse on Method* or the Replies to Objections to the *Meditations*. The notion of extension as preeminently intelligible, however, remains. This reflects Descartes’ attitude towards geometry, in which he was of course not only an expert, but a revolutionary. Even if it is correct that he gave up on the project of the *Rules*, Descartes undoubtedly wanted to import the intelligibility characteristic of geometry into the foundations of natural philosophy.

From Descartes’ correspondence we know that he thought of his later metaphysical works as providing a basis for his natural philosophy, the heart of which had been formulated before he wrote the *Meditations* and the *Principles*. The connection between metaphysics and natural philosophy is found in the notion of clear and distinct perception, which plays a central role in the *Meditations* and the *Principles*. This connection is evident in Descartes’ letters to Mersenne: “The principal aim of my metaphysics is to show which are the things that can be distinctly conceived…”; “I must tell you that the little book on metaphysics which I sent you...”

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contains all the principles of my physics”; “I may tell you, between ourselves, that these six Meditations contain all the foundations of my physics. But please do not tell people, for that might make it harder for supporters of Aristotle to approve them.”

At least part of what Descartes means here must be that the *Meditations* prepares and encourages the mind to discard prejudices and preconceived notions and to focus on the objects it is capable of perceiving clearly and distinctly. Among these is body, conceived as a merely extended thing. Descartes thinks that other properties typically attributed to body are projections either of the qualities of our sensory impressions or of the qualities that properly belong to minds alone. When he says that the aim of his metaphysics is to show which things can be distinctly conceived, the things in question are mind and body. If the *Meditations* are studied with sufficient care, Descartes thinks, the readers mind will have shed its prejudices and recognized the two basic kinds of things for what they are: thinking substance and extended substance.

Descartes’ goals for his metaphysics govern both the *Meditations* and the *Principles*, but in the latter there is a more particular agenda at work as well. The *Principles* is intended to be a replacement for Scholastic textbooks; this reflects Descartes’ ambition to replace Aristotle’s natural philosophy with his own as the

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6 AT III 233; CSMK 155.

7 AT III 298; CSMK 173.
dominant framework for the study of nature. The work’s structure is in some respects modeled after a Scholastic textbook, but more importantly Descartes casts his metaphysics and natural philosophy in terms familiar to his intended audience. Thus he has a theory of distinctions resembling that of Suarez, an ontology organized around the notions of substance, mode and attribute, and importantly for this study, a theory of place that is a recognizable adaptation of the Aristotelian account. In spite of this accommodation to his prospective readers, Descartes’ aim is quite radical: he wants to thoroughly undermine the metaphysics and natural philosophy of the schools. Consequently there is something of a “wolf in sheep’s clothing” aspect to the *Principles*.

This is not to say that the work is just an exercise in deception. Descartes engages his chosen interlocutors philosophically, and he modifies standard Aristotelian terms and concepts to fit them to his views, rather than simply adopting them in bad faith. His position on space and vacuum is a particularly interesting case, because here, as will become clear, Descartes takes a position that is more Aristotelian than that of the Scholastics. Aristotle thoroughly rejected the possibility of empty space, but though his view was formally adopted by most Scholastics, it was modified and weakened significantly in response to theological concerns. Descartes wants to get back to the simplicity of Aristotle’s view on the vacuum, though of course generally his agenda is quite anti-Aristotelian.

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As if navigating between Aristotelianism, the concerns of Christian theology, and his own revolutionary goals were not enough, there is another movement in natural philosophy that is relevant to the *Principles*, namely the revival of Classical atomism. Descartes was acquainted with the mechanist natural philosophy of the atomist tradition, and certainly shared many of its aspirations. Nonetheless he was very concerned to distinguish his views from those of Democritus, Epicurus, Lucretius, and those who adopted their principles. He argued repeatedly against the very idea of an atom, and of course against the vacuum or void as well. Thus when Descartes addresses the vacuum in *Principles* Part II, he has at least two positions in mind: that of the Scholastics and that of the atomists.

With that general background laid out, I will briefly indicate the content of each chapter and the part it plays in the whole study. Chapter One is in some ways the most important chapter. It consists of an interpretation of Descartes’ treatment of the notions of space and place in *Principles* II. I examine a recent paper by Thomas Lennon and develop parts of it further to mobilize a critique of the standard interpretation of this section in Descartes. The claim that body is really identical to space and only conceptually distinct from it has been misconstrued as a claim of identity between a body and a space, so that each body has its corresponding space. I argue that this reading is incompatible with Descartes’ account of the conceptual distinction between space and body. That is, the standard reading of the identity claim is incompatible with what Descartes says about the notion of space operates.

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9 Garber, 117-120.

10 AT VIII A 325; CSM I 287-8.
Descartes is in fact not asserting the identity of this space and this body, but the identity of the real extension signified by the terms “space” and “body.” This is significant because Descartes’ account of how the notion of space operates is actually quite interesting, as will become clear in later chapters.

Chapter Two is an interpretation of Descartes’ arguments against the possibility of the vacuum. This chapter includes a taxonomy of different types of vacuum, or ways of construing the notion of a vacuum; I relate each kind of vacuum to Descartes’ view to get a clearer idea of what his position is. The position that vacuum or empty space is logically impossible turns out to apply to a wide range of different types of vacuum. Descartes’ case against each type is examined carefully; against some proposals his arguments appear distinctly unsatisfactory. He wants to make a number of crucial inferences for which there seems to be no basis or independent motivation. This chapter sets up Chapter Five, where I argue that Descartes has another, more plausible way to argue for his view as superior to those of his rivals.

The third and fourth chapters treat challenges to Descartes’ position on the vacuum. There are of course many objectors who could be discussed here, but I have chosen to deal primarily with arguments from Antoine Arnauld, Henry More and Spinoza. The first two philosophers are particularly relevant here because they raised their objections in letters to Descartes, so we have his responses. Spinoza’s argument is highly ingenious and combines the force of Arnauld and More’s objections. It has also been subject to misinterpretation, in my view, so there is additional reason to discuss it here. These two chapters serve a dual purpose in the dissertation: they treat
carefully constructed arguments that threaten to undermine his position on the vacuum on the basis of other positions to which Descartes is committed. Thus they help to show more fully how Descartes’ position hangs together with his other commitments, and what some of the best available alternatives are to his view on space and vacuum. More specifically, however, the arguments from Arnauld and Spinoza focus on the relationship between Descartes’ theory of extended substance and his position on the vacuum. Getting clear on how Descartes can respond is helpful for understanding the former as well as the latter. The metaphysics of extended substance cannot be treated fully here, but in the Appendix I offer suggestions as to where this thread in the dissertation leads, and how it relates to recent literature on the subject. In general this study is primarily concerned with how Descartes deals with the notion of space and accounts for space’s apparently non-material structure, but ultimately this has to be understood in tandem with his views on the metaphysical structure of matter—hence the need to at least touch on the latter in the Appendix.

Chapter Three is based around objections from Arnauld and More. Both of these philosophers, in their correspondence with Descartes, argue against his position on the vacuum by means of a thought experiment, in which God removes the matter within a vessel without letting anything else replace it. They argue that a vacuum would be the result. Arnauld in particular draws on Descartes’ theory of extended substance to argue that Descartes is committed by his own positions to the possibility of the thought experiment, and hence that he has to give up his position on the vacuum. The chapter is largely comprised of a close reading of the relevant
correspondence. I then argue that Descartes can answer these objections and retain his position on the possibility of the vacuum. In the case of Arnauld’s argument, however, giving the full Cartesian answer involves determining what counts as an extended substance for Descartes. This is a matter of some interpretive controversy, and to give a full defense of my view on the topic is beyond the scope of this study. I briefly sketch out the implications of the third and fourth chapters for that topic in the Appendix.

Chapter Four deals with an argument given by Spinoza that centers around a similar thought experiment. Spinoza, however, privileges the Cartesian position on the vacuum. He tries to show that that view is incompatible with Descartes’ metaphysics of extended substance, and hence that the latter should be rejected in favor of his own monistic metaphysics. I present and defend an interpretation of this argument; it turns out to correspond closely to Arnauld’s argument, but Spinoza’s critique goes beyond Arnauld’s to address problems about causality and explanation raised by the thought experiment. I argue that Spinoza’s challenge, however ingenious, does not in the end tell against Descartes’ position: Spinoza does not establish an inconsistency.

Chapter Five picks up on the problems identified in Chapter Two with Descartes’ arguments for the inconceivability of various notions of empty space. I argue that Descartes has a way to argue for his view by appealing to its superior economy or simplicity relative to the alternatives. The chapter goes through a number of steps to show how this kind of argument comes out of Descartes’ treatment of space and vacuum. First I pose the objection that Descartes has simply ignored the
features attributed to space which differentiate it from body: these include at least penetrability, immobility and indivisibility. This is a common objection from philosophers responding to Descartes. I show that he in fact deals with these features. From his analysis of space, according to the interpretation presented in Chapter One, it naturally follows that people attribute these characteristics to space, even though for Descartes talk about spaces is really just a certain sort of talk about bodies. That is, Descartes has an error theory about the endorsement of notions of space that would make a vacuum conceivable, and this error theory accounts for the specific characteristics that are supposed to differentiate space from body.

From this point I show how Descartes regards rival accounts of space—in short, because he has an error theory explaining how these conceptions arise from our notion of space as he has analyzed it, he takes himself to be justified in dismissing them as pseudo-concepts, rather than true ideas. And only if they were true ideas would they defeat the crucial inferences that secure his strong position on the vacuum. Clearly, however, the mere fact that Descartes has a story about how his opponents came up with their crazy views does not amount to an argument that those views are incoherent. Nevertheless I show that this suggests a more indirect argument for his view: namely that his account of space explains everything the alternatives do in terms of a simpler and more intelligible ontology. On this reading Descartes’ position on space and vacuum is less dogmatic than it initially appears; Descartes is careful to address what he takes to be the central strength of the alternative positions, and he tries to undermine it by accounting for the crucial *explananda* within the more austere limits of his ontology.
A brief word about the situation of this project relative to the literature is appropriate. This study owes much to the general historical and philosophical background laid out in recent influential monographs on Cartesian natural philosophy by Daniel Garber and Dennis Des Chene. For medieval and late Scholastic theories of space and vacuum I have had recourse to Edward Grant’s indispensable work of intellectual history; Des Chene takes up particular aspects of this background in more detail as well. On certain crucial points I offer a reinterpretation of how Descartes relates to his Scholastic sources, and I support my reading with reference to those sources; nevertheless even this disagreement occurs against the background of the research done by Grant, Des Chene, and Garber.

There is a good deal of recent literature paying close attention to the metaphysical structure of matter and space in the early modern period. A good example is Thomas Holden’s topic-based study, which addresses a vast range of early modern approaches to a metaphysical problem about infinite divisibility and the relationship between material parts and wholes. There is significant recent work on the metaphysical structure of Newtonian space: relevant authors include Andrew Janiak, Graham Nerlich, Nick Huggett, and Edward Slowik. There is a significant


recent paper by Jasper Reid on Henry More’s theories of space; I address this essay at length in Chapter Three.\textsuperscript{15} Richard Arthur’s volume of Leibniz’s writings on the continuum fits into this general area as well.\textsuperscript{16} This is obviously not a comprehensive literature review, but there is a growing body of work in this area, and it is appropriate to acknowledge that at the outset. On Descartes’ position on the vacuum in particular there has also been recent work done; I will engage that literature directly in the first two chapters.


13
1.1 Introduction

This chapter is devoted to Descartes’ conception of space and place. Though it is a commonplace that he identifies space with body, Descartes’ theory of space is generally misunderstood. Most of the chapter takes the form of an analytical commentary on *Principles of Philosophy*, Part II.10-18, which is Descartes’ most formal and extended discussion of space and vacuum. I also relate this discussion to other parts of his work, particularly several arguments found in the correspondence.

I begin with Descartes’ analysis of place, which involves the distinction between external and internal place (where the latter is the same as the space a body occupies). I argue that commentators have almost universally misunderstood Descartes’ treatment of space, and that it is more original than has been recognized. The literature, following Edward Grant’s magisterial work on medieval theories of space and vacuum, has generally taken Descartes’ discussion of internal and external place as a recycling of Scholastic notions. Recently Thomas Lennon has capitalized on this assumption to argue in favor of a reading of Descartes as an Eleatic monist about extended substance.17 Lennon makes a significant advance over the rest of the literature in reading Descartes on internal and external place. Nevertheless I will

argue that he shares with that literature a misreading of Descartes’ claim that body and space are identical. So long as the identity claim is misread, the Cartesian account of how we conceive of space is distorted and its originality obscured.

1.2 Place and Space: the Texts

To understand Descartes’ treatment of space in the *Principles* it is crucial to grasp how it fits into the argumentative arc of Part II. After arguing that extended substance exists (II.1), and that its nature consists solely in extension (II.4), Descartes proposes reasons why one might doubt that his conception of body is correct. One of these reasons is that a mere three-dimensional extension is commonly taken to be no more than a space, “or even an empty space; and almost everyone is convinced that this amounts to nothing at all.”\(^{18}\) Roger Woolhouse argues persuasively that this second doubt should be read as the suggestion that Descartes has simply defined the wrong thing.\(^{19}\) The objector proposes that instead of defining matter or body, Descartes has really defined space, which is somehow devoid of the reality that body is supposed to have.

Descartes responds to this doubt by presenting an analysis of place and space that has two crucial results: first, these terms do not indicate anything real over and above bodies; second, place and space are concepts that are derived from and dependent on the concept of body or matter. He then uses this analysis to refute the doubter’s objection. According to the first result, a space is nothing more and nothing

\(^{18}\) AT Vila 43; CSM I 225.

less than a body considered in a certain way. Thus the term “space” does not signify some less real, non-corporeal object, a “mere” extension; it just signifies a body in a different way. According to the second result, the doubt actually presupposes the notion of body Descartes proposes. Hence there is no force to the doubter’s objection; not only is it incorrect in taking a space to be nothing, but it is based on a concept that actually presupposes the notion of body which the objector is trying to problematize.20 This is the context in which Descartes proposes his analyses of place and space.

Following late Scholastic practice, Descartes’ distinguishes two kinds of place: internal and external.21 The former is taken to be the same as space; this too is a move made by the Scholastics.22 Internal place or space is, according to Descartes, “something extended in length, breadth and depth.”23 Of course, this is just what he takes a body or part of matter to be, and hence the nature of space is identical with the nature of body. What this “identity claim” amounts to will be a main concern in this chapter. The distinction between body and space is merely conceptual, a distinctio rationis, in the theory of distinctions laid out in Principles I. I will discuss the distinction between space and body in more detail below, but in short it amounts to

20 Descartes has to fill in a gap here; he has to show how it is that the concept of space as he defines it is distorted such that we think that space is nothing. He does this in II.18, where he offers a genetic account of the mistaken belief in the possibility of an absolute vacuum. Woolhouse is still right to say that the initial doubt is not based on this belief, but on the belief that a space is nothing. The latter belief is involved in the genesis of the belief in the vacuum.

21 Grant, Much Ado, 14-17.

22 Eustachius of Sancto Paulo, Summa Philosophiae Quadripartitae [1609], (Cambridge: Roger Daniel, 1648),155.

23 AT VIIIA 46; CSM I 227.
the following: a space is conceived when we think of some part of extension as remaining one and the same just in case it keeps the same shape, size (volume), and position with respect to specified external bodies. The space is thus conceived as remaining the same even when the body in the space is replaced by another. A given space is, thus, not identical to a particular body over time, but at any given time there is nothing signified by the term “space” other than the body that is then occupying that position with respect to the reference bodies.

External place, on the other hand, is “the surface [superficies] immediately surrounding what is in the place.”24 While this is basically an appropriation, via the Scholastic tradition, of the Aristotelian notion of place, it is not straightforward. Descartes seems to want to conceive of this surface, or superficies,25 as a mode, but one which need not be conceived as belonging to the bodies of which it is the common boundary. As an example he supposes a ship in a river, “pulled equally in one direction by the current and in the opposite direction by the wind,” but at rest with respect to the banks. Descartes accepts the commonsense judgment that the ship isn’t changing place, although the immediately surrounding bodies are constantly changing. Hence the surface, which is stationary, does not belong to the surrounding bodies. Rather, the external place, or superficies, is “simply the common surface,

24 AT VIII A 48; CSM I 229.

25 Lennon uses the cognate term “superficies” to indicate that in this context Descartes uses it as a technical notion. I will follow that practice here.
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.”

1.3 The Standard Interpretation and a Challenge

On the standard reading of this section of the text, it is assumed that the identity of space (or internal place) and body makes it impossible for a body to change its space (or internal place). Change of place, it is typically inferred, is change of external place only. This is a natural move in two respects. First, Descartes defines motion as change of vicinity, where vicinity involves immediate contact with the surrounding bodies. Thus he seems to tie definition of motion to external place, at least indirectly. One might assume, therefore, that the important kind of change of place is change of external place. Second, Descartes’ discussion of the two kinds of place is a reworking of a Scholastic distinction between intrinsic and extrinsic place. It is common in the literature to assimilate the internal-external distinction to the

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26 AT VIIIA 48; CSM I 229. This is paradoxical, since a mode is not really distinct from – i.e., is not ontologically independent of – that of which it is a mode. (AT VIIIA 29; CSM I 214) It is hard to see what the superficies could be a mode of, if not some or all of the bodies that are in contact at the surface. There is of course an additional problem, as to whether one mode can belong to more than one substance. I am granting to Descartes that a surface between two bodies can belong to both of them. The point at issue is how it can be thought to belong to neither of them.

27 See C.G. Normore, “Descartes and the Metaphysics of Extension,” in A Companion to Descartes, ed. Janet Broughton and John Carrasco (Malden, Mass.: Blackwell, 2008), 284. As I will note below, Normore gets the structure of the conceptual distinction between space and body right, but because he makes the faulty assumption about the identity claim, he thinks the distinction is really between body and external place, which flagrantly contradicts the text. See also Emily Grosholz, “Descartes and the Individuation of Physical Objects,” in Individuation and Identity in Early Modern Philosophy, ed. Kenneth Barber and Jorge Gracia (Albany: SUNY Press), 42. The misreading is not restricted to recent interpreters, either; Jacques Rohault, in his Cartesian Traité de Physique (first published in 1671), makes the very same move, though his aim is not so straightforwardly interpretive. [A System of Natural Philosophy, trans. and ed. John and Samuel Clarke (London: James Knapton, 1723), 28.]
intrinsic-extrinsic distinction.\textsuperscript{28} Hence internal place is regarded as inseparable from the body, while external place is defined by extrinsic relations that a body can have or not have at any given time.

I think this is a mistake, and one that has serious consequences. One unfortunate result has been pointed out by Thomas Lennon (though he does not think of it as unfortunate). In a recent paper, he argues that Descartes’ treatment of place, space, and motion establishes the impossibility of real motion. Therefore, says Lennon, we should read Descartes as an Eleatic monist about extended substance: motion is relegated to the mind-dependent or phenomenal realm. All that is mind-independent in the physical world is the unchanging essence of extension. Lennon sums up his argument neatly: “Motion occurs with change in external place; external place changes when there is change in internal place; but change in internal place is impossible.”\textsuperscript{29} To spell it out a little more, a body really moves only if it changes its external place; a body changes its external place only if it changes its internal place as well; a body cannot change its internal place, because it is really identical with it. Lennon argues at length for the first premise, linking the notion of a superficies in the account of external place to the notion of a vicinity in Descartes’ strict definition of

\textsuperscript{28} The connection between the Scholastic distinction and the reading of internal place as intrinsic is found in Grant, Much Ado 15. Grant’s influence here is apparent on Normore (284) and Woolhouse (“Nature of Body,” 30-31). Grosholz is also explicit in lining up “extrinsic-intrinsic” with “external-internal” (42). Garber (134-6, and esp. note 61) likewise seems misled by the Scholastic connection, and this is perhaps what leads him to claim that “in thinking about internal place or space we abstract out size and shape,” whereas (says Garber) we abstract out position only in thinking about external place. In all of these cases the Scholastic author who is emphasized is Franciscus Toletus.

\textsuperscript{29} Lennon, “Eleatic,” 37.
motion. This is not implausible, but it is the second and third steps of the argument that are most relevant for my purposes.

The literature universally accepts the third step of Lennon’s argument: a body cannot change its internal place (or space), because it is identical to it. To take a parallel example, if I am identical with my body, then I cannot change bodies and retain my identity. Just so with body and internal place, say Lennon and the rest of the literature:

Although internal place may be conceived in such a way that it can be occupied by a body other than the body actually occupying it, really it can be occupied only by the body actually occupying it. (Otherwise, either transitivity of identity is sacrificed, or a thing can persist but lose its identity – whatever that might mean.) Hence there is no real motion.\(^3\)

The parenthetical remark indicates the following line of thought. Suppose, per impossibile, that the body occupying some space is replaced by another body. Then, since the space is identical to each of them, they must also be identical to each other, since identity is transitive. The conclusion could be avoided if identity were temporally restricted here, so that the space is identical to the first body for some span of time, and identical to the second body at some later time. But this, Lennon says, would just be nonsense. To take the parallel example again, it would be like saying that I am identical with my body, but that I can become identical to some other body and lose my first one.

As I noted above, the third step of the argument reflects a consensus in the literature. Lennon’s conclusion is typically avoided by rejecting (at least implicitly)

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\(^3\) Lennon, “Eleatic,” 37-8.
the second step of the argument. The second step establishes that change of place is
‘both or neither’; either a body changes its internal and external place, or it does not
change place at all. Unfortunately for the rest of the literature, Lennon’s claim has a
very secure textual basis. The commentators on these texts are not in a good position
to avoid the Eleatic conclusion. It is very clear in articles 10 and 12 that a space
remains numerically the same, or is at least conceived as remaining numerically the
same, just in case its size, shape, and relative position all remain the same.

The difference arises as follows: in the case of a body, we regard the extension as something particular, and
thus think of it as changing whenever there is a new body; but in the case of a space we attribute to the
extension only a generic unity, so that when a new body comes to occupy the space, the extension of the space is
reckoned not to change but to remain one and the same, so long as it 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.31

Crucially, the same is true for external place. Recall that external place is
defined as “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.”32 As the example of the boat in the river shows, for the place to remain the
same, it is also required that the body in the place keeps the same position relative to
some external reference bodies (the banks of the river). Thus an external place also

31 AT VIIIA 45; CSM I 227.

32 AT VIIIA 48; CSM I 229. This is paradoxical, since a mode is not really distinct from–i.e.,
is not ontologically independent of–that of which it is a mode. (AT VIIIA 29; CSM I 214) It is hard to
see what the superficies could be a mode of, if not some or all of the bodies that are in contact at the
surface. There is of course an additional problem, as to whether one mode can belong to more than one
substance. I am granting to Descartes that a surface between two bodies can belong to both of them.
The point at issue is how it can be thought to belong to neither of them.
remains numerically identical just in case its size, shape, and relative position remain constant. One might think that these conditions are necessary but not jointly sufficient for the external place to remain one and the same, since in the boat example the boat also remains numerically identical. Perhaps the contained body’s numerical identity is a necessary condition for the numerical identity of the external place? Descartes’ discussion of Transubstantiation in his correspondence with Mesland makes it clear that this is not the case. A superficies can remain numerically identical even if both the contained and containing bodies are replaced, so long as the size, shape, and position remain unchanged.  

Thus the two kinds of place have the same identity conditions. For example, the external place of the book on my desk is the book-shaped surface defined by its position relative to, say, the walls of the room. The internal place is just the book-shaped volume, also defined by its position relative to the walls. Hence for every internal place there is a corresponding external place and vice versa. All Lennon needs is the weaker claim that change of external place requires change of internal

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33 Descartes is trying to show how he understands a point of this doctrine defined in the Council of Trent: that the species of the bread (and wine) remains the same, while the substance is replaced. Crucially, Descartes takes “species” to refer to the surface – the superficies – of the Host. See Fourth Replies: AT VII 251; CSM II 174. Clarifying for Mesland, he writes:

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. That is to say, when we call it the surface of the bread, we mean that although the air which surrounds the bread is changed, the surface remains always numerically the same, provided the bread does not change, but changes with it if it does. And when we call it the surface of the air surrounding the bread, we mean that it changes with the air and not with the bread. And finally, when we call it the surface intermediate between the air and the bread, we mean that it does not change with either, but only with the shape of the dimensions which separate one from the other; if however, it is taken in that sense, it is by that shape alone that it exists, and also by that alone that it can change. (AT IV 164; CSMK 241-2) My italics.

I will discuss the persisting superficies more below.
place. As he puts it, “Internal place has been defined in such a way that external place changes only when body changes internal place.”34 If the book on my desk changes its external place, then *ipso facto* it has changed its internal place as well. Both kinds of place, crucially, are identified by extrinsic relations, namely their position relative to some reference bodies. Thus internal and external place relate to each other not as intrinsic to extrinsic, but as a three-dimensional volume to its two-dimensional boundary surface. (I will say more about this relationship between internal and external place below.)

Some interpreters, however, sensing conflict between their assumption that internal place is intrinsic and the fact that articles 10 and 12 specify extrinsic identity conditions for space, take these articles to be really referring to external place.35 It is worth showing here that this cannot be right. First, Descartes explicitly talks about internal place in articles 10 through 12, and he immediately introduces the term “space” as interchangeable with “internal place.” “External place” does not appear until the title or heading of article 13: “What is meant by ‘external place’.” Descartes does not introduce “external place” into the actual text until II.15. It is *prima facie* unlikely that he is really talking about external place in 10 and 12, since he there introduces the term “internal place” and fails to introduce “external place” until later.

The text provides more evidence still. When Descartes first gives a clear account of what external place is, he says the following:


35 See Normore, 284; and Grosholz, 42.
Thus we always take a space to be an extension in length, breadth and depth. But with regard to place, we sometimes consider it as internal to the thing which is in the place in question, and sometimes as external to it. *Now internal place is exactly the same as space; but external place may be taken as being the surface immediately surrounding what is in the place.*\(^{36}\)

There are two points to note here. First, Descartes emphatically identifies internal place and space. Second, he contrasts external place by saying that it “may be taken as […] the surface immediately surrounding.”\(^{37}\) The point, I take it, is that there is a difference of dimensionality between internal and external place. The former is indeed “an extension in length, breadth and depth,” but the latter is a *surface*, a two-dimensional entity. Hence external place cannot be identified with space.

Going back to II.10-12, then, it is clearly wrong to read that discussion as dealing with external place. Whatever kind of place Descartes is talking about there (leaving aside for the moment the fact that he *says* it is internal place), the place at issue is *both* really identical and conceptually distinct from the body that occupies it. But the passage from II.15 quoted above establishes that external place cannot be identified with space or body, because it is two-dimensional rather than three-dimensional. In fact, the argument in II.11 for the real identity between space and

\(^{36}\) AT VIIA 48; CSM I 229. [My italics.]

\(^{37}\) Descartes’ weak formulation here may cause one to doubt my reading. Perhaps Descartes is saying external place *may* be taken for a surface, though it can also be taken as the space. I don’t think this works. The point of the “may” is that external place may also be taken more loosely, as when I say that the place of my computer is my office (rather than the computer-shaped surface between it and the air, desk, etc). This is the Aristotelian distinction between “common” and “proper” place; Descartes was certainly familiar with it (see Eustachius, 155-6). The point of II.13, entitled “What is meant by ‘external place’,” is to point out this ambiguity in the notion of external place. That is why the title suggests the definition of “external place” comes in II.13, whereas one reading just the text without titles would locate the definition in II.15. The latter deals with external place in the strict or “proper” sense.
body relies crucially on the fact that they are both “something extended in length,
breadth and depth.”\(^{38}\) That argument cannot go through if space is understood as 
external place. Hence one cannot save the reading of internal space as intrinsic by 
taking II.10 and 12 to be about external place.

Thus the literature is not in a good position to resist the Eleatic conclusion of 
Lennon’s argument. The second step in that argument constitutes a major 
improvement in the understanding of what Descartes is doing here. Again, either real 
change of place occurs for both kinds of place or for neither. Since it cannot be both, 
says Lennon, it is neither. I will argue that the other option—that it is both—is in fact 
highly plausible, and that taking it reveals that Descartes’ analysis of space is much 
more sophisticated than it first appears.

1.4 Re-interpreting the Identity between Space and Body

There is, I will argue, a natural reading of the text on which bodies can 
successively occupy different spaces, and the account does not involve the absurdity 
of things persisting while losing their identities. The literature assumes that the 
“identity claim” about space and body is to be interpreted as a claim about a 
particular space and the body occupying it. I will argue that this is not what Descartes 
means at all, and that it obscures his important account of what we are doing when we 
conceive of a space. The assumption in the literature is that “space” and “body” both 
successfully refer to determinate objects, and that the relationship between the object 
referred to by “space” and that referred to by “body” is that of identity. But in fact, as

\(^{38}\) AT VIIIA 46; CSM I 227.
I will show, Descartes’ point is that a space is not a thing at all. Let us look first at the texts where Descartes describes the conceptual distinction between a space and a body. First, as quoted above, in article 10 he writes:

The difference arises as follows: in the case of a body, we regard the extension as something particular, and thus think of it as changing whenever there is a new body; but in the case of a space we attribute to the extension only a generic unity, so that when a new body comes to occupy the space, the extension of the space is reckoned not to change but to remain one and the same, so long as it 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.39

And again, in article 12:

For if a stone is removed from the space or place where it is, we think that its extension has also been removed from that place, since we regard the extension as something particular and inseparable from the stone. But at the same time we think that the extension of the place where the stone used to be remains, and is the same as before, although the place is now occupied by wood or water or air or some other body, or is even supposed to be empty. For we are now considering extension as something general, which is thought of as being the same … provided only that it has the same size and shape, and keeps the same position relative to the external bodies that determine the space in question.40

There are two closely related aspects in which the conception of a body differs from that of a space. First, when we conceive of a space we are somehow considering the extension as “something general,” or as having “only a generic unity.” Second, the conditions under which a space is the same space are different from those under

39 AT VIII A 45; CSM I 227.

40 AT VIII A 46-47; CSM I 228.
which a body is the same body. (To be clear, Descartes here assumes that bodies retain their identity through motions, and provides no criterion of identity for them, but he does specify the identity conditions for a space such that the space can retain its identity through change of body occupying the space.) The upshot of the distinction’s second aspect is that a space is at least conceived as remaining the same space even if it is occupied by a succession of different bodies, provided certain conditions obtain.

The first aspect of the conceptual distinction explains the second. To conceive a body or part of matter just as a certain size and shape is to conceive of it abstractly, as something able to be instantiated by many particulars. Descartes has set this point up in II.8, where he claims that there is only a conceptual distinction between quantity and the extended substance:

We can think of the number ten, or the continuous quantity ten feet, without attending to this determinate substance. For the concept of the number ten is exactly the same irrespective of whether it is referred to this measurement of ten feet or to anything else; and as for the continuous quantity ten feet, although this is unintelligible without some extended substance of which it is the quantity, it can be understood apart from the this determinate substance.\footnote{AT VIII A 44; CSM I 226.}

Similarly, one can conceive of the continuous three-dimensional quantity one cubic foot, and one can specify that it is arranged into a certain shape. A shaped volume is still instantiable. This is not yet, however, to conceive of a space; to do so one has to apply a description wherein the shaped volume is linked to a particular location.
relative to some reference bodies. Given that restriction, and given impenetrability,\textsuperscript{42} many particular bodies can satisfy the description, but only successively. That is, many different bodies can \textit{be} the extension that is a given shaped volume in a given position, but not simultaneously.\textsuperscript{43} For example, many different bodies can at different times \textit{be} the one cubic foot of extension that is arranged spherically and is located exactly in the middle of my room.

Distinguishing these related aspects of the distinction makes it clear, on the one hand, why Descartes uses the terms “general” and “generic” here, and on the other hand, why only one body can be identical to a given space at one time. As Lennon points out in an earlier work, modeling the relationship between body and space on that between a token and a type does not explain this latter point.\textsuperscript{44} It is nonetheless common to find interpreters dutifully noting that a space stands to the body occupying it as extension in general to a particular extended thing.\textsuperscript{45}

\textsuperscript{42} Descartes’ position on impenetrability is to be found in his correspondence with More (AT V 269-71; CSMK 361-2). He argues to More that impenetrability follows from extension; the view is akin to Descartes’ position on rarefaction and condensation (AT VIIIA 44; CSM I 226). Whatever the merits of the argument, which I discuss in Chapter Two, the point I am making is just that the description which specifies a space always includes a determinate \textit{situs}, and that Descartes holds that only one body can be located at a given \textit{situs} at any one time.

\textsuperscript{43} Of course, the matter occupying a space at a given time may in fact be several bodies, according to Descartes’ way of counting bodies (AT VIIIA 53-4; CSM I 233). The point is not about counting “bodies” in this sense – it is rather only that two distinct chunks of matter, each the right volume to “fit” a given space, cannot both occupy it at the same time.

\textsuperscript{44} Lennon, \textit{Battle of the Gods and Giants} (Princeton: Princeton UP, 1993), 199. He there discusses Margaret Wilson’s attempt to assimilate the space-body relation to that between an instantiable quality and an object that instantiates it. See Wilson, \textit{Descartes} (London: Routledge & Kegan Paul, 1978), 86-7. Wilson, to her credit, acknowledges the point.

\textsuperscript{45} See, in addition to Wilson, Genevieve [Rodis-]Lewis, \textit{L’Individualité selon Descartes} (Paris: J. Vrin, 1950), 44-5; Frédéric de Buzon and Vincent Carraud, \textit{Descartes et les “Principia” II: Corps et Mouvement} (Paris: Presses Universitaires de France, 1994), 58-9; Garber, 136. Des Chene (263-4) gets closer to the correct reading, since he sometimes takes a space to be a \textit{located} volume rather than “extension in general,” but he nonetheless does not explain how the universal-particular
One has to be careful in stating what a space is, because really it is not one thing at all; when we conceive of a space we are applying a singular term to what is really a series of temporal parts of different bodies.\textsuperscript{46} Trouble arises, therefore, when we try to talk about a space as belonging to a particular body. This has to be temporally specified in order to be correct. The point is easily missed, and in fact is almost universally absent from the literature,\textsuperscript{47} because we talk about spaces as particular objects that remain identical over time. Hence when the question is posed, “What is a space?” we expect the answer to pick out some single thing. Descartes’ point, though, is that this feature of the common use of the term is misleading, and the aim of the conceptual distinction is to show how we can use the term that way, though there is no single thing corresponding to a space. That is, he is claiming to explain, in terms of an ontology that admits only one kind of extended thing, how we have “body language” and “space language,” where both look like they involve reference to particular extended things that retain their identities through time. In the case of “space language,” there is no real single thing that endures, but there is a set of conditions that really obtain: it is really the case that different bodies can be the same size and shape and successively occupy the same relative location. These real model works or why two bodies cannot be the same space at the same time. He introduces more confusion, I think, by talking about “particular spaces” in addition to “generic spaces.”

\textsuperscript{46} It may be, of course, that during some particular time span a space is occupied by only one body, which does not move. This doesn’t affect the point, i.e. that the unity of a space is essentially conferred by our conceiving – though that conceiving tracks certain real conditions’ obtaining.

\textsuperscript{47} The partial exception is Normore (see below, next page), who models the distinction correctly, I think, but applies it to body and external place, thus leaving his reading open to Lennon’s objection.
conditions are the conditions that govern our language about spaces, and they are construed as identity conditions when we think of a space as a real thing.

Another way to understand what a space is, albeit an anachronistic one, is to think of material objects as composed of temporal slices. If we imagine all the temporal slices spread out before us, then we can group them in different ways. We can of course group together all those that compose a single body. But we can also group all those temporal slices that satisfy a certain set of criteria, comprised of determinate size, shape, and position relative to the temporal slices of some reference bodies. For Descartes, such a collection of temporal slices is not an object; nevertheless this illustration allows us to give us a more straightforward answer to the question, “What is a space?”

To further clarify the account I have just laid out I turn to an excellent example from a recent paper by C.G. Normore. He has misgivings about the language of generality in Descartes’ account of the conceptual distinction, and tries another way to model it:

We can get a firmer grip on what he [Descartes] has in mind if we think of a description like “Prime Minister of Canada.” That description was first satisfied by John A. Macdonald, later by Wilfrid Laurier, still later by Mackenzie King, and so on. It was the same office they all held and while each at the time he held the office was identical with the Prime Minister of Canada, different people have been the Prime Minister at different times.48

48 Normore, 284. Though he has made the move that allows one to properly understand the claim of identity between a space and a body occupying it, Normore nevertheless misreads that claim: “Because the internal place of a quantity of extension just is that extension itself, it moves with the extension.”
In this example, we have the seemingly odd situation of having identity claims which do not exhibit transitivity, which was, according to Lennon, the problem that would arise from saying that a body could change its internal place. Of course in this case there is not really a problem, because statements such as “Mackenzie King is identical with the Prime Minister of Canada” are true only during some specified period of time, and no two people can be identical with the Prime Minister at any given time. The reason that different people can be the Prime Minister at different times is that the office endures. For Descartes a space is like both the office of Prime Minister and the description “Prime Minister.” That is, we think about a space as a particular thing or object, just as the Prime Minister is a particular person, but the conditions under which we attribute identity to the space are more like the conditions under which the office of the Prime Minister endures. Insofar as we talk about a space as a particular thing, however, we are reifying the notion of a space. There is really no such entity, and the conditions under which we say that a space endures are not the identity conditions of any real thing. They are conditions that different real things meet successively.

Normore’s example is partially intended to make sense of Descartes’ talk about identity in connection with space and body. The suggestion is that a body’s identity with the space it occupies is like the George W. Bush’s identity with the President of the United States. But it is important that this example, though helpful to see how the conceptual distinction operates, does not really save identity between a space and a body. For one thing, if $X$ and $Y$ are identical, then they are necessarily identical. But it is of course not true that a space $S$ must be identical with the body $A$
occupying it at time \( t \), or that the President of the United States must be identical with George W. Bush.\(^{49}\) Further, a space is immobile (relative to the reference bodies) while a body is mobile. Hence the space and the body have different properties, and thus cannot be identical.\(^{50}\)

If Descartes were really saying that this space is identical to this body, then Lennon and the literature would certainly be right: a body could not possibly change its space or internal place. But Descartes does not come out and make this identity claim, and it is crucial to see exactly what he is saying instead. The strongest claim in the discussion of space and body comes in section 10: “For in reality the extension in length, breadth and depth which constitutes a space is exactly the same as that which constitutes a body.” Now a body is only conceptually distinct from its extension, and this implies conceptual inseparability.\(^{51}\) That is, the extension of the body just is the body, and neither could conceivably exist without the other. One might take this text, therefore, to be sufficient evidence for a strong claim of identity between this body and this space.

