DESCARTES AND THE NATURE OF BODY

(Principles of Philosophy, 2.4–19)

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As is well known, Descartes holds that ‘the nature of matter, or body consists . . . simply in its being something which is extended in length, breadth, and depth’. Because of the criticisms of, for example, Leibniz and Locke, to the effect that extension is not sufficient for matter and that solidity, for example, is necessary too, I shall refer to this as his ‘thin’ conception of matter, body, or corporeal substance. He does not just state it; he argues for it too. He argues that if we lay aside opinions derived from the senses and make use of the intellect alone we shall see that the nature of matter or body does not consist in its being ‘hard or heavy or coloured, or [anything] which affects the senses in any way’ (PP 2.4).

Having argued for it, Descartes says that ‘[t]his truth about the nature of body is obscured by preconceived opinions concerning rarefaction and empty space’ so that ‘there are still two possible reasons for doubting that the true nature of body consists solely in extension’ (PP 2.5). The preconceived opinion concerning empty space is that ‘if we understand there to be nothing in a given place but extension in length, breadth and depth, we generally say not that there is a body there, but simply that there is a space, or even an empty space’ (PP 2.5). So one reason for dissatisfaction with the ‘thin’ conception of matter is that extension in length, breadth and depth seems to define ‘space’ and not ‘body’.

At least some of the following sections of the Principles, from 6 to 18, discuss and reject this reason for dissatisfaction. It is a

mistake to worry that the 'thin' conception of matter fails to
distinguish between space and corporeal substance for 'the
extension constituting the nature of a body is exactly the same as
that constituting the nature of a space' (PP 2.11). In the last three
of these sections (16–18) there is explicit discussion of the vacuum
and Descartes says that since there is body where there is extension
there can be no vacuum, no space empty of corporeal substance.
Finally, in section 19, Descartes restates the 'thin' conception, and
repeats that 'the nature of corporeal substance consists simply in its
being something extended'.

So much by way of what I hope is interpretation-free summary.
How is it to be interpreted and understood? What exactly is the
problem about the supposed failure to distinguish between space
and body? What exactly is Descartes' response to it?

It is easy to suppose that the problem is that the 'thin' conception
of matter rules out the possibility of empty space or vacuum; and it
is easy to suppose that Descartes' simple response to it is merely to
reject the idea of a vacuum or of space empty in the 'philosophical
sense' (PP 2.16) of the term, on the grounds that indeed it is
inconsistent with his 'thin' conception of matter. On this approach
the problem is: the 'thin' conception rules out a vacuum; and
Descartes' response is: then a vacuum is ruled out.

I know 'it is easy to suppose' that this is the problem and this the
response because it is exactly what I used to suppose. I was not
completely alone. Cottingham says that in Descartes' system the
vacuum gets ruled out because it is inconsistent with the
fundamental definition of matter as no more and no less than what
has extension.\(^2\) Kenny says that Descartes deduces that there is no
vacuum \textit{from} his 'thin' conception of matter;\(^3\) and Machamer says
that 'making use of the premise that matter is only extension'
Descartes argues at \textit{Principles} 2.16–18 that 'there can be no
vacuum in nature'.\(^4\)

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\(^3\) Anthony Kenny, \textit{Descartes: A Study of His Philosophy} (New York: Random House,
1968), p. 204; see also S. V. Keeling, 2d ed. \textit{Descartes} (London: Oxford University Press,
1941), p. 284.