When Descartes formally argues for the claim in section 11, however, he gives a version that is significantly different: “It is easy for us to recognize that the extension constituting the nature of a body is exactly the same as that constituting the nature of a space.” The difference is the reference to the natures of a body and a space. This might seem unimportant, but in the argument which follows Descartes

\(^{49}\) This objection was posed to me by Thomas Lennon. Something close to it occurs also in Jonathan Bennett, *Learning from Six Philosophers* Vol. 1 (Oxford: Clarendon, 2001), 37.

\(^{50}\) This was made clear to me by Anja Jauernig.

\(^{51}\) AT VIIIA 30-1; CSM I 215.
performs a quick version of the conceptual separation arguments he uses in PP II 4 to establish that the nature of body is simply extension. The point, then, is that the nature of a body—to be extended in three dimensions—is identical with the nature of a space. Descartes’ argument here would undoubtedly have been recognizable to his Scholastic audience as related to an argument given by Aristotle in Physics IV.8. In this passage Aristotle attacks the idea that a body (the example is a wooden cube) could occupy a region of void space:

But the cube also has a magnitude equal to that occupied by the void; a magnitude which, if it is also hot or cold, or heavy or light, is none the less different in essence from all its attributes, even if it is not separable from them; I mean the bulk of the wooden cube. So that even if it were separated from everything else and were neither heavy nor light, it will occupy an equal amount of void, and fill the same place, as the part of place or of the void equal to itself. How then will the body of the cube differ from the void or place that is equal to it? And if there can be two such things, why cannot there be any number coinciding?52

Descartes is making a rather shrewd move in II.11, because the conceptual separation procedure, where we are supposed to abstract out all the supposed attributes of body other than its extension, is both the way he argues for his controversial definition of body and an echo of Aristotle’s argument here. Of course Aristotle does not endorse the claim that a body is just an extended thing. His point in Physics IV.8 is that there is no discernible difference between the dimensions or quantity of the body itself, on the one hand, and the void space it is supposed to occupy, on the other hand. And if some difference is postulated, why could we not posit a new difference over and over

again, with the absurd result that any number of extended things could coincide with
the extension of the cube?

The target of Aristotle’s argument is a notion of space as something extended
that is other than body and can be occupied by body. Similarly, what Descartes wants
to avoid is the idea that our talk about bodies occupying a space or place commits us
to the existence of two co-located extensions: the body and the region of space it
occupies. If spatial and bodily extension were both really present in the region that
the body occupies, they would have to be different in some way. They would have to
be something about their natures that makes them discernible. This is not to say that
Descartes is invoking the identity of indiscernibles; the assumption is more specific to
the context. If bodies can occupy space, then minimally space differs from body in
that it is penetrable. Some qualitative difference between spatial and bodily extension
will therefore obtain. That is why Descartes makes the identity claim: to rule out a
fundamentally different, non-bodily kind of extension. This makes good sense in light
of the rival accounts Descartes likely had in mind.

Recent commentators have argued that Descartes’ main opponents on space,
in the context of his discussion in the *Principles*, are the neo-Epicurean atomists and
the Scholastic Aristotelians. In these camps there are many examples of how spatial
extension is proposed as something fundamentally different than corporeal extension.
On the conception of the atomists, space is a penetrable three-dimensional extension

53 Des Chene, 354 *passim*; Gaukroger, *Descartes’ System*, 102-3. See also Garber, Chapter 5,
for background on Descartes’ exposure to atomistic theories of natural philosophy.
that is not, however, a substance. Gassendi even says that it is “nothing positive.”\textsuperscript{54}

Moreover, in Lucretius’ natural philosophy space has intrinsic directionality, since all the atoms fall “downward.”\textsuperscript{55} On the Aristotelian conception of natural place, places have a sort of agency, because they are the final causes of natural motions. Further, the scholastic notion of “imaginary spaces,” which Descartes criticizes several times in his writings, is also a concept of a three-dimensional extension that is supposed to be different in kind from the extension that is a property of corporeal substances. Imaginary space is associated with the distinction between \textit{locus} and \textit{ubi}, where the former is the kind of place bodies have, the latter the kind of place belonging to spirits, or bodies created in a vacuum by a miracle.\textsuperscript{56} Descartes wants to sweep away all of these distinctions: there is only the extension of body. Everything else is at best a superfluous theoretical entity. The point of the claim that the extensions of space and body are the same is to make it clear that even though we say a body “occupies a space,” there is nonetheless only one extension there, and it is that of the body. The argument proceeds roughly as Aristotle’s does: when everything has been abstracted from the body but its extension, it is supposed to be clear that there is no difference between the extension signified by “space” and that signified by “body.”

According to Descartes, then, there is no real, incorporeal extension corresponding to the notion of space. Insofar as “space” signifies a real extension, it


\textsuperscript{55} Gaukroger, \textit{Descartes’ System}, 103.

\textsuperscript{56} Des Chene, 263. He is discussing the commentary of the Coimbra Jesuits in particular, which was one of Descartes’ Scholastic sources.
just signifies body. That is why, when Descartes sums up his account in II.10-12, he makes a semantic point:

The terms ‘place’ and ‘space’, then, do not signify \textit{significant} anything different from the body which is said to be in a place; they merely refer \textit{designant} to its size, shape and position relative to other bodies.\textsuperscript{57}

Descartes is setting up what we would call a translation scheme. The discussion of the conceptual distinction between space and body sketches out how the translation works. When we talk about a space (or place) and say that it persists through change of bodies occupying it, this can be translated into statements about bodies and their relations. Spaces are identified by shape, size and position relative to reference bodies. So a space persists through a period of time if and only if, for every moment during that period, some body or other is in the specified position and has the specified size and shape.

Descartes, then, is not claiming that a body is identical to a space. This accounts for the fact that, unlike Lennon and the rest of the literature, Descartes never uses possessive locutions like \textit{the body’s internal place} or \textit{the space of the stone in the sense of its currently distributed volume}.\textsuperscript{58} If we are thinking about the body’s extension as inseparable from it, then we are not conceiving of a space at all.\textsuperscript{59} In other words, Descartes’ account of how we conceive of a space, which is clear and

\textsuperscript{57} AT VIIIA 47; CSM I 228.

\textsuperscript{58} Lennon, “Eleatic,” 37. My emphasis.

\textsuperscript{59} Des Chene (263) deals with this problem by distinguishing between particular and general spaces, but there is no basis for this in the text. The account in articles 10 and 12 makes it very clear that when we think of a body’s extension as inseparable from it, we are just conceiving of a body, not a space.
emphatic, has to be distorted to allow for the standard reading of the identity between space and body. If space were inseparable from a body, moreover, it would capture nothing useful about the notion of space or place. For Scholastics like Toletus, who adopted the notion of internal place, the situation is somewhat different. They allowed that a corporeal substance could change its *quantum* (volume) while retaining its identity, so the notion of internal place, which was closely related to that of a body’s *quantum*,60 is distinct from the notion of body in a potentially useful way. But Descartes rejects the possible of a body’s changing its volume or quantity,61 so the theoretical notion of internal place would be entirely idle if it were inseparable from a body. In sum, the application to Lennon’s argument should be clear. The conceptual distinction ensures that the identity of *this* space is not tied to any particular body, and the identity of *this* body is not tied to any particular space. The identity is between the nature of spatial extension and that of corporeal extension; this is entirely compatible with a body’s changing its space in the way specified by the conceptual distinction. Hence Descartes’ account of space does not imply the impossibility of motion.62

60 Grant, *Much Ado* 15-16.

61 AT VIIIA 43-5; CSM I 225-7.

62 More precisely, there is a good way to read the account that does not imply that real motion is impossible; hence even if Lennon’s overall interpretation of Descartes on extension is correct, the argument he gives cannot serve as independent ground on which to base his interpretation. Lennon would have to base his Eleatic reading on other, perhaps more general considerations. With that overall reading assumed, he may be able to give an “Eleatic” interpretation of the texts on place and space. That is not what he does in the paper I am examining, though. There he puts forth the argument drawn from his reading of these particular texts as independent evidence for his general interpretation.
1.5 *Descartes’ Relation to the Scholastic Theory of Place*

It turns out that there is strong historical justification for the reading given here. Descartes’ theory of place and space is undoubtedly an adaptation of the Aristotelian account as it came through the Scholastics. When the Cartesian analysis of the concept of a space is viewed in light of certain long-standing issues in the Aristotelian theory of place, it is unsurprising that the concept should function in the way I have described. Aristotle made two claims about place that are prima facie in conflict with each other: first, a body’s place is the surface of the immediately surrounding bodies; and second, place is immobile.63 Aristotle and those who adopted his account of place had to make sense of the conjunction of these two claims. If place is a surface, and surfaces move with the bodies to which they belong, it is not clear how place can be immobile. Aristotle’s own answer is brief and undeveloped. He introduces the “boat in the river” example, which appears throughout the Scholastic tradition and is taken up by Descartes; Aristotle claims that the whole river is the place in that scenario, since it is immobile and the water is not (212a17).

Edward Grant has shown that this puzzle in Aristotle’s theory of place was taken up by medieval philosophers, who proposed a number of solutions.64 The details of their disputes on the question are not relevant here, but Descartes is clearly responding to the issue in *Principles* II.10-12, so it is important to introduce the main solutions in outline. Aquinas considered the following objection to Aristotle’s

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64 Grant, “Medieval Doctrine of Place.” See previous note.
definition of place: “Since the container is mobile, the terminus of the container will also be mobile. And thus a thing existing at rest will have diverse places.” That is, the ship moored in the river or a tower surrounded by moving air—the two standard examples—cannot be said to be in the same place at different times. Aquinas answers the objection by defining the ratio of place as the ordo or situs of the successive surfaces with respect to some immobile whole.

Therefore the place of the ship is determined in the flowing water, not in respect to this water which flows, but in respect to the order or site which this flowing water has to the whole river. And indeed this order or site remains the same in the water which succeeds.

Aquinas’ view survived in later Scholastic accounts as the distinction between material place, which is mobile, and formal place, which consists in a constant relation to the outermost sphere and is thus immobile. Note that Aquinas still accepts Aristotle’s definition, so place is defined as the innermost motionless containing surface. The place cannot, however, be identified with any particular surface. The identity of the place through time consists in the fact that the different surfaces successively have the same position or situs with respect to the whole river, or rather the riverbed.

Scotus revised this account to deal with what he saw as fatal errors therein. On his view the successive surfaces surrounding a body at rest can be regarded as numerically identical “by equivalence,” though they are really numerically different. The idea is that the surfaces have “equivalent” values of some relevant qualities,


66 Aquinas, *Commentary*, 229.
probably including shape and size. In this way he avoided saying that one and the
same relation or *ordo* persisted in a succession of different subjects, which he thought
problematic. (The same scruple comes up in Leibniz’s theory of space, though the
solutions are slightly different.) Though Scotus apparently thought that his account
obviated the need to refer to a place’s position relative to some larger whole, it is
not clear that it does, and often his view was taken as complementary to the
Thomistic one rather than as a replacement for it.

If we look at two of the Scholastics whose works Descartes was acquainted
with, Suarez and Eustachius, we see that they adopt elements of these ways to
understand the immobility of place. Here is Suarez, who touches on the point in the
course of arguing that place is not a quantity:

Further, insofar as place must be immobile, as Aristotle
says, the different surfaces succeeding each other at the
same distance from the poles are said to be numerically
the same place…

This recalls the solution of Aquinas. The salient point for my purposes is that
different surfaces successively satisfy a certain condition, namely being a certain
distance from the poles of the celestial sphere, and for this reason they are said to be

67 Leibniz, Fifth Letter to Clarke, in *Philosophical Papers and Letters*, ed. L. Loemker

For the place of A and B is the same, whereas the relation of A to fixed bodies is not precisely and
individually the same as the relation which B (that comes into its place) will have to the same fixed
bodies; but these relations agree only. For two different subjects, as A and B, cannot have precisely the
same individual affection, it being impossible that the same individual accident should be in two
subjects or pass from one subject to another.

68 Grant, “Medieval Doctrine of Place,” 67.

69 *Disputationes Metaphysicae*, ed. S.R. Romeo, S.C. Sanchez, and A.P. Zanon (Madrid;
Editorial Gredos, 1964), 124. “*Immo, quatenus locus debet esse immobilis, teste Aristotele, superficies
variae sibi succedentes in eadem distantia ad polos dicuntur esse idem locus numero.*” My translation.
numerically identical. Again, place is still defined as a surface. Nonetheless the place is immobile, and is said to remain numerically identical, because the surfaces only count as temporal parts of the place when they stand in this fixed relation to the immobile poles.

As a side point, this passage from Suarez is particularly helpful in showing how close Aristotelians seem to come to claiming identity between a place and a surface, even though the point is really that the place’s identity conditions are different than those of any surface. The task is to account for the judgment that a place remains the same through change of bodies (and hence surfaces). This is accomplished either by reference to a relation that remains the same (Aquinas) or by reference to a series of relations that are “equivalent” (Scotus). Philosophers in the analytic tradition might expect them to change the definition so that place is no longer the containing surface but a relation (Aquinas) or series of relations (Scotus). Nonetheless these Scholastics continue to define place as the containing surface, or rather the containing surface insofar as it is in a certain relation. So long as it was clear what was meant by the “insofar as” clause, these philosophers did not think that they had to eliminate such an element from a definition. Whereas for a contemporary analytic philosopher, if place does not have the same identity conditions as any surface, then “surface” had better not be the substantive term in the definiens. This may be helpful to show why Descartes did not think it necessary to emphasize the non-identity of this space and this body, even though he recognized it.

Another of Descartes’ Scholastic sources, Eustachius of Sancto Paulo, characteristically takes a sort of grab-bag approach to the immobility of place. He
poses the question of how a thing can remain in the same place when it is not
surrounded by the same surface; his example is a tower surrounded by moving
currents of air. Eustachius gives four answers, without making it clear whether they
are parts of one account or rival and incompatible answers. One of these is that the
body is “always conceived to be surrounded by the same imaginary surface,” and
another is that “the new surface of air which succeeds another is judged to be the
same by equivalence [per aequivalentiam].” The latter is obviously drawn from
Scotus. In any case the same points I picked out from Suarez’ discussion apply here
as well. Different surfaces succeed each other in satisfying some condition, namely,
whatever is required for them to be “equivalent,” and this is taken to be sufficient for
saying that the place is numerically identical.

For these Scholastic philosophers, the immobility of place was an issue only
for external place. When Toletus, for example, adopts the notion of internal place, he
explicitly considers it as an intrinsic feature of a body which moves along with it.70
Returning to Descartes, it is clear that his account of external place takes a stand on
this issue in the Aristotelian tradition; in his case, however, there is also a parallel
account to secure the immobility of internal place. It is not surprising that Descartes,
in engaging the Scholastic treatment of place, takes up this issue about external place.
That he does so is signaled quite clearly by his discussion of the canonical example of
the boat in the river. He is not, however, concerned to establish the immobility of
place in an absolute sense. There is no outermost surface in the Cartesian cosmos
which might furnish an absolute standard of immobility. Places are immobile only

70 See Grant, Much Ado, 273n44.
with respect to the reference bodies which are “regarded as being at rest.” Aside from that, however, the structure of the problem is the same. If external place is the surface immediately containing a body, then how can something remain in one place while different surfaces successively surround it? Descartes’ answer is like that of Aquinas, but is spelled out more explicitly. The place remains one and the same just in case the size, shape, and relative position remain constant. That is the reality that corresponds to the notion of external place: at any moment it is a particular surface, and over time it is a set of surfaces all satisfying some geometrical criteria.71

If Lennon is right, however—and I have argued that he is—for every external place there is a corresponding internal place. Thus Descartes, unlike the Scholastics, must give a similar account for the (relative) immobility of internal place. That is, he must explain how it is that a space is said to be one and the same even when it is successively occupied by different bodies. My interpretation shows a clear continuity with the Scholastic accounts of the immobility of place, especially the tradition going back to Aquinas. The difference in Descartes’ case is that he has abandoned the conception of internal place as intrinsic; instead internal place is a volume as opposed to a surface. Internal place is not, for Descartes, something inseparable from the body. Rather it relates to the body just as external place does to the body’s surface.

The literature has followed Grant in reading internal place as something intrinsic to a body; that is how Toletus conceives of it, and the implicit, perhaps

71 Thus where Lennon sees the passage in the letter to Mesland (see above, p.25) as confirmation that we project the superficies onto reality, I read it as an explicitly geometrical version of the Scholastic strategy on the immobility of place. It involves projection only insofar as we construe the geometrical criteria as the identity conditions of a place, where they are really just the conditions for the assertion of the place’s identity. Nevertheless the conditions are really met.
unrecognized assumption is that Descartes adopts this conception along with the terminology. On that conception, internal place is inseparable from the body, while the identity of external place is determined by geometrical relations to external bodies. The assumption is incorrect, however, as has been shown above. The difference between the two kinds of place, for Descartes, lies only in their dimensionality. Both internal and external place are defined in part by relations to external bodies. In the case of internal place, or space, this feature of Descartes’ account has been inadvertently distorted to accommodate the standard reading of the identity claim: that a body is identical to the particular space it occupies. Neither the identity claim nor the structure of the distinction between space and body can be properly understood in isolation from the other.

1.6 Conclusion

Descartes’ analysis of the concept of space has been misunderstood. It will emerge through the course of the dissertation that the Cartesian conception of space has consequently been underappreciated, both for its strength when evaluated against rival accounts of space, and for its implications for issues in the Cartesian theory of extended substance. To recount, I have argued that internal place or space is not something intrinsic to and inseparable from a body, but is, like external place, defined in part by external geometrical relations. A space is not identifiable with any particular body, but the extension signified by the term “space” is none other than that of bodies. A space is defined by certain conditions which can obtain for bodies. Those conditions are a determinate size, shape, and most importantly, position relative to some reference bodies. Since different bodies can meet those criteria successively, the
space can be said to retain its identity through change of bodies. Though there is no single entity corresponding to the conception of a space, that conceiving is not mere subjective projection. What we take to be the identity conditions for a space are really just the conditions under which we assert the identity of the space. Those conditions are objective, even though they do not in reality amount to an entity’s identity conditions.

In giving such an account of space Descartes takes up concepts from the Scholastic tradition and transforms them. The particular point which should be emphasized here, since it will be crucial in later chapters, is that Cartesian spaces are individuated and defined in part by external geometrical relations. Descartes adopts this way of defining a place from the Scholastic accounts of the immobility of external place, but he applies it in the case of internal place as well. In the following chapters I will show how this combination of Scholastic developments on the Aristotelian doctrine of place—namely, the notion of internal place and the solution to the immobility problem—allows Descartes to address objections to his position on space and vacuum in a surprisingly cogent fashion.
CHAPTER TWO
AGAINST THE VACUUM

2.1 Introduction

That a vacuum or empty space is logically impossible is one of Descartes’ most well-known theses. Especially in Descartes’ correspondence, the justification for the claim seems to be simply that space and body are identical, or at least that the ideas of space and body are the same. Since a vacuum is supposed to be a space that is not a body nor occupied by body, it would seem that this identity claim is all that is required. In his extended treatment of the topic in Principles II, however, Descartes’ arguments do not seem to fit very well with this “short argument,” as I will henceforth refer to it. Further, it is not always obvious just what notion of vacuum Descartes is attacking in various passages. Thankfully, and in contrast to the case of his conceptual analysis of space, Descartes’ treatment of the vacuum has been very ably discussed by recent commentators, especially Daniel Garber, Roger Woolhouse, Jonathan Bennett, and especially Dennis Des Chene. This chapter is indebted to their work.

The goals here are the following: to provide a clear and unified account of how Descartes addresses different kinds of vacua, or different ways of construing the vacuum; to give a close reading of Principles II.16-18, assessing the role Descartes’ account of the space-body relation plays in those articles; and finally, to relate the arguments against the vacuum in the correspondence to my unified account and to the
arguments in the *Principles*. I will begin with a fourfold taxonomy of things that might be meant by “vacuum,” followed by a brief proposal of what I take to be the central commitment behind Descartes’ rejection of all these types of vacuum. In the next sections I will take up the four kinds of vacuum and show in detail how Descartes argues, or would argue, against them. The most important concept of vacuum for the *Principles* is that of a spatial extension that is somehow less real than corporeal extension, so that it is either nothing or something with insufficient ontological “heft” to qualify as a substance. The following section is an analysis of the genetic account, found in *PP* II 17-18, of the widespread belief in this sort of vacuum. In the final section I address the fourth notion of a vacuum: an extended substance that is not corporeal. Though Descartes’ position in the *Principles* is principally concerned with the connection between extension and substantiality, Descartes also holds that extended substances are necessarily corporeal. The arguments of *Principles* Part II, however, are insufficient to secure this latter point; Descartes offers a fuller account in his correspondence, especially his letters responding to Henry More. The arguments that Descartes offers against the possibility of various types of vacuum are in several cases unpersuasive. It is clear what the systematic motivation is for Descartes to reject these notions of vacuum, but his arguments that they are inconceivable generally seem to be failures. In the conclusion of the chapter I offer a brief general characterization of the weakness in the Cartesian treatment of vacuum. In Chapter Five I argue that Descartes has another, more satisfactory way to argue for his position, and I show why he is not concerned about the apparent problems with the arguments discussed here.
2.2 What Sorts of Vacuum Descartes Rejects and Why

In order to grasp Descartes’ position on the vacuum as it appears in various different formulations, it is necessary to distinguish different things that might be intended by the term “vacuum.” A minimal condition for a state of affairs to involve the existence of a vacuum is that two bodies are distant from each other, while what is between them, if anything, is different from matter or body in some relevant sense. This is, of course, a condition proper to the vacuum intramundanum rather than spaces outside the world. The latter are certainly a sort of vacuum Descartes’ is concerned to reject, and thus the classification that follows does not exhaust all the kinds of void or vacuum. I think, however, that the intracosmic void encompasses more possible ways to think about a vacuum, because it is plausible that the possibility of a local and bounded empty space can be supported on grounds weaker than those required to support the possibility of unbounded empty space. Descartes’ direct treatment of the extracosmic void, or spaces outside the world, will come up in a later chapter.

There is an intracosmic vacuum if and only if two bodies, $A$ and $B$, are distant from each other, and one of the following states of affairs obtains:

- **Vacuum$_1$**: Nothing lies between $A$ and $B$.
- **Vacuum$_2$**: Something lies between them, but it is not extended. (Perhaps it is God, or a mind.) This will only be relevantly different from Vacuum$_1$ if the unextended object or objects between $A$ and $B$ are somehow responsible for the fact that there is a distance between $A$ and $B$.
- **Vacuum$_3$**: Something extended lies between them, but it is not a substance.
Vacuum₄  Some extended substance lies between them, but it lacks
certain properties that are definitive of body, e.g. physical
divisibility, mobility, impenetrability, or inertial resistance.

This classification is based on the following set of divisions: assuming $A$ and $B$ are
distant, either there is something between them or there isn’t. The latter case is
Vacuum₁. In the former case, what is between $A$ and $B$ either is extended or it isn’t.
The latter case is Vacuum₂. In the former case, the extended something between $A$
and $B$ either is a substance or it isn’t. The latter case is Vacuum₃, the former is
Vacuum₄. This is not the only scheme for distinguishing between kinds of vacuum.

Nor is Descartes equally concerned with all four of these kinds of vacuum; Vacuum₂,
for example, is not addressed directly at all in Descartes’ writings, and Vacuum₁ and
Vacuum₃ are not treated as two separate options. The latter point is important; in my
classification Vacuum₁ and Vacuum₃ are not only distinct, but mutually exclusive,
since in one case there is nothing between $A$ and $B$, while in the other case there is
something, though the ontological status of that something is murky. Descartes gives
one argument that tells against both Vacuum₁ and Vacuum₃. Nonetheless this
classification will show itself to be helpful in understanding Descartes’ position, not
least because some of his remarks apply more clearly to Vacuum₁ than Vacuum₃.

Descartes is committed to denying the possibility of all of the above. The
central position underlying his stance is the claim that extension is the “principal
attribute” of body. Descartes famously holds that “to each substance there belongs
one principal attribute,” which “constitutes its nature, and to which all its other
properties are referred.”⁷² Some general clarification of this position is in order. The

⁷² AT VIII A 25; CSM I 210.
two principal attributes that Descartes recognizes are, of course, thought and extension. Their status as principal attributes is tied to their conceptual priority; our concepts of the properties of things sort themselves out into two (or perhaps three) classes. Extension is involved in the concepts of all the members of one class, thought in all the concepts of the other class, and the mind-body union in all the concepts of the third class. (About this third class Descartes is arguably ambivalent; that need not concern us here.) Thus the principal attributes are, as Descartes says, summa genera—the most general properties of real things. But Descartes also claims that all the essential properties of bodies follow from extension. There is a tension here, as will become clear below.

Descartes claims that extension is the basic and unanalyzable idea underlying all our true ideas of corporeal substance. Even if extension is conceptually basic, however, one might wonder why that means that it constitutes the nature of a substance. Why, in other words, can there not be a conceptually basic mode or accident? Here Descartes is following Aristotle and the tradition coming from him.

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74 AT VIII A 23; CSM I 208.

75 As Des Chene puts it:

To constitute the nature of a thing, then, is to stand to that nature as form to substance, to be the ground of the properties that follow from having that nature. Extension by itself is not the nature of corporeal substance. That nature also includes being divisible, mobile, capable of figure. But all those properties follow, or so Descartes believes, from extension. (365)

See also Garber, 85-89.

in Metaphysics VII Aristotle famously argues that the concept of an accident involves the concept of its subject. The example given is “snubness,” which cannot be conceived without conceiving of a nose.

There is another and perhaps more important reason for Descartes to hold this view, however, and it lies at the core of what one might call his rationalism. If the concept of some mode is basic insofar as its content is concerned, while it is ontologically derivative on the substance in which it inheres, the relationship between the substance and mode becomes unintelligible. It would just be a brute fact that this (kind of) mode belongs to this (kind of) substance. Descartes’ claim that all our ideas sort themselves out into two or three classes is an expression of his optimism about reason. In Spinoza’s hands, of course, this tendency in Descartes is much more explicit: conceptual dependence, causal dependence, and inherence all collapse into each other. Descartes is not so thoroughgoing, but he nonetheless would see it as unintelligible that a mode could be conceptually unanalyzable. The mark of the modal distinction, after all, is that the mode cannot be conceived independently of the substance, while the substance can be conceived independently of the mode.

The independent conceivability of substance is crucial for understanding what Descartes means by saying that extension and thought are principal attributes of the two kinds of substance. Daniel Garber helps to clear this up by showing that the idea from which all the others within that domain follow is not that of mere extension or

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78 AT VIIIA 29; CSM I 213-4.
mere thought, but the idea of an extended thing or thinking thing.\textsuperscript{79} Descartes claims that a substance and its principal attribute, e.g. a body and its extension, are merely conceptually distinct. “Thought and extension … must then be considered as nothing else but thinking substance itself and extended substance itself – that is, as mind and body.”\textsuperscript{80} It will become evident below that when Descartes argues that some property follows from extension, he typically proceeds by asking his interlocutor to conceive of an extended thing—at that point it is supposed to become simply obvious that such a thing cannot but be conceived as, for example, divisible, or impenetrable.

It is important not just that the basic idea is that of an extended thing, but that it is the idea of a \textit{complete} thing. By “complete” Descartes means something rather specific. The main context in which the notion comes up is the argument that the mind and the body are really distinct. That the ideas of body and mind are of complete things, in this special sense, is at least implicit in the \textit{Meditations}. It is clear from the replies to Arnauld’s and Caterus’s objections that it plays a crucial role in the argument for the real distinction between mind and body.\textsuperscript{81} In the \textit{Meditations} Descartes seems to argue that simply because he can be certain of his existence, while doubtful of the existence of any bodies, the mind is really distinct from the body. Caterus and Arnauld objected, arguing (in different ways) that this is insufficient to establish that the mind can really exist apart from the body. In his replies Descartes

\textsuperscript{79} Garber, 88.


\textsuperscript{81} For an excellent discussion of the argument, and the idea of conceiving a “complete thing,” see Wilson, \textit{Descartes}, 191-8.
stresses the point that the ideas of mind and body are of complete things, rather than abstractions. The clearest articulation of what is meant by “complete thing” here occurs in a letter to Gibieuf from 1642.

Gibieuf wonders how Descartes can claim to know that his ideas of body and mind are not “made inadequate by an abstraction of my intellect,” a claim which Descartes had made in response to Caterus. The force of the question is that if Descartes cannot tell whether some idea has been rendered inadequate through abstraction, then he may have left something essential out of the idea, and hence the independent conceivability of two ideas might be nothing but a result of abstraction, rather than justification to infer a real distinction between the objects. To clarify, Descartes explains what he means by abstraction:

[T]o tell whether my idea has been made incomplete or inadequate by an abstraction of my mind, I merely look to see whether I have derived it, not from some thing outside myself which is more complete, but by an intellectual abstraction from some other, richer or more complete idea which I have in myself. This intellectual abstraction consists in my turning my thought away from one part of the contents of this richer idea the better to apply it to the other part with greater attention.82

Descartes maintains that the idea of a finite extended thing is “a complete idea, because I can conceive it entirely on its own, and deny of it everything else of which I have an idea.”83 This rules out the possibility that he merely omitted some essential aspect of the idea from consideration; if that had been the case, some incoherent aspect would have become apparent when all other ideas are denied of the thing in

82 AT III 474-5; CSMK 201-2.
83 AT III 475; CSMK 202.
question. Hence Descartes does not merely mean to claim that bodies are essentially extended, but that the entire nature of body follows from its being extended. Body has every characteristic that is implicit in the idea of an extended thing, and just as importantly, it has no other real characteristics.

This idea, that the conception of an extended thing as a complete thing is fundamental, helps in understanding what Descartes means by saying that the other properties of body follow from extension. When we conceive of a concrete extended thing, which exists merely as an extended thing, we can, according to Descartes, introspectively recognize that it will necessarily have certain properties, notably divisibility, mobility and impenetrability. And when we conceive of the parts of the extended world as actually moving with respect to each other, we recognize that each physically distinct part will have a determinate shape and size. Many questions remain about the plausibility of these claims, but the general idea is clear: when we conceive of a thing which exists just as an extended thing, we have to conceive of it as having certain properties. And these will be the only essential properties of corporeal substance, because otherwise the concept of an extended thing would not be the concept of a complete thing. The central explanatory claim of Cartesian physics is that these properties are sufficient to account for all natural phenomena. With respect to the vacuum, it is the fundamental status accorded to the idea of a (merely) extended thing that is supposed to eliminate the possibility of any such thing.

84 This presupposes that I can access all of my ideas and know when I have exhausted them, which is a pretty strong assumption, to say the least.

85 One has to add the significant caveat that motion is also required, which does not follow from the nature of corporeal substance. Mobility does thus follow, according to Descartes, but God has to impart motion. [AT VIIIA 61-2; CSM I 240.]
2.3 Vacuum\textsubscript{1}: Distance Relations and the Pure Vacuum

Descartes treats Vacuum\textsubscript{1} and Vacuum\textsubscript{3} together. This is not surprising, since he does not think that there can be anything real that is neither a substance nor an attribute of a substance, as Vacuum\textsubscript{3} is supposed to be.\textsuperscript{86} I will discuss Vacuum\textsubscript{3} more below. The argument most relevant to Vacuum\textsubscript{1} occurs in PP II.18:

And it is a manifest contradiction for [two bodies] to be apart, or to have a distance between them, when the distance in question is nothing; for every distance is a mode of extension, and therefore cannot exist without an extended substance.\textsuperscript{87}

Descartes here treats the supposed distance not as a two-place relation between two bodies, but as a three-place relation between the distant bodies and something lying between them. Hence he understands the distance as a length, a mode of what lies between the distant bodies. So the notion he is attacking, which Bennett calls the idea of vacuum as a “bulky nothing,” is incoherent. It proposes that a mode, distance, can exist without any subject. As Bennett puts it, “You cannot have a sheer five inches between two things: it must be some third thing that measures five inches along one of its dimensions.”\textsuperscript{88}

\textsuperscript{86} For example, Descartes shows no sympathy for the Scholastic notion of “imaginary spaces.” (For an extended discussion of the relevant Scholastic background, see Des Chene 354-66.) He takes it to be a sufficient refutation of the “philosophical” notion of vacuum to argue that any extension must belong to a substance which is extended. That is, the item at issue must be either an extension that belongs to nothing (the “bulky nothing” version of Vacuum\textsubscript{1}), which is an absurdity, or an extension that belongs to a concrete subject, in which case we have a genuine and fully real extended substance. There is thus no room for some quasi-real extension like the “imaginary spaces” outside of the world. Nonetheless the distinction between Vacuum\textsubscript{1} and Vacuum\textsubscript{3} is helpful, because in PP II.18 the crucial claim is that distance is a mode of extended substance, while in II.16 it is that extension is an attribute of substance. The former is directed against something like Vacuum\textsubscript{1}, the latter against Vacuum\textsubscript{3}.

\textsuperscript{87} AT VIIIA 50; CSM II 231.

\textsuperscript{88} Bennett, \textit{Six Philosophers}, 38.
But as Bennett also points out, this is not the only way to construe Vacuum1; one could also think of distance as just a two-place relation. That is, one might propose that the distance between two objects is “a basic fact about how the two things are related, not one made true by an underlying fact about how the two relate to a third thing.” Yet Descartes’ claim that extension and extended substance are only conceptually distinct rules out the possibility of this version of Vacuum1 as well. Extension relates to the substance of which it is predicated in a particular way: it just is that substance. But if the extension between A and B is nothing but a consequence of a relation, then that extension, the length AB, cannot be identified with any substance. That is not to say that there is no ontological support for such a distance; the distance relation is not a subject-less property, and so it does not violate the general principle that all properties must belong to something. Yet it does violate the claim that extension is identical to the substance to which it belongs. Distance relations, then, are conceptually dependent on the presence of some extended substance between distant bodies.

It is clear that Descartes holds that distance is conceptually dependent on extension. It is not at all clear, however, that it is true, or even that there is independent motivation for the claim. Certainly many of Descartes’ critics claimed that they were perfectly able to conceive of the distance between two bodies without


90 A good illustration of this point is to be found in Descartes’ correspondence with Arnauld. See below, Chapter Three.

91 As discussed below in Chapter Three, Arnauld makes this very point to Descartes [AT V 191], and Descartes’ response, as I read it, is to invoke the identity between extension and extended substance.
reference to the presence or absence of anything at all between them. The heterodox Cartesian Gerauld de Cordemoy, for example, argues that the fact that there is a certain distance between two bodies only entails the possibility of there being a material thing of the corresponding length between them.

Although one can say that between two bodies, which do not touch each other, one can measure the length of so many feet of other bodies, one does not have to conclude that they exist because of that. One must only say that the two bodies are situated in such a way that it is possible to place between them some bodies, which joined together would compose an extension of so many feet.92

Descartes, of course, ties distance more closely to extension or length, but Cordemoy’s position seems intelligible, at the very least. At this point I leave this as a problem for the Cartesian position. Here it is principally important to be clear about what that position amounts to. Descartes’ view is that the idea of an extended thing, an object that can exist as a merely extended thing, is presupposed in the concept of a distance, so that for two things to be a certain distance apart is for there to be the corresponding amount of extended stuff between them. This is one aspect of the general position that all ideas that represent something real in bodies involve the concept of an extended thing.

2.4 Vacuum: An Overlooked Option?

Descartes never seriously considers the possibility that extension might not be a genuine attribute at all, but a predicate analyzable in terms of attributes of non-extended substances. For Descartes, however, the same considerations that rule out

the possibility of Vacuum$_1$ also apply to Vacuum$_2$. If extension is not a genuine attribute, but something that results from simple substance or substances in some way, then it certainly cannot be identified with the substance that is the ultimate basis of extension. Fundamentally, it is just a basic commitment of Descartes’ that extension can be clearly and distinctly perceived and does not presuppose any prior attribute. This conviction is the basis of his attempt to reform natural philosophy; the key move that is supposed to secure intelligibility is to posit that the subject-matter of the science is nothing other than that of geometry. So it is non-negotiable for Descartes that extension is a genuine attribute, not analyzable into anything prior.

There is one context in which Descartes feels he has to argue that extension inheres immediately in a substance. The concern is that extension might depend directly on God, rather than belonging to some created substance distinct from all minds. Descartes tries to rule this out by arguing that extension belongs to a substance not just eminently but formally. This is a central conclusion of the Sixth Meditation:

I do not see how God could be understood to be anything but a deceiver if the ideas were transmitted from a source other than corporeal things. It follows that corporeal things exist. … [T]hey possess all the properties which I clearly and distinctly understand, that is, all those which, viewed in general terms, are comprised within the subject-matter of pure mathematics.\textsuperscript{93}

Even if the argument goes through, which is doubtful, it is not clear that Descartes has avoided the basic problem. He still claims that extended substance is created by

\textsuperscript{93} AT VII 80; CSM II 55.
God, so in some sense the extended really does result from the non-extended.94

Spinoza pounces on this point: “And they maintain that it has been created by God. But by what divine power could it be created? They are completely ignorant of that. And this shows clearly that they do not understand what they themselves say.”95

Spinoza’s point is particularly telling against Descartes, for if extension is a principal attribute because of its conceptual basic-ness, it is hard to see why that does not rule out the possibility of its coming from something non-extended. The issue, of course, is how intelligibility constraints apply or do not apply to God’s relation to everything else. This is too large of an issue to handle here, but it is worth noting that Descartes’ position is somewhat vulnerable on this point. It seems that he should provide some principled reason why extension cannot even be conceived as derivative on any other kind of created thing, while it is in fact derivative on a simple substance, God.96

2.5 *Vacuum*: Space without Substance

Descartes argues against the possibility of a vacuum most formally in *PP II* 16.

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94 The issue may be related to another point in Meditation VI, concerning the heterogeneity between cause and effect in cases of inner sensation like pain, thirst, etc. [AT VII 80; CSM II 55 *passim*.]


96 As a project undertaken by some Cartesians this went in two different ways: one could either seek to make the relation of God to extension intelligible, or one could seek to show why it was not a problem for this relation to be inscrutable. Malebranche’s doctrine of intelligible extension was designed in part to make sense of God’s creation of material things. Robert Desgabets and Pierre-Sylvain Regis made a sharp distinction between the intelligibility criteria applicable to relations among created things and their modes, on the one hand, and the way in which God’s relationship to creation can be understood. Since God creates with complete indifference, even with respect to the eternal truths, the procession of creation from God is radically inscrutable. See Tad Schmaltz, *Radical Cartesianism: the French Reception of Descartes* (Cambridge: Cambridge UP, 2002), esp. Chapter 2.
The impossibility of a vacuum, in the philosophical sense of that in which there is no substance whatsoever, is clear from the fact that there is no difference between the extension of a space, or internal place, and the extension of a body. For a body’s being extended in length, breadth, and depth in itself warrants the conclusion that it is a substance, since it is a complete contradiction that a particular extension should belong to nothing; and the same conclusion must be drawn with respect to a space that is supposed to be a vacuum, namely that since there is extension in it, there must necessarily be substance in it as well.97

There is initial plausibility to a reading of this passage as a version of the short argument that Descartes apparently appeals to in various texts from the correspondence. The short argument is just this: since space and body are identical (PP II 11), there can be no space that is not also body. But a vacuum is supposed to be just that: a space where there is no body. If the space just is material, then there is no question of its being empty of or unoccupied by matter. The first sentence of article 16 suggests that this is the sort of argument Descartes is going to use; the impossibility of the vacuum is linked to the fact that there is “no difference between the extension of a space … and the extension of a body.” This suggests a parallel with the short argument as articulated in the correspondence. In a 1645 letter to the Marquess of Newcastle Descartes writes, “I think the existence of a vacuum involves a contradiction, because we have the same idea of matter as we have of space.” 98 Similarly, writing to Mersenne, Descartes argues that a space without body is contradictory: “For the idea that we have of body, or matter in general, is contained in the idea that we have of space, i.e. of something which has length and breadth and

97 AT VIII A 49; CSM I 229-30.
98 AT IV 329; CSMK 275.
depth, just as the idea of a mountain is contained in the idea of a valley.”99 One might take these passages from the correspondence as a model for interpreting the argument in II.16.

Immediately, however, complications arise. What Descartes means by “vacuum” here is “that in which there is no substance whatsoever,” and this is what he refers to as “a space that is supposed to be a vacuum.” If this were a version of the short argument, it seems the relevant notion of a vacuum would be a space in which there is no matter. The conclusion of the argument is that if a space contains extension, it must also contain substance. This is not yet to establish that it contains body, still less that it just is body. Of course Descartes thinks that extended substance is necessarily corporeal; the point here is just that nothing in II.16 would tell against Vacuum4. It does not follow from this argument that a space without matter is contradictory, so long as one admits that this matter-free space is a substance.100 Descartes’ direct target in article 16, then, is not a space without matter, but a space that is not a substance. What could such a space be?

As discussed in the previous chapter, there were two positions Descartes was concerned to reject which held that space is extended in three dimensions but is not a substance. The first was the Classical atomist concept of the void. Democritus and Leucippus reportedly characterized it as “non-being,”101 while modern atomistic

99 AT II 482; CSMK 132.

100 Not surprisingly, this objection was commonly brought against Descartes. See the discussion of More below in Chapter 3.

natural philosophers such as Gassendi denied that space is a substance—space was “nothing positive.” The other was the range of Scholastic views that weakened the original Aristotelian position on the impossibility of empty or incorporeal spatial dimensions. The example of the latter that Descartes mentions explicitly are “imaginary spaces” outside the world. These were conceived as really just an aspect of God’s power or immensity: his power to act at any place, even outside the boundaries of the material world. The notion is an uneasy compromise between God’s simplicity and incorporeality, on the one hand, and his omnipotence, infinity and ubiquity, on the other. These imaginary spaces are not fictional, since God really can act outside the material universe; nevertheless their extension is not the extension of any substance. Insofar as it is real, it is something contained in the nature of God, who in himself is not extended. (In the next chapter Henry More’s early conception of space, which is closely related to Scholastic theories of imaginary space, will be examined in connection with his correspondence with Descartes.)

On a similar note, a recurring discussion in the Scholastics involves scenarios in which God is supposed to annihilate some part of the material world; the question is then posed as to how to understand what would be left behind. Descartes explicitly presents a scenario like this in II.18, so it is certainly relevant for understanding the

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103 AT XI 31-2; CSM I 90; AT VIII A 52; CSM I 232; AT V 354; CSMK 375.

relevant notion of vacuum here. And it is consonant with the notion of extracosmic imaginary spaces; Grant points out that in medieval philosophy the use of annihilation as a methodological tactic was known as “proceeding secundum imaginationem.”

In both cases the non-substantial extension amounts to God’s power to act, either by creating some new corporeal substance or annihilating some that he had previously created.

In light of these rival positions, Descartes’ argument is quite intelligible. The key premise is general and metaphysical: there can be no attributes that do not inhere in a substance. Since a space obviously has the attribute of being extended in three dimensions, Descartes infers that where there is space, there is extended substance.

Notice that I have not introduced as a premise the claim that material extension and spatial extension are identical. It appears that this could be left out of the argument; as long as it is conceded that space is extended, it should follow immediately, from the general metaphysical principle, that the extension is that of an extended substance. Yet Descartes includes the relation between spatial and material extension for a good reason. The opposing position, whether atomist or Scholastic, holds that there can be extension that is somehow less than a substance; it is, perhaps, a potentiality, or an aspect of the power of the perfectly simple Deity. Descartes claims that, in the case of

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105 Eric Palmer even argues that it is a specific understanding, found in Albert of Saxony, of such annihilation scenarios that Descartes is opposing in II.16-18. [“Descartes on Nothing in Particular,” in New Essays on the Rationalists, ed. by Rocco Gennaro and Charles Huenemann (Oxford: Oxford UP, 1999), 26-47.] It is possible that Descartes had this in mind, but his argument in II.16 addresses any position that posits some extension that is not the extension of a substance. I find a more inclusive reading of what Descartes had in mind as his target here to be more plausible and more helpful.

106 Grant, Much Ado, 390n169. Grant (169) also shows that at least some Scholastics applied the notion of imaginary space to intracosmic as well as extracosmic void.
bodies, their extension is taken as a sufficient condition of their being substances. But if it really is a sufficient condition, of course, then the same inference should be made in the case of anything extended, whether it is supposed to be a body or not. The identity between spatial and material extension is needed for the argument insofar as there is a widespread tendency, evident in the atomist and Scholastic positions alike, to regard space as an ontological lightweight. Descartes goes on, in the following articles, to give an account of this tendency.

The argument in II.16, then, is directed against Vacuum₃, a space or extended interval that is not a substance. (Descartes tacitly assumes along the way that Vacuum₃ collapses into the “bulky nothing” version of Vacuum₁. If the extension is not nothing, then it is an extended thing, an extended substance.) There is no direct argument here against a Vacuum₄, a substantial space that is not corporeal. To the extent this is so, the discussion in II.16-18 is not dependent on Descartes’ very parsimonious notion of matter. Here I agree with Roger Woolhouse, who in a helpful paper on the argumentative structure of PP II 4-19, maintains that the argument against the vacuum is independent of Descartes’ conception of matter as constituted by extension alone. Woolhouse correctly points out that articles 10-12 are meant to provide an account of space as conceptually dependent on body, so that, as he puts it, “spatiality is a function of corporeality.”

not rest on any claim about what is essential or non-essential to a body. The point is that the extension is the same in both cases, so what matters in conceiving of the body is that everything is left out besides extension—it does not matter, for this argument, that what is left out is, for Descartes, non-essential.

Following up this latter point, Woolhouse claims that Descartes’ direct discussion about the possibility of a vacuum, in II.16-18, is likewise independent of Descartes’ thesis that extension constitutes the essence of body. There is certainly something right about this. The point about space and matter in II.16 is just the point made in article 11: spatial and corporeal extensions are not different in kind. For a body to be extended is for it to have three dimensions, and the same account applies for a space’s extension. As pointed out above, this is all that is needed in II.16; just as material extension implies extended substance, so does spatial extension. Since they are the same in kind, there is no reason for the inference to go through in the one case and not in the other. It is true that Descartes could make this argument even if he had a more robust conception of matter.

Woolhouse goes too far, though, in claiming without qualification that Descartes’ position on the vacuum tout court is independent of his “thin” conception of matter. The argument against the vacuum, as Woolhouse construes it, is an adaptation of Aristotle’s argument in Physics IV.8, which compares the extension of a body with that of the supposed space it occupies in order to show that the latter is superfluous. On this reading, Descartes “wants us imaginatively to see that a body such as a stone already has its own dimensionality and can of itself provide

everything that is supposed to be provided by an independent space.”109 But this is problematic for two reasons. First, Descartes does not claim that a vacuum would be a superfluous or redundant theoretical entity; he claims that it is unintelligible and incoherent. Second, as just noted, Descartes argues in the *Principles* against Vacuum3, not Vacuum4, whereas the argument in Aristotle applies equally to both.110

The targeted notion of vacuum in II.16-18 is very specific: an extension or interval which is either nothing or something less real than a substance. An objection raised by Garber is helpful here: the fact that material extension and spatial extension are the same does not entail that space and matter are the same.111 Space and matter can be extended, such that the property applies univocally to both, and still they might be fundamentally different kinds of extended substances that relate to one another in certain asymmetrical ways. This is (roughly) More’s proposal, as we will see in the next chapter.112 It is too much, then, to say that Descartes’ position on the vacuum is independent of his conception of matter. Rather, it is his arguments against a particular notion of a vacuum that are thus independent.

Woolhouse might respond that Descartes has already given an analysis of space that rules out its status as an incorporeal extended substance. A space just is the extension of a body, so whether or not there is more to body than extension, there


110 Des Chene (356) shows that the Cartesian argument corresponding to this Aristotelian one is really that of *PP* II 11, rather than that of article 16. I also discussed this in Chapter One, and treat it more fully below in Chapter Five.

111 Garber, 132.

112 At the time of the correspondence More thinks that space and matter are extended in distinct, “analogical” senses. On his mature theory of divine absolute space, however, the extension of matter and that of space are the same. See below, Chapter 3.
cannot, by definition, be a space without body. But here it is helpful to bring in a point made by Jonathan Bennett about Descartes’ conception of body: that conception is so thin as to make it plausible that the term “body” will range over extended things that differ in important ways. Two sorts of “body,” according to Descartes’ broad use of that term for anything extended, might differ such that one class might be more material and the other more spatial, even though they are both covered by the term “body.” Even if Descartes’ analysis of space is correct, so that a spatial extension is always a corporeal extension, it is still an open question whether that extension will behave “materially” or “spatially” in some more specific sense of those terms. So notwithstanding Descartes’ analysis of space in II.10-12, his position on Vacuum₄ is not independent of his “thin” conception of matter.

Descartes, in his writings on the vacuum, links three notions: extension, substantiality, and corporeality. Extension is supposed to entail substantiality—that is the point of II.16. But extension is also supposed to entail everything included in the notion of corporeality, including divisibility, mobility and impenetrability. The latter claim is, again, part of what is involved in the thesis that extension constitutes the essence of corporeal substance. One reason, then, that Descartes does not explicitly mention Vacuum₄ as a target in his discussion in the *Principles* is that he has already ruled it out in a general way. That is, he has already claimed, in *PP* I 53, that “everything else [besides extension] which can be attributed to body presupposes

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113 Bennett, *Six Philosophers* 35.
114 Des Chene, 361, 377.
115 Buzon and Carraud, 66.
extension, and is merely a mode of an extended thing.”116 It is also relevant that Descartes composed the *Principles* as a counterpart to Scholastic textbooks, and hence it was particularly important for him to address the Scholastic doctrine of “imaginary spaces,” and to distinguish himself from those who sought to revive Classical atomism as an alternative to Aristotelian natural philosophy.117 Vacuum3 was more urgent than Vacuum4, as a consequence.118

2.6 *The “Short Argument”*

The argument in the *Principles*, then, does not amount to a mere appeal to the identity between space and matter. Taking the Cartesian corpus as a whole, however, it is too much to say, with Jonathan Bennett, that the short argument “has almost nothing to do with what Descartes wrote.”119 As I pointed out at the outset of this chapter, in his letters Descartes sometimes appears to offer something like the short argument. Thus in writing to Chanut he argues against the possibility of empty spaces outside of a finite material universe:

> For when I examine the nature of this matter [i.e. the matter of which the world is composed] I find it to consist merely in its having extension in length, breadth and depth, so that whatever has these three dimensions is a part of this matter; and there cannot be any completely

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117 As discussed above in the Introduction, Descartes was often accused of merely recycling ancient atomism, to the point that he devoted an article at the end of the *Principles* to elaborating the differences between his natural philosophy and that of the atomist tradition going back to Democritus [AT VIII A 325; CSM I 287-8.]

118 Des Chene (378-9) hypothesizes that Descartes may have simply been confused about the status of impenetrability and its distinction from hardness, which he argued was not a real property of body in *PP* II.4. It is only when he is pressed by More, on this hypothesis, that he realizes that he actually has to argue that impenetrability follows from extension.

empty space, that is, space containing no matter, because we cannot conceive such a space without conceiving in it these three dimensions and consequently matter.\textsuperscript{120}

I quoted above from two other letters in which Descartes makes similar arguments. It is worth clearing up what is going on in these passages.

Descartes uses the short argument as a shorthand version of a complex position: extension entails substance, and extension entails corporeality. Depending on the context, when the short argument appears it may be directed against Vacuum\textsubscript{1}/Vacuum\textsubscript{3}, Vacuum\textsubscript{4}, or all of the above. The above passage from the Chanut letter is directed against Vacuum\textsubscript{4}: “we cannot conceive of such a space without conceiving in it these three dimensions and consequently matter.” The passage from the letter to the Marquess of Newcastle, part of which I quoted in the previous section, is an example of a shorthand version of the argument against Vacuum\textsubscript{1}/Vacuum\textsubscript{3}.

I also said expressly in article 18 of Part Two that I think the existence of a vacuum involves a contradiction, because we have the same idea of matter as we have of space. Because this idea represents a real thing to us, we would contradict ourselves, and assert the contrary of what we think, if we said that that space was void, that is, that something we conceive as a real thing is not real.\textsuperscript{121}

In a letter to Arnauld Descartes offers an argument that addresses Vacuum\textsubscript{1}/Vacuum\textsubscript{3} and Vacuum\textsubscript{4}.

The difficulty in recognizing the impossibility of a vacuum seems to arise primarily because we do not sufficiently consider that nothing can have no properties; otherwise, seeing that there is true extension in space we call empty, and consequently all the properties necessary for

\textsuperscript{120} AT V 52; CSMK 320.

\textsuperscript{121} AT IV 329; CSMK 275.
the nature of body, we would not say that it was wholly empty, that is, mere nothingness.\textsuperscript{122}

The chief concern here is a vacuum that is “mere nothingness,” but Descartes also says that we perceive extension in the putative vacuum, and “consequently all the properties necessary for the nature of body.” This addresses Vacuum\textsubscript{4}, which depends on the possibility of something extended that does not possess “the properties necessary for the nature of body.” Thus the short argument can be used to indicate both the move from extension to substantiality and that from extension to corporeality or materiality. In the first case the idea is that a true instance of extension must belong to some subject, which is therefore an extended substance. In the second case the idea is that from the conception of something extended follow all the properties that really belong to bodies.

Descartes, then, takes the status of extension as a principal attribute of substance to rule out the possibility of Vacuum\textsubscript{4}. In a way this only puts Descartes’ conception of corporeal substance into question, because there seems to be nothing incoherent about an incorporeal extended substance (or so said several of Descartes’ critics). This challenge to Descartes’ position, and the general outline of his response, is treated in the final section of this chapter and further discussed in a later chapter as well. In the interest of providing a close reading of Descartes’ entire discussion of the vacuum in \textit{Principles} II, the next section deals with articles 17 and 18, which together comprise a sort of error theory, designed to explain the widespread endorsement of such an incoherent notion.

\textsuperscript{122} AT V 223; CSMK 358.
2.7 Why People Believe There Can Be a Vacuum

One of the initial worries Descartes posed for his own definition of matter was that it really amounts to a definition of space, which is popularly thought of as “nothing at all.” The discussion in II.17-18 is intended to show how people come to believe a) that a space devoid of matter is possible, and b) that such a space is nothing at all. Descartes has to tell such a story because he has claimed that such a view is logically incoherent. Since the view is, he admits, almost universally held, the onus is on him to show how it is that we make such a gross error. He has to give some account, if only a causal one, of the belief in the possibility of a vacuum. Otherwise one would justifiably suspect that he has somehow sidestepped the issue, since he claims that an empty space is strictly inconceivable. “But everybody does conceive of it,” the objector would reply, “so you have only confirmed the suspicion that your definition of material substance is really just a definition of space. Your position on the vacuum is thus only arrived at by a stipulative and misleading use of the terms here.”

How does Descartes respond to this implicit objection? He gives a rather elaborate genetic account involving several elements: our common use of the term “empty”; our prejudice in favor of the senses; a kind of scenario commonly encountered in experience; and a fallacious inference that is nevertheless an easy one to commit in the context of that scenario. First, in article 17, he claims that our pre-philosophical reliance on the senses sets us up for making an error about the vacuum. We use the term “empty” in a perfectly legitimate way to refer to “a place in which there is none of the things that we think ought to be there.” Emptiness is thus a
contextual and relative notion: “a pitcher made to hold water is called ‘empty’ when it is simply full of air; a fishpond is called ‘empty’, despite all the water in it, if it contains no fish.” And in most contexts we are predisposed to be concerned only with sensible things. This does not yet amount to an error, because there is no judgment involved, but it makes us prone to err if we forget that “empty” is a relative term. People do not generally recognize the degree to which their beliefs about the world are shaped by their senses, which are really only fitted to our survival interests. This is the general background, meant to explain why we are already apt to make mistakes concerning the notion of emptiness.

In article 18 Descartes goes on to propose a kind of scenario in common experience where a fallacious inference can easily be made.

Seeing no necessary connection between a vessel and the body contained in it, we reckoned there was nothing to stop God, at least, removing the body which filled the vessel, and preventing any other body from taking its place. But to correct this error we should consider 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 its general sense, which must be contained in the concave shape.

That is, we conflate the fact that there is no particular body that need be contained in the vessel with the spurious claim that there need be no body at all in the vessel. The account is not implausible; the occurrence of a fallacy here is in fact quite probable. People do not immediately grasp the non-equivalence of two claims of this form, and

123 AT VIII A 49; CSM I 230.
124 AT VII 59-62; CSM II 41-3. See also AT VIII A 17-18; CSM I 204.
125 AT VIII A 50; CSM I 230.
ordinary language is often ambiguous with respect to scope, which is crucial here.

‘No x need be contained in y’ can be taken in two ways. It can mean ‘There is no x
such that it must be contained in y,’ or it can mean ‘It is possible that there should be
no x contained in y.’ On Descartes’ view, the first claim is true, but the second is
false.

Descartes gives a similar account of the belief in the possibility of the vacuum
in a letter to Arnauld; part of the passage was quoted in the previous section.

The difficulty in recognizing the impossibility of a vacuum seems to arise primarily because we do not sufficiently consider that nothing can have no properties … Secondly, it arises because we have recourse to the divine power: knowing this to be infinite, we attribute to it an effect without noticing that the effect involves a contradictory conception, that is, is inconceivable by us.126

The reference to “divine power” ties this passage to the scenario laid out in PP II.18,
and emphasizes the role played in that scenario by the appeal to God’s omnipotence.

This suggests another dimension to the connection between articles 17 and 18. In the
former Descartes claims that the notion of emptiness is contextual and relative.
Emptying out some container, in most contexts we find ourselves in, involves
technical obstacles. It requires force or power in some physical sense. It requires in
some cases a certain kind of container—water can be bailed out of a floating boat, but
not if it is constructed entirely out of chicken wire. In some cases the task is more
difficult, and requires more physical force, or a more robust container, than it does in
others. Thus it will be natural to think of the capacity needed to perform various
instances of “emptying” as lying along a gradient: more power (and technical

126 AT V 223-4; CSMK 358.
capacity) is required to evacuate a container of certain kinds of matter than others.
And thus it will also be natural to think of an absolutely empty container as corresponding to an absolute power and technical capacity, which of course belong to God.

For Descartes, this last move is a mistake, and it involves an improper reliance on the senses. These different “kinds of matter,” which are distinguished by sensible characteristics, are not basic, but reduce to differences in the microstructure and motion of the parts of matter. Matter itself is perfectly homogeneous. Emptying a container of all matter is not a physical task at all; rather, it is a self-contradictory proposal. It is because we are prejudiced in favor of our senses that we think of an “absolute emptying” as differing only in degree from “emptying” in the contexts proper to more specific kinds of matter, which are distinguished merely by different sensible characteristics. That is, it is only because of our prejudice in favor of the senses that we miss the point that producing an absolute vacuum is logically incoherent, rather than a physically and technically challenging task.

In articles 17 and 18 Descartes is dealing with beliefs that are commonly, almost universally held, yet this follows immediately upon his rejection of “a vacuum in a philosophical sense.” The point is not that everyone has a philosophically formulated position on the matter, but that attempts by philosophers to articulate and defend the possibility of such a conception of the vacuum are rooted in the widespread error and common prejudice of everyday experience. Accordingly, when Descartes directly addresses the conceptions of empty space that are his targets in PP II.16 (the void of the atomists and the imaginary spaces of the Scholastics), he
criticizes them as mere developments of pre-philosophical prejudices. Thus he writes to More,

    On this topic I did not hesitate to disagree with great men such as Epicurus, Democritus and Lucretius, for I saw that they were guided by no solid reason, but only by the false preconception with which we have all been imbued from our earliest years... Since Epicurus, Democritus and Lucretius never overcame this preoccupation, I have no obligation to follow their authority.\textsuperscript{127}

In his next letter to More Descartes addresses the other target: “I do not care if others call this space [outside the world] imaginary and thus regard the world as finite; for I know what are the preconceived opinions that gave rise to this error.”\textsuperscript{128} The purpose of articles 17 and 18, then, is to give an account of these “preconceived opinions” and the way they lead to erroneous theories of empty space.\textsuperscript{129}

2.8 \textit{Space as Extended Substance}

Since Descartes thinks that extension entails materiality, he rejects the possibility of space as an incorporeal extended substance. This is a remarkably strong claim; Descartes is committed to the inconceivability of something extended that is not physically divisible, or something extended that can be co-located with some other extended thing. There are positive and negative aspects to his position. Negatively, anything that does not follow from the notion of an extended thing is not a real property of corporeal substance. Thus the real accidents of the Scholastics and

\textsuperscript{127} AT V 271; CSMK 362.

\textsuperscript{128} AT V 345; CSMK 375.

\textsuperscript{129} I deal further with \textit{PP} II.18 in Chapter Five, exploring its general implications for the strength of Descartes’ view against rival conceptions of space.
the gravity of the atomists are eliminated, for example.\textsuperscript{130} On the positive side, Descartes does recognize certain universal properties of corporeal substance: mobility, divisibility, and impenetrability, at least.\textsuperscript{131} These all simply follow from extension, in his view.

Replying to More, for example, Descartes says the following:

For in a space – even an imaginary and empty space – everyone readily imagines various parts of determinate size and shape; and some of the parts can be transferred in imagination to the place of others, but no two of them can in any way be conceived as compenetrating each other at the same time in one and the same place, since it is contradictory for this to happen without some part of space being removed. Now since I consider that such real properties can exist only in a real body, I dared to assert that there can be no completely empty space, and that every extended being is a genuine body.\textsuperscript{132}

This text is particularly illuminating because here Descartes does not just assert that extension constitutes the essence of body or matter, but unpacks what that claim is supposed to mean in an attempt to justify it. The point about the supposed space is that in conceiving of it as something extended, we must also conceive of it as physically divisible, that is, divisible into parts which can change positions. These parts, moreover, cannot be co-located: in other words, conceiving of an extended thing implies conceiving of it as divisible into mobile and impenetrable parts.

\textsuperscript{130} The position is more radical than this, of course; in the Third Meditation Descartes says that the ideas of sensory qualities like color, taste, etc., may lack objective reality altogether, because they do not follow from extension and hence are not conceived clearly and distinctly. [AT VII 43-5; CSM II 29-31.] For a discussion of some of the problems raised by this claim, see Wilson, 105-119.

\textsuperscript{131} See Des Chene 365. He also points out that it is of the nature of corporeal substance to be “capable of figure.”

\textsuperscript{132} AT V 271; CSM I 362.
Since there are different properties that are included in the nature of body, Vacuum$_4$ can be construed in different ways. That is, the division between spatial and corporeal properties can be carried out in various ways. One candidate is what Bennett discusses in this context as “container space”: extended substance that is metaphysically indivisible, able to be co-located with bodies (penetrable), and immobile. Bennett also proposes something he calls “separator space,” which is never co-located with bodies but surrounds them and separates one from the other, like water does fish. On this notion of space, it is mobile, impenetrable, and divisible, but differs from matter in that it is completely devoid of inertial resistance. I will address these two versions of Vacuum$_4$ in order. It will become evident along the way why divisibility, mobility and impenetrability stand or fall together.

Considering divisibility first, it is important at the outset to distinguish different sorts of divisibility. To clarify, I will borrow some terminology from Thomas Holden’s work on the early modern debate about what he calls “the internal architecture of matter.”

An extended entity is physically divisible (hereafter p-divisible) if and only if its spatially distinct parts can be broken apart by natural processes and separated from one another […] metaphysically divisible (hereafter m-divisible) if and only if it is logically possible that is spatially distinct parts could exist separately from one another […] formally divisible (hereafter f-divisible) if and only if it has parts that can be distinguished by their spatial properties, regardless of whether

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133 Holden, vii.
those parts can be separated from one another, either naturally or by God.\textsuperscript{134}

I will refer to these kinds of divisibility and the corresponding kinds of indivisibility frequently from this point on.

It is clear that Descartes intends to ascribe both metaphysical and physical divisibility to corporeal substance. The standard argument Descartes produces against the possibility of atoms apparently moves from the formal divisibility of every extended thing to its metaphysical divisibility, by way of God’s omnipotence. Thus in \textit{PP II.20} he writes:

\begin{quote}
For if there were any atoms, then no matter how small we imagined them to be, they would necessarily have to be extended; and hence we could in our thought divide each of them into two or more smaller parts, and hence recognize their divisibility. For anything we can divide in our thought must, for that very reason, be known to be divisible; so if we were to judge it to be indivisible, our judgement would conflict with our knowledge. Even if we imagine that God has chosen to bring it about that some particle of matter is incapable of being divided into smaller particles, it will still not be correct, strictly speaking, to call this particle indivisible. For, by making it indivisible by any of his creatures, God certainly could not thereby take away his own power of dividing it, since it is quite impossible for him to diminish his own power, as has been noted above. Hence, strictly speaking, the particle will remain divisible, since it is divisible by its very nature.\textsuperscript{135}
\end{quote}

Applying Holden’s distinctions between kinds of divisibility, it is clear that the argument is problematic. It appears to rest on an equivocation between formal and metaphysical indivisibility. Since the supposed atom is extended, it is f-divisible; in

\textsuperscript{134} Holden, 11-14.

\textsuperscript{135} AT VIIIA 51-2; CSM I 231-2. See also the letter to Gibieuf of 19 January 1642 [AT III 477-8; CSMK 202-3.]
that sense the initial move is uncontroversial. Then, however, Descartes infers that it is at least divisible by God, where he clearly means m-divisible.

As Garber shows, however, the atomism Descartes was so concerned to avoid typically involved a distinction between conceptual indivisibility (which corresponds to metaphysical indivisibility in Holden’s terminology) and physical indivisibility. Gassendi’s atom, for example, is “a thing which cannot be split by any natural means, a thing which cannot be split by any of [God’s] creatures, a thing which cannot be split by any but him.”136 It seems, then, that Descartes has missed the point. He needs to argue that p-divisibility is a universal characteristic of bodies, but for some reason he argues only for m-divisibility. Garber tries to fill the gap by reference to Descartes’ claim, in article 33, that in certain motions matter must be divided ad indefinitum, so that a p-indivisible corpuscle of definite size conflicts with the demands of motion in a plenum. I think Descartes would have welcomed Garber’s move, but would have thought it unnecessary, strictly speaking. When Descartes claims that motion in a plenum sometimes requires something involving infinitely divided matter to occur, he is not trying to establish divisibility, but actual division. The argument Descartes has in mind for divisibility, I think, has already occurred before II.33.

In the passage from PP II.20, Descartes finishes the argument by claiming that the particle “is divisible by its very nature.” He admits that God could make a part of matter p-indivisible, but regards this as irrelevant. This is not because he misreads his opponents, but because of what he requires by way of explanation in natural

136 Garber, 125.
philosophy. If there were p-indivisible atoms in the world, their indivisibility would not be explicable in terms of their nature. It would be superadded by a gratuitous act of God. As Leibniz, a good Cartesian in this respect, might have said, such atoms would be a perpetual miracle. This might seem question-begging as an argument for the point in question: divisibility follows from extension because indivisibility does not? Could we not run this argument just as easily in the other direction? If we look first at p-divisibility, perhaps it does not (pace Descartes) seem to follow just from the notion of an extended thing; can we thus conclude that p-indivisibility follows from that notion, because p-divisibility would be inexplicable? What tips the balance in favor of one or the other? It is not clear at this point how Descartes is to answer this question. If extending things are necessarily m-divisible, then perhaps that gives one some reason to prefer physical divisibility, but entailment seems lacking. At any rate, Descartes can also have recourse to the argument Garber points out about the infinite division of matter.

What is at stake, however, is the Cartesian position on empty space, and here it is the move from formal to metaphysical divisibility that is primarily the issue, not that from metaphysical to physical divisibility. Vacuum, as far as divisibility is concerned, is supposed to be an extended substance that is f-divisible but not m-divisible, as opposed to an atom that is m-divisible but not p-divisible.137 (It is

137 I suppose one could propose a theory of space as metaphysically divisible, but it is not clear that that would serve the intuitions typically driving one towards a body-independent notion of space. Such notions of space are usually invoked at least in part because such a space seems to be required for the possibility of the motion of bodies. But if it were possible for parts of space to move as well, then by the same reasoning there would have to be some other space underlying the first one. Proponents of something like absolute space have generally opted not to get started on this kind of regress. See Grant, Much Ado, 19-23, where he discusses Philoponus’ and Crescas’ responses to Aristotelian regress arguments against a separate space.
important to note, however, that Descartes does want to infer p-divisibility as well; this shows why divisibility and mobility stand or fall together. Physical division conceptually implies relative motion of the parts into which the object is divided.) Turning to the argument for the m-divisibility of extension, Descartes’ thinking is perhaps clearer in the letter to Gibieuf cited above in the discussion of the “complete thing” idea. There Descartes elaborates on the character of our conception of distinct parts of extension:

From the simple fact that I consider the two halves of a part of matter, however small it may be, as two complete substances, whose ideas are not made inadequate by an abstraction of my intellect, I conclude with certainty that they are really divisible.”138

As shown by the other parts of the letter discussed above, Descartes is claiming that the idea of a finite extended thing is complete, in that he can conceive of it while denying of it everything else of which he has an idea. This is what is supposed to establish the metaphysical divisibility of matter, because two things that can be conceived as complete in this fashion can exist independently of each other. At the very least, God can bring about this division. Thus Descartes does not merely assume that f-divisibility implies m-divisibility, as he appears to in the Principles. Rather, he argues that every extended thing is m-divisible on the grounds that we conceive of it as a complete thing in the way specified. This is supposed to apply not only to extended things that are physically distinct, but to any assignable part of matter, even if it is at rest with respect to its surroundings.

138 AT III 477; CSMK 202-3.
A problem with the argument, however, is that the premise seems to contradict what Descartes says elsewhere. According to Descartes it is not true that one can conceive of a finite extended thing while supposing that no other created substances exist; this is, roughly, his argument that the world is not finite. Hence it is not clear how he can say, as he does to Gibieuf, that we can conceive of a finite extended thing and “deny of it everything else of which I have an idea.” It seems, if we take him at his own word, that we must affirm of it at least that it is surrounded by some other extended substances. At this point it is not completely clear what is involved in denying “everything else of which I have an idea.” But even if we discount the countertexts, it still does not seem inconceivable that there could be an extended thing that is metaphysically indivisible. Descartes has a problem, then, in establishing that extension implies divisibility, whether that means m-divisibility or p-divisibility. I will return to this issue in Chapter Five; for now it must be left as a problem.

Physical divisibility entails mobility of the parts into which the whole is divided. What, if any, is the connection between these properties and impenetrability? There is no direct entailment; at least, *prima facie* it does not add much to an argument for the impenetrability of extended substance to suppose that the substance is p-divisible and mobile. Certainly mobility would be a problematic notion if bodies were *incapable* of excluding each other, but impenetrability as Descartes thinks of it requires that bodies always and necessarily exclude each other. It is not clear why

139 VIIIA 52; CSM I 232, and AT V 52-3; CSMK 320. See Appendix for further discussion of the tension here.
mobility would require the latter. The proposal in question, however, is a kind of empty space (Vacuum$_4$) that is m-indivisible, whose parts are consequently immobile with respect to each other. At this point, as the above discussion has shown, Descartes does not have a good way to establish that extension implies m-divisibility, or even that the latter implies p-divisibility. So an m-indivisible, immobile extended substance seems to be a conceptually respectable option. If this is to be compatible with any explanation for natural phenomena, however, motion has to be possible somehow. And thus there must be in addition to this container space some mobile bodies, and if the space is continuous, then bodies must occupy some regions of it. Hence space will be penetrable, in that it can be co-located with bodies. And this provides a plausible candidate for the specific difference between corporeal and spatial extended substance—the former is impenetrable while the latter is not. Thus it will be natural for a proponent of Vacuum$_4$ to group indivisibility (both physical and metaphysical), immobility and penetrability as distinctive non-corporeal properties of spatial extended substance. This is at least approximately what More does, and what Newton does in *De Gravitatione*.

When More writes to Descartes for the first time in 1648, the very first objection he raises is to the definition of body as extended substance. “For God, or an angel, seems to be extended,” so that extension is a broader category than body. Having argued that body is only one species of extended substance, More proposes a *differentia* for body. This he calls tangibility or impenetrability. Bodies, unlike spiritual extension, cannot be co-located with, cannot penetrate or be penetrated by
other bodies. More’s theory of spatial extension will be addressed in the next chapter. What is relevant here is Descartes’ response, in which he claims that an extended thing, just in virtue of being extended, is impenetrable. The upshot is that impenetrability is not some additional fundamental attribute; extension suffices to constitute the essence of body. Descartes needs to say this, because otherwise he would have to admit another fundamental and unanalyzable property of corporeal substance, and that would upset the simplicity and intelligibility he claims for his natural philosophy.\footnote{See Bennett, \textit{Six Philosophers}, 35.}

The argument is similar to the one Descartes uses to establish that rarefaction does not involve the addition of extension to one and the same substance.\footnote{AT VIIIA 45; CSM I 226.} There he claimed that since a corporeal substance is not really different from its extension, its extension is not a variable feature of it. If more extension or quantity is added to a body, then more extended substance has been introduced. Concerning impenetrability, the point is that an extended thing just is its volume, so two such objects cannot occupy the very same concrete volume.

Moreover, it is impossible to conceive of one part of an extended thing penetrating another equal part without thereby understanding that half the total extension is taken away or annihilated; but what is annihilated does not penetrate anything else; and so, in my opinion, it is established that impenetrability belongs to the essence of extension … so impenetrability must be admitted in every space.\footnote{AT V 342; CSMK 372-3.}
As Garber puts it, in the supposed case “there is no interpenetration, only
annihilation.”\textsuperscript{144} It is not because of some basic property or power of resisting that a
body excludes the presence of other bodies, but simply because it is what it is: this
particular extended thing. Garber calls the argument “ingenious”; Des Chene is “not
sure” that it is not question-begging.\textsuperscript{145}

Bennett, on the other hand, is quite sure that it is question-begging:

[The argument] assumes that the physical fusion of a body with
volume $V_1$ and a body with volume $V_2$ must be a body with volume
$(V_1 + V_2)$; but that is equivalent to the conclusion that the bodies
cannot share any space. If they could interpenetrate, then one body
might have $V_1$ and the other $V_2$, though the two together have less than
$(V_1 + V_2)$; in which case neither has lost any volume.\textsuperscript{146}

He goes on to give as an analogy the case of two sounds, where the volume of each is
defined as that of “the region throughout which it is audible.” Then it is clear that the
volumes could combine to less than their sum, as long as in some region both sounds
are audible. The example, however, is telling in that Bennett introduces an intensive
quality, which makes it unproblematic to distinguish one item from the other even
when their volumes “penetrate” each other. In the case of Cartesian extended
substances, though, it is not so clear what could play this role. If two bodies
“overlapped,” what would be the basis of the assertion that the region of overlap
contains parts of two bodies (which parts completely interpenetrate), rather than just

\textsuperscript{144} Garber, 147.

\textsuperscript{145} Des Chene, 381.

\textsuperscript{146} Bennett, \textit{Six Philosophers}, 31.
one?\textsuperscript{147} This touches on the issue of individuation of corporeal substances, a thorny question in Descartes.

Notice, however, that Bennett criticizes the argument because it assumes that the bodies “cannot share any space.” On the Cartesian view, bodies are identical (at any particular moment) to the spaces they occupy. So here we would indeed have the problematic scenario that Lennon used to argue for his Eleatic reading: body A is identical to space X; body B is identical to space X; therefore body A is identical to body B. So to propose that it is an open question how bodies behave with respect to sharing or not sharing space is already to assume a faulty notion of space, from Descartes’ perspective. This does not altogether dispel the suspicion that the argument begs the question against More, since Descartes is arguing for the strong claim that a penetrable extended substance is inconceivable, whereas even with my supplementary point it seems the most he can say is that penetrable extended substance requires a conception of space that is not his own. Nevertheless, this helps to show what Descartes is thinking, and what the dialectical situation is between his view and More’s. As in the case of several of the arguments discussed in this chapter, its final evaluation will come later.