\(^4\) Peter Machamer, 'Causality and Explanation in Descartes' Natural Philosophy', in Peter
K. Machamer, Robert G. Turnbull, eds. \textit{Motion and Time, Space and Matter} (Ohio:
Ohio State University Press, 1976), p. 173. Williams, too, implies that Descartes' denial
of the vacuum depends on his 'thin' conception of matter (\textit{Descartes: The Project of Pure
A preconceived opinion concerning 'empty space' is, though, only the second of two 'possible reasons for doubting that the true nature of body consists solely in extension' (PP 2.5). The first is a preconceived opinion 'concerning rarefaction', that the same body can vary in extension. Descartes' own explanation of rarefaction (PP 2.6) proceeds by way of an example of sponge which enlarges as its pores fill with water or air, and contracts as they are collapsed and air or water is squeezed out. This is merely an analogy and we do, he admits, have to 'infer the existence of pores and gaps which are made larger' in genuine rarefaction, and the matter which fills them is imperceptible to us. But, he says, 'it is very easy for us to see how rarefaction can occur in this way, but we cannot see how it could occur in any other way' (PP 2.7).

Now particularly if one has already supposed that the second of the possible reasons for doubt is that the 'thin' conception of matter seems to rule out there being any space empty of body, it is easy — at least if the text is held at a distance from the mind — to suppose that the question of rarefaction turns on this too. It is easy to suppose that what Descartes is facing up to and is against, is the Greek atomists' account of rarefaction according to which it is a matter of the atomic parts of a body becoming separated by vacua. And if one does suppose this one ends up supposing that what Descartes is saying is, 'Rarefaction can't be as the atomists think, because that supposes that vacua are possible; but vacua are not possible because my account of body rules them out. Rarefaction must be as I say.'

Leibniz seems to suppose that Descartes sets his account of rarefaction against one which involves vacua.\(^5\) And this interpretation is not hard to find in our own time. Explaining that expansion of a vapour depends for Descartes on 'an incursion of new matter from the environment to the interstices' of the vapour, Cottingham says that 'part of the reason why this sounds so wrong-headed to us now is that we are used to the idea that a quantity of gas can... be spread out... as a rarefied cloud over

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vast areas of empty space. . . . But for Descartes the notion of truly empty space is incoherent. 6

The whole of this interpretative understanding of sections 5 to 18 of part 2 Descartes’ Principles is misinterpretative misunderstanding. In outline they should be read as follows. The second reason for dissatisfaction with Descartes’ ‘thin’ conception of matter, namely that extension in length, breadth, and depth seems to define ‘space’ and not ‘body’ is just that. Having set out to define one thing, ‘body’, Descartes seems to have ended up defining something else, namely ‘space’, something of which some people have the preconceived opinion that it is different from body. The problem is not a specific problem about how on Descartes’ ‘thin’ conception of matter there could be a vacuum, and the subsequent discussion of it does not consist of question-begging assertion and reiteration. The discussion (which, since sections 8 and 9 concern rarefaction, runs from sections 10 to 15) provides an account of the nature of space and its relation to body which does not presuppose and is completely independent of the ‘thin’ conception that there is no more to body than dimensionality. In effect these passages say: ‘It is suggested I have a problem about the difference between body and space. But, quite apart from what I say of the “thin” nature of body, a correct understanding of the nature of space and its relation to body (whether this is “thin” or as “thick” as you like) shows that there is no real difference between body and space.’

Given what Descartes says in sections 10 to 15 about the relation between space and body the question of the possibility of a vacuum does arise — hence he addresses that at section 16. But since the discussion of sections 10 to 15, about the relation between space and body is completely independent of whether matter is as ‘thin’ as he says or should be ‘thickened up’, the question which arises at section 16 about the vacuum is also quite independent of what there is to matter.

What about the rest of what I am claiming is a misunderstanding of these sections? What about the first of the two ‘possible reasons for doubting that the true nature of body consists solely in

6 Cottingham, Descartes, p. 85. Similarly Keeling says that it is from his view that matter has only spatial characteristics and consequent denial that ‘there can be no vacuum’ that Descartes deduces rightly that ‘the extensity of a particular body is fixed and constant’ (Descartes, p. 284).
extension' (PP 2.5), the preconception about rarefaction? This too has nothing to do with the possibility of the vacuum; and once one sees this, one sees also that the discussion of rarefaction is not the marginal, minor one it might have seemed. It is easy to suppose that while sections 6, 7, and 19 have specifically and solely to do with rarefaction, all the rest discuss the second preconceived opinion, about empty space — a discussion which, to the extent that both preconceived opinions are taken as having something to do with the vacuum, has indirect consequences for rarefaction. In fact, though, Descartes’ remark at the end of section 7, that what he has been saying about rarefaction ‘will become clearer from what follows’, refers quite specifically to the next two sections, 8 and 9. Descartes does not begin to address the second preconception, about ‘empty space’, until section 10.