There is another property of body which generates a notion of Vacuum\textsubscript{4} that is relevant for Descartes: inertial resistance. As mentioned above, Bennett introduces “separator space” as a candidate view of space for Descartes to accept or reject. This kind of space stands to bodies “as water does to fish swimming in it.”

\textsuperscript{147} Des Chene (381) helpfully relates this consideration to Aristotle’s argument against separate space in \textit{Physics} IV.8, the same argument that provides the blueprint for \textit{PP} II.11.
There are regions of space and there are bodies, and the two kinds jointly exhaust all the locations there are; but no two particulars have the same position at the same time. Where body starts, space stops; just as where fish starts, water stops.\textsuperscript{148}

Thus the parts of separator space are mobile, divisible and impenetrable. They differ from matter only because no force is required to move them aside. One can actually make a fairly compelling case that Descartes is committed to admitting something like separator space, under the ambiguous term “subtle matter.” Leibniz makes the accusation that “Descartes, having introduced his subtle matter, did away with the vacuum in name only.”\textsuperscript{149} As Eric Palmer has recently shown, Descartes does propose hypothetical physical scenarios in the \textit{Principles} that involve the notion of empty space.\textsuperscript{150} To simplify his explanations in this part of his physics, Descartes assumes that the corpuscles of matter he is talking about are moving in a medium with no resistance whatsoever, as if the spaces between them “were filled by a material which neither contributed anything to the motion of other bodies nor in any way impeded it.” Descartes then adds, “For in accordance with what has already been said, there obviously can be no other correct idea of empty space.”\textsuperscript{151}

Palmer, however, thinks that this notion of vacuum “would be a body with no humanly detectable property except extension.”\textsuperscript{152} He thinks Descartes admits as a

\begin{itemize}
\item Bennett, \textit{Six Philosophers}, 39.
\item Leibniz, “Con spectus for an Elements of Physics” [1678-9] in \textit{The Labyrinth of the Continuum}, 233.
\item Palmer, 35-37.
\item Palmer, 36.
\end{itemize}
possibility a notion of “separator space” that does not move in a continuous path like a body, but just appears in one place while it disappears in another. This kind of vacuum would just be a constant quantity of extension that exhibits no properties, and appears intermittently in various disconnected places in the universe. For example, if there is a gallon of matter and a gallon of physical vacuum in a sealed cylinder, Palmer’s interpretation is that one could flip the cylinder over, so that the matter moves to the other end, without the vacuum having to go through or around the matter. It would just appear on one side of the matter at the same rate it disappears on the other. But Descartes makes it quite clear in his correspondence with Mersenne that he has nothing so exotic in mind.

In conceiving of a body moving in a non-resistant medium, what I suppose is that all the parts of the surrounding liquid body are disposed to move at the same speed as the original body in such a way as to leave room for it and take up its room. That is why every kind of liquid resists some movement or other. To imagine some matter which resisted none of the different movements of different bodies, you would have to pretend that God or an angel was moving its parts at various speeds to correspond with the speed of the movements of the body they surround.¹⁵³

Inexplicably, Palmer ignores this passage in trying to interpret Descartes’ discussions of a physical notion of empty space. There is nothing contradictory, of course, about the supposition that God or an angel is moving matter around in the way described, but it is not a natural possibility, or as we might say, a nomological possibility. That is why Descartes says that “every kind of liquid resists some movement or other.” So there is an important difference between this kind of “vacuum” and the others dealt with so far. Descartes regards all the others as logically

¹⁵³ AT II 482-3; CSMK 132.
impossible, but this notion of vacuum is merely nomologically impossible. But the fact that he does think of this kind as nomologically impossible shows that Palmer is too sanguine in his estimate of what sort of empty space Descartes allows. Descartes is not committing himself to the physical respectability of extended substance that is completely devoid of physical effect on bodies. Rather, he is doing something scientists have always done in their theorizing: supposing that some physical factor is negligible for present purposes and treating it as absent. His move here is tantamount to supposing a frictionless plane, or taking air resistance to be negligible, or ignoring tidal effects—the kinds of things physicists do all the time, without thereby committing themselves to the nomological possibility of a frictionless plane or the like.

Moreover, if Descartes were to allow the possibility of an extended substance which is not corporeal, in that it is not mobile in anything like the way bodies are mobile, then it would be false that extension entails mobility. But Descartes clearly wants to hold onto the latter claim.¹⁵⁴ It is part of his more general thesis that extension is sufficient to constitute the nature of body. So Palmer’s “physical vacuum” is not only nomologically but logically impossible, according to Descartes. This is evident in Palmer’s discussion of another set of texts where Descartes addresses the vacuum in a physical context. Palmer claims that Descartes contemplates “the coherence of the possibility of vacuum” in his discussion (with

¹⁵⁴ See, for example, PP II 23 [AT VIII A 52; CSM I 232]: “All the properties which we clearly perceive in [matter] are reducible to its divisibility and mobility in respect of its parts.” [Translation modified from CSM, which has “divisibility and consequent mobility.” “Consequent” is not in the Latin.] See also the aforementioned letter to Mersenne: “Movements in the subtle matter are, I imagine, no different from those we already see in bodies.” [AT II 484-5; CSMK 133.]
Mersenne) of Galileo’s treatment of cohesion in the *Two New Sciences*.

Galileo argues for the existence of interstitial void, infinitesimally small empty spaces that are supposed to account for the cohesion of solid bodies. In this context he discusses the case of two smooth marble slabs, which stick together sufficiently that one can be lifted by the other, even though there is no “glue” or bond between them. Galileo claims that there is a momentary void between the two slabs when they are separated, lasting as long as it takes for the surrounding air to enter in between them. Descartes responds by denying that the slabs can be separated in a perfectly parallel fashion; one will always separate one side before the other, and thus the inference to the vacuum fails. Palmer points out that Descartes concedes the conditional claim that if one could separate them in that fashion, then a void would exist for a very short time. Thus, Palmer concludes, Descartes is allowing that some kind of physical vacuum is at least coherent.

But this only follows if Descartes thinks that a perfectly parallel separation of two perfectly smooth (and impermeable) surfaces is logically possible, and there is every reason to think that Palmer’s *modus ponens* is Descartes’ *modus tollens*. That is, since the vacuum is logically impossible, so is such a scenario. As will be clear in the following chapters, Descartes has no qualms about judging what appear to be

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155 Palmer, 41. Descartes’ discussion of Galileo’s work in correspondence with Mersenne begins in October 1638 [AT II 380; CSMK 124].

156 AT II 482; CSMK 132. Palmer’s reading of this passage seems questionable anyway, since Descartes appears to be talking merely about a space void of air; as Palmer points out, however, there is some variation in the textual sources here.

157 If he means merely a space void of air, then he is denying nomological possibility; if he means a space void of everything, then he is denying logical possibility. See previous note.
specifiable physical scenarios as logically impossible if their possibility entails that of a vacuum. That this is what he does here is supported by his remark about Galileo’s cohesion hypothesis, which involves the abhorrence of a vacuum: “If it were abhorrence of a vacuum that prevented two bodies from separating, there would certainly be no force capable of separating them.”\footnote{158 AT II 382; CSMK 125.} Palmer cannot make sense of this remark, but it makes perfect sense if Descartes is talking about an incoherent notion of vacuum. No force can bring about something logically impossible.

Bennett’s notion of a physical vacuum or “separator space” is less extreme than Palmer’s. Descartes does, in the passage quoted above, propose a perfectly non-resistant matter as logically possible. And this is essentially what Bennett’s separator space is: an absolutely non-resisting medium in which physical bodies move. But Descartes’ explanation to Mersenne also makes it clear that this kind of vacuum, strictly speaking, requires a miracle: some supernatural being has to intervene to make the medium move out of the way at just the right speed and in just the right direction for each body moving through it. All matter is subject to the first law of motion: “each thing, in so far as it is simple and undivided, always remains in the same state, as far as it can, and never changes except as a result of external causes.”\footnote{159 AT VIII A 62; CSM I 241.} This law, according to Descartes, accounts for “the power which all bodies have to act on, or resist, other bodies.”\footnote{160 AT VIII A 66; CSM I 243.} Obviously this is a problematic account of resistance, but Descartes just as obviously intends this to be a universal feature of
bodies. Thus it should be clear that Descartes’ supposition of non-resisting spaces is not an endorsement of a vacuum fundamentally different from body in its properties. This “vacuum” is just extremely subtle matter, which Descartes sometimes assumes, for simplicity, to be completely devoid of resistance, or absolutely subtle.

Nonetheless it is an interesting question whether subtle matter, or the matter of “the first element,” can really do what Descartes needs it to do without his tacitly ascribing fundamentally non-material properties to it. Descartes explains the fluidity, or subtlety, of his first element in terms of the speed of the relative motion of its particles. Since Descartes rejects the void in all the senses discussed above, and rejects rarefaction and condensation of matter, he has to show that motion is compatible with a rigid plenist universe. And in this context he argues that the division of matter, in at least some motions, is infinite. Descartes is cagey about using the term “infinite,” but he really commits himself to it here. This account occurs in \textit{PP II 33}; Descartes proposes a circular motion of bodies, each part of matter smoothly replacing the part ahead of it. Then he proposes a case where the matter has to travel through a continually narrowing gap at one part of its loop. The consequence is that some part of the matter has to be infinitely divided, so that it contains no particles of a definite size, but rather an infinite number of infinitely small particles, so to speak:

\begin{quote}
For it is impossible for the matter which now fills space G [the largest space through which a given volume of matter has to pass] successively to fill all the spaces between G and E [the smallest space], which get gradually smaller by countless stages, unless some part of that matter adjusts its shape to the innumerable different volumes of those spaces. And for this to come about, it is necessary that all its imaginable particles, which are in fact innumerable, should
\end{quote}
shift their relative positions to some tiny extent. This minute shifting of position is a true case of division.\textsuperscript{161}

So some matter, at least, must be perfectly subtle. On Descartes’ account of subtlety, the resistance of a fluid medium decreases as its actually divided parts become smaller and move faster.\textsuperscript{162} It seems that perfectly subtle matter would have to have actually divided parts that are infinitely small and move with respect to each other at an infinite speed. Since Descartes needs the matter to be perfectly fluid to avoid a vacuum in the case treated in II.33, he cannot just say that this matter consists of very small particles, or moves so quickly that we can assume its motion to be infinitely fast. He appears to be committed to motion with infinite speed, a disastrous result.\textsuperscript{163} So Descartes actually requires at least some of his subtle matter to have fundamentally incorporeal properties, since his corporeal explanation of subtlety cannot intelligibly account for the perfect subtlety or fluidity that his plenist physics requires.

\textbf{2.9 Conclusion}

Descartes commits himself, explicitly or implicitly, to a position on all the types of vacuum I have categorized in this chapter. The taxonomy I have proposed is helpful for understanding Descartes’ position, and for keeping things clear when interpreting the various texts that deal with the topic. What Descartes is most often concerned with, however, is the connection between extension and substance, and

\textsuperscript{161} AT VIII A 60; CSM I 239.

\textsuperscript{162} See AT VIII A 70-1; CSM I 245, and also AT VIII A 105; CSM I 258.

\textsuperscript{163} See Bennett, \textit{Six Philosophers}, 46-8.
that between extension and corporeality. The former is what most of the discussion in the *Principles* is aiming at, and addresses both Vacuum$_1$ and Vacuum$_3$ in my scheme. It is in his correspondence that Descartes directly argues for the claim that extension implies the distinctive properties of body, which is the basis for his rejection of Vacuum$_4$. On that subject there is an important difference between a kind of vacuum that differs from corporeal substance with respect to properties that are essential to the latter, and a vacuum that has the same nature as corporeal substance but exhibits different behavior. The former, according to Descartes is logically impossible; the latter is only nomologically impossible.

Descartes’ arguments against the vacuum do not have a high success rate. First, where his position is that distance relations conceptually presuppose extension, so that the relational version of Vacuum$_1$ is ruled out, it is not clear that he has any argument other than the general thesis that all the properties of corporeal substance presuppose extension. As Cordemoy points out, there seems to be nothing incoherent about a position that allows distance to be either “filled,” where there is continuous body between the distant objects, or empty, where there is not. Similarly, Descartes claims that an extended thing necessarily possesses the properties impenetrability, mobility, and divisibility, both metaphysical and physical. It is clear that Descartes cannot admit a fundamental and non-geometrical notion of impenetrability into the nature of body if he wants to have a fully and exclusively geometrical subject-matter for physics. Nonetheless his arguments that impenetrability, as well as divisibility and mobility, simply follow from the idea of an extended thing, are not persuasive. The alternative seems at least conceptually respectable: extended substance comes in at
least two different varieties, material and spatial; body is distinguished from space insofar as it is impenetrable, mobile and divisible.

There is tension between two aspects of the thesis that extension is the principal attribute of corporeal substance. On the one hand, extension is a highest class, or most general category. On the other hand, extension is supposed to entail what look to be more specific characteristics of body, like divisibility. One way to characterize the problem with Descartes’ position on the vacuum is in terms of a familiar Porphyrean “tree,” with genera, species and their differentiae. Descartes puts extension at the most generic level while expecting it to determine properties at a more specific level. Descartes is a confident philosopher, but he is also a brilliant one, and so the present evaluation is rather unsatisfying. How could Descartes not recognize that there were alternatives to his view that were conceivable? It is one thing to propose a highly specific conception of extended substance, but Descartes goes further and claims that the rival theories are strictly incoherent. This is a high level of dogmatism, which should, I think, lead us to think that Descartes had more to say about the matter. In Chapter Five I will argue that more can be said in Descartes’ favor here, such that his position is more compelling and his stance less dogmatic than they initially appear to be.
3.1 Introduction

The thesis that a vacuum is logically or conceptually impossible is radical, and earned Descartes a great deal of criticism. Following the normal assumptions of the period about possibility, many of Descartes’ critics took his position to imply that not even God could bring about a vacuum. This was not a happy result, in their view. Since Descartes held that God’s power extends beyond what is non-contradictory, he could, strictly speaking, claim not to have deserved this charge—and in fact he did make this claim. Nevertheless the dispute was not so much about possibility as about conceivability. Descartes’ pronunciations on divine omnipotence notwithstanding, his critics were simply unwilling to accept that a space without matter is strictly inconceivable.

More than this, many of them argued that certain other commitments of Descartes’ entailed the possibility of the vacuum, and that the core of his natural philosophy could do very well without this extravagant claim. Briefly, the argument strategy takes as a premise the independence of bodies from one another, sometimes basing this explicitly on Descartes’ writings. On this assumption, it is then claimed that one body can be removed from its place or annihilated without the surrounding bodies being affected. But this implies that the space the body had occupied is now unoccupied, so a vacuum is the result. Since the stipulated scenario is conceivable,
then the vacuum is too. This line of argument had a long history before Descartes, in fact, reaching back to the controversial incorporation of Aristotelian doctrines into Christian theology and philosophy.\footnote{See Grant, Much Ado, Part I Chapter 3. There is some discussion in contemporary metaphysics concerning “holes,” and there is interesting overlap between those discussions and the topic of this and the following chapter. For a recent example see A. Wake, J. Spencer, and G. Fowler, “Holes as Regions of Spacetime,” Monist 90 (2007): 372-378.} Descartes was well acquainted with it, and took it seriously enough to discuss it in the Principles, though his proposed solution was questioned by many of his philosophical interlocutors, including More, Arnauld, Gassendi, Cordemoy, Spinoza, Leibniz, Locke, and Bayle.

This chapter is devoted to the analysis of that discussion in the Principles and of two representative versions of such an argument, given respectively by Antoine Arnauld and Henry More. I have chosen these examples because both were posed in letters to Descartes, and thus his responses can be examined. Mersenne, as well, posed this sort of objection to Descartes well before the Principles were written; I will take Descartes’ reply to him into account as well. Both Arnauld and More claim that Descartes is committed to the possibility of the vacuum, and thus that he is guilty of inconsistency. Through a careful analysis of the discussions in the correspondence, I will suggest that these charges are not successful; Descartes’ position is not shown to be inconsistent. This is relatively easy to establish in the case of More’s argument, but the full resolution of the problem Arnauld raises for Descartes would require a comprehensive discussion of Descartes’ theory of extended substance, which is beyond the scope of this project. I make some suggestions on this topic in the Appendix. Arnauld’s argument, it will turn out, is helpful as a heuristic for
interpreting Descartes’ view of extended substance, because it establishes a certain combination of positions Descartes cannot endorse if he is to remain consistent. More generally, Descartes’ responses to both philosophers are helpful to see how his position on the vacuum hangs together with his other commitments.

3.2  *Descartes on the Thought Experiment: Can God Cause a Vacuum?*

Descartes was aware that his position on the vacuum would appear to put limits on God’s power in an unacceptable way, because it seems to rule out the possibility of God’s annihilating a part of the material world. This is perhaps one reason he holds back from making the strong claim against the vacuum in *Le Monde*.\(^{165}\) In a letter to Mersenne in 1639, Descartes addressed a scenario wherein God removes the contents of a vessel. Mersenne had apparently asked how Descartes could deal with such an event, given his thesis that the vacuum is impossible. Descartes thought it appropriate to consider the same type of scenario explicitly in the *Principles*. His conclusion is that the remaining bodies, which had surrounded the now-removed matter, would have to be in contact with each other once the event had occurred:

> Hence, if someone asks what would happen if God were to take away every single body contained in a vessel, without allowing any other body to take the place of what had been removed, the answer must be that the sides of the vessel would, in that case, have to be in contact. For when there is nothing between two bodies they must necessarily touch each other.\(^{166}\)

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\(^{165}\) AT XI 20-21; CSM I 87. Garber, 154.

\(^{166}\) AT VIII A 50; CSM I: 231.
The principle announced in the final sentence is based on the conceptual priority of extension. All the modes of a corporeal thing are conceptually dependent on extension – they cannot be conceived except as modes of an extended thing. Here the mode in question is distance, and the idea is that it reduces without remainder to extension or length. Thus for two bodies to be a yard apart is for there to be a yard’s worth of extended substance between them.

Descartes is careful in stipulating the conditions of the thought experiment. God takes away (auferat) all the contained bodies and does not allow any other(s) to take their place. Here the place can be understood either as internal or external; as I argued earlier, the presence of one entails the presence of the other. Descartes’ account of place entails that once God removes the contained bodies, there is no place or space left at all. The original body has been removed, and thus it does not occupy the place, and by hypothesis no other body occupies it. Descartes’ reductive analysis of space and place serves here to establish that the distance relations obtaining between the vessel’s sides depend on the extension of the contained matter. Get rid of the matter, and ipso facto you have gotten rid of the distance between the sides. Thus Descartes’ basic strategy is clear. For the same reason that a vacuum is logically impossible, the sides of the container will be in contact as soon as God’s intervention has occurred. Therefore there is no empty space left behind, and thus the possibility of the intervention does not imply the possibility of a vacuum.

Commentators on the passage sometimes treat the scenario described here as involving a geometrical absurdity, as if the vessel’s dimensions would be unaffected

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167 AT VIIIA 25; CSM I 210-11. See above, Chapter 1.
by the removal of the contents; all that would change is that there would somehow actually be no distance between the inner sides.\textsuperscript{168} In other words, the shape of the vessel would remain the same, but it would in fact contain no volume. A reading like this is natural if one thinks that Descartes is a monist about extended substance, because at least on some versions of that reading the selective annihilation of a part of the material world is inconceivable.\textsuperscript{169} It will be helpful to address this interpretation here; in the process it will emerge that Descartes deals with two distinct kinds of thought experiments along these lines. One involves the \textit{annihilation} of a part of matter, while the other supposes that a body is literally \textit{moved} from its place while all others are prevented from filling up the place that it leaves behind.

I take the position that in PP II 18 Descartes is envisioning a “collapse” of the vessel, so that it is no longer vessel-shaped. This does not mean that the sides of vessel move through all the intermediate places until they come into contact: if the annihilation of the contents is instantaneous, so is the collapse. The point is that the bodies surrounding the annihilated or removed matter undergo a change of their physical configuration. In support of this reading, the passage seems to be intended to show that Descartes’ view on the vacuum is not confuted by the possibility of such an

\textsuperscript{168} See Palmer, 32-5. Another example is found in section 1.2.5 in Hume’s \textit{Treatise of Human Nature} (Oxford: Oxford UP, 2000), 40-1. Leibniz also seems to have this in mind at one point: \textit{New Essays on Human Understanding}, trans. P. Remnant and J. Bennett (Cambridge: Cambridge UP, 1981), 155. See also Lennon, “Eleatic,” 46, though his position on this point is slightly ambiguous there. In conversation Lennon has made it clear that this is how he reads \textit{PP} II 18.

\textsuperscript{169} This depends on how the substance-mode relation is understood with reference to extension. If finite bodies are modes of the one extended substance, the annihilation of one of them might be conceivable. If, however, finite bodies are more like parts of the one extended substance, the situation would be different. If the remaining bodies could be conceived after one had been annihilated, then they would be really distinct, contra the hypothesis. Whereas in the first case, where bodies are modes, then each of them would be conceptually dependent on a third thing, namely the one extended substance, and thus they would not count as really distinct.
event. This is clearer, I think, in a parallel text, in Descartes’ letter to Mersenne of January 9, 1639:

If you wish to conceive that God removes all the air in a room without putting any other body in its place, you will have to conceive accordingly that the walls of the room touch each other; otherwise your thought will contain a contradiction [il faut par mesme moyen que vous conceviez que les murailles de cete chamber se viennent joindre, ou bien il y aura de la contradiction en vostre pensée]. Just as we could not imagine him flattening all the mountains in the world while leaving all the valleys, so we cannot think that he removes every kind of body and yet leaves space behind. For the idea that we have of body, or matter in general, is contained in the idea that we have of space, i.e. of something which has length and breadth and depth, just as the idea of a mountain is contained in the idea of a valley.170

The first thing to note is that he says “otherwise your thought will contain a contradiction.” If the annihilation produces a geometrical absurdity, then the thought will contain a contradiction in any case; if there’s no collapse, the annihilation is simply inconceivable, irrespective of whether one does or does not recognize that the sides are in contact. Descartes seems rather to be showing how one has to conceive the event in order to avoid contradiction, implying that one can in fact avoid it. Further, note that he carefully specifies that what is inconceivable is that space should be left behind as the result of the removal of all bodies. If the vessel collapses, however, there will be no empty space left behind, and Descartes says nothing here that suggests the collapse of the vessel is inconceivable.

One might respond that Descartes is being cagy, since he is treading on theologically dangerous ground—seeming to constrain Divine Omnipotence. That is in fact how many of his critics framed their objections: it seemed to them wildly

170 AT II 482; CSMK 132.
implausible that God should be constrained from annihilating one of his substances while leaving the rest alone. Perhaps, the objection might go, Descartes is really just dissembling by spelling out part of what must be thought in framing the annihilation scenario, rather than claiming to be offering a solution to the incoherence. It is true that Descartes here does not claim that the scenario is possible. Instead he identifies and disavows one way of conceiving it that would lead to incoherence, and this does not commit him to there being some way to construe the scenario as coherent. The objection is made more plausible by his language in both passages: “if someone asks,” “if you wish to conceive.” Perhaps, then, his real position is that the annihilation is strictly inconceivable, and he is just hesitant to say so explicitly. On this construction, Descartes is saying something like this: “Go ahead and talk about those inconceivable scenarios if you insist, as long as you remember two things: first, that the supposition of the annihilation means, by definition, that the surrounding bodies are in contact—so there’s no remaining gap, and thus I haven’t contradicted my position on the vacuum—and second, that God’s omnipotence is not circumscribed by what is conceivable to us—so I haven’t placed any undue restrictions on his power.”

I think this reading is implausible. When More pressed him on Divine Omnipotence and the possibility of the vacuum, Descartes was willing to say bluntly that the thought experiment as More wanted to think of it was inconceivable, even if we posit God as the agent. Descartes’ openness here makes it highly unlikely that he would care to be cagy on the issue to Mersenne, of all people, to whom he wasn’t afraid to admit the heliocentrism of *Le Monde* when he heard of Galileo’s
condemnation. If he thought the scenario genuinely inconceivable, then Descartes would in all likelihood have said so. He had already avoided the charge of constraining God’s power by extending that power beyond what is conceivable. As far as omnipotence is concerned, it would not matter if the annihilation scenario is inconceivable, because God is not restricted by contradictions. Hence Descartes did not have a pressing need to cover for himself further by admitting an incoherent thought experiment and spelling out how best to conceive of it.

There is one other point that might be pressed on behalf of the geometrical absurdity interpretation. In the French version of the *Principles*, Descartes adds that the sides of the vessel will come into contact “immediatement,” signifying that this is not to be construed as a process involving a time interval, but rather as an instantaneous event. Similarly, Sobrière recounted to Gassendi that when Descartes was asked, regarding such an annihilation scenario, whether the walls of a room (the contents of which are supposed to have been annihilated) would come into contact by moving towards each other, he responded that no motion would be necessary. This might seem to tell against my “collapse” interpretation and to favor the alternative, where the conclusion that the sides are in contact just stems from a conceptual truth rather than a physical result of the annihilation.

In both of these texts, however, Descartes’ concern is to avoid the implication that there is an empty space left between the sides of the vessel. The point of saying

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171 AT I 285; CSMK 42.
172 AT IXB 73.
173 AT IV 109. See also Garber, 342.
that no motion is required is that there is no distance that the sides have to traverse continuously in order to come into contact; once the annihilation has occurred they are *ipso facto* in contact. If Descartes were to allow that the collapse takes time, he would have to admit that a vacuum existed, if only for a few moments. This move does not imply anything about whether or not the vessel or room collapses—that is, whether it changes shape. If I am right, the result of the annihilation is that the matter constituting the vessel is no longer shaped like a vessel: it no longer has a concave inner surface. Instead of a glass pitcher there is a solid glass cylinder, or something like that.\(^{174}\) If the annihilation occurs instantaneously, then the collapse is instantaneous as well.

The strongest reason to reject the geometrical absurdity account will emerge from the detailed account of the arguments formulated by More and Arnauld. Here I will give only a brief preview. More does not postulate an annihilation, but rather God’s performance of a certain combination of motions. God moves a body out of its container and constrains any others from taking its place. As I will show, in this case it is evident that Descartes says that the container must collapse. The geometrical absurdity account is inapplicable in this case.

There is every indication that Descartes gave the same answer in the case of annihilation, as will be evident in discussing Arnauld’s argument below. In fact the passages in the *Principles* and the letter to Mersenne are ambiguous in this respect. God “removes” the matter from the container, but it is not specified whether this is

\(^{174}\) It is indicative of the weirdness of this scenario, its uneasy position between physical and conceptual issues, that it is hard to say what shape a given vessel would assume post-annihilation. Descartes, understandably, never tries to answer this question.
annihilation or a motion. If anything, the texts favor interpreting these as “motion
cases” rather than “annihilation cases.” Further, when Descartes responds to Arnauld,
who explicitly proposes the case of annihilation, he says that he has nothing to say
that he did not already cover in the *Principles.* The evidence is strong, then, that in
all of these cases Descartes understands the situation in the same way: the matter
surrounding that which is removed undergoes a “collapse.”

3.3 Arnauld’s Objection and Counterproposal

Arnauld, writing to Descartes in 1648, disputes the position Descartes takes
regarding the vacuum’s possibility. Arnauld makes a highly interesting case for the
claim that a barrel, even with its contents annihilated, could remain intact, with the
same distance between its sides as before. This amounts to a version of Vacuum₁, as
should become clear. Arnauld has obviously studied the *Principles* very carefully. He
poses the initial Cartesian response to the scenario and then tries to show how a
vacuum can be admitted without violating the central features of Descartes’ position.
The articulation of the problem and the solution proposed are subtle, and deserve
close attention here.

But you [Descartes] will say that if a vacuum is given, all the
properties of a body will belong to it, namely width, depth, divisibility,
etc.; therefore it would really be a body. I answer, no property belongs
to the vacuum itself, inasmuch as it is nothing, but only to the
concavity of the barrel, whose parts are so many feet distant from each
other, etc. And the body contained within the sides of the barrel
confers nothing on the barrel, and hence it is no surprise if, with that
body removed, the same properties of the concavity should belong to
it. For since the vessel and the wine, or whatever other body contained
within the sides of the vessel, are obviously two different substances,

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¹⁷⁵ AT V 194; CSMK 355.
either is able to be completely conceived without the other. I ask, therefore, while the vessel is considered in itself, whether I cannot measure its concavity, and understand how many feet it stands from the base, what the diameter of the cylindrical concavity is, and other things of this kind? Hence I say that only these properties remain, given that the body contained in the barrel has been annihilated, and not the properties that belong to that body separately, as for example, that its parts can be mutually separated from each other, and agitated by various motions.¹⁷⁶

In unpacking this passage, it becomes clear that Arnauld applies a very specific understanding of the real distinction between bodies. First, he assumes that the barrel and its contents are really distinct. There is strong evidence in the *Principles* that Descartes held this to be true: “And we can also be certain that, if [corporeal substance] 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.”¹⁷⁷ Arnauld then infers that the barrel and the wine inside it can be clearly and distinctly understood, each apart from the other. Again, he is on firm ground from the Cartesian perspective. Descartes is more often concerned with the converse of the principle here; normally he argues from the premise that two things can be clearly and distinctly conceived apart to the conclusion that they are really distinct. In this context, however, Arnauld’s move is unproblematic, since Descartes claims that we can be certain of the real distinction between the different parts of matter.¹⁷⁸ In the Second Replies

¹⁷⁶ AT V 190-1.

¹⁷⁷ AT VIII A 28; CSM I 213.

¹⁷⁸ In other words, Arnauld’s inference does not depend on the general principle that real distinction between two items implies that we are able to clearly and distinctly conceive the items separately. Arnauld is merely pointing out that Descartes claims that we in fact know that these two objects are really distinct, and that we can only have such knowledge when we can clearly and distinctly conceive the items separately.
Descartes makes it clear that whenever we know two things to be really distinct, it is because we can clearly and distinctly conceive each apart from the other.179

The condition that we must be able to conceive each object apart from the other is ambiguous as stated. What exactly is meant by “apart from the other”? Here again Arnauld is careful to interpret according to Descartes’ own usage, where “apart from” has a distinct ontological import. For example, Descartes bases his claim that he clearly and distinctly conceives the mind apart from the body on the arguments of the Second Meditation.180 According to Descartes’ account in the Synopsis, what is accomplished in the Second Meditation is the formation of “a concept of the soul which is as clear as possible and is also quite distinct from every concept of body.”181 Descartes forms this concept by supposing that all the objects of the imagination, and thus the things represented by “every concept of body,” do not exist. Even while he supposes this, however, he is still certain of his existence as a thinking thing. This is what substantiates the claim that he clearly and distinctly conceives of his mind apart from all bodies. Hence in this case the conceivability of one thing, A, apart from another, B, has two aspects: A is clearly and distinctly conceived as existing, and can be so conceived whether or not B is conceived as existing.

On the basis of this example, the claim that the barrel and the wine are really distinct cannot just mean that they are spatially distinct or non-overlapping, or that no part of the one is a part of the other. It must mean that the barrel can be clearly and

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179 AT VII 132-3; CSM II 95.

180 This is presented most clearly in the Synopsis of the Meditations: AT VII 12-13; CSM II 9.

181 AT VII 13; CSM II 9.
distinctly conceived as existing whether or not the wine is conceived as existing. The import of “apart from” is ontological: the idea is that the existence of A is conceptually independent of the existence of B. On my reading this is also the position in the letter to Gibieuf, as discussed above in Chapter Two.

Hence, in Arnauld’s thought experiment, if God annihilates the wine (and does not replace it with something else), we will still be able to clearly and distinctly conceive the barrel. Arnauld infers from this that the properties of the barrel that belong to it while there is wine (or something else) within it will also belong to it when the contents have been annihilated. This is implausible if the properties in question include everything that can be predicated of the barrel, for surely the truth of the claim that the barrel is full of wine is dependent on the existence of wine within it. Arnauld has some more restricted set of predicates in mind, then, when he says that the contained body “confers nothing on the barrel.”

The crucial move in the argument is to include the barrel’s shape, or concavity, as one of the properties that are independent of the existence of the contents. As I have argued, Descartes’ treatment of the similar scenario in PP II.18 invokes the collapse of the vessel; the shape is not independent of the existence of some contents or other. In fact Arnauld is surely targeting Descartes’ claim that “there is a very strong and wholly necessary connection between the concave shape of the vessel and the extension, taken in its general sense, which must be contained in the concave shape.”\textsuperscript{182} Since it is not implausible to thing that the container’s shape is an intrinsic property of it, it is not unreasonable for Arnauld to include it as a property

\textsuperscript{182} AT VIII A 50; CSM I 230. I discuss this “necessary connection” further in Chapter Five.
that the barrel must have whether or not any contents exist. To sharpen the point, Arnauld is here assuming that the barrel’s shape is essential to it, in the sense that the barrel’s identity depends on it. I think Descartes rejects this assumption; I will address this more fully below. To sum up the present discussion, I will examine the extent to which Arnauld succeeds in retaining key Cartesian positions while allowing the possibility of a vacuum.

As I noted in Chapter One, Descartes concludes his discussion of the relation between space and body with a semantic claim: “The terms ‘place’ and ‘space’, then, do not signify anything different from the body which is said to be in a place.”¹⁸³ Part of Descartes’ point here is that body is conceptually prior to space; it is only by manipulating our notion of bodies in a certain way that we can even frame the idea of a space. The semantic and conceptual theses here have ontological weight. There is no such thing as a space independent of body. It is important for Arnauld’s suggestion that it preserves these points. There is no separate thing signified by the term ‘space’, even though it is possible for there to be no body at all within a given space. Arnauld’s empty space is not an entity at all: “no property belongs to the vacuum itself, inasmuch as it is nothing.” What seem to be the vacuum’s properties really belong to the barrel’s concavity; the vacuum is defined by properties belonging to the concavity. Hence this empty space is conceptually and ontologically dependent on the barrel and the particular shape it has.

Arnauld also preserves the crucial metaphysical principle underlying Descartes’ rejection of the vacuum: there can be no attributes that do not inhere in a

¹⁸³ AT VIIIA 47; CSM I 228.
substance. In Descartes’ argument this principle is supposed to secure the inference from two bodies’ being separated from each other by some distance to the existence of extended substance between them. On Arnauld’s interpretation of his thought experiment, the distance between the sides would be referred to the “concavity of the barrel.” Thus there would be no substance-independent properties; rather the geometrical properties in question would have the vessel as their subject. This goes along with the previous point: the extension within the barrel is not independent of body, because the properties which constitute that extension inhere in and therefore depend on the barrel itself. On Arnauld’s view, then, there can be a space without body, a vacuum, and yet no free-floating properties are implied.

I have already indicated how Arnauld adopts Descartes’ thesis that the parts of matter are really distinct from one another. Thus he preserves the plurality of extended substances, the conceptual and ontological dependence of space on body, and the prohibition of free-floating properties. Arnauld deftly shows how these core theses can be retained while spatial and material properties are teased apart. Any determinate region of extension is separable from the presence of any matter at all within it, because the region is uniquely determined by the inner surface of the surrounding bodies, just as the region inside the barrel is uniquely determined by the barrel’s inner surface. The suggestion to Descartes is that his physics and concept of matter can be saved, while respecting the power of God over each individual substance, by this subtle adjustment to the conceptual relation between space and matter.
This suggestion was objectionable to Descartes, nevertheless. His response to Arnauld is terse and seemingly stipulative: “What you call the hollowness of a barrel seems to me to be a body with three dimensions, not to be identified with the sides of the barrel.”\footnote{AT V 194; CSMK 355.} Descartes does not defend his position against the charge of inconsistency; he merely maintains the sufficiency of what he said in the \textit{Principles}. For my interpretation it is significant that he does not think the explicit annihilation scenario here requires any different response than the ambiguous “removal” thought experiment of \textit{PP} II 18. As I noted above, this suggests that the “collapse” account is meant to apply to both the “motion” and the “annihilation” cases.

Though he does not identify which premise or premises of Arnauld’s argument he would reject, Descartes does express his reason for rejecting Arnauld’s claim that the properties which would seem to belong to the vacuum really belong to the concavity. Descartes’ response, in all its brevity, does not acknowledge the subtlety of Arnauld’s suggestion, but it is ingenious in its own right, and goes immediately to the heart of the matter. Descartes holds that the extension of corporeal substance is identical with the substance; this is one of the key moves he makes in rejecting the scholastic account of matter.\footnote{See \textit{Le Monde} (AT XI 35-6; CSM I 92) and \textit{Principles} II:8 (AT VIII A 44-5; CSM I: 226).} If the geometrical properties constituting a three-dimensional extension are to \textit{belong} to the inner surface of the barrel, then those properties must be \textit{identified} with that surface. But the surface is two dimensional, albeit cylindrical, so the properties which supposedly belong to it cannot be identified with it. Again, Descartes’ response is short, but in my view it is very
clear what he has in mind. He mentions two items: the extension within the barrel and the sides of the barrel; he notes that the former is three-dimensional; and he says that it cannot be identified with the sides. Descartes requires that a corporeal substance is the subject of its extension, when the latter is considered as something predicated of it, but also that the substance is identical to its extension. This dual requirement rules out Arnauld’s move. Arnauld can provide a subject for the properties only by violating the identity of extension and its subject.186

There still remains, of course, the problem of how Descartes avoids Arnauld’s conclusion. Descartes does not identify which premise or premises of the argument he rejects. I have suggested, however, that he must deny that the barrel’s shape is an essential property of it; I will say more about this in Chapter 6, though a full account of how Descartes thinks of extended substances is beyond the scope of this dissertation. For now it will suffice to note what Arnauld has established negatively for Descartes—that is, what Descartes cannot admit if his position is to be consistent. Arnauld has laid out an inconsistent triad for Descartes:

*The barrel and the wine contained in it are really distinct.*

*The barrel’s shape is essential to it—that is, the barrel’s identity depends on it.*

*It is impossible for a vacuum to exist.*

186 I discussed this briefly in Chapter Two above in the discussion of Vacuum1. I should add that even if the subject of the properties defining Arnauld’s vacuum is the barrel rather than the barrel’s concave inner surface—Arnauld seems to suggest the latter, but it is not clear that the surface can be a subject of properties anyway—the problem remains basically the same. The extension within the barrel is a different shape than the barrel is, and a different size. So there is still geometrical non-identity, and that is the problem from Descartes’ point of view.
In the Appendix I indicate a reading on which Descartes rejects the second of these propositions. In the next section I will examine a different but closely related argument for the possibility of a vacuum.

3.4 Henry More: Divine Extension and the Physical/Logical Distinction

Henry More also wrote to Descartes with criticisms of the position on the vacuum articulated in the *Principles*. The kind of empty space More defends is clearly a version of Vacuum4: an extended substance that is not corporeal. More, like Arnauld, took pains to establish the independence of much of Descartes’ natural philosophy from his strict stance on empty space. So again we have an argument to the effect that Descartes is committed by his own positions to the possibility of the vacuum, along with the suggestion that admitting this has no negative effects on the core of Descartes’ natural philosophy. I will deal with these two aspects in turn.

In contrast to Arnauld’s annihilation scenario, More’s thought experiment involves a certain combination of motions.

When you imply that not even divine power is able to bring about a vacuum, strictly speaking, and that if all body were removed from a vessel, the sides would necessarily come together, this indeed seems to me not only false, but inconsistent with what came before. For if God imparts motion to matter, as you have held, can he not press against the sides and prevent them from coming together? “But,” you will say, “it is a contradiction for the sides of the vase to be apart, with nothing lying between.” The learned ancients did not think so: Epicurus, Democritus, Lucretius, and others. But in order to give up this weakest form of argument, I contend that Divine extension lies between the sides, and that your supposition here, that matter alone is extended, is weak. The sides, moreover, will come together, not by logical necessity, but by natural necessity: only God can prevent it. For since the particles of the first and second elements move with such violent
motion, it is necessary that, where matter is removed, they will rush in rapidly, and carry along the other particles contiguous to them. \(^{187}\) More is responding directly to PP II 18; significantly, he reads it as a case not of annihilation, but of removal in the physical sense. More grants to Descartes that what we call “empty” in the normal course of things is not truly devoid of matter, but just of the kind of matter relevant in those situations. \(^{188}\) More is also happy to concede that a created being cannot “empty” a vessel in the strict sense; some matter will still be there. He construes this, however, as a physical and technical limitation. If no creature can pump all the matter out of a chamber, for instance, that is because there is physically no way to stop the smallest kind of material particles from penetrating between the particles of the chamber’s sides. God’s power, however, is not subject to limitations of this kind. Perhaps God cannot bring about something contradictory, but according to More there is nothing incoherent in his proposal.

More argues that the scenario is genuinely conceivable because all it requires is that postulation that God can move matter as he pleases. He points out that by hypothesis the situation described in PP II 18 already involves God’s removing matter from a vessel, and by the same token we can just stipulate that God applies a resistance to the pressure of the surrounding bodies. This is what is intended by the claim that Descartes’ position is “inconsistent with what came before.” Descartes, More objects, allows that God can remove the contents, yet implicitly requires that God cannot (conceivably) impart an equal and opposite pressure against the sides of


\(^{188}\) AT VIII A 49; CSM I 230.
the vessel to keep it from collapsing. Now Descartes certainly holds that God is responsible for the motion in the material world: “God imparted various motions to the parts of matter when he first created them, and he now preserves all this matter in the same way, and by the same process by which he originally created it.” More’s assumption, however, is actually more specific than this; his argument requires that the motion of the contents out of the vessel and the outward motion of the vessel’s sides, which opposes the inward pressure of the surroundings, are independently specifiable motions, so that each can be conceived independently of the other. Any connection between the two must be physical and causal rather than conceptual.

This assumption about motion is the contentious one for Descartes. His first point in response to More’s thought experiment is to point out that he does not infer that God absolutely cannot do such a thing, but only that he cannot do so in a way conceivable to us. As I noted above, this is Descartes’ default response to worries about God’s omnipotence and the vacuum: he separates conceivability and possibility-for-God. With that point made, he goes on to deny emphatically that More’s scenario is conceivable as described.

And so, since I see that it conflicts with my way of conceiving things for all body to be taken out of a container and for there to remain an extension which I conceive in no way differently than I previously conceived the body contained in it, I say that it involves a contradiction that such an extension should remain there after the body has been taken away. I conclude that the sides of the container must come together. This is altogether in accord with my other opinions. For I say elsewhere that all motion is in a manner circular[PP II 33]; from which it follows that it cannot be distinctly understood that God should remove some body from a container unless we understand at

189 AT VIIIa 62; CSM I 240.
the same time that another body, or the sides of the container, should move into its place by a circular motion.\textsuperscript{190}

Descartes freely admits that his position on the vacuum puts constraints on which combinations of motions are conceivable, and he points to \textit{Principles} II.33 where he explicitly drew that conclusion. So he simply rejects More’s supposition that the thought experiment is possible, or rather conceivable. Supposing that God can move a chunk of matter is fine, but it is quite another thing to suppose that he simultaneously moves other bodies in a way that disrupts the circular loop of bodies in motion. If God removes the matter from the vessel \textit{and} keeps all other bodies from filling the vessel, then the sides of the vessel must come together. This is a matter of conceptual necessity, not a physical fact relative to the limited power of created things. It is clear, then, that More has not established an inconsistency in Descartes’ view. The latter simply bites the bullet and embraces the constraints on motion entailed by the impossibility of the vacuum, along with the absolute inelasticity and impenetrability of matter.\textsuperscript{191}

Incidentally, it should be noted that in this case it is indisputable that Descartes is talking about the vessel’s collapsing. The contents are literally moved out of the vessel, and what follows is that \textit{either} some other matter takes its place and fills the vessel, \textit{or} the sides of the vessel come together. These are two ways a circular motion could occur, given the initial removal of the contents. Thus here when Descartes talks about the sides of the container coming into contact, he is explicit that

\textsuperscript{190} AT V 272-3; CSMK 363.

\textsuperscript{191} For the analysis of Descartes’ theory of motion in a plenum based on these three premises, see Bennett, \textit{Six Philosophers}, 53.
this is by an actual *motion*. Thus the geometrical absurdity account I considered earlier is not an option here. And if we note the close correspondence between Descartes’ language here and his discussion in *Principles II*.18, it is clear that he is making the same point. There, just as here in the letter to More, the hypothesis is that God removes all the contents of the vessel *and keeps* all other bodies from replacing the contents. The conclusion is that “the sides of the vessel would have to be in contact.”192 He is more explicit in the letter that motion is involved, but the accounts correspond fully.193 I take this to be sufficient to dispose of the geometrical absurdity interpretation.

Returning to the reply to More, it should be said on More’s behalf that Descartes invites this kind of objection by using causal language to refer to the motion of a loop or circle of bodies. Descartes acknowledges that the entire circular motion happens simultaneously, because the material world is not just a plenum, but a rigid plenum.194 Descartes nonetheless describes the scenario as if one of the bodies is moving the one in front of it, and that one moving the one in front of it, and so on. The problem, of course, is that any part of the loop is equally cause and effect, so it is arbitrary to single one out as the cause. There is, really, no “pushing” going on at all,

192 AT VIIIA 50; CSM I 231.

193 There is the potential problem that in the French edition of the *Principles* the sides are said to come into contact “immediately,” which on my reading is more appropriate for the annihilation than for the removal scenario. But since the plenum is rigid, there is no time lapse between the removal of the contents and the collapsing motion of the sides, and this might explain the addition of “immediately.” In any case the authenticity of isolated revisions like this in the French edition is uncertain, so I do not take this as a significant problem either way.

194 AT VIIIA 58; CSM I 237-8.
just simultaneous replacement.\textsuperscript{195} In using causal language here, Descartes inadvertently invites the critical reader to question the view by deploying judgments about what sort of occurrences of motion’s being caused are conceivable. This is just what More does; if “pushing” is involved, then surely the power to push matter will come in degrees. In terms of natural causes, nothing will have the power to prevent the circular replacement loop in all cases of motion. God’s omnipotence, however, transcends all such limitations. So More is picking up on Descartes’ claim that physical causality is involved here, and drawing on that to argue against the logical necessity for circular motion and the plenum.

I have suggested that Descartes cannot justify his use of causal language in describing the simultaneous motion of the parts of a loop of matter. Nevertheless he does use this language, notwithstanding the fact that he completely rejects More’s attempt to apply the distinction between natural and logical necessity here.

I do not agree with what you very generously concede, namely that the rest of my opinions could stand even if what I have written about the extension of matter were refuted. For it is one of the most important, and I believe the most certain foundations of my physics; and I confess that no reasons satisfy me even in physics unless they involve that necessity which you call logical or analytic, provided you except things which can be known by experience alone, such as that there is only one sun and only one moon around the earth, and so on.\textsuperscript{196}

Descartes’ view on causation in the natural world is of course an area of long-standing dispute, and one which I will not deal with here. I merely flag the point because Spinoza’s argument, which I will treat in the next chapter, brings it up again.

\textsuperscript{195} For an account of this problem see Lennon, “Eleatic,” 31, and Bennett, \textit{Six Philosophers}, 53-55.

\textsuperscript{196} AT V 275; CSMK 364-5.
to a different purpose. It is not just causation that is at issue here, but explanation. In the passage just quoted, Descartes claims that for a broad range of explananda in the material world he will only accept explanations, or “reasons,” that involve logical necessity.

Returning to the text at hand, More not only argues that Descartes must allow for empty space, he also proposes a way to understand that spatial extension in a conceptually respectable way. In order to answer the Cartesian objection he poses to his own scenario, namely that the supposed vacuum must in fact be something extended and therefore material, More refers back to the more general agenda of his letter. He opens his criticisms of Descartes by claiming that the identification of matter and extension is a mistake, since although everything material is extended, not everything extended is material. As a counterexample he proposes God and the angels as immaterial beings that are extended in some way. As Jasper Reid has recently shown, in his letters to Descartes More did not advance the conception of Divine absolute space that is closely associated with him; Reid argues persuasively that More did not adopt that conception until around a decade later.197 In the correspondence with Descartes More still asserts his earlier view that God’s extension amounts to the presence of his entire essence at each point. In More’s later works he dubs this Neo-Platonic position “holenmerianism,” and there he argues strenuously against it.

Thus when More says that “Divine extension lies between the sides” of the vessel, he does not mean that the vessel circumscribes an empty portion of absolute space. He means only that God is wholly present at each point within the vessel, just

197 Reid, 19.
as he is wholly present in every point of the material world. It is not the case that part of God is here and another part is there, nor that he is divisible. The “holennerian” conception of spiritual presence is explicitly designed to accommodate the simplicity of spiritual substances, and in the case of God, to reconcile his immateriality and simplicity with his ubiquity. More calls this an “analogical” attribution of extension; God is not extended in the very same sense that bodies are. Nevertheless, he maintains, this is a genuine kind of extension, enough to derail Descartes’ inference from extension to matter.198

Reid points out that in More’s works in the 1640s and ‘50s, he associates space with “Hyle,” the lowest level in his hierarchical Neo-Platonist ontology.199 Hyle is simply the potentiality for corporeal beings to be created. Nevertheless in this period More understands Hyle as extended, with discernible partes extra partes.200 It is true that in the letters to Descartes More never mentions Hyle or discusses space in its own right. Nevertheless this notion of space as an extension of possible locations is helpful to understand his suggestion to Descartes. The divine extension between the vessel’s sides consists, as I noted above, in the complete presence of God in each part

198 Des Chene (387-8) relates More’s position here to that of Suarez. They have basically the same view about Divine presence, but More, unlike Suarez, thinks that God’s presence warrants attributing extension to him. Incidentally, Suarez’s position is an example of Vacuum; that is potentially relevant for Descartes.

199 Reid, 5-6.

200 Reid (6) quotes this passage from the 1655 Appendix to the Antidote to Atheism:

[T]his Imagination of Space is not the imagination of any real thing, but only of the large and immense capacity of the potentiality of the Matter, which we cannot free our minds from, but must necessarily acknowledge, that there is indeed such a possibility of Matter to be measured upward, downward, every way in infinitum, whether this corporeal Matter were actually there or no.
of that extension. But on what grounds can More assert that God is present not only where corporeal substance is, but also where it is not? The notion of possibility is crucial here. God is present wherever he acts or is capable of acting. More sees nothing contradictory about the claim that God is able to act where there is in fact no corporeal substance. At this stage in his career, however, he does not ground this possibility on the actual existence of absolute (and divine) space. God just is present everywhere bodies can be located, and his power is not circumscribed by the actually existing collection of bodies that makes up the world.

In response to More, Descartes admits that God is present everywhere in virtue of his power, and he even admits that “God’s essence must be present everywhere for his power to be able to manifest itself everywhere.”\(^{201}\) Thus far he assents to More’s “holenmerist” conception of God’s extended presence. Hence in his second reply he declares that he and More “are in substantial agreement,” and that all that is left is “a question of terms.”\(^{202}\) This is not quite right, however. For Descartes, it is legitimate, though potentially misleading, to say that God is extended, but only insofar as divine power is considered in relation to corporeal substance: “I think that God is everywhere in virtue of his power; yet in virtue of his essence he has no relation to place at all.”\(^{203}\) Crucially, for Descartes this means that God’s ubiquity, which after all just amounts to the power to act everywhere, is to be understood only in terms of corporeal substance, because all places, even possible ones, are to be

\(^{201}\) AT V 403; CSMK 381.

\(^{202}\) AT V 342; CSMK 372.

\(^{203}\) AT V 343; CSMK 373.
understood only in those terms. God is present in every place, but there can be no places empty of matter; the mere appeal to God’s presence cannot justify the contrary assertion. More, on the other hand, asserts God’s extension as something independently intelligible; God would still be extended “in his own way” if there were no corporeal substances. Corporeal substance is extended not because it is corporeal, but because it is a substance. So being a body is just one way a thing can be extended; divine extension is an equal genuine species of extension, and hence not conceptually restricted to the limits of corporeal extension.

So at this point More asserted the divine presence in possible but non-actual locations of corporeal substance. Already he had the tools to argue that spatial extension is conceptually prior to material extension. Hence it is not surprising that in his later works he more clearly elevates space to the status of a divine attribute rather than a mere potentiality. His position at the time of the Descartes correspondence is unstable. It includes the conceptual priority of spatial extension, but is ambiguous about the ontological status of that extension. This is evident from Reid’s suggestion that at the time of the letters to Descartes, More’s spatial extension is merely the possibility of God’s action. Reid gives a careful treatment of these letters, but in them More clearly says that the extension left in the vessel is an attribute of God independent of the existence of matter: God is extended. Is Reid simply mistaken, then?

204 In fact, as Reid (5) points out, More at this time is at least open to the view that this spatial Hyle figures into the creation account. Like the “receptacle” of the Timaeus, this extension is prior to bodies and is a condition for the possibility of their creation.

205 AT V 305: “Nego enim extensionem corpori competere, quatenus corpus est, sed quatenus ens, aut saltem substantia est.”
The ambiguity here is plausibly due to a shortcoming of the holenmerian position itself, or rather its unsuitability for the task More sets for it. It is arguable that this understanding of spiritual extension is inherently derivative; one can say that God is wholly present in each part of extension, but this seems to presuppose that the extension is already there. It is hard to see how extension could consist merely in God’s holenmerian presence. If God is the same, entire and indivisible in each part, then where does the extension, the spread-out character, come from? This is presumably why Reid claims that More’s early view includes the thesis that “God is not extended.” Reid overstates his case; as I noted, in the letters to Descartes More explicitly claims that divine extension is genuine extension, and clearly implies that it is not dependent on the existence of material extension. Reid’s understanding of the holenmerian position is nonetheless sensible. The position was, after all, explicitly designed to preserve the simplicity of the divine essence.

Thus Descartes’ complaint that God essentially has no relation to place at all is understandable too. It is not clear how the early More can ground his understanding of spatial extension as independent of material extension. In order to secure this independence, More has recourse to God’s holenmerian presence. But again, this seems to presuppose already an extension with *partes extra partes*. And the early More has not settled on the ontological status of such an extension; more to the point, he makes no mention of it in the letters to Descartes, but seems to think that God’s power is sufficient. If holenmerian presence presupposes extension with *partes extra partes*, then it seems More can only appeal to the divine presence in the vacuum if he is already conceiving of some non-material extension there for God to occupy. If
instead he appeals directly to God’s power, then the question becomes: What is this
divine power? It is a power to occupy what, exactly? The early position would
suggest that God is not occupying any real being; spatial extension as Hyle just is the
possibility of God’s acting. But More’s conception of this spatial extension is doing
more work than that: it is what gives content to the notion of God’s power here.

However that may be, by the time More writes the *Enchiridion Metaphysicum*, the ontological status of space has decisively caught up to the conceptual:

For this infinite and immobile extension will be seen to be not something merely real (which we have noted in the last place) but something divine after we shall have enumerated those divine names or titles which suit it exactly, and with the greatest certainty make it not possible to be nothing, seeing that so many and such excellent attributes fit it. Of which kind are those which follow, which metaphysicians specifically attribute to First Being. Such as one, simple, immobile, eternal, complete, independent, existing from itself, subsisting by itself, incorruptible, necessary, immense, uncreated, uncircumscribed, incomprehensible, omnipresent, incorporeal, permeating and encompassing everything, Being by essence, Being by act, pure Act.  

More’s absolute space is extended in the normal sense; it has *partes extra partes*. He has decisively rejected the holenmerian understanding of God’s extension.

Nevertheless, he still has ample resources to distinguish between spatial and corporeal extension, as the above list of attributes somewhat hyperbolically suggests. Space, though it genuinely extended, does not have “physical parts”—that is, parts which can be actually separated or removed from each other. The whole of space is prior to the parts. Hence these parts are immobile. More also attributes penetrability to space and

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impenetrability to matter; this was already a central issue in his letters to Descartes, as I discussed in Chapter Two. Absolute space is indivisible, immobile, penetrable, while corporeal substance is divisible, mobile, and impenetrable.

Descartes, of course, does not give up on the claim that everything extended is material. No matter whether More proposes Divine extension as holenmerian presence or as absolute space, Descartes objects that once something extended is given, the properties that constitute matter are given as well:

For in a space—even an imaginary and empty space—everyone readily imagines various parts of determinate size and shape; and some of the parts can be transferred in imagination to the place of others, but no two of them can in any way be conceived as compenetrating each other at the same time in one and the same place, since it is contradictory for this to happen without some part of space being removed. Now since I consider that such real properties can exist only in a real body, I dared to assert that there can be no completely empty space, and that every extended being is a genuine body.207

The point is that More’s spatial extension is not conceivable; we simply cannot conceive clearly and distinctly of extension without recognizing in it the distinctively material properties of impenetrability, divisibility, and mobility.

The debate between More and Descartes seems to arrive at an impasse, then. More spells out a concept of extension that admits of incompatible differentiae, which in turn characterize different species of extension: material and spiritual. Descartes steadfastly resists, not willing to admit that extension is such an indeterminate concept. The question, at this point, is whether anything can be said for Descartes’ intransigence. Given that he and his critics have incompatible accounts of space and matter, and none of them, apparently, is able to convict his opponent of

207 AT V 271; CSMK 362.
inconsistency, why is Descartes so fixed on the idea that his way is the only way? More saliently, is he at all justified in being so stubborn? I take that question up in Chapter Five; in the next chapter I discuss Spinoza’s highly interesting version of the annihilation scenario argument.

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208 I make this remark in anticipation of the Appendix, where I suggest that Descartes can and does understand the real distinction between bodies in a way that allows him to avoid Arnauld’s charge of inconsistency. In More’s case the inconsistency is avoided simply by Descartes’ denial that the set of motions specified by More is a conceivable one.
CHAPTER FOUR
DESCARTES’ CRITICS II: SPINOZA

4.1  Introduction

Another group of philosophers responding to Descartes constructed arguments similar to those discussed in the last chapter. That is, these philosophers also claimed that if bodies are really distinct from one another, then the vacuum is possible. Unlike More and Arnauld, however, philosophers such as Robert Desgabets, Pierre-Sylvain Régis and Spinoza privileged the Cartesian position on the vacuum, turning the argument on its head to establish that bodies are not really distinct, but modes of a single indivisible substance. As in the last chapter, here I select a representative example of this line of argument rather than carrying out a comprehensive survey of its instances. Spinoza is the focus of this chapter, for several reasons. Spinoza is, of course, generally considered a more major figure in the history of philosophy than the Cartesians Desgabets and Régis. 209 His argument, moreover, has been misunderstood in the literature, and influential reconstructions of it have unfortunately obscured its connection to the types of arguments treated in Chapter Three. 210

209 This remark is not meant to downplay the importance of recent studies establishing the historical and philosophical importance of their work. See especially Schmaltz, Radical Cartesianism.

210 While this chapter was in the final stages of preparation I became aware of an article advancing an interpretation of Spinoza’s argument very similar to mine: Thaddeus Robinson, “Spinoza on the Vacuum and the Simplicity of Corporeal Substance,” History of Philosophy Quarterly 26 (2009): 63-82.
There is, finally, a reason more germane to my topic here: Spinoza articulates, in a way the arguments of Regis and Desgabets do not, problems in the way Descartes proposes his vortex theory of motion in a plenum. In Spinoza’s interpretation of Descartes, the necessary truth that every moving body must be part of a continuous loop of matter is the basis for a mechanistic causal law: a body can be moved only by the impulse of another body. This interpretation is encouraged by Descartes’ discussion of such patterns of motion in causal terms in the *Principles*. By examining Spinoza’s argument we can see how he (Spinoza) follows up on this discussion to build a theory of extended substance as both conceptually and causally self-contained. The argument thus indicates an interesting development of Descartes’ position on the vacuum, one worth examining.

The principal passage in question here is a puzzling argument Spinoza makes in Part I of the *Ethics*, in the famous scholium to Proposition 15. The argument starts with the assumption that a vacuum is impossible, and concludes that bodies are not really distinct from one another—that is, that bodies are not existentially independent of the rest of the material world. The argument is *prima facie* rather odd, and has certainly puzzled the commentator who has written about it most: Jonathan Bennett. I argue that Bennett’s interpretation of the argument fails, and that it is based on a flawed interpretive principle. I also oppose an alternative reading given by Tad Schmaltz. Both Bennett and Schmaltz underestimate the similarity between Spinoza’s argument and those that proceed in the other direction—i.e., the arguments for the possibility of a vacuum given by More, Arnauld, Locke, and the rest.
I show that Spinoza’s argument is directed at Descartes’ position, and constitutes a subtle and sophisticated challenge to the latter’s theory of extended substance. The argument involves an annihilation scenario similar to the one proposed by Arnauld. Spinoza’s case, however, proceeds by way of dilemma: either Descartes accepts a strong criterion for things’ being really distinct, in which case it follows that a vacuum is possible; or he adopts a weak criterion and claims that the surrounding bodies “collapse” as soon as the contained body is annihilated. In the latter case, Spinoza argues that Descartes has to give a causal account for the collapse, but is in principle unable to do so. In effect, Descartes must appeal to the *horror vacui*, which any good mechanistic natural philosopher must reject. Spinoza thus tries to establish that the Cartesian claim that bodies are distinct substances is inconsistent with other theses that Descartes accepts, and hence that there are internal reasons in Descartes’ philosophy to accept Spinoza’s bold claim that there is only one extended substance.

While the argument is ultimately not successful in demonstrating an inconsistency in Descartes, it is nonetheless illuminating. Spinoza takes the Cartesian conception of corporeal substance very seriously. He believes that the status of extension as an attribute entails both that extension is conceptually prior to its modes and that the extended world is causally complete, i.e. that nothing about the extended world is caused by something that falls outside the attribute of extension. The vacuum argument is a critique of Descartes that tries to do full justice to the conception of extension as constituting the essence of material substance. As such, it

\[211\] See E Ip1, E Ip28, E IId1.
is a critique that is relevant for understanding Descartes’ position on the vacuum in its philosophical context. Further, Spinoza identifies the conceptual entanglement that must obtain between Descartes’ extended substances, and thereby shows the appeal of monism as a conceptual framework for Cartesian natural philosophy.

4.2 The Context in Ethics I; Bennett’s Reading

After Spinoza argues for substance monism in Part I of the *Ethics*, he defends his attribution of extension to God in a scholium (Ip15s). It is not until IIp2 that Spinoza directly claims that God is extended, but it is nonetheless a relevant concern at Ip15s. Given that God exists and is a substance (Ip11), and that extension is an attribute of substance (two premises which Spinoza shares with Descartes), it follows that if extension is not an attribute of God, then substance monism is false. Descartes obviously takes the latter option. An obvious reason, from the Cartesian point of view, why not everything can be merely an attribute or mode of God, is that there is an attribute of substance, namely extension, which cannot belong to the infinite substance, God. It becomes clear in the *Ethics* that extension is taken by Spinoza to meet the criterion of his definition: “By attribute I understand what the intellect perceives of a substance, as constituting its essence.”

Spinoza analyzes what he takes to be the arguments showing that extension cannot be an attribute of an infinite being, and concludes that they all hinge on the

212 E Id4.
premise that extended substance is divisible, or composed of parts. The heart of the
scholium consists of his response to this claim. Of course, as Spinoza himself notes,
he has already responded in the abstract; Ip12 states that “No attribute of a substance
can be truly conceived from which it follows that the substance can be divided.” This
entails that if extension is an attribute, it is not divisible. If anything, though, this
shows why the scholium is important; Spinoza needs to show that extension is not
ruled out as an attribute of substance by the indivisibility constraint arrived at in Ip12.

The text of Spinoza’s argument is as follows:

So also others, after they feign that a line is composed of points, know how to invent many arguments, by
which they show that a line cannot be divided to infinity. And indeed it is no less absurd to assert that
corporeal substance is composed of bodies, or parts, than that a body is composed of surfaces, the surfaces
of lines, and the lines, finally, of points. All those who know clear reason is infallible must confess this—
particularly those who deny that there is a vacuum. For if corporeal substance could be so divided that its parts
were really distinct, why, then, could one part not be annihilated, the rest remaining connected with one
another as before? And why must they all be so fitted together that there is no vacuum? Truly, of things which
are really distinct from one another, one can be, and remain in its condition, without the other. Since,
therefore, there is no vacuum in nature (a subject I discuss elsewhere), but all its parts must so concur that
there is no vacuum, it follows also that they cannot be really distinguished, that is, that corporeal substance,
insofar as it is a substance, cannot be divided.213

Before going on to Bennett's analysis, a couple of preliminary remarks are in order.

In this scholium Spinoza takes the following to be equivalent: “extended substance is
divisible”; “extended substance is composed of parts”; and “bodies are really distinct

213 E Ip15s.
from one another.” For this argument it is the last of these three that is crucial. Here Spinoza is following Descartes’ theory of distinctions. As discussed above, two things are really distinct just in case each can exist without the other.214 I will say more about Spinoza’s construal of the real distinction in later sections of the chapter. Also note that there is something weird about this argument at first glance, especially where he asks why the parts of matter have to be “so fitted together that there is no vacuum.” Spinoza seems to be suggesting that the impossibility of a vacuum is due to something about the behavior of bodies, some way they physically cohere together.215 Whatever one might think of the coherence of bodies in a plenum, it seems to be a different issue than the metaphysical question of the real distinction between bodies.

That initial impression leads nicely into Bennett’s interpretation of the argument, because he is very much concerned with that seeming conflation of different issues. Bennett discusses this argument three times: first in an article, the contents of which he retains basically unchanged in A Study of Spinoza’s Ethics.216 He comes back to the argument in Learning from Six Philosophers.217 His treatment there is, I think, more satisfactory, but problems remain. I’ll focus on the points that stay constant in all three discussions.

214 AT VIIIA 28-9; CSM I 213.

215 How one reads this sentence will vary depending on what the antecedent of “they” is taken to be. If it is bodies in general, then my suggestion here is not intuitive, but if it is the remaining bodies of the previous sentence, then Spinoza does seem to be saying something about the physical arrangement, if not coherence, of the bodies in question.


217 Bennett, Six Philosophers, 138-140.
First, Bennett rejects any reading of the argument that involves what he calls “metaphysical rubber bands.” This is something like the initial point I made; there’s something weird going on in Spinoza’s argument, and it looks like a conflation of a metaphysical question with a theory of physical cohesion or something like that. Bennett says what this way of reading the argument looks like:

What centrally engages Spinoza’s attention in 1p15s is the supposed fact that if one body were annihilated, others would have to move. They would have to do so because ‘There is no vacuum’, meaning that if there is container space, it is all full. The question is: Why could a vacuum not be created by the annihilation of a body? What sort of metaphysical rubber bands are at work to hold bodies together, ensuring that no vacuum is left? The answer is that the other bodies are under this constraint because they are not really, basically, ultimately distinct from one another.218

This is “incoherent,” according to Bennett, because denying that bodies are really distinct is not an explanation for “why under certain circumstances [bodies] must rush around filling gaps.” I think this nicely captures the initial weirdness of the argument, but Bennett confuses things a bit with the interpretation of vacuum here. He thinks that this naïve reading hangs on a more modern, physically substantive notion of vacuum; i.e., a region of space that is massless or empty. Hence the talk of “container space,” by which Bennett means substantival space. If we recognize that for Spinoza ‘vacuum’ is a nonsense concept, an “extended nothing,” then we’ll be guarded against this “rubber bands” reading. Why? Because “it would be excessively odd if he

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218 Bennett, Six Philosophers, 139.
thought that something’s being nonsense could explain a fact about bodies’ having to move.”219

This is a point that Bennett emphasizes in A Study of Spinoza’s Ethics. He is quite right to say that for Spinoza it is a conceptual truth that there is no vacuum, because the concept is incoherent: a nothing with the features of extension. Bennett refers to the following passage in The Principles of Cartesian Philosophy where this is made clear:

By a vacuum is understood extension without corporeal substance; that is, body without body, which is absurd. For a fuller explanation, and to correct prejudice concerning the vacuum, read Articles 17 and 18 Part 2 of the Principia, where it should be particularly noted that bodies between which nothing lies must necessarily touch each other, and also that to nothing there belong no properties.220

This is the sense of the term Spinoza has in mind in the scholium. Bennett approves of the conceptual point that the notion of an “extended nothing” is “nonsense,” but he wants to draw a sharp distinction between this and any substantive claims about actual physical things. Now this is, I submit, an inappropriate principle for interpreting Spinoza. Nothing could be further from the spirit of Spinoza’s overall project than the suggestion that conceptual points are trivial and lack robust ontological or physical consequences. Indeed Bennett himself solemnly declares that Spinoza does not distinguish causal from logical necessity, and that “we are not well

219 Bennett 2001, Six Philosophers, 140.

placed to be condescending” about the matter. But it is condescending to assume Spinoza can’t mean what he says when he seems to link conceptual truths to causal consequences, and that is just what Bennett does.

I conclude that we at least have reason to be skeptical of Bennett’s reasons for ruling out the “rubber bands” reading of the passage. That may turn out to be a bad reading, but one can’t dismiss it as an interpretation just because it takes a conceptual point to have predictive consequences in a given situation. What does Bennett have to say about the way the argument should be read?

In Learning from Six Philosophers Bennett is less than clear in his positive account of the argument. What remains constant in his reading is the claim that Spinoza is not really interested in exploring the consequences of the annihilation of one body. Rather, according to Bennett, he is simply recognizing that without a separate, substantival space, the idea of a selective annihilation is incoherent.

Spinoza’s real point is that if container space is rejected … there could not possibly be an annihilation of a portion of matter while the rest remained in existence, whether moving or still.

From this it follows that bodies aren’t really distinct; their “ontological fates” are not separable, to use Bennett’s phrase.

I’ve argued that Bennett’s reasons for avoiding a more literal reading are not good ones. Here I’ll just note two related problems with his positive reading. It seems to matter (pace Bennett) whether the remaining bodies are allowed to move or not. If

221 Bennett, Study, 30. This stance doesn’t change in Learning from Six Philosophers.

222 Bennett, Six Philosophers, 140.
the other bodies can just “squeeze together” somehow when the one is annihilated, why is the annihilation impossible? It seems Spinoza should have pursued this line of reasoning, but he doesn’t, on Bennett’s reading. Second, Spinoza does in fact specify that the surrounding bodies, which remain after the annihilation, do not move: “the rest remaining connected with one another as before.” And he presents this not in a merely rhetorical fashion, as Bennett’s reading would suggest, but as part of an explication of what it is for things to be really distinct from one another: “Truly, of things which are really distinct from one another, one can be, and remain in its condition, without the other.” It’s not obvious, then, that Bennett can trivialize the stipulation that the other bodies don’t move. In fact, as I’ll go on to show now, it really is part of the argument.

4.3 The Vacuum Argument as Anti-Cartesian

The first move I will make to get away from Bennett’s reading is to determine the argument’s target. Spinoza addresses it to a specific audience, “those who deny that there is a vacuum.” The central point of the scholium as a whole is to defend the attribution of extension to God. Spinoza examines two ways to argue that extension cannot belong to God: the first relies on the premise that corporeal substance is finite in extension, the second associates imperfection with the supposed divisibility of corporeal substance. The former part of the scholium is not directed against Descartes, who argued against the finitude of the extended world. H.A.

223 E Ip15s.

224 It is telling that Bennett does not quote this sentence in his discussion of the argument, but jumps right in, ignoring the context in which the argument is offered.
Wolfson has carried out a careful examination of the background for the part of the
scholium dealing with the infinity of extension. He finds evidence that Spinoza’s
discussion is shaped by Crescas’ criticisms of Aristotle.\textsuperscript{225} When Spinoza reaches the
point I am examining, however, he addresses the argument to those who recognize
the impossibility of the vacuum; this rules out Crescas.\textsuperscript{226} While the denial of the
possibility of the vacuum goes back to Aristotle, the most plausible target is Descartes
and his followers. Descartes is the philosopher to whom Spinoza is in general most
concerned to respond, and when Spinoza refers here to his own discussion
“elsewhere” of the impossibility of a vacuum, he is apparently thinking of the passage
from \textit{The Principles of Cartesian Philosophy} quoted above, where he endorses
Descartes’ conceptual argument for the impossibility of a vacuum.

Further, as I noted earlier, the operative notion of a “real distinction” is
recognizably Cartesian. It has been disputed whether Descartes held that the parts of
matter are really distinct, but Spinoza certainly attributed this view to him in his work
on the \textit{Principles}.\textsuperscript{227} As noted above in the discussion of Arnauld’s argument, there is
\textit{prima facie} persuasive textual support for this reading. There is also support for the
inference from the real distinction between objects to the possibility of the
annihilation of one of them, where the existence of the others is unaffected. In Book I
of the \textit{Principles} Descartes defines substance as “a thing which exists in such a way

\textsuperscript{225} H.A. Wolfson, \textit{The Philosophy of Spinoza} Vol. I (Cambridge, Mass.: Harvard UP, 1934),
16.

\textsuperscript{226} Grant, \textit{Much Ado}, 22.

\textsuperscript{227} PPC, 60. “Because the parts of matter are in reality distinct from one another, one can exist
without another, and they do not depend on one another.”
as to depend on no other thing for its existence.”\textsuperscript{228} He immediately concludes that there is only one substance, God, but claims that the notion can be extended non-univocally to some created things. These will be called substances if and only if they “need only the ordinary concurrence of God in order to exist.” In short, created objects are substances if and only if they meet the existential independence requirement within a certain domain—one that comprises all things but God. Descartes goes on to say that a “real distinction exists only between two or more substances.”\textsuperscript{229} So this kind of distinction applies if and only if the distinguished things are existentially independent.

The “ordinary concurrence” Descartes mentions in connection with created substances refers to his view that God sustains the created world from moment to moment to keep it in existence. Creation is not a one-time event, but an ongoing act of ontological support. Descartes claims that our duration is sufficient to prove God’s existence, because there is nothing about our present existence that necessitates our existence in any following moment.\textsuperscript{230} In Spinoza’s \textit{Principles of Cartesian Philosophy}, he justifies the equivalence of the creation and conservation of created minds in the following way: “For the concept that we have of our thought does not involve, or does not contain, the necessary existence of the thought.”\textsuperscript{231} Thus we can clearly and distinctly perceive that we, as thinking beings, might exist now and cease

\textsuperscript{228} AT VIII A 24; CSM I 210.

\textsuperscript{229} AT VIII A 28; CSM I 213.

\textsuperscript{230} AT VIII A 13; CSM I 200.

\textsuperscript{231} \textit{PPC}, 23.
to exist in the next moment. Descartes claims that “when we come to know God, we are certain that he can bring about anything of which we have a distinct understanding.”\textsuperscript{232} Thus God can bring it about that any created substance should not exist, simply by withholding his act of preservation for that substance. Annihilation, then, is a real possibility on the Cartesian view of created substances. As discussed in the last chapter, Descartes discusses, in \textit{PP II 18}, a case that is at least similar to the annihilation of a selected part of matter.\textsuperscript{233} I think it very likely that Spinoza has this in mind when he makes his vacuum argument. Thus, when he asks, “And why must they all be so fitted together that there is no vacuum?” I think he is asking \textit{why} the sides of the vessel are now in contact. I flag this point now, because it will be crucial in my final reading of the argument.

This background from Descartes helps to establish the context for the vacuum argument. Spinoza is defending the view that corporeal or extended substance is one and indivisible, and uses the view held in common—the impossibility of a vacuum—to challenge the Cartesian view that extended substance is composed of many parts and divisible.\textsuperscript{234} In other words, Spinoza is arguing that Descartes holds incompatible theses: that many really distinct substances compose the extended world, and that a vacuum is impossible. One of these must be given up, Spinoza claims, and he clearly thinks it should be the former. This charge of inconsistency, as has been shown, was

\textsuperscript{232} AT VIIIA 28; CSM I 213.

\textsuperscript{233} AT VIIIA 50; CSM I 231.

\textsuperscript{234} I have been asked whether Spinoza really thought that Descartes endorsed a plurality of extended substances. In the \textit{PPC} it is clear that Spinoza thought just that: see p. 60. I discuss this more below.
brought against Descartes by several critics, and it can be framed as a valid argument. Many of those critics, however, ran the argument in the other direction; that is, they assumed that bodies are really distinct and argued that the vacuum is possible.

Locke’s version is particularly helpful to see the correspondence with Spinoza’s:

No one, I suppose, will deny, that God can put an end to all motion that is in Matter, and fix all the Bodies of the Universe in a perfect quiet and rest, and continue them so as long as he pleases. Whoever then will allow, that God can, during such a general rest, annihilate either this Book, or the Body of him that reads it, must necessarily admit the possibility of a Vacuum. For it is evident, that the Space, that was filled by the parts of the annihilated Body, will still remain, and be a Space without Body.235

The idea is quite clear: if the annihilation is conceivable (and if bodies are really distinct then it is conceivable), then so is a vacuum. In Locke’s formulation, it is stipulated that no motion is allowed, and from this it follows that the surrounding bodies will not change position to “fill the gap.” Hence there will be a gap, which is nothing other than a vacuum.

Arguments like Locke’s were the subject of the previous chapter. Here I only want to emphasize that the general outline of the argument does not present any fatal difficulties. There is thus at least an initial plausibility in taking Spinoza to be arguing along the same lines, even though he chooses the impossibility of the vacuum as the premise and the denial of the real distinction as the conclusion. For this reason, I take issue not only with Bennett’s reading, but with an alternative interpretation of this

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235 Locke, Essay, 176.
passage given by Tad Schmaltz.\textsuperscript{236} In his view the delimited section of the text I am dealing with is extremely elliptical; the move from the impossibility of the vacuum to the indivisibility of substance involves a complex set of considerations about substance, modes, and different types of infinity. Certainly Spinoza is often elliptical, and arguments formulated briefly in the \textit{Ethics} often, perhaps usually, require a great deal of expansion. In this case, however, I think Schmaltz is mistaken when he decides against treating this text as the formulation of a more-or-less complete argument.

Schmaltz argues that the passage in question here is \textit{prima facie} problematic, since it aims to establish the indivisibility of extended substance, yet relies on the Cartesian rejection of a vacuum, which involves the reduction of space to divisible bodies. This conjunction of indivisibility and divisibility is supposed to be a problem.\textsuperscript{237} Yet the divisibility involved in Descartes’ argument against the vacuum does not entail that the divisible bodies are really distinct in the metaphysical sense, which is what Spinoza is interested in. The most that is required (so far as divisibility is concerned) for Descartes’ argument is that all the parts of matter are capable of moving relative to each other. Nothing is implied about the possibility of the annihilation of a body.


\textsuperscript{237} Here Schmaltz’s point may only be directed against Bennett’s reading. See below.
To be fair, Schmaltz is concerned to avoid Bennett’s interpretation, as I am, and it is in this context that he rejects a more straightforward reading.\textsuperscript{238} Nevertheless Schmaltz’ reconstruction of the argument effectively bypasses the text in question; in particular, none of the premises of his version bear any clear relation to the supposition of annihilation. What is apparently an important thought experiment that is crucial to the argument is thus left out altogether. Rather, Schmaltz uses a very sophisticated interpretation of the substance-mode relation in Spinoza to create an argument that leads from the impossibility of the vacuum to the indivisibility of substance. Though he makes many important points relevant to neighboring portions of the scholium, as well as to the broader issue of the substance-mode relation in Spinoza’s metaphysics, his reconstruction bears no resemblance to the passage in question, except that the starting point is the impossibility of the vacuum and the conclusion is the indivisibility of extended substance. In the course of avoiding Bennett’s reading, Schmaltz apparently gives up altogether the idea that there is a thought experiment about annihilation that is integral to the argument. This, I think, is unwarranted, and in effect gives Bennett too much credit, as if he had made a definitive attempt to given an interpretation that stays close to the text.

I will go on, therefore, to read this argument as having the same basic form as those of Locke \textit{et alia}. We can try to formulate the argument as follows:

1. \textit{A vacuum is impossible.}

\textsuperscript{238} Schmaltz, “Vacuum,” 184-5. Schmaltz hypothesizes that Bennett’s reading takes Descartes’ identification of space and matter to be a reduction of matter to space, rather than \textit{vice versa}. 
(2) *If a vacuum is impossible, then the annihilation of just one body, such that the surrounding bodies do not change their relative positions, is impossible.*
(For simplicity, stipulate that no other body is simultaneously created to replace the annihilated one.)

(3) *If the annihilation of just one body, such that the surrounding bodies do not change their relative positions, is impossible, then bodies are not really distinct.*

(4) *Bodies are not really distinct.*

By “the annihilation of just one body” I mean only to convey that this is a selective annihilation of matter, not the wholesale annihilation of the extended world. Nothing hangs on how many bodies, in the sense of “what is moved together,” are annihilated. A continuous and finite parcel of matter is annihilated—that is the point.

The premises validly entail that bodies are not really distinct—but are these premises acceptable to a Cartesian? That, I think, is the relevant standard to which to hold Spinoza here, at least initially, since he apparently claims to have identified an inconsistency. Descartes endorses (1), obviously. He also endorses (2), as is evident in the passage, quoted above, from PP II.18. (3), however, is another question altogether. Descartes’ position on the annihilation scenario is that the relative position of the surrounding bodies (the parts of the vessel, for example) does depend on there being some body or other contained by them. This is compatible with the complete independence of the surrounding bodies, including their position, from any particular contained body. But in addition to that, even if we assume that a corporeal substance has to be independent of all other bodies taken together, why should position have to be one of the properties of the substance that is independent of everything else?

Jacques Rohault, an important defender and expositor of Cartesian physics, makes this very point.
Perhaps it may be urged by some, that the Walls of a Room exist independent of what is contained between them, and consequently that they might continue in the State they were, without approaching one another, though what is between them were annihilated. To which I answer, that it is very true, that the Existence of the Walls does not depend on what is contained between them; but the State they are in, or the Disposition of them, in order to compose a Room, this depends upone [sic] Extension, or some Matter which is between them, and consequently, this Extension cannot be destroyed without destroying the Disposition which the Walls were in before, though not the Walls themselves.  

Malebranche gives a similar account in the *Search After Truth*: “Hence, one half [of a body] being annihilated, it follows from this … that the other half no longer has any relation to it; but it does not follow that it no longer exists.” If, as I have argued, Spinoza is trying to show incoherence in the Cartesian account, the argument does not suffice. Descartes will not accept that the dependence of some given bodies’ positions on the presence of *some body or other* is sufficient to undermine the independence required for a real distinction. The bodies’ positions can are still independent of any particular contained body, and that is what matters. If the objection is that a substance cannot have any property that depends on the existence of something else in general, then this is surely too strong, and begs the question in favor of Spinoza’s substance monism.

There is in fact something at stake here, more than a disagreement over the term “real distinction.” If Spinoza’s argument here relies on the assumption of

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239 Rohault, 28.

substance monism, then the Cartesian can rightly complain that Spinoza is not taking
substance pluralism seriously. And who but a substance monist would think that a
real distinction between entities implies that every property of each such entity is
independent of the existence of everything else taken together? For the pluralist, there
will at least be some relational properties of a body that are dependent on the
existence of some bodies or other, but this is no surprise. In this case, Spinoza is
presuming at least that the relative positions of the surrounding bodies, their mutual
configuration, should be independent of the existence of some contained body or
other. And this is precisely what Descartes denies; it is not clear why that is
problematic.

It seems, then, that the dialectic breaks down at this point; Spinoza has to have
recourse to a very strong criterion for multiple things’ being really distinct. He hasn’t
shown, on grounds acceptable to the Cartesian, that the impossibility of the vacuum
and the real distinction between bodies are contradictory commitments. Nevertheless
I think this argument is present in the text. Spinoza’s statement is very clear: “Truly,
of things which are truly distinct from one another, one can be, and remain in its
condition, without the other.” And he clearly applies this to the annihilation scenario
as if a substance’s “condition” has to be independent of other substances in general,
not just independent of this substance or that substance. I suggest that Spinoza
follows up this argumentative strategy with an alternative. The first option presented
to Spinoza’s target audience is to accept this strong independence criterion for things
being really distinct, in which case the bodies do not move upon annihilation of their
neighbor. If they don’t move, then there will be a vacuum. The second option is to
allow the bodies to move, opting for a weaker criterion of real distinction. Spinoza, I want to argue, has something to say about that option as well. Hence the overly strong independence criterion is not something he expects a Cartesian to be moved by; it is merely the initial horn of a dilemma. If the dilemma is a real one, then it does not matter whether the two horns have equal force or persuasiveness. All Cartesians may predictably opt for the second horn, but Spinoza thinks that there is a problem there as well.

4.4 *The Argument as a Dilemma: Possible Vacua or “Nature Abhors a Vacuum”*

The follow-up argument is suggested by a crucial parallel text in Spinoza’s *Priniciples of Cartesian Philosophy*. Part II, Proposition 8 reads: “When a body moves into the place of another body, at the same moment of time the place quitted by it is occupied by another body immediately contiguous to it.”241 Spinoza is articulating the basis of Descartes’ theory of motion in a plenum, which always involves a continuous “loop” of matter, the parts of which move simultaneously. Spinoza’s proof of this proposition, unsurprisingly, relies on the thesis that a vacuum is impossible. He is concerned, however, to avoid the implication that that impossibility is a cause of motion. This comes out in the scholium to the proposition, part of which was quoted earlier:

> Because the parts of matter are in reality distinct from one another, one can exist without another, and they do not depend on one another. So all those fictions about Sympathy and Antipathy must be rejected as false. Furthermore, because the cause of an effect must always be positive, it must never be said that a body

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241 *PPC*, 59.
moves to avoid there being a vacuum. It moves only through the impulse of another body.²⁴²

First it should be noted that this text decisively establishes that Spinoza read Descartes as a pluralist about extended substance. This should dispel doubts that might have arisen on that score about my construal of the Ep15s vacuum argument as intentionally anti-Cartesian. Further, whatever Spinoza’s specific target in rejecting “Sympathy and Antipathy,” it is clear that the general point of this scholium is about mechanism; it is intended to restrict the kinds of causal interaction attributable to bodies. The passage is particularly interesting in reference to the vacuum argument in Ep15s, since it concerns both the impossibility of the vacuum and the real distinction between parts of matter. What is principally relevant here is the claim that the cause of a motion has to be physical impulse and not a teleological principle like the abhorrence of a vacuum.

In light of this text, Spinoza’s remarks from the vacuum argument in the scholium, particularly the question that seemed to suggest the “metaphysical rubber bands” reading, can be read in a very different way. Recall the point I flagged earlier: Descartes claims that if God removes all the matter from a vessel, the surrounding bodies will collapse and will be in contact with each other. Spinoza is asking why, after the removal, the sides of the container have come into contact. He is asking for a sufficient reason. The passage in the PPC establishes that “it must never be said that a body moves to avoid there being a vacuum,” while in Ep15s Spinoza poses the question: “And why must they [the remaining bodies] all be so fitted together that

²⁴² PPC, 60.
there is no vacuum?" It is highly plausible that the force of the latter question is that
the Cartesian position violates the strictures laid down in the *PPC* scholium.

An alternative reading would take “they” in this sentence to refer, not to the
remaining bodies of the annihilation scenario, but to bodies in general. On this
reading, Spinoza steps back from the particular thought experiment and asks why, in
general, the parts of matter must be arranged as a plenum, if they are really distinct
from each other. This is certainly a possible reading of the passage, but I favor the
other interpretation. One reason is that in the next sentence Spinoza is clearly talking
about the annihilation scenario, so I find it unlikely that he suddenly departed from it
and then returned without warning. The continuity of the discussion is increased on
my reading. Further, I do not think the argument is very persuasive on the alternative
reading, nor that Spinoza would have found it an interesting one. He accepts
Descartes’ strict position on the vacuum, and by implication Descartes’ views on
place and space as well. Asking why bodies must be next to each other simply makes
no sense if the very notion of place has to be cashed out in terms of extended
substance. As noted in the discussion of More’s view in Chapter Three, for Descartes
there is no sense to the suggestion that God might be present somewhere other than
where there is body. There is no “where” that is not a mode of an actual body. This is
not a decisive refutation of the alternative interpretation, but at least there are reasons
to doubt that it is the correct one.

My suggestion is this: Spinoza is claiming that the Cartesian position, in order
to avoid inconsistency, has to invoke an illicit teleological explanation. The
implication is that in this case there is no bodily impulse to serve as the cause of the
“collapse,” which after all involves a (non-inertial) change of relative position among bodies. For clarity, here is a more formal statement of this argument:

(A) A vacuum is impossible.

(B) If a vacuum is impossible, then the annihilation of just one body, such that the surrounding bodies do not change their relative positions, is impossible. (As before, we stipulate that no other body is simultaneously created to replace the annihilated one.)

(C) The annihilation of just one body is possible only if the surrounding bodies change their relative positions. (By A, B)

(D) If the relative positions of the other bodies change, then motion has occurred. (By definition)

(E) The annihilation of just one body is possible only if the surrounding bodies move. (By C, D)

(F) Every motion is caused by the impulse of another body.

(G) A body exerts impulse on another body only if there is a complete circle of bodies moving together. (From Descartes’ physics, as interpreted by Spinoza)

(H) The annihilation of just one body is possible only if bodies move without a complete circle of bodies moving together.

(I) The annihilation of just one body is possible only if motion occurs without the impulse of another body. (By H, I)

(J) The annihilation of just one body is impossible. (By G, J)

(K) If the annihilation of only one body is impossible, then bodies are not really distinct from each other. (By definition)

Therefore,

(L) Bodies are not really distinct from each other. (By J, K)

In this argument Spinoza does not rely on the overly strong criterion of independence. Rather, he explores what would have to happen—given the annihilation—in order to avoid a vacuum, and concludes that a body would have to move without a mechanical cause. To clarify, I think the line of argument I have laid out here is posed by Spinoza in addition to the argument relying on the strong
criterion. It does not replace that argument. In the text, Spinoza asks a succession of rhetorical questions: “[W]hy, then, could one part not be annihilated, the rest remaining connected with one another as before? And why must they all be so fitted together that there is no vacuum?” The first question encapsulates the short argument, which depends on the strong criterion of independence. The second question implicitly acknowledges Descartes’ discussion in PP II.18, which specified that the bodies must “be all so fitted together that there is no vacuum,” as Spinoza puts it. Spinoza demands that the Cartesian give an appropriate reason for the fact that the surrounding bodies come into contact. From the PPC we know that Spinoza will not let the impossibility function as a positive cause of a motion. I will say more below about why Spinoza thinks a particular kind of mechanical cause is required here.

A Cartesian would have some trouble denying any of the premises of this latter argument. Descartes commits himself to (A) and (B), and therefore to (C). (D) would seem to be trivially true in light of Descartes’ definition: “motion is 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.” There are issues with this definition, of course, as with Descartes’ theory of motion in general, but if anything is clear there it is that motion fundamentally consists in the change of relative positions of bodies. It is true that

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243 AT VIIIA 53; CSM I 233.

244 There is a move Descartes could make here: deny that a motion has occurred by insisting on continuity as a necessary condition of motion. If God just takes a body out of existence all at once, then the remaining bodies don’t move together – they just are together, instantaneously. Sobrière reported to Gassendi that Descartes said something very much like this (AT IV: 109), but it hardly solves the problem, even if it were to make sense. There seems to be no reason why God couldn’t carry
not all change of relative position is motion in the strict sense, according to Descartes. This will not help here, however. Motion in the strict sense consists in a body’s changing its “vicinity.” That is, a body moves when it ceases to be in direct contact with some group of bodies and comes to be in direct contact with others.\textsuperscript{245} The bodies immediately surrounding the annihilated matter will be in contact at some part of their inner surfaces, which before had not been in contact. If this is not motion, then it is close enough to make it odd that it should not require a physical cause.

To understand what is going on in (F) – (H) it is necessary to return to Descartes’ idea, discussed above in connection with More, that all motion has to take place as part of a loop of moving matter. The parts of the loop move in perfect simultaneity, each replacing the part in front of it as it moves. In this thought experiment, however, matter has to move to take the place of the annihilated body, but it is not “pushed” into that place by a loop going back to the original displaced body. Why? Because that body is gone—it is no longer where it was, but it is not anywhere else either, so it can’t exert a “push” that would come around and bring the other bodies into its former place. As pointed out in the discussion of More’s argument in Chapter Three, there are very serious problems with understanding these circular motions in a plenum as involving any “pushing” at all, Descartes’ language in \textit{PP} II 33 notwithstanding.

\textsuperscript{245} Garber, 168-9. See also Des Chene, 271. The latter puts the point very well for my purposes: “The nonrelational facts upon which judgment about motion are [sic] based are reciprocal facts about touching and not touching.” Just so, in the annihilation scenario the surrounding bodies do not touch prior to the annihilation, but do touch as soon as it has occurred.
Spinoza, nevertheless, apparently took Descartes’ causal language very seriously. Indeed, in the corollary immediately following the *PPC* scholium, he argues that “in every motion, a complete circle of bodies moves at the same time,” using *as a premise* the claim that motion “occurs only through the impulse of another body.” This argument is very important for understanding Spinoza’s interpretation of motion in a plenum, and for the connection between the *PPC* scholium and the vacuum argument in the *Ethics* scholium. The proof for this corollary runs as follows. As long as we are just considering the logical point about motion in a plenum—namely, that if a body moves out of its place, then another body must simultaneously take its place—then this could conceivably occur without there being a closed loop of bodies. It might just be an infinite regress: body 1 is replaced by body 2, which is replaced by body 3 … *ad infinitum*. But if one of the bodies in the loop is construed as the first in a real causal sequence, then there must be a loop, because the impulse has to “travel” around to “push” some body into the place of the original impelling body. In other words, the argument is as follows: every motion occurs through impulse; impulse is possible only within a closed loop of matter; therefore every motion occurs within a closed loop of matter.

Hence Spinoza, like More, expands on Descartes’ claim that the parts of matter which move in a circular fashion are related causally to one another; Spinoza gives a more determinate account as to how causality is involved. Moreover, Spinoza proposes not mere removal, but annihilation of the contained body. The problem posed to Descartes is consequently more difficult. Since the contained body is not just

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246 *PPC* 60-1.
removed, but annihilated, it cannot be the first section of a circle of bodies connecting with the collapsing surroundings. There can be no loop in this case. Spinoza concludes that there can therefore be no bodily impulse either. His proof of the Corollary to Proposition 8 entails that the only way that a body can exert impulse on another is if they are both part of a closed loop of moving bodies.

A Cartesian, or Descartes himself, might want to question (F), and this premise is the crucial one, on my reading. A Cartesian response, based on the denial of this premise, will be considered in the next section. Spinoza’s overall strategy here is to establish that on Descartes’ account of the annihilation scenario, only a pseudo-cause, like the principle that nature abhors a vacuum, can be adduced to explain the collapsing motion of the surrounding bodies. It may be helpful, in grasping the force of this argument, to compare it to one given by Kant in the *Metaphysical Foundations of Natural Science*. He is arguing against the idea that impenetrability follows from the mere reality of an object in space; instead, says Kant, there must be a force responsible for a body’s resistance to the presence of other bodies in the space it occupies.

According to their ideas, the presence of something *real* in space must already, through this concept, and thus in accordance with the principle of noncontradiction, imply this resistance, and bring it about that nothing else can be simultaneously in the space where such a thing is present. But the principle of noncontradiction does not repel a matter advancing to penetrate into a space where another is found.²⁴⁷

Kant mentions Lambert as a proponent of this idea, but Descartes has the same understanding of impenetrability. If two parts of matter are co-located, then since all there is to matter is extension, there will really be only one part of matter left. There are no longer two bodies if they coincide. Hence the real existence of the two bodies implies their impenetrability. Kant’s point is that we ascribe impenetrability because a body resists the motion of other bodies into its space. Hence this property has to be grounded in something capable of opposing motions, and that can only be a force, not the mere existence of an extended thing. What is particularly Spinozistic, if you will, about Kant’s remark is the claim that “the principle of noncontradiction does not repel” anything; this abstract and negative principle cannot be the cause of a particular and positive effect. In the case of Spinoza’s vacuum argument, the principle that a vacuum is impossible cannot be the cause of the “collapse” of the surrounding bodies.

Kant also makes the point that the force that physically excludes penetration by another body is actually presupposed by the logical exclusion of another body in a body’s space. Penetration of one body by another is only contradictory if we already attribute a force of impenetrability to matter. Thus the claim that the principle of non-contradiction suffices to establish impenetrability gets things exactly the wrong way around. This is exactly Spinoza’s claim about teleology in general: “For what is really a cause, it considers as an effect, and conversely. What is by nature prior, it


249 Kant, 35.
makes posterior."\(^{250}\) In the annihilation scenario, Spinoza claims, Descartes has to posit that the impossibility of the vacuum is conceptually prior to the motion of the surrounding bodies. For Spinoza, this is backwards. There has to be a cause of the motion that is not just a negative principle, but a cause with at least as much reality as the effect.\(^{251}\)

Recall the initial weirdness of Spinoza’s vacuum argument, which Bennett captured in his rejected “metaphysical rubber bands” interpretation. Construing the argument as anti-Cartesian has allowed us to see that Spinoza is not endorsing such “rubber bands.” On the contrary, he is showing that the Cartesian is committed to them! What could be more like “metaphysical rubber bands” than the principle of the \textit{horror vacui}? Bennett trivializes the issue of motion in the vacuum argument, seeking to avoid imputing to Spinoza the view that the indivisibility of substance could cause a particular motion. Yet the connection between an abstract and negative conceptual claim and a particular physical effect is drawn in the argument. The key point is to recognize the argumentative context. Spinoza is not endorsing this connection, but rather arguing, as a \textit{reductio}, that the Cartesian position entails it. Either the Cartesian respects the strong criterion for real distinction, in which case she must allow the possibility of the vacuum, or she invokes a “collapse” of the surrounding bodies, in which case she has allowed that the \textit{horror vacui} can be a real cause. Since both of

\(^{250}\) E I App.

\(^{251}\) \textit{PPC} 21, 60. In the scholium to Part 2, Proposition 8, Spinoza cites Part 1, Axiom 8: “Whatever there is of reality or perfection in any thing exists formally or eminently in its first and adequate cause.” This in turn is justified by reference to Axiom 7: “No thing, nor any perfection of a thing actually existing, can have nothing, or a nonexisting thing, as the cause of its existence.”
these results are unacceptable to an orthodox Cartesian, the real distinction between parts of matter has to be relinquished.

It is instructive to relate Spinoza’s argument to those of Arnauld and More. In a way Spinoza combines the two. The first alternative posed to the Cartesian involves a strong criterion for real distinction, which rules out the collapse of the containing bodies. This is precisely how Arnauld’s argument goes. The only difference is that Spinoza talks about the surrounding bodies and their relative position, whereas Arnauld considers the surroundings as comprising one body, the barrel. What Arnauld supposes about the barrel, namely, that its shape must be intelligible with or without the existence of the contents, is equivalent to what Spinoza supposes about the plural surrounding bodies. The relative position of the parts constitutes the shape of the whole. Thus the first horn of the dilemma Spinoza poses corresponds to Arnauld’s argument.

As noted above, however, the second part of Spinoza’s argument is different from More’s insofar as the thought experiment involves annihilation rather than removal. Spinoza’s argument is a decided improvement over More’s for just this reason. Descartes, as shown in the previous chapter, readily admits the necessity of circular motion in his plenist conception of the material world, and thus he simply rejects the thought experiment as More conceives it. Spinoza’s argument, however, turns on the fact that in the annihilation scenario there cannot possibly be a closed loop of bodies replacing each other. The annihilation breaks the circle. Descartes is really committed to the collapse of the surrounding bodies in both cases, whether it is the annihilation or the removal of the containing body. In the removal case, there will
still be a closed loop of bodies, and so it is plausible, according to Descartes’
discussion in the *Principles*, to say that the *cause* of the vessel’s collapse is the
necessary intrusion of the surrounding bodies. But in the annihilation case, there is no
loop, causal or otherwise, and yet Descartes must give the same answer: the vessel
must collapse. Descartes cannot say that the motion of bodies causes the collapse of
the container, because the collapse must happen just the same even when there is in
principle no available causal story about the motions of bodies. The merely
conceptual account of motion in a plenum thus comes apart from the causal account
in this case, according to Spinoza.

For Spinoza this would constitute a serious failure. Arguably, for Spinoza,
causal and conceptual dependence collapse into each other.\(^252\) To take just one
example, in IP16 Spinoza claims that “from the necessity of the divine nature there
must follow infinitely many things in infinitely many modes,” and the argument takes
the concept of “following” here in a clearly logical sense.\(^253\) Yet the three corollaries
which are supposed to immediately follow from this proposition and its proof are all
about God’s causality with respect to himself and the things which follow from him.
More generally, Spinoza opposes his own view of the relation of God or Nature to the
world to two other proposals.\(^254\) One of these is that all things proceed from God’s
absolute and inscrutable will, so that everything which in fact follows from God is

\(^{252}\) See Bennett, *Study* 29-30. A more radical account, on which Spinoza collapses other
dependence relations into each other as well, is given in Michael Della Rocca, *Spinoza* (New York:
Routledge, 2008), 42-3.

\(^{253}\) E Ip16.

\(^{254}\) E Ip33 and scholia.
radically contingent. The other proposal is that God always acts for the good, as if he is bound by a standard antecedent to his causality. The former position saves God’s ambiguous status as the first cause, but completely abandons any sense in which things follow logically or conceptually from God’s nature. The latter position preserves the order of conceptual dependence, insofar as there are reasons for everything which God produces. Nevertheless, Spinoza respects this position even less than he does the other, because it sets up the good as something independent of God’s causality. As Spinoza says, “This is simply to subject God to fate.” There is much more to be said about this, of course, but it is clear that Spinoza thinks his view is the only one which accounts for both the causal and the conceptual relation between God and everything else, and that the failure to account for both produces irreparable incoherence in the alternative views.

Thus the separation of the causal and the conceptual accounts of motion in a plenum that results from the Cartesian position is a local violation of the general picture Spinoza thinks is the only intelligible one. Spinoza, I think, regards it as an accomplishment of Descartes’ physics that it ties together the conceptual and the causal in the “loop theory.” This is why Spinoza will not allow some other cause or reason as a sufficient reason for the body’s motion—the only thing that can make the (non-inertial) motion of a body intelligible is the impulse of another body. From

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255 E Ip33s2.

256 See also E Ip28, where Spinoza argues that every finite effect has to have a finite cause. As applied to this case, this means that a body cannot be moved as a direct result of the divine nature or something like that. Of course he cannot just appeal to this principle in the present context, because the hypothesis is that God performed a particular action of annihilation, but this helps to see what the motivation behind Spinoza’s argument is.
the nature of extended substance it follows that a vacuum is impossible; correspondingly, the causal order of the extended world must make it to be the case that there is no vacuum. Spinoza’s conclusion in the vacuum argument is that bodies are not really distinct, but modes of the one indivisible substance. If that conclusion is true, then the annihilation is impossible, and the problems raised for Descartes will not come up for Spinoza. Specifically, the relations of conceptual and causal dependence that obtain between extended modes and the extended substance will not come apart.

4.5 A Cartesian Response to Spinoza’s Argument

Descartes opts for a “collapse” interpretation of scenarios such as that postulated in Spinoza’s argument; the second part of Spinoza’s argument is designed to show that an absurdity results from the “collapse” account. As I noted in the analysis of that part of the argument, the contentious premise, from Descartes’ point of view, is that all motion is caused by bodily impulse. It might seem, however, that the better option for Descartes is just to renege on his causal description of circular motion in a plenum. Every part of the loop is equally cause and effect of any other part; it is indefensible to single out one body as the cause. This, so the suggestion might go, is just a local mistake on Descartes’ part, and the best way to defend his view is just to drop the causal language altogether. If the Cartesian makes this move, the link Spinoza makes between bodily impulse and the presence of a closed loop of matter in motion cannot be maintained. The suggestion has merit, since it is certainly true that one cannot single out the cause within such a circle of moving matter, but it does not get Descartes out of the problem Spinoza poses. Even if body-body
causation is understood to apply not to contiguous parts of a loop of matter, but to bodies which collide, it is still the case that the surrounding bodies of the annihilation scenario were first apart and then came together (non-inertially). So it is still legitimate to ask for a cause in this case, and it is clear that there is no independent reason for there to be a body providing just the right impulse whenever God annihilates something. Spinoza’s discussion of circular motion and bodily impulse in the PPC was crucial for properly interpreting his argument, but once it is formulated it is clear that even if Descartes stops talking about loop motion as a causal series, he still has a motion here that needs a cause, or at least an explanation.

Thus (F), that all motion is caused by the impulse of a body, is indeed the crucial premise. Descartes banishes final causes from physics, so he won’t admit “nature abhors a vacuum” as a cause or explanation of motion. Nevertheless, it seems that he can say that in the case of annihilation, God himself is the positive cause of the motion involved. This will, perhaps, violate the conservation of the quantity of motion, but Descartes does not claim that God cannot violate this law. On the contrary, he explicitly mentions special cases, including those we know by revelation, where God’s mode of action changes (though God himself does not).\(^{257}\) It is not \textit{ad hoc} to bring God in, either, because the entire scenario in question is a hypothetical case of special divine action. The hypothesis is a miracle, so the Cartesian does not have to confine herself to what is nomologically possible in her response; as long as she can avoid contradiction she will have answered the challenge.

\(^{257}\) AT VIII A 61; CSM I 240.
One more point can be made to draw out Spinoza’s line of thought here. He has apparently put the Cartesian in an uncomfortable position, in spite of the response above. Isn’t the appeal to God *ad hoc*? Why does God move this particular matter in this way? The answer seems obvious: to avoid there being a vacuum. In that sense, the fact that it is God who moves the matter verges on irrelevance. The *reason* the matter has to move is to prevent a vacuum, and God just happens to be the only one who can arrange for it to move. Even if God is adduced as the cause, the reason for the bodies’ motion is still a negative teleological reason: the bodies move in order that a vacuum not occur. Even if the cause is described merely as “God,” it is not just any divine action, but the particular one that is required here.²⁵⁸ Hence, Spinoza might say, Descartes has to posit a *horror vacui* in God, which, while perhaps slightly less objectionable than introducing such a principle in the natural world, is quite bad enough by Spinoza’s lights.

Spinoza’s argument is, I submit, highly ingenious. Nevertheless it still involves an assumption that can plausibly be rejected on Cartesian grounds. The assumption is that God’s action is only to annihilate a part of matter, and the “collapse” of the surrounding bodies is a *consequence* of that action. This assumption is what justifies asking what the cause of the collapse is even after God is specified as the cause of the annihilation. Treating the annihilation and the collapse as distinct events, however, is unwarranted from the Cartesian perspective. When there is nothing between two bodies, they are *ipso facto* in contact, according to Descartes.

²⁵⁸ See EIP28, where Spinoza argues that a finite thing cannot exist or be determined to causality directly by God or one of his infinite modes. Anything which follows from God or an infinite mode must itself be infinite.
Moreover, Spinoza appears to endorse this view, because he mentions it in the passage from the *PPC* that he refers to in the vacuum argument. If that is admitted, however, then the “collapse” is not some consequence of the annihilation, for which a separate cause must be adduced. Rather, the complete description of God’s action here is that he both annihilates a part of matter and simultaneously “collapses” the surrounding parts; these are two inseparable aspects of one and the same action. Hence if God is the cause of the annihilation, then he is the cause of the “collapse.” The event should not be conceived as if God annihilates the body and then has to make up for it by “collapsing” its surroundings. In doing the one he is already doing the other, and this is true because of the nature of extension, not because of some *horror vacui* on God’s part.

The Cartesian can maintain consistency, then. Nevertheless Spinoza’s argument highlights the degree to which a multiplicity of extended substances must be conceptually entangled with each other. To illustrate this, one simply has to reverse the point made in the previous paragraph. That is, one can specify a certain combination of motions of bodies, which at the level of the individual bodies would be perfectly intelligible. Suppose that God carries out this combination of motions. If the combination is specified in the right way, the full account of God’s action will recognize that it involves the annihilation of a certain part of matter. To put it more plainly, not only can God, by a selective annihilation, simultaneously cause a “collapse” of the surrounding bodies, but he can also, by making several bodies converge, “squeeze” another body out of existence. In fact these will just be two descriptions of the same divine intervention. Descartes, I think, is willing to bite the
bullet here. From his perspective there is nothing absurd about this at all. There must be somewhere for bodies to go if they are to move, and if a miraculous combination of motions is stipulated, then it is no problem if that involves an act of annihilation. Spinoza, I think, would regard this as evidence of how far such Cartesian substances fall short of the central Spinozistic substance criterion: being “conceived through themselves.”

4.6 Conclusion

Spinoza’s argument is, like many parts of the Ethics, compressed and cryptic. I’ve tried to show that when the dialectical context is identified, and especially when the passage from the PPC is taken into account, there is a sophisticated argument being made against Descartes’ theory of extended substance. On the reading presented here, the argument does not, contrary to Bennett’s worries, rest on some kind of confusion between conceptual and physical issues. It does take seriously (albeit dialectically) the possibility of selective annihilation of a part of matter, and it does explore the implications of such an event. Spinoza is drawing Cartesian theses out and showing how they lead to the startling claim that there is only one extended substance. He does not, in my view, definitively succeed in that task, but in large part that is because he set the bar so high by claiming to demonstrate an inconsistency. His effort is instructive in exposing the problems with Descartes’ conception of circular motion as a case of body-body causation, but it is also suggestive with respect to Spinoza’s own conception of extended substance, and the way the conceptual and

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259 E Id3.
causal priority of substance are meant to hold together. In the Appendix I will sketch
the outlines of an interpretation of Descartes’ conception of extended substances that
clarifies in what sense they are ontologically independent of each other. In the next
chapter, however, I will take up the problems with Descartes’ arguments against the
vacuum that were discussed in Chapter Two.
CHAPTER FIVE

MATTER AND SPACE ACCORDING TO THE ORDER OF REASONS

The principal aim of my metaphysics is to show which are
the things that can be distinctly conceived. [AT III 192;
CSMK 154]

5.1 Introduction

In Chapter Two I analyzed Descartes’ arguments against the conceivability of
a vacuum and found them inadequate as they stand. In particular, Descartes does not
appear to have any good reason to think that the notion of a space as a system of
distance relations (Vacuum₁) is incoherent—likewise for the notion of space as a
container (Vacuum₄). His claims here appear to be perfect examples of dogmatism;
we can see why Descartes does not want to admit the conceivability of these other
sorts of extension, but no independent motivation seems to be forthcoming. Though
Descartes cannot entirely be cleared of dogmatism, I think there is more to be said for
his account of space and vacuum. He has an argument, or at least the materials for an
argument that his understanding of space is simpler than the alternatives. This
suggests that his position on the inconceivability of the vacuum should not be
regarded as based merely on an appeal to clear and distinct perception. Rather,
Descartes thinks that he has accounted for everything his rivals had, on the basis of a
simpler and more intelligible ontology. This is not to deny that Descartes asserted the
inconceivability of alternative notions of space. The account of space and vacuum is
tied up with that of the essence of extended substance, and hence alternative accounts
are inconceivable in that they are incompatible with that essence. I will say more in what follows about the relationship between the inconceivability claim and the argument from ontological economy.

I begin this chapter by posing an objection to Descartes’ analysis of space, namely that it simply leaves out characteristics that are included in our concept of space, and hence that Descartes’ claim of identity between the ideas of space and matter is contradicted by the features of those ideas as we actually have them. I then argue that Descartes’ analysis of space and the error theory built upon it give him the resources to acknowledge the fact that his opponents, wrongly, in his view, attribute immobility, penetrability, and metaphysical indivisibility to space. That is, the error theory can account quite naturally for the fact that people assert that space is indivisible, immobile and penetrable. This is corroborated in an interesting way by Descartes’ argument against a finite material universe.

I argue that the error theory gives a general account of the common error of all of the alternative views of space Descartes explicitly rejected as incoherent: Vacuum₁ (Arnauld), Vacuum₃ (Scholastics’ imaginary spaces), and Vacuum₄ (More). This suggests a different way for Descartes to defend the crucial inferences that were considered and found lacking in Chapter Two. He can argue with some plausibility that his account of space, which is given in terms of his account of body, involves a simpler and more intelligible ontology than the alternatives, and that it accounts for everything they do. Such an argument would be unavailable for Descartes if he did not at least address the non-bodily characteristics typically attributed to space; in that
case he would arguably not be accounting for the same *explananda* at all. That is why it is important that he has an answer to the initial objection considered in this chapter.

This argument from simplicity, which is something like an inference to the best explanation, helps to account for why Descartes is so confident in his view on the vacuum, notwithstanding the problems pointed out in Chapter Two. An overall difficulty with Descartes’ arguments for the inconceivability of empty space is that he takes a very general notion, extension, and claims that it entails what seem to be much more specific properties. The objections from More and Arnauld, to the effect that the idea of empty space is intelligible, amount to the claim that extension can be conceived as a genus, with different species falling under it. Descartes’ inference from extension to substantiality and corporeality fails, on their view, insofar as extension conceivably has a wider logical extension than the concepts that are supposed to follow from it.260

Since Descartes’ position is that the alternative accounts of space are incoherent, it may not be clear what an inference to the best explanation does here: it would seem to be either unnecessary or inadequate, depending on whether or not we have already established that the alternative accounts are incoherent. But Descartes’ position on the vacuum, as shown in Chapter Two, is tied up with his conception of

260 This may not be so clear in the case of substantiality, especially since Descartes holds that there are non-extended substances. All I mean is that for Arnauld, Cordemoy, and others, an extension can be conceived either as an extended substance or as a distance between extended substances. If distance is not reducible to length in the way Descartes claims it is, then from the fact that there is a certain distance between two things it does not follow that there is an extended substance of corresponding length between those two things. So the point is not about comparing the overall logical extensions of the concepts extension and substantiality. The precise comparison is between extension and the volume of a corporeal substance. If Arnauld is right, for example, there can be a determinate extension that is not the volume of any corporeal substance, so one cannot infer from extension to substantiality in the way Descartes thinks he can.
body, and specifically with the thesis that extension constitutes the essence of body. Nothing prevents him from arguing for his conception of body by inference to the best explanation. And if his conception of body is correct, then the other views of space are incoherent. This does not mean that they cannot be formulated and discussed, only that they are ruled out by virtue of what corporeal substance is. In the last section I present evidence that my reading here fits Descartes’ own estimation of his argumentative position with respect to his rivals. The reason he is so confident in inferring substantiality and materiality from extension is that he has an account of how people formulate the pseudo-concepts that would block those inferences. The alternative “species” of extension that would block the inferences are really just the result of distorting our notion of body, rather than legitimate perceptions of different kinds of extension. The fact that they confer no advantage and only introduce unintelligibility is, for Descartes, a confirmation that they are not really conceivable.

5.2 Characteristics Wrongly (but Naturally) Attributed to Space

5.2.1 Indivisibility

Descartes claims to have carried out an analysis of the concept of space in *Principles* II, an analysis that leads into his rejection of the possibility of a vacuum. Descartes claims that his is the only way to conceive of extension without incoherence. Further, his analysis of space involves the argument in *PP* II.11 to the effect that spatial extension is no different than material extension. His opponents, however, conspicuously attribute non-bodily properties to space; this is quite obvious.

261 This is admittedly puzzling; I will say more about this point below.
in More, for example. So the objection arises that Descartes’ analysis has simply left out crucial features of the concept of a space. Taking More as an example again, there are at least three fundamental properties of space that differentiate it from body: spaces or parts of space are not physically or metaphysically divisible from one another; spaces can be co-located with bodies; spaces are immobile. The question is this: How does Descartes account for the fact that others claim to have a very different idea of space? If he has no answer, then it is not clear what the basis is for his claim that “we have the same idea of matter as we have of space.”

Locke gives a concise statement of this objection with respect to divisibility:

*Body* then and *Extension*, ’tis evident, are two distinct *Ideas*. For … [t]he Parts of pure Space are inseparable one from the other; so that the Continuity cannot be separated, neither really nor mentally. For I demand of any one, to remove any part of it from another, with which it is continued, even so much as in Thought. To divide and separate actually, is, as I think, by removing the parts one from another, to make two Superficies, where before there was a Continuity: And to divide mentally, is to make in the Mind two Superficies, where before there was a Continuity, and consider them as removed one from the other; which can only be done in things considered by the Mind, as capable of being separated; and by separation, of acquiring new distinct Superficies, which they then have not, but are capable of: But neither of these ways of Separation, whether real or mental, is, as I think, compatible to pure *Space*.263

Here Locke’s “real” and “mental” divisibility correspond to Holden’s p-divisibility and m-divisibility, respectively. So Locke is pointing out that our idea of space is such that it is p-indivisible and m-indivisible, while our idea of body is of something

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262 AT IV 329; CSMK 275.

that is at least m-divisible.\textsuperscript{264} And insofar as his analysis does not recognize the
difference in the ideas themselves, Descartes has failed to give an analysis of what
Locke takes to be the target concept. For Locke, then, Descartes is just redefining
words when he says that our ideas of body and space are the same.\textsuperscript{265} If Descartes
wants to define certain concepts in a technical way, then perhaps that is alright, but it
is hard to see how he can generate the inconceivability claims if that is how he
proceeds.

It is a virtue of my interpretation of Descartes on space that it allows him to
address this charge. It will become clear that Descartes in fact realized that he had
accounted for the fact that others attribute indivisibility to space. We have seen that
Descartes’ analysis of space and the associated error theory offer a way to deal with
claims about the persistence of spaces and places through change of bodies, so that
those claims do not imply the existence of anything but bodies and their relations. But
people make other claims about space besides those involving the persistence of a
space through change of bodies. The objection here is that Descartes does not even
address certain putative features of space that could differentiate it from body. I will
argue, however, that Descartes does have a way to address these features. I will take
the case of indivisibility first, then penetrability. (Recall that physical divisibility
entails mobility, so the latter need not be treated as a separate case.)

\textsuperscript{264} Matter will of course be p-divisible in macroscopic cases, but since Locke endorses
corpuscularianism as the most plausible hypothesis in natural philosophy, it is not clear that matter is
always and necessarily p-divisible. See \textit{Essay} IV.iii.16, 547-8.

\textsuperscript{265} See \textit{Essay} II.xiii.11, 171.
In Chapter One I argued that internal places, or spaces, as defined in *Principles* II.10-12, are not the intrinsic volumes of particular bodies, but are defined in part by external geometrical relations. That is, the space my body occupies is not identifiable with my body’s extension, precisely because a space is picked out by its relationship to certain external reference bodies—in the case of my body, the walls of the room or something like that. The volume that my body takes up can be specified in relation to reference bodies that are at rest relative to each other, and this specification does not depend on my body’s actually occupying that volume of extension, even though there is now no extension there other than my body. The crucial point is that spaces are individuated, in part, by external geometrical relations. Again, this point will be missed so long as the external-internal place distinction is taken to track the extrinsic-intrinsic distinction.

Recall that Descartes’ account of the identity of a space through change of bodies establishes the immobility of spaces relative to the relevant reference bodies. This is the analogue of the immobility that his opponents attribute to space. If our talk of “this space” tracks different bodies insofar as they successively occupy a certain position, then the space, if we now mistakenly think about it as a real thing, must be immobile with respect to the reference bodies. This is not surprising; as shown in Chapter One, the discussion in articles 10 and 12 occurs against the background of the Aristotelian problem of the immobility of place.

Once this is recognized, however, it is apparent that Descartes’ notion of a space does imply a certain sort of indivisibility, or rather the analogue of the indivisibility that will be attributed to space once we reify it. For example, so long as
the walls of my room remain at rest relative to each other, the space my body
occupies can be defined with respect to them, and that space is indivisible. Nothing
can separate one region of that space from the remainder of it. The parts of the body
that fills that space at a particular time can be physically separated from each other,
and can even be metaphysically separated by a selective annihilation. But the space
will remain, so long as the reference bodies remain at rest relative to each other—that
is, so long as the space is defined. Again, this is not surprising, since immobility of
parts just is the physical indivisibility of the whole.

It is more remarkable that Descartes has an analogue of metaphysical
indivisibility as well. This is evident in two contexts in Descartes’ writings. In PP
II.18, as discussed above in Chapter Two, Descartes claims that people wrongly
extrapolate from the fact that there is no necessary connection between a vessel and
its particular contents to the false claim that the vessel can be entirely empty of
matter. In making this error people overlook the fact that there is still a necessary
connection here.

But to correct this error we should consider 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 its general
sense, which must be contained in the concave shape.266

Descartes does not explicitly use the term “space” in this article, but it is important to
realize that the vessel here defines a space, because the extension within it has a fixed
shape, size and position (relative to the vessel itself). When he talks about “extension
taken in its general sense,” he is referring back to articles 10 and 12, where a space is

266 AT VIII A 50; CSM I 230. My italics.
explicated as extension conceived as “something general” or “having only a generic unity.” The necessary connection here is between the vessel and *some body or other* that fills it. More precisely, the necessary connection is between the vessel’s *shape* and some body or other that is the appropriate size and shape to fill it. The salient points are that the vessel defines a space and that, given the vessel, some body or other is necessarily there filling it up. So the space cannot be divided from the vessel, whether by motion or annihilation, so long as the vessel exists and has that particular shape. (Descartes’ opponents argue that this is true whether or not there is any body in it; Descartes’ own view is that the vessel cannot have that particular shape without there being some body within it.) The parts of the space, moreover, will be inseparable from each other for the same reason.

The discussion in *PP II.18* involves the necessary connection between a container and the existence of some contents or other. Given the container, the contents follow (though not any particular contents). This corresponds to the non-existence of the *vacuum intramundanum*. The opposite scenario, where some finite part of matter is given and the existence of some matter containing it is inferred, is found in Descartes’ arguments that the world is indefinitely extended. Here he argues against the *vacuum extramundanum*. He claims that conceiving of the boundary of the material world requires conceiving of “spaces which are three-dimensional” outside of that boundary.267 Descartes sets up the argument by supposing a finite corporeal substance or set of corporeal substances, and infers that there are spaces outside its boundary. Then and only then does he infer that there are corporeal substances, or

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267 AT VIII A 52; CSM I 232.
parts of corporeal substance, outside the boundary. This pattern is the norm when he
argues for the indefinite extension of the world: in the *Principles*, in the letter to
Chanut of 6 June 1647,268 and in the letter to More of 15 April 1649.269

The letter to Chanut is particularly helpful for showing the parallel to the point
in *PP* II.18; Descartes uses the same terminology to make the corresponding point.

For the actual or real existence of the world during these last five or
six thousand years is not necessarily connected with the possible or
imaginary existence which it might have had before then, in the way
that the actual existence 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.270

The discussion of time is not relevant for present purposes, but this text shows that
Descartes very deliberately holds that there is a necessary connection between a finite
part of matter and something surrounding it—to be precise, the *spaces* surrounding it.

It is important to be clear on this detail in the argument. The sphere is not
conceptually dependent on the fact that any particular chunk of extended stuff is
circumscribed around it. The requirement is simply a matter of geometrical
conceivability—i.e. there must be some chunk of matter or other that fits that
geometrical description. The sphere must have a boundary, and for Descartes that can
only be conceived as a boundary between the sphere and some spaces outside of the
sphere.271 Hence the inference is from the supposed finite material world to a space
defined in reference to it. Here the term “space” serves as shorthand for “some body

268 AT V 52; CSMK 320.
269 AT V 345; CSMK 374-5.
270 AT V 53; CSMK 320.
271 See especially AT V 52; CSMK 320.
or other that satisfies a certain description.” It need not be this body or that body, but there must be some body or other that surrounds the finite sphere. So the necessary connection is between a given body and some body or other that surrounds it.

Descartes’ achievement here is to give an account of why people naturally, albeit wrongly from his point of view, think that they have an idea of an extension that is physically and metaphysically indivisible, within the confines of his ontology of the material world, which admits only divisible extended substances. Extended things really are such that they necessarily imply the existence of other extended things which surround them, and it is really the case that a body which defines a concavity necessarily implies the existence of other extended stuff which fills that concavity. But there is no real extended thing that is metaphysically or physically indivisible, because there are no necessary connections between any non-overlapping parts of matter. Given any pair of bodies, they can be physically separated by motion or metaphysically separated by the annihilation of one of them. Descartes emphasizes this when he argues against atomism.272 So long as there is at least one body, however, there must be an indefinitely large extended world, composed of some bodies or other.273

It is easy to miss the subtlety of Descartes’ move; to my knowledge it has not been recognized in the literature. The relevance for Locke’s objection should be clear. Descartes holds that when we talk about “a space” we are signifying some-body.or-other that satisfies a certain description, one which can be satisfied by only one body

272 AT III 475-8; CSMK 202-3. AT V 273; CSMK 363. AT VIIIA 51-2; CSM I 231-2.

273 See Normore, 283, and my discussion below in the appendix.
at a time. But this captures precisely the respect in which extension exhibits a structure of necessary connections between regions, such that it is in a way indivisible. That is, the necessary connections are precisely connections between a given body and some-body-or-other that satisfies a certain description. The necessary connections between regions of extension are located at the spatial level, so to speak, not at the level of this body and that body. So when people mistakenly think that “this space” signifies some one thing, they will attribute both physical and metaphysical indivisibility to it. (Moreover, the term “space” can be used usefully as a shorthand in contexts where the connection between a body and some-body-or-other is important, as in the argument against a finite world.) Thus Descartes does not ignore the fact that his opponents claim to have a notion of space such that its parts are indivisible from each other. Locke is correct, however, that Descartes is revising rather than simply assuming our typical understanding of the notion of a space. I will address the justification for this move later in the chapter: basically, it is just that Descartes ends up with a simpler and, he thinks, more intelligible ontology of extension.

I have described Descartes’ error theory about space by talking about the reification of space. It might seem incompatible to say both that the error of alternative accounts comes down to reification and that these alternative accounts are incoherent. If the error is just a matter of whether or not the concept is instantiated,

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274 The idea of a necessary connection between a body and some-body-or-other is admittedly rather strange; one might take that as reason to think that the idea of a space really represents an object rather than just a shorthand formulation indicating “some body or other.” In Descartes’, view, however, it is more objectionable to add another kind of extended thing to his ontology; in the end it is systematic considerations like these, if anything, which provide some justification for his claim that the term space, as we customarily apply it, is just shorthand for “some-body-or-other.”
then how can it be a conceptual error as well? It is not quite right, however, to say that the error is just a matter of reification. Descartes does not think that we have two concepts of extension, one spatial and one corporeal, and that only the latter is instantiated. Rather, we have one concept of extension, in terms of which we can understand our talk about spaces. Part of that understanding is the realization that an application of the term “space” does not track any one extended thing; though grammatically it looks like we are referring to particular things called “spaces,” we are really not succeeding in referring (diachronically) to a single thing at all when we talk about “a space.” If we recognize this, we can continue to use the term, as Descartes does, without being committed to some extension over and above bodies. This positive use of the notion is in evidence when Descartes argues against a finite universe, and also when he occasionally uses the term “space” in the context of his physics in the later parts of the *Principles*. But the tendency is to think there is really some extended thing that endures when a body moves out of a place, and this is an incoherent belief, according to Descartes. It amounts to believing that the extension in a location changes but also remains the same. Thus while it can be helpful to think of the error as a matter of reification, it is not just a question of instantiating a concept or not.

I have addressed immobility and indivisibility at this point. Of the central properties attributed to space by Descartes’ opponents, penetrability is the remaining one. That people will attribute this property to space is an almost trivial consequence

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275 For this objection I am indebted to Anja Jauernig.

of the error theory. Recall the vessel scenario in PP II.18: the space within the vessel is inseparable from the vessel, and since bodies can also be present within the vessel, it follows that the space is present in the vessel when body is too. Hence if we take spaces to be things, then they can be co-located with bodies. The notion of space gets its distinctive way of signifying by taking the persistence of some conditions, successively met by different bodies, as the conditions for asserting the identity of the space. But this already makes it obvious that if we think of a space as a real extension over and above bodies, it will be co-located with many different bodies successively. So the attribution of penetrability also follows naturally from Descartes’ error theory.

5.2.2 Geometry and the Physical World

It is worth emphasizing that Descartes’ position here is an answer to a general challenge for his geometrized natural philosophy: to relate mathematical space to a world of substances. Descartes claims that a vessel’s shape is necessarily connected with the presence of some contents which fill it, and that a finite part of matter is necessarily connected with some matter which surrounds it. The underlying principle is the same in each case. Bodies are essentially extended things, and extension is the subject-matter of geometry. Therefore the theorems of geometry must hold for the material world. When Descartes says that we cannot conceive of a finite boundary to the universe, he takes himself not to be reporting on a psychological quirk, but rather to be appealing to the certainty of geometry. Specifically, Euclid’s second postulate ensures that any finite straight line can be produced indefinitely.\(^{277}\) Given a boundary

such as a spherical surface, and the region within it, we can draw straight lines from within the region to the boundary, and by the postulate we can extend them outside of any such boundary. So a finite material universe would, for Descartes, be geometrically inconceivable; the second postulate would not hold true for such a world. The same general point applies to a vessel with, say, a cylindrical shape but no volume within it. Body cannot violate the principles of geometry, because its essence just is the subject-matter of geometry.

It is notable that Descartes appeals to this principle in contexts where the notion of space is operative. One way to apply geometry to the world would be to simply posit that geometrical space exists independent of body and is indivisible, since given a coordinate system, we can specify any region of it merely by its relations to other regions. The second postulate, for example, would hold in that world simply because there actually are infinite lines everywhere in space. This is Newton’s proposal in *De Gravitatione*. Descartes, of course, is no less committed to the geometrical intelligibility of nature, and he certainly recognizes that one can specify a region of extension merely by its relations to some other regions that are given. On his view, however, geometry holds in the natural world, but not because there actually is such an indivisible space in existence. Rather, when we specify a region by its external relations, there is nothing to that region other than a series of bodies which successively meet the relevant description. Though we have seen this last point already, it is worth emphasizing that Descartes’ treatment of space

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addresses the larger question of how geometry relates to the natural world. When Descartes says that he conceives of matter as that which geometers “take as the object of their demonstrations,” he is not saying that *res extensa* as a whole is to be identified with mathematical space. The corporeal world, unlike mathematical space, is populated by substances that are physically and metaphysically divisible all the way down. Nonetheless the truths of geometry all hold for *res extensa*, even those postulates which provide for the construction of geometrical objects solely on the basis of external relations.

### 5.3 Where the Alternative Conceptions of Space Go Wrong

With the foregoing in mind, it becomes clearer what Descartes’ general stance towards alternative theories of space is. As shown in Chapter Two, he has a theory of how people come to believe that there can be empty space; the central idea of that error theory is outlined in *PP* II.18. Again, Descartes is there directly addressing the commonsense notion of space. A prejudice that is at work here, he claims, is the tendency to count as real only what is accessible to the senses, “for normally the only things we give any thought to are those which are detected by the senses.” Hence it does not occur to most people, having made the fallacious inference identified in II.18, to think of the space within the vessel as something real which is not a body. Rather they just regard space as nothing. It is important, however, to recognize that there are more options here. If one is scrupulous about the conceptual respectability

\[\text{279 AT VIIIA 79; CSM I 247.}\]

\[\text{280 AT VIIIA 49; CSM I 230.}\]
of one’s beliefs, then one might follow up the fallacy not with the naive theory of
space as nothing, but with a theory of space that gives a different interpretation of the
difference between spatial and bodily extension. (In fact Descartes does relate the
Scholastics’ imaginary spaces and the Classical atomists’ void to his error theory, so
he is not just concerned with pre-philosophical beliefs.)

In this section I look at material that should be familiar by now, in order to
make it clear how Descartes thinks the error theory of PP II.18 gives him a general
diagnosis of all the notions of space that he regards as incoherent. That is, he thinks
he has picked out the common conceptual core of all incoherent notions of space.
This kind of unified diagnosis is part of Descartes’ stated agenda in the Principles:

I do not think that the diversity of the opinions of the scholastics
makes their philosophy difficult to refute. It is easy to overturn the
foundations on which they all agree, and once that has been done, all
their disagreements over detail will look foolish.\footnote{AT III 232; CSMK 156.}

Making explicit a common diagnosis of the rival conceptions of space in terms of
Descartes’ error theory will be useful in assessing the justification for his position
later in the chapter.

Here it is helpful to characterize very generally the lesson the reader is
supposed to take from II.18. This can be done more adequately now that we have
seen in what way there is an indivisible structure implicit in the Cartesian material
world. When people infer, wrongly, from the lack of necessary connection between
the vessel and its contents to the lack of necessary connection between the vessel and
material contents in general, there is a presupposition at work. It will be obvious to
most people that there is a necessary connection between the shape of the vessel and
the determinate region of extension within it: one cannot conceivably have the boundary surface of a cylinder without the volume. But since most people have mistakenly concluded that it is possible for there to be no body at all within the vessel, they have to give some other characterization of the determinate extension within the vessel. There can be many different stories here, but they will all have in common the commitment to a non-bodily extension. For all of Descartes’ opponents, then, there exists some kind of extended structure that is really separable, at least locally, from corporeal extension, and such that the parts of it are metaphysically indivisible from each other. Indivisibility applies because the vessel’s shape determines the whole volume and all the sub-regions thereof. That is, any sub-region of the extension determined by the vessel’s shape can be specified by its position in relation to the vessel. Further, since this non-bodily extension can, by hypothesis, be co-located with a body, it will also be characterized as penetrable.

For example, in Arnauld’s case the extension within the empty barrel, though it is not anything self-subsisting and consists merely in the fact that the barrel has a certain shape, is nevertheless a definite extension that can be, but need not be, co-located with bodies. Moreover it is conceptually indivisible from the barrel; so long as the barrel is the thing that it is, there will be that definite volume within it, regardless of whether there is material extension within the barrel or not. More generally, Vacuum1 is an interval between bodies that are distant without having anything between them. But this means that extension as distance is different and

282 Though, as Palmer (32-35) shows, certain Scholastics did in fact think that the result of an annihilation scenario was the existence of something like a cylindrical surface with no volume within it.
separable from extension as length. If body $B$ (or $B'$, $B''$, etc.) is between bodies $A$ and $C$ and exactly fills up the gap between them, then the distance, call it $AC$, is different and separable from all the lengths $B$, $B'$, $B''$, etc. The extension between $A$ and $C$ is therefore twofold; two different kinds of extension are co-located there. The extension of $B$ (or $B'$ or $B''$, etc.) and the distance $AC$ can be co-located, but need not be. So long as $A$ and $C$ maintain their relative position with respect to each other, the distance $AC$ retains its identity irrespective of whether it coincides with the length of $B$ or any other body. In other words, extension as distance is penetrable and metaphysically indivisible.

One might object that since Arnauld’s vacuum within the barrel is nothing in itself, there is no co-location. Indeed, part of the ingenuity of Arnauld’s proposal is precisely the fact that it avoids the co-location of two real extensions. When the wine fills the barrel, what could it be co-located with? The space that remains when the wine is annihilated is, after all, nothing. Extension as distance is nothing, so it cannot have the property of penetrability. Still, there is something very much like co-location even in Arnauld’s case. Arnauld’s vacuum is not an extended nothing; the properties which comprise the volume within the vessel are properties of the vessel. So although there are not two co-located subjects of extension, there are still two co-located extended structures.

The point applies more obviously in More’s case, in both his early and late accounts of spatial extension. Divine extended substance, whether understood as holenmerian presence or absolute space, is metaphysically indivisible. The removal or annihilation of some part of matter does not and cannot remove the part of spatial
extension which the matter had occupied, because nothing can remove a part of space from its surroundings. Moreover, space is penetrable while body is not; in the correspondence with Descartes this is the primary point. More’s early theory is much like the Scholastics’ imaginary spaces, and the point applies in the latter case as well. Whether or not God actually annihilates the matter within the lunar sphere, for example, he has the power of doing so, and that power is all there is to the imaginary spaces within or without the corporeal world. More accurately, God’s power to act, whether by creating, annihilating or moving bodies, is all there is to imaginary spaces.

And this power is ubiquitous, present whether or not there is body in a particular place or not. Hence imaginary spaces can be co-located with bodies, so penetrability applies in this case as well.

Thus with respect to Vacuum (Arnauld), Vacuum (imaginary spaces), and Vacuum (More), Descartes’ error theory as outlined in PP II.18 gives a fundamental common diagnosis of these conceptions of space. They all rest on a fallacious inference based on common experience and deeply ingrained empiricist prejudice; they all reify the way of thinking involved in our talk about “a space.” But we talk about “a space” by picking out a succession of bodies that successively have the same relations to external reference bodies. Consequently, these rivals all end up with a kind of extension that is not corporeal, and which is penetrable and metaphysically

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283 Though most Scholastics did not think, as the early More did, that God’s holenmerian presence in imaginary spaces justified attributing extension to Him. See Des Chene (387-8) for the contrast between More’s early view and Suarez’s on this point.

284 See Des Chene (357), discussing Fonseca’s view: “Likewise the “existence” of space, or the capacity to receive body, is merely the reverse of the coin whose obverse is God’s power to create quantified matter.”
indivisible. For Descartes all such accounts betray their common and erroneous foundation by this conceptual core.

5.4  Descartes the arch-Aristotelian

In opposing his account to all those that allow extension to be “doubled” or co-located with some other extension, Descartes is following up on an Aristotelian line of thought. Part of Descartes’ achievement is to improve upon certain aspects of the Aristotelian theory of place. In *Physics* IV.8 Aristotle argues that the void must be penetrable, or such as to be co-located with bodies. For if it were to be displaced by bodies, void or vacuum would manifestly just be a kind of body. Then Aristotle makes the argument that is echoed in *PP* II.11:

But the [wooden] cube also has a magnitude equal to that occupied by the void; a magnitude which, if it is also hot or cold, or heavy or light, is none the less different in essence from all its attributes, even if it is not separable from them; I mean the bulk of the wooden cube. So that even if it were separated from everything else and were neither heavy nor light, it will occupy an equal amount of void, and fill the same place, as the part of place or of the void equal to itself. How then will the body of the cube differ from the void or place that is equal to it? And if there can be two such things, why cannot there be any number coinciding?²⁸⁵

This is at once an argument that the void is a superfluous theoretical entity and a charge of unintelligibility. Body already has its own quantity, its own three-dimensionality; the void is thus unnecessary. “Therefore if this differs in no respect from its place, why need we assume a place for bodies over and above the bulk of each, if their bulk be conceived as free from attributes?”²⁸⁶ Moreover, since


proponents of the void admit that two extended things can coincide, what reason can there be for restricting coextension to two things? Why not three, or any other number? The implicit contrast is with Aristotle’s own account, where nothing with three-dimensionality can be co-located with any other such thing. Aristotle, like Descartes, seems to find the truth of this claim to be obvious.

Descartes does not explicitly make an argument that the vacuum is superfluous; he is interested in the stronger claim that it is incoherent. Nevertheless he is thoroughly Aristotelian on this point. In PP II.11, as pointed out in earlier chapters, his point is that the extension of a body is the same as that of a space, and his concern is to deny that there are two co-located extensions when a body occupies a space. This is germane to Aristotle’s argument as well, as evidenced by his rhetorical question: “How then will the body of the cube differ from the void or place that is equal to it?” Aristotle’s point, then, is that there is no obvious way to distinguish the body’s dimensionality from the void that it occupies. And further, if one comes up with some kind of differentiating characteristic, there will be an element of arbitrariness in the account, since these two dimensions are allowed to penetrate each other, but no more than these two.

Undeniably there is a certain simplicity to the Aristotelian position, in that there is only one sort of extension or three-dimensional quantity, and hence no need to theorize about the ways different kinds of extension relate to one another. The question of penetrability or co-location becomes moot. As we have seen, however, in the medieval period the account became complicated by questions about God’s

287 See Des Chene, 354-5; Grant, Much Ado, 14.
omnipotence, and more generally about the relationship of God and the angels to the corporeal world. Hence a distinction was made between *locus* and *ubi*, and also between corporeal dimensions and imaginary spaces; Descartes, somewhat understandably, wanted to do away with these subtleties and recapture the simplicity and intelligibility of the Aristotelian position. He responded to concerns about omnipotence by separating what is possible for God from what is conceivable for us. Thus, as we saw in earlier chapters, Descartes simply claims that he cannot conceive of a vacuum, but refrains from saying that it is impossible for God to bring one about.

Aristotle’s view, however, was challenged not only by concerns about omnipotence; his arguments against the void met some vigorous opposition quite early, even within the school he founded. One of the most important critiques was that of John Philoponus, the sixth-century Neo-Platonist. Considering his objections helps to show how Descartes develops and improves on the Aristotelian position on the vacuum. Philoponus famously responded to Aristotle’s arguments about motion in a void, but those are not directly relevant to Descartes. Rather it is the critique of Aristotle’s definition of place and the aforementioned argument from *Physics* IV.8 that help bring out Descartes’ contribution on the issue. Philoponus argues in defense of one of the rejected alternatives Aristotle considers as an account of place: place is a three-dimensional extension that bodies occupy. There is never an actual vacuum, but a vacuum is certainly conceivable.

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There are two points that Philoponus makes against Aristotle’s definition of place that are especially salient here. First, he claims that there is a dimensionality problem, since bodies are three-dimensional but Aristotelian place is two-dimensional. Second, he points out a problem discussed in Chapter One: place is supposed to be immobile, but surfaces move with the bodies of which they are the boundaries. So it seems that either place is not a surface, or it is not immobile.

Philoponus gives several arguments for a three-dimensional view of place (and space), but the most fundamental one is the following:

If what is in place is nothing other than body, and it is not in place by virtue of anything other than its being body, but what is in the surface of the container is not in it by virtue of being body (for body is extended in three dimensions and whatever is so extended cannot be in a surface as such), it follows that place is not a surface. But the boundary of the container by virtue of which it contains the contained is a surface; hence place is not the surface of the container by virtue of which it contains the contained. For the surface is extended in two dimensions and so could not receive in itself what is extended in three dimensions, by virtue of its being such. For it is not in contact with the whole, and the surface does not receive the whole body. For how could one say that the depth of the body is in the surface? Only the boundaries of the body are in the surface.

Philoponus seems to be putting a lot of weight on a fairly specific notion of being “in” a place. Surely in some sense the internal volume of a sphere is “in” the spherical boundary surface, even though the surface is not “in contact with the whole.” It is not hard to see how Aristotle could respond, but Philoponus does have a point. We think of bodies as occupying places, not just as circumscribed by them, and a three-dimensional understanding of place seems to capture the notion of occupation in a more intuitive fashion than the Aristotelian two-dimensional account. So Philoponus

289 Philoponus, 23.
can at least claim to be following common usage on this point, arguably more closely than Aristotle does. Further, Aristotle takes as a starting point the idea that place is equal to the body in place, and Philoponus points out that a surface cannot be equal to a volume. Again, while this is not a devastating objection, Philoponus’ account is more direct in the notion of equality that is preserved.

On the dimensionality issue Descartes is on Philoponus’ side, in a way; part of the point of framing the notion of internal place, for the Scholastics from whom Descartes adopted that concept, was to accommodate concerns like those raised by Philoponus. As shown in Chapter One, however, Descartes follows another tradition in dealing with the problem of the immobility of place. With respect to the Aristotelian conception of place and the long tradition of criticism and adaptation thereof, Descartes’ crucial move is the combination discussed in Chapter One. He adopts a strategy for dealing with the immobility of place found in Aquinas, Scotus, and Suarez, and applies it to the notion of internal place. The result of this combination is the conception of internal place as determined by relations to external reference bodies. And that conception, in turn, is what makes it possible for Descartes to capture the indivisibility and penetrability implied in the notion of space as most people understand it. Further still, since Descartes has an account of this characteristic of space, he is able to construct an error theory for all rival accounts. Specifically, this is a theory that accounts for why people naturally think there are two different kinds

\[290\] In the case of Toletus, he actually interpreted Philoponus as advancing a notion of internal place rather than something separable from bodies. See Grant, *Much Ado*, 14-15, 273n44.
of extension that can be co-located, even though this is strictly speaking inconceivable.

The error theory’s importance can be seen by contrast with Aristotle’s view and Philoponus’ critique. In his arguments against the void Aristotle tended to ascribe bodily properties to it, which then generate absurdities.\textsuperscript{291} The implicit justification for this is that extension entails these characteristics.\textsuperscript{292} This is problematic first of all because Aristotle does not think that the essence of corporeal substance is extension alone.\textsuperscript{293} In Descartes’ case, of course, there is nothing over and above extension in body; in that respect he is in a better position than Aristotle to take the Aristotelian stance. But Aristotle’s stance is also problematic insofar as he arguably fails to take seriously the proposal that there is another kind of extended thing that simply has different characteristics than body does. Spatial extension is immobile, indivisible and penetrable, says Philoponus, and thus a whole set of arguments against the possibility of void fail. There is no absurdity in the co-location of body and space. Moreover, there is no need to posit a further extension to stand to space as space does to body. There must be spatial extension because of the motion of bodies and certain basic

\begin{itemize}
    \item Grant (14) shows that these arguments became standard refutations of the void in the Medieval period.
    \item Aquinas, commenting on the latter argument in Aristotle, says that “the fact that two bodies cannot exist together is not due to the matter or to the sensible passions but only to the dimensions, in which there cannot be diversity, if they are equal, except in respect to site.” \textit{[Commentary, 264]} This nicely encapsulates Aristotle’s line of thought: there will be no good reason forthcoming why two and only extensions can coincide, because no extensions can coincide. Further, the \textit{per impossible} removal of all the attributes of the cube besides its extension or dimensions is relevant precisely because, Aristotle assumes, the impenetrability of the body is entirely a function of its extension or magnitude. The Coimbra commentary on the \textit{Physics} takes the same line here, as Des Chene (355-6) shows.
    \item Philoponus, 20-1.
\end{itemize}
trough truths about place, but the parts of space do not move and are not in place. Thus the argument can not be iterated, and hence there is no absurd regress or infinity of extensions.

Aristotle, then, is open to the charge that he simply fails to take the most plausible rival account seriously. Descartes, on the other hand, at least gives the beginnings of an account that traces the characteristics attributed to spatial extension in rival accounts back to the legitimate features of our notion of space. He agrees with Aristotle that there is not and cannot be something extended that is indivisible, immobile and impenetrable, but he goes further than Aristotle in recognizing that it is natural for us to think that there can be such a thing. Descartes recognizes that the onus is on him to account for certain features of place and space that figure conspicuously in all non-Aristotelian accounts of those concepts—all accounts that allow the possibility of the vacuum. Moreover, as I will show in the following section, this allows him to argue more persuasively that his account of space and body is the only conceivable one.

5.5 The Order of Reasons and the Argumentative Strength of the Cartesian Position

Descartes, as shown in Chapter Two, thought that any theory of space that allowed for the possibility of the vacuum was incoherent. Nonetheless, I will argue that Descartes had an argument for his view on space and vacuum, or at least the resources for such an argument, that appealed to simplicity or economy. That is, he

294 Philoponus, 21.
tries to argue by inference to the best explanation, even though he thinks the alternative explanations are really incoherent. This can be seen by examining Descartes’ conception of his philosophical aims and method. In a letter to Mersenne Descartes famously distinguishes between “the order of topics” and “the order of reasons,” claiming that his *Meditations* follow the latter rather than the former.\(^ {295} \) By the “order of topics” Descartes means a way of proceeding that involves saying “in a single place everything relevant to a given subject.” In the letter’s context the relevant case is that of the soul; Descartes is explaining and defending the fact that he considers the soul in the Second Meditation but does not prove that it is really distinct from the body until the Sixth.

You should not find it strange, either, that I do not prove in my Second Meditation that the soul is really distinct from the body, but merely show how to conceive it without the body. *This is because I do not yet have, at that point, the premisses needed for the conclusion. You find it later on, in the Sixth Meditation*.\(^ {296} \)

The hallmark of the “order of reasons” is that no conclusion is advanced before the premises which are sufficient to prove it.

The order of topics, on the other hand, is “good only for those whose reasoning is disjointed, and who can say as much about one difficulty as about another.” This sentence parallels a number of other passages, where Descartes is distinguishing his method for discovering the truth from those endorsed by various other thinkers or schools. In passages scattered throughout his writings Descartes criticizes different philosophical methods that rely on dividing things up into a set of

\(^{295}\) AT III 266-7; CSMK 163-4.

\(^{296}\) AT III 266; CSMK 163. My italics.
categories at the outset. These are often accompanied by complaints against
traditional logic, in particular Aristotelian syllogistic. For example, in the *Discourse on Method* he attacks conventional logic along with Raymond Lully’s proposal for a universal method of discovery:

> But on further examination I observed with regard to logic that syllogisms and most of its other techniques are of less use for learning things than for explaining to others the things one already knows or even, as in the art of Lully, for speaking without judgement about matters of which one is ignorant.297

This charge against syllogistic, namely that it is useless for discovering the truth, occurs in several passages as early as the *Regulae*. Much later, in the *Conversation with Burman*, Descartes is more circumspect, distinguishing logic from dialectic. The former “provides demonstrative proofs on all subjects,” while the latter is the proper target of the passage just quoted from the *Discourse*, which Burman had asked about.

> This really applies not so much to logic … but to dialectic, which teaches us how to hold forth on all subjects. In this way it undermines good sense, rather than building on it. For in diverting our attention and making us digress into the stock arguments and headings, which are irrelevant to the thing under discussion, it divers us from the actual nature of the thing itself.298

The reference to “stock arguments and headings” suggests a connection between the “order of topics” and “dialectic” as Descartes characterizes it here. Stephen Gaukroger has argued that the background to passages like this in Descartes includes the medieval tradition of interpretation of Aristotle’s *Topics* and humanist

297 AT VI 17; CSM I 119.

298 AT V 175; CSMK 350.
conceptions of method, both of which tended to reduce questions of method to pedagogy, on the premise that “the vast bulk of what there was to be known was already known, so the pressing task was to co-ordinate this knowledge and present it in a systematic and economic fashion.” Hence Descartes’ target is any method in philosophy, and especially in natural philosophy, which adopts a set of categories at the outset and takes it to provide constraints on sound argumentation.

A rather flagrant example of this kind of proceeding, and Descartes’ response to it, occurs in the Seventh Objections to the *Meditations*. The author of the objections, the Jesuit Pierre Bourdin, at one point objects, concerning the argument that the mind is really distinct from the body, that “the inference from knowledge to existence is not a valid one.” In context he seems to mean something like the inference from “I know myself merely as a thinking thing” to “I am merely a thinking thing.” As a follow-up to this objection Bourdin supplies a diagram, which provocatively divides ‘thinking substance’ into two categories: corporeal and incorporeal. The tone is sarcastic (Bourdin advises Descartes to “meditate on this for two weeks at least”), but the point seems to be that looking at the relevant ontological categories shows that Descartes has erred. He cannot infer from the fact that he knows himself only in a certain respect, that is, only as a thinking thing, to the conclusion that he is just a thinking thing, or a thing that can exist merely as a thinking thing. One could know something in the category of corporeal thinking substance merely as a thinking thing, but the Cartesian conclusion would not follow.

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300 AT VII 506; CSM II 344.
The Cartesian strategy of using epistemic claims as a basis for establishing the
essence of the thinking thing is ruled out by the already-established taxonomy of the
kinds of thinking substance. Descartes, of course, is not amused. His opponent, he
says, “produces, like a fluttering flag of victory, a diagram which contains a
completely arbitrary classification of thinking substance,” and “sets out various types
of thinking substance as if he had got his information from some oracle.”301

A more substantive parallel passage is in the *Search for Truth*, which in turn is
related to a passage in the Second Meditation where the meditator considers and
rejects an initial answer to the question, “What am I?”302 There the meditator reasons
as follows:

> What then did I formerly think I was? A man. But what is a man? Shall I say ‘a rational animal’? No; for then I should have to inquire
what an animal is, what rationality is, and in this way one question
would lead me down the slope to other harder ones, and I do not now
have the time to waste on subtleties of this kind.303

In the *Search for Truth*, Descartes’ mouthpiece Eudoxus asks the untutored Polyander
to tell him what he is. Polyander replies that he is a man. In Eudoxus’ response he
attacks the “Porphyrean tree,” a paradigm of classification connected with Aristotle’s
*Categories*.304

> You are not paying attention to my question, and the reply you gave me, however simple it may seem to you, would plunge you into very
difficult and complicated problems, were I to press you even a little. If,

301 AT VII 517, 520; CSM II 352, 354.
302 For a brief note about the dating of the *Search for Truth*, see CSM II 399.
303 AT VII 25; CSM II 17.
304 The “Porphyrean tree” comes from Porphyry’s *Isagoge*, a neo-Platonic commentary on
Aristotle’s *Categories*.
for example, I were to ask even Epistemon himself what a man is, and he gave the stock reply of the scholastics, that a man is a ‘rational animal’, and if, in order to explain these two terms (which are just as obscure as the former), he were to take us further, through all the levels which are called ‘metaphysical’, we should be dragged into a maze from which it would be impossible to escape. For two other questions arise from this one. First, what is an animal? Second, what is rational? If, in order to explain what an animal is, he were to reply that it is a ‘living and sentient being’, that a living being is an ‘animate body’, and that a body is a ‘corporeal substance’, you see immediately that the questions, like the branches of a family tree, would rapidly increase and multiply. Quite clearly, the result of all these admirable questions would be pure verbiage, which would elucidate nothing and leave us in our original state of ignorance.305

This recalls the discussion of the “order of topics,” which is helpful only for those “who can say as much about one difficulty as about another.” Descartes’ complaint against this kind of procedure is twofold: it keeps us from taking the necessary step of moving our attention away from the senses, and it consequently diverts us from the “order of reasons,” which produces sound argumentation at every step. The former point is apparent in the Conversation with Burman passage, while both complaints are made in the letter to Mersenne: after distinguishing the “order of reasons” and the “order of topics,” Descartes concludes that he was right not to include objections and replies within the Meditations itself.

So I do not think that it would be useful, or even possible, to insert into my Meditations the answers to the objections which may be made to them. That would interrupt the flow and even destroy the force of my arguments. The majority of the objections would be drawn from things that are perceivable by the senses, whereas my arguments get their force chiefly from the need to withdraw one’s thought from these things.306

305 AT X 515-6; CSM II 410.

306 AT III 267; CSMK 164.
Here Descartes draws an important connection between the order of topics and improper reliance on the senses. If one begins to philosophize by formulating a system of categories, one will just systematize and entrench the preconceived notions of our pre-philosophical stance towards our experience. This connection is also evident within the passages quoted from the Second Meditation and the *Search for Truth*, where pre-philosophical notion of the self as a certain kind of body is connected with a Porphyrean “tree” division of the Aristotelian category of substance.

This background on Descartes’ conception of his philosophical method bears on the question of the vacuum, by helping to make sense of his approach to alternative views of space. Briefly, Descartes is not very concerned to defend directly his claims against the conceivablebility of the vacuum, namely, that distance has to be cashed out in terms of length (*contra* Vacuum₁) and that corporeality follows from extension (*contra* Vacuum₄). We are just supposed to be able to see that these are true once we have freed ourselves from attachment to the senses. The objections to these inferences—i.e., from extension to substantiality and from extension to corporeality—depend on schemes of categories that reflect and systematize our empiricist prejudices. These schemes divide extension into different species: distance-extension and length-extension in the case of Vacuum₁, spatial and material extended substance in the case of Vacuum₄. According to Descartes, these systems involve pseudo-concepts just like the one produced by Bourdin does. The process of articulating his position on vacuum, then, is less a matter of constructing an argument than one of removing notions that obscure what should be an obvious line of thought. How are such preconceived notions to be removed? Ultimately this comes down to
the clear and distinct perception that the Second Meditation is concerned to facilitate. There is simply a kind of grasp of the idea of an extended thing, of which everyone is in principle capable, that allows one to identify the alternative conceptions of extension as incoherent.

Nevertheless, even in contexts where his position rests on the claim of clear and distinct perception, Descartes sometimes uses an argument from simplicity or economy to make his case. This is evident in the *Meteorology* when he explicitly avoids the assertion that there is nothing real in the nature of bodies other than the geometrical properties he appeals to in that work. Instead, he says, he merely makes the weaker claim that he does not need to appeal to any such entities as real accidents or substantial forms in order to give explanations.\(^{307}\) In his replies to Arnauld’s objections to the *Meditations*, and again in a letter to Regius, Descartes makes it very clear that this was a purely strategic move.\(^{308}\) He has no real misgivings as to whether there might really be substantial forms in bodies, for example. It is more effective as a means of persuasion, however, as well as politically safer for Descartes to argue by inference to the best explanation in this case. As he puts it to Mersenne, “The principal aim of my metaphysics is to show which are the things that can be distinctly conceived.”\(^{309}\) In some cases this goal can, he thinks, be accomplished without explicitly rejecting certain ideas that he does in fact reject as inconceivable. The goal,

\(^{307}\) AT VI 239; CSM II 173n2.

\(^{308}\) AT VII 249; CSM II 173. AT III 491-2; CSMK 205.

\(^{309}\) AT III 192; CSMK 154.
however, is to persuade people that these ideas are in fact incoherent pseudo-concepts.

Now in such matters, saying that one does not wish to make use of these entities is almost the same as saying one will not accept them; indeed, they are accepted by others only because they are thought necessary to explain the cases of natural effects.\textsuperscript{310}

In this passage we see clearly that Descartes advanced what amounts to an inference to the best explanation in cases where the alternative explanations are, in his view, incoherent.

This point applies to the question of the vacuum as well. In \textit{Le Monde} Descartes was content to do without the vacuum, but held back from arguing against its possibility.\textsuperscript{311} Though he makes the strong inconceivability claim in the \textit{Principles}, Descartes also thinks that the conceptions of space which admit of the vacuum’s possibility are posited only to explain certain “natural effects,” and that he has a simpler and clearer explanation. The error theory of \textit{PP} II.18 identifies the relevant \textit{explananda}: bodies change their positions so that many can successively occupy the same space; and the space is defined by external geometrical relations, and hence if a space were to exist as such it would be indivisible.\textsuperscript{312} Descartes’ analysis of space accounts for both of these items, or rather for our \textit{talk} about spaces, of which these are examples, while denying the possibility of non-bodily extension in any form.

\textsuperscript{310} AT III 500; CSMK 207. My italics.

\textsuperscript{311} AT XI 20-1; CSM I 87.

\textsuperscript{312} Notice that these \textit{explananda} do not include anything specific about Descartes’ mechanics, as, for example the distinction between inertial from non-inertial frames, etc. The Cartesian account of place and space is only designed to deal with relatively basic features of motion: e.g., that a body can take the place of another.
Moreover, Descartes can argue with some plausibility that his account of space is more economical and avoids the difficulties of its rivals. That is, Descartes does not have to give any account of co-location or penetration and the circumstances in which it is and is not possible. Nor does he have to admit multiple kinds of extended thing, which differ with regard to divisibility, mobility and penetrability. Rather, the simplicity and intelligibility of the idea of extension is matched by the complete uniformity among extended things, all of which are impenetrable, mobile and m-divisible.

Hence even though Descartes makes the strong claim that the alternative conceptions of extension are incoherent, he also thinks that it can be useful to make the weaker point that they involve an unnecessarily complex ontology of extension. He does not always emphasize the weaker argument, and it never becomes fully explicit, but it is there. It is evident in PP II.13, when Descartes wraps up his treatment of internal place by saying that “the terms ‘place’ and ‘space’ … do not signify anything different from the body which is said to be in a place.”313 At this point he has given no argument against a notion of space as body-independent extension, but he claims to have sufficiently accounted for our concepts of place and space in terms of his conception of body as constituted by extension alone. Further, as I have argued, Descartes claims to have accounted for our mistaken belief in the indivisibility of space (though not in so many words) without having to admit an indivisible extension; this is an extension of the account in PP II.10-12. For comparison, in a more general context Descartes notes that everybody admits the

313 AT VIII A 47; CSM I 228.
existence of matter and properties such as shape, size and motion. He then claims to have shown that that is all that is necessary in natural philosophy:

And since all natural phenomena can be explained in this way, as will become clear in what follows, I do not think that any other principles are either admissible or desirable in physics.314

Hence there is a discernible appeal to something like inference to the best explanation in Descartes’ treatment of space, and again we see that the rejected alternatives are both superfluous and inadmissible, both unneeded and incoherent.

If my account is correct, Descartes thinks of the error theory as very important in making the case for his view. It allows him to make contact, so to speak, with rival positions, even if it is only to show how the relevant errors arise. And this is borne out in the texts; Descartes does think the error theory is significant for his argumentative position relative to his opponents. In the *Principles*, having argued that “there is no real difference between quantity and the extended substance,” he addresses briefly those who had thought that there was such a difference:

Others may disagree, but I do not think they have any alternative perception of the matter. When they make a distinction between substance and extension or quantity, either they do not understand anything by the term ‘substance’, or else they simply have a confused idea of incorporeal substance, which they falsely attach to corporeal substance; and they relegate the true idea of corporeal substance to the category of extension, which, however, they term an accident. There is thus no correspondence between their verbal expressions and what they grasp in their minds.315

Similarly, writing to More, Descartes addresses the Scholastic notion of imaginary space outside the world: “I do not care if others call this space imaginary

314 AT VIII A 79; CSM I 247. My emphasis.

315 AT VIII A 79; CSM I 247.
and thus regard the world as finite; for I know what are the preconceived opinions that gave rise to this error.” 316 Note that these “others” only “call this space imaginary.” As in the previous passage, Descartes’ point is that “there is no correspondence between their verbal expressions and what they grasp in their minds.” 317 As noted in Chapter Two, Descartes also mentions the ancient atomists as examples of theorists whose accounts of space were infected with errors based in the pre-reflective bias in favor of the senses. 318 Descartes does not explicitly extend the error theory in a context where he is addressing Vacuum4, but it is significant that the last couple of texts occur in his letters to More. Though it would be too much to claim definitively that Descartes was fully aware of the general implications of his error theory, it is not at all implausible that he was. At the very least he extended the error theory to the Scholastics and the ancient atomists. But further, Descartes’ claim that the extensions of space and matter are the same is not restricted to a notion of space as Vacuum1 or Vacuum3. It is more natural to read PP II.11 as directed against any notion of space as a three-dimensional something that is distinct from bodies and can be co-located with them. This makes it more plausible to read the error theory as having the same general applicability as well.

316 AT V 345; CSMK 375.

317 Incidentally, this is why Descartes can say that our ideas of space and body are the same, even though we talk about a space as something extended which remains through replacement of bodies, and hence as having at least the non-bodily property of penetrability. Space as something penetrable, indivisible, etc. is not something of which we have an idea, properly speaking, even though we can frame the notion and talk about it.

318 AT V 271; CSMK 362.
In a letter to Hyperaspites Descartes makes an explicit connection between the error theory of *PP* II.18, which is specifically about the idea of space, and his theory of error in general, presented in the Fourth Meditation. His correspondent had pointed out that others deny having the idea of God as Descartes characterizes it in the *Meditations*. Descartes responds by distinguishing judgment from perception:

> I do not remember that I ever expressed surprise ‘that not everybody is aware of the idea of God in himself’; for I have often observed that what men judge does not accord with what they understand. I do not doubt that everyone has within himself an implicit idea of God, that is to say, an aptitude to perceive it explicitly; but I am not surprised that not everyone is aware that he has it or notices that he has it. … *In the same way, people judge that so-called empty space is nothing; all the same they conceive it as a positive thing* … and in many other matters people’s judgements disagree with their perception.319

Everyone has the idea of a thing whose essence is constituted by extension, but most are unaware that they have it. The account in *PP* II.18 is supposed to show how, by making unwarranted judgments, we distort our understanding of the idea of extension, which we have within our minds all along.

This shows that Descartes’ claim about inconceivability of empty space is not sufficiently refuted by the fact that many intelligent people claim otherwise based on introspection. The Cartesian position rests not just on a report of Descartes’ own perceptions, but also on an argument from simplicity or economy. Assuming provisionally that Descartes’ conception of extended substance and the accompanying analysis of space are correct, one can account more simply and intelligibly for the “phenomena” that more complex and obscure theories try to account for. The relevant “phenomena” are the judgments we make about space in our ordinary language.

319 AT III 430-1; CSMK 194. My italics.
Moreover, on this assumption, Descartes can explain both the existence and the appeal of the alternative views: they result from the process described in PP II.18. So compared to the alternatives, the Cartesian view should win out for its economy, since it can account for the relevant phenomena and the existence of the alternative proposals, all on the basis of a simpler and more intelligible ontology. At least, that is Descartes’ understanding of his view’s strength, on my reading.

It is important to note, however, that Descartes’ position is not just proposed as a simpler hypothesis about space and place, but as part of an account of the essence of corporeal substance, which therefore puts constraints on what is truly conceivable. In other words, the explanation which Descartes infers to includes his theory of material substance. If he’s right that extension constitutes the essence of body, then our normal notion of space has to be understood through the error theory—in other words, our everyday notion of space will be incoherent. Thus, the fact that there is an inference to the best explanation here does not entail that Descartes is merely arguing for one of several conceivable accounts. Descartes can defend a view of extension and substance on grounds of its superior economy and simplicity without admitting that the alternatives are conceivable in the strong sense, where that would imply possibility. On this point it is significant that he distinguishes between the verbal formulations proposed by his rivals and “what they grasp in their minds.” 320 One can frame some notion and think that one understands it, but this does not entail that it is clearly and distinctly perceived. Descartes acknowledges these proposals about space and vacuum, but it is clear that he does not regard them as conceptions in the strong sense.

320 AT VIII A 45; CSM I 226-7.
sense. In fact the argument is supposed to support the position that the alternative proposals are inconceivable: first, they are unnecessary, and second, we can explain their apparent conceivability in terms of the true conception of extension, which nonetheless rules out their actual conceivability.

5.6 Conclusion

Descartes’ rather radical position on the vacuum, which has appeared to many as a particularly clear example of his dogmatism, is in fact surprisingly viable in its argumentative context. No doubt there is still an element of dogmatism here: Descartes thinks that if simply perceive an extended thing with our intellect and get our prejudices out of the way, we will recognize that empty space is inconceivable. Everything above notwithstanding, this claim still seems to reflect more on Descartes’ philosophical agenda than on what we can and cannot conceive. The option would be open for one of his opponents to admit that Descartes has a more economical account of space, but still to maintain that alternative views are conceivable. More importantly, even when one recognizes that Descartes has an inference to the best explanation in the background, it is still the case that he only addresses the notion of space with respect to our general experience and the basic features of motion. That is, he does not analyze what is required by the laws of motion as far as space and place are concerned. Historically this is ironic, since his position on the vacuum was supposed to be an upshot of his geometrization of body, which in turn was intended to make an intelligible and universal physics possible. It almost goes without saying that the physics of Descartes’ res extensa turned out to be inadequate and conceptually problematic in various ways.
With these caveats duly noted, it should be recognized that Descartes’ account of space is a remarkable piece of philosophical work. He enters into discussions in the tradition of Aristotelian views of place and space and emerges with a view that is decidedly more effective than its predecessors in retaining and developing the core Aristotelian idea about space and vacuum, namely that corporeal extension is the only kind of extension that needs or ought to be admitted. Descartes described his project in the *Principles* as “teaching [his] World to speak Latin.” With respect to the subject treated here, this is an extreme understatement of the philosophical sophistication with which Descartes defines his view against that of the Scholastics.

Moreover, even those who were not concerned to follow Aristotle’s position in their views of space and vacuum should have found Descartes’ account a serious challenge. Through his error theory he accounts for the features of indivisibility and penetrability that belong to space as we are apt to conceive of it, and this theory gives a unified treatment of all his main rivals on the subject. Further, his treatment of indivisibility represents an ingenious solution to the problem of relating geometrical space to a world of metaphysically-divisible extended substances.\footnote{This is a problem that is sometimes pointed out as one that defeated Descartes’ best efforts. See Grosholz for a discussion of the problem of the individuation of extended substances.} Holden has argued persuasively that the tension between the geometrization of nature and basic metaphysical principles was a fundamental issue for virtually all natural philosophers in the seventeenth and eighteenth centuries; Descartes’ treatment of space and vacuum is thus part of a significant chapter in the history of philosophy.
It is also important that Descartes does not simply rest his case against the vacuum on an appeal to clear and distinct perception, especially since his position is often taken as a paradigmatic instance of dogmatism in natural philosophy. The argument that I have tried to uncover and reconstruct in this chapter shows how in practice Descartes tried to justify, rather than merely assert the claim that our clear and distinct perception of matter is simply that of an extended thing. There is no denying that the doctrine of clear and distinct perception does a lot of work for Descartes, but it is also easy to misinterpret him as merely invoking introspection to justify controversial claims about what is conceivable and what is not. The picture that emerges from the present study is that of a more responsible and dialectically engaged Descartes, who carefully assesses rival accounts of space and tries to ensure that his account has the resources to explain the existence and plausibility of its rivals while surpassing them in intelligibility.

This is apparent in Descartes’ argument about impenetrability in the correspondence with More. [AT V 342; CSMK 373.] If I am right, he would perhaps have done better to spell out for More, in terms of his own (i.e., Descartes’) conception of extended substance, how the error theory applies to More’s view, rather than to argue directly that the penetrability of an extended thing is inconceivable. The cogency of that direct argument is doubtful, but to get fully clear on it, a better understanding of Descartes’ view of individuation of corporeal substances is necessary. See Appendix.
APPENDIX

THE METAPHYSICS OF EXTENDED SUBSTANCE IN DESCARTES

The relation of extension and substance in Descartes’ metaphysics is a long-standing interpretative concern in Descartes scholarship. The present study has some implications for this topic, which cannot be fully pursued here. In the course of constructing an interpretation of Descartes on spatial structure, I have also touched on the metaphysical structure of corporeal substance itself. The arguments from Arnauld and Spinoza are obviously important here, as is Descartes’ thesis that the existence of a part of matter is necessarily connected with the existence of some matter or other ad infinitum. This appendix serves to sketch out briefly what some of the main interpretive issues are, what my study of Descartes on space and vacuum implies or suggests for those issues, and how this relates to the current literature on the topic. There is a recent body of literature on the topic of extended substances in Descartes, and the present study relates to that literature in promising ways.

An initial problem concerns Descartes’ conception of substance itself. Notoriously, he has at least two “official” definitions of substance. One is found in the Second Replies, and is basically the idea of substance as the bearer of properties.

This term [substance] applies to every thing in which whatever we perceive immediately resides, as in a subject, or to every thing by means of which whatever we perceive exists. By ‘whatever we perceive’ is meant any property, quality or attribute of which we have a real idea. The only idea we have of a substance itself, in the strict sense, is that it is the thing in which whatever we perceive (or
whatever has objective being in one of our ideas) exists, either formally or eminently. For we know by the natural light that a real attribute cannot belong to nothing.\footnote{AT VII 161; CSM II 114.}

The other definition of substance is given in the \textit{Principles}, and the central notion is that of existential independence: “By \textit{substance} we can understand nothing other than a thing which exists in such a way as to depend on no other thing for its existence.”\footnote{AT VIII A 24; CSM I 210.}

Descartes immediately concludes that only God satisfies this criterion fully:

\begin{quote}
In the case of all other substances, we perceive that they can exist only with the help of God’s concurrence. Hence the term ‘substance’ does not apply \textit{univocally}, as they say in the Schools, to God and to other things; that is, there is no distinctly intelligible meaning of the term which is common to God and his creatures."
\end{quote}

Descartes never directly addresses the relation between his two characterizations of substance.\footnote{For a good overview of Descartes’ uses of the notion of substance see Vere Chapell, \textit{“Descartes on Substance,”} in Janet Broughton and John Carriero, \textit{A Companion to Descartes} (Malden, MA: Blackwell, 2008): 251-270.}

Extended things fit well with the first notion of substance, but it is not so clear how they can satisfy the independence criterion. As discussed in Chapter Five, Descartes argues that we cannot conceive of a world containing only a finite part of matter, so he seems straightforwardly committed to the falsity of the view that parts of matter or bodies require only the help of God’s concurrence to exist.\footnote{Edward Slowik [“Descartes and Individual Corporeal Substance,” \textit{British Journal for the History of Philosophy} 9 (2001): 1-15.] tries to avoid the problem by distinguishing between existence and conceivability: we cannot conceive of a finite material world, but that does not license the conclusion that such a world could not exist. I do not think this will work. What is conceivable is precisely the issue, as is clear from Descartes’ test for whether two things are really distinct—i.e., whether they can be conceived as existing independently of each other. It is true that Descartes separates what is possible for God from what is conceivable, but if Slowik only means that we cannot deny God the power to create a finite material world, that does not suffice in this context. We cannot deny God the power to make it the case that $2+2=5$ either, according to Descartes.}

Descartes clearly says that a world consisting only of God and a finite part of matter

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is inconceivable. A necessary condition for the existence of a finite part of matter is the existence of indefinitely more matter. Nevertheless he also explicitly says that corporeal substance (along with created thinking substance) “can be understood to fall under this common concept: things that need only the concurrence of God in order to exist.”327 If a finite part of matter is a substance, then, then it would seem that the concurrence of God would be a sufficient condition for its existence. One response to this difficulty is to attribute a monistic view of extended substance to Descartes: finite parts of matter or bodies are not substances; there is only one infinitely extended corporeal substance. In some cases the one corporeal substance is understood as all of extension taken together, while other commentators take the essence or nature of extension, as a subsisting abstract object, to be the unique extended substance. As emphasized in some recent research, however, there is surprisingly little textual evidence for the monistic reading. Aside from the difficulty laid out above, in fact, there is virtually none. Descartes seems quite willing to call finite parts of matter substances, and he explicitly says that different (non-overlapping) parts of matter are really distinct from each other; the problem, then, is how to square this with the independence criterion. If there is a plausible way to do this, then the monistic reading should be abandoned.

There is one text, sometimes construed as support for the monistic reading, that is significant in this context. In the Synopsis of the Meditations Descartes specifies that substances are naturally incorruptible, and applies this to extended substance:

327 AT VIII A 24; CSM I 210.
First, we need to know that absolutely all substances, or things which must be created by God in order to exist, are by their nature incorruptible and cannot ever cease to exist unless they are reduced to nothingness by God’s denying his concurrence to them. Secondly, we need to recognize that body, taken in the general sense \( corpus \text{ in } \textit{genere sumptum} \), is a substance, so that it too never perishes.

Martial Gueroult’s influential monistic interpretation of Descartes on extended substance relies heavily on a particular reading of \( "\textit{corpus in genere sumptum}." \) For Gueroult this means all of body, or the one big \( \textit{res extensa} \)—body \( \textit{in globo} \), to use Tad Schmaltz’s characterization. Schmaltz and others, I believe, show clearly that Gueroult’s reading is questionable at best.\(^{328}\) I will not pursue this question here, but it is important that pluralistic readings must take this passage into account: extended substances had better end up being things that are not naturally subject to generation and corruption.

To be clear, the issue is not just about whether Descartes thinks there is one extended substance or many. If that were the extent of the question, it would, as Jonathan Bennett says, reflect “little more than a disposition on his part to use the word ‘substance’ in a certain way.”\(^{329}\) And in fact it is quite clear that Descartes applied the term to finite parts of matter. Part of what is really at stake has to do with the tension between two sets of texts, in one of which Descartes stresses the independence of non-overlapping parts of matter from each other, and in the other of which he argues that a finite part of matter cannot be conceived as existing all by itself.\(^{330}\) The most important of the former occur in the letter to Gibieuf of 19 January

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\(^{329}\) Bennett, \textit{Six Philosophers}, 136.

\(^{330}\) For a good discussion of the relevant texts see [Rodis-]Lewis, 39-51.
1642 and in *Principles* I.60: in both texts Descartes says that non-overlapping parts of matter are really distinct, in that each can be conceived as existing apart from the other. The latter texts contain Descartes arguments against a finite material world; the letter to Chanut of 6 June 1647 and *Principles* II.21 are two good examples. On this point the implications of the present study are significant. My interpretation of Descartes’ analysis of space (in Chapter One) and his argument against a finite material world (in Chapter Five) shows that a finite part of matter is independent of the particular matter surrounding it, but requires the presence of some matter or other.

Moreover, from my discussion of Arnauld’s and Spinoza’s arguments it should be clear that as long as he can specify extended substances such that they are not individuated by shape, Descartes can consistently maintain that parts of matter are really distinct and that a vacuum is impossible.

These parts of my interpretation accord with some recent pluralist readings of Descartes on extended substance, put forward by Matthew Stuart, Tad Schmaltz, and Calvin Normore. Though there are some differences between these three interpretations, they share the idea that extended substances are particular quantities of matter, which can be divided and change shape, but which cannot pass out of existence without annihilation. These interpretations take the “body in general” of the Synopsis not as extension *in globo*, where the contrast class would be finite bodies, but as parts of matter as such, where the contrast class is material things that


332 The quantities in question are understood according to an analysis by Helen Cartwright in her “Quantities,” *Philosophical Review* 79 (1970): 25-42. This understanding of quantities as non-instantiable portions of stuff may be helpful for understanding Descartes’ argument that extension implies impenetrability.
are identified by their membership in a particular kind, like the human body. The
latter can go out of existence in the natural course of things, since its identity depends
on a certain configuration of parts, but the particular quantity of matter that makes up
the human body at a given time cannot perish except by divinely caused
annihilation. These quantities are not independent of their proper parts, and they
require the existence of some matter or other surrounding them *ad infinitum*, but they
are independent of any other particular quantities of matter. (This kind of reading is
implicit in Descartes’ discussion of the annihilation scenarios treated in my third and
fourth chapters. In particular, Arnauld and Spinoza’s arguments make it clear that the
identity of extended substances cannot, for Descartes, depend on their shapes.)
Normore goes so far as to read the independence criterion in *PP I 51* as specifying
only this kind of independence, namely that the object does not depend on any
*perticular* created thing, rather than the kind of independence that would ground the
possibility of a world containing only God and the object. This is not an impossible
reading of that text, but it is, to say the least, not a straightforward one. Schmaltz, to
my mind, has a better strategy, which is simply to admit that Descartes uses the term
“substance” in importantly different ways, depending on the context. It is simply not
crucial, in the end, to save a uniformly applicable criterion of independence for

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333 In my view this is a much more satisfactory reading of the Synopsis passage, and deals a
decisive blow to Gueroult-type monistic readings. Descartes’ point in the passage is precisely to
distinguish the human body as such from incorruptible corporeal substance. The particular quantity
that is temporarily arranged “human body-wise” serves just as well as the whole of extension to make
this contrast. Thus there is no reason forcing one to read “*in genere*” as “*in globo*.” As Slowik
(“Corporeal Substances,” 7) points out, the pluralist reading actually gives a better reading of “*in
genere,*” since “any part, or all of extension” is a more general category than “all of extension.”
334 Normore, 283.
substance; we do better to examine the particular contexts where Descartes touches on how different objects do or do not depend on each other.

As Schmaltz points out, even the very articulation of the independence criterion makes clear that sometimes it must be applied in a non-univocal way. Schmaltz argues that the criterion has to be construed non-univocally for mind and body: there is a certain degree of independence applicable to particular extended substances, but it is not equivalent to that of thinking substances. Normore’s reading, which aims at a more modest kind of independence belonging to both kinds of substances, cannot avoid the fact that bodies, unlike minds, have constituent parts upon which they depend for their identity. Hence one has to restrict what counts as “other things” in the case of bodies more strictly than in the case of minds. So part of the criterion, namely the reference to “other things,” applies non-univocally to mind and body. I would follow up Schmaltz’s suggestion further and argue that *Principles* I.51 identifies a common sense of the term “substance” that nonetheless does not amount to univocity, or a “distinctly intelligible” meaning of the term common to God and creatures. This gives Descartes a way to apply different, though related, independence criteria in different contexts. The account would go something like this: X is a substance iff X is existentially independent of all the objects in some domain. When the domain is specified, all things are divided into substances and non-substances, but the taxonomy will vary as the domain varies. If the domain

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336 This, I hypothesize, is what Descartes is getting at by saying there is no “distinctly intelligible” common meaning. A meaning would be distinctly intelligible if it allowed a unique classification of all things as substances or non-substances. The notion of distinctness, for Descartes, has to do with recognizing what does and does not belong to a thing of a certain kind. By analogy, a
includes everything besides X, then X is a substance in the strictest sense, and in fact is God. If the domain includes everything besides X and God, then we can make a further distinction. X can be existentially independent of all other created things taken together, so that it is possible for only God and X to exist. Alternatively, X may be existentially independent of each particular other thing other than God, but may depend on the existence of some created objects or other. Further, we can specify the domain further to rule out the proper parts of an object as things of which it is independent. If this seems so flexible as to make the term “substance” useless and uninteresting, it should be recalled that Descartes also has the “subject of properties” notion of substance in the background. A full account would have to show how this notion, in concert with the varying degrees of existential independence, underlies Descartes use of the term “substance.”

This account of substance and the independence criterion can, I think, make more sense of the way Descartes uses the term “substance” in different contexts. This in turn allows what Descartes does in these specific contexts to shed light on his official pronouncements about substance and the theory of distinctions. In my view this is far more fruitful and historically sensitive than imposing a clean interpretation of the official theory of substance and real distinction on particular contexts. To spell out an example in more detail, take the case of two parts of matter. Descartes claims in the letter to Gibieuf that the two halves of a given part of matter are really distinct from each other, and are true substances. Part of the argument is that the idea of a part

337 Schmaltz (“Extensions,” 13) makes a suggestion along these lines.
of matter is a complete idea, where that means that we can deny of it every property of which we have an idea, and still conceive of the part of matter. This is Descartes’ proposed way to eliminate the possibility that the separate conceivability of two things is just an artifact of abstraction; he is interested in applying this to the case of mind and body. In this context it is taken to be a sufficient condition for two things being really distinct that each can exist without the other. Descartes’ official position is that only substances are really distinct. So a problem arises if we try to impose the independence criterion, which in at least one formulation explicitly requires the possibility of a world containing only God and the relevant object. In the particular context of the letter to Gibieuf, independence from any particular created thing is taken to be sufficient for being a substance, while in the official doctrine it is not.

Thinking about independence as relative to a domain brings out a further question. Given that a finite part of matter is not dependent on the existence of any particular finite parcel of matter surrounding it, is it nonetheless true that it depends on the rest of the indefinitely large material world? Or could one and the same part of matter exist, so long as some-material-world-or-other surrounded it? Normore takes the latter view: “there is no particular indefinitely large whole whose existence my left forefinger’s quantity requires; any will do.” Thomas Holden, who recognizes that all finite parts of matter are independent of the particular finite parcels of matter surrounding them, seems to endorse the former reading, however: “Considered as a whole, the entire plenum is, like Newtonian space, m-indivisible. Since the plenum’s

338 AT III 474-8; CSMK 201-3.
339 Normore, 283.
defining essence is extension, the existence of one part necessarily implies the
existence of the whole.340 Granted, it is not clear that Holden is committing himself
one way or the other in the passage, but his language (“implies the existence of the
whole”) contrasts nicely with Normore’s (“any [indefinitely large whole] will
do”). Holden suggests that two particular finite parts of matter can be separated from
each other by motion, but there is no mention of the possibility of one’s being
annihilated altogether. On this reading a finite part of matter would require the
existence of the particular parts of matter that actually exist, though not in any
particular configuration.

If my interpretation holds, however, Descartes admits the possibility of the
annihilation of a part of matter. It might seem that the “indefinitely large whole,” if it
is an individual at all, is no longer the same individual after one of its proper parts has
been annihilated. I think that would hold for any of Descartes’ finite extended
substances, but it is not so clear in the case of the whole of extension, since it is not
clear how Descartes thinks about the relationship between a finite proper part and an
infinite whole. An infinite quantity of matter minus a finite quantity is still infinite,
whereas in the finite case the quantity is of course reduced. In the latter case the claim
that the whole would lose its identity follows from the fact that an extended substance
just is its quantity. The answer to the question is thus unclear. Moreover, Descartes’
argument against a plurality of physical universes can be read as implying that the
only possible extended substances are the actual ones.341 In that case there would be
no difference between “the indefinitely large whole” and “any indefinitely large

341 AT VIIIA 52; CSM I 232.
whole.” I do not think it has to be read that way, but it would take more space than is appropriate here to argue for the interpretation.

The question is rather abstruse in any case, but it does concern the sense in which a part of matter can be conceived as an independent thing. Holden comes close to saying that Descartes extended world is just like Newtonian absolute space, except that the finite parts are movable. Given a particular finite bit of matter, not only would an infinite plenum follow, but the particular constitution of that plenum follows as well (though not the configuration of its parts). On this reading, it would not be true that we can conceive of a part of matter while denying that any other of our ideas belongs to it, as Descartes maintains in the letter to Gibieuf. Since this is Descartes’ most developed explanation of what is required conceptually for two things to be really distinct, I am inclined to take that as a decisive text. Given a part of matter, an infinitely extended plenum follows, but neither the configuration nor the identity of any of its parts follows.

There are at least a couple of other points on which my interpretation of Descartes on space helps one understand Descartes on substance. As the text from the Synopsis shows, part of the difficulty of getting clear on Descartes’ view on extended substance is his use, in a number of different contexts, of locutions like “extension considered in general” or “body in general.” It is not always obvious what he means by this, nor is it clear that he means the same thing in each case. In addition to the passage in the Synopsis and those in the Principles treatment of space, there is also an important discussion of “a body in general” in a letter to Mesland concerning Transubstantiation. There are a range of different interpretations of these locutions in
the literature. In addition to Gueroult’s reading of “body in general” as body *in globo*, Roger Woolhouse takes a mass-term reading of “substance,” so that “body in general” means “extended stuff as such.”  

342 Lennon takes “extension *in genere*” to mean the subsisting Platonic essence of extension, while many commentators take it to mean an abstract volume or shaped volume that can be instantiated by many particular bodies.  

343 My interpretation in Chapter One shows just what Descartes means by such locutions as he uses them in the discussion of space in the *Principles*. Here the present study can be thought of as complimentary to some of Schmaltz’s recent work on the notion of extension in Descartes, which includes an excellent and much-needed discussion of the different senses of “extension in general.”  

344 Such an account is necessary for determining what count as extended substances for Descartes and what their metaphysical profile is.  

Any account of the metaphysics of extension must address the question of individuation for extended substances. I follow several recent commentators who distinguish between the individuation of parts of matter from that of bodies in the sense relevant for Descartes’ physics; Des Chene refers to the “static individuation of potential parts of matter” versus the “dynamic individuation of actual parts of matter.”  

345 Descartes only gives an explicit treatment of the latter, where bodies are individuated by motion.  

346 There is no direct discussion of the individuation of parts of matter prior to motion. Some commentators have tried to piece together such an

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343 See Chapter One.
345 Des Chene, 370; Garber, 175-6; Grosholz, 41 *passim*; Normore, 281.
346 AT VIII A 53-4; CSM I 233.
account from the discussion of internal place in *PP* II.10-12. Grosholz, in particular, gives a sophisticated account of “geometrical individuation” based on these passages. The account, however, runs into problems which are, in my view, artifacts of her misreading of the analysis of space. First, she takes internal place to be the intrinsic extension of a part of matter; second, she takes the language of “generic unity” to signal that parts of matter stand to the shaped volumes they instantiate as species to genus.347 Serious problems result for this reconstructed account, but since it is constructed on these two mistaken interpretive moves, this does not, in my view, reflect on Descartes’ own thinking about individuation. If the analysis of space gives us a clue on this subject, it is that Descartes does not think that bodies are individuated by the spatial characteristics that define an internal place. On the contrary, when we think of a region of extension as identified by its shape, size and position, we are precisely not thinking about a particular body. Moreover, a space does not stand to the body in it as genus to species, so there is no evidence that Descartes wants to think about individuation in those terms.

If there is something that individuates parts of matter, it is not their shapes or sizes, much less their positions. Des Chene suggests that there is something like a primitive haecceity for each assignable part of matter.348 Normore proposes that individuation is simply basic: there is no need for a principle of individuation at all,

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347 Grosholz, 41-44.
348 Des Chene, 375. Schmaltz (“Extensions,” 12n) also proposes a view of individuation that he says is similar to Des Chene’s, but I am not clear on exactly what that view is. He says that God could distinguish different parcels of matter because he would know which one “goes with” each corporeal substance, but this seems to introduce too much of a distinction between the substance and its extension. See Normore, 272-9, for a discussion of the relationship between extension and an extended thing.
since there is nothing that needs to be individuated.\textsuperscript{349} Both of these readings gain some support from the fact that Descartes, in discussing the notion of space, seems to simply assume that parts of matter retain their identity through motion. Rather than providing an account of their individuation and identity, he is interested in accounting for the perceived identity of a space insofar as it does not correspond to that of any body. This suggests that Descartes simply takes the individuation of parts of matter (as opposed to the bodies relevant in physics) for granted. Des Chene makes his suggestion with reference to Leibniz’s argument, in \textit{De Ipsa Natura}, to the effect that Cartesian motion ends up not being motion at all, since it consists only in the mutual replacement of absolutely indiscernible volumes. If there are primitive haecceities, then perhaps Descartes can maintain, \textit{contra} Leibniz, that God at least could discern different parts of matter.\textsuperscript{350} But this proposal runs counter to Descartes’ argument that penetrability follows from extension. If there is some individual difference that makes geometrically identical parts of matter discernible in principle, then it is not clear why, in the case of a supposed penetration of one volume by another, one of the parts of matter would have to be annihilated. On Normore’s reading this latter difficulty would not come up, it seems, but the argument of \textit{De Ipsa Natura} becomes unanswerable. I do not think that any interpretation will save Descartes on both of these points; it seems reasonable, however, to privilege a charitable reading of an argument he actually gives over a response to an objection made by a later philosopher, other things being equal.

\textsuperscript{349} Normore, 281-2.
\textsuperscript{350} Des Chene, 375.
On all of these issues there is of course much more to be said, and of course an interpretation of Descartes on extended substance must also address his thought on thinking substance. Nonetheless it is clear that my reading of Descartes on space and vacuum lends support to a pluralist interpretation, and that it shows promise of helping to clarify certain aspects of the metaphysics of extension. In particular, recognizing the role played by the notion of space in the argument against an extramundane void is crucial for getting clear on the sense in which bodies satisfy the independence criterion. Also important is the implication of annihilation scenarios according to my reading, namely that finite corporeal substances are not individuated by shape. That my interpretation accords well with some of the best recent work on Descartes’ metaphysics of extension counts in its favor, as well.
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