My interpretation of these passages does not require a diagnosis of how the misinterpretation I am replacing arises. Nevertheless, my suggestion is that it comes about like this. One approaches them with a preconceived and completely unacknowledged idea about the relation between space and body, an idea so preconceived and unacknowledged that one naturally unwittingly assumes that Descartes shares it too. What I have in mind is the idea that space is logically independent of body and can, so far as its nature goes, exist without body; body, on the other hand, is not logically independent of space, which ‘contains’ it. Leibniz describes this in a piece dated 1671: ‘Space [is] something . . . extended but nothing else . . . A body is something in space (that is, something not apart from some space), which we perceive we cannot think of without space, though we can think of space without it.’

It appears from Edward Grant’s wonderful history of space and the vacuum that essentially this idea of incorporeal extended space, conceptually separate from contained extended body, can be found from the earliest times in atomism, in the sixth century in John Philoponus, increasingly more frequently in the sixteenth century, and, in a classical expression of it, in Newton in the late seventeenth century. It is clear that the nature it attributes to space

7 Loemker, *Leibniz: Philosophical Papers*, p. 143, see also p. 100.
and its relation to body allows of the possibility of there being a vacuum or empty space and leaves it to other considerations, of which one might be the nature of body, to decide the matter. Indeed, if the nature of body is as Descartes says, then space — on this view of it — seems automatically to become filled by it.

In one way it would not be completely unreasonable to suppose that this is Descartes’ view about the nature of space and its relation to body, for it seems to be what he espouses ten or so years earlier in *The World*. In that work he speaks as though the possibility of the vacuum is opened but not closed by the nature of space and its relation to body.9

But whatever the case with *The World*, the *Principles* does not — or so I emphatically claim — suppose this view of space and body. Indeed, and this is an exquisitely ironic twist, *it is precisely this view which is the preconceived opinion of section 8 about the nature of space and body!* In short, what I have called a complete misunderstanding of Descartes results from reading him against the background of an unacknowledged assumption about the relation between space and body, an assumption so unacknowledged that one automatically supposes Descartes makes it too, and so, having done so, one completely fails to realize that this is precisely the assumption against which Descartes proceeds to argue. No wonder if Descartes then seems to be up to something else! Where else could a left-footed beginning like this lead, except into thickets of misunderstanding?

It is high time I substantiated and filled out these claims about how these sections are to be understood. I shall begin with the first of Descartes’ two possible reasons there may be for doubting his account of the nature of body, the one concerning rarefaction. It is not merely that his account runs up against a preconceived opinion that matter can be rarefied, or course. It is, rather, that it runs up against a preconceived opinion that it can be rarefied ‘in such a way that when rarefied . . . [it] possesses more extension than when condensed’. Explaining this opinion he says, ‘Indeed, the subtlety of some people goes so far that they distinguish the substance of a body from its quantity, and even its quantity from its extension’ (*PP* 2.5).

9 *Philosophical Writings of Descartes*, vol. 1, pp. 90–91. Though he does not claim to have proved the matter he closes the possibility by appeal to empirical considerations (pp. 85–86).
As I have already said, in his own explanation of rarefaction and condensation Descartes refers to what happens when a sponge is squeezed into a smaller volume: in terms of its individual parts the sponge is no smaller than it was; its parts have simply been rearranged more closely and the air or water which separated them has been squeezed out. His suggestion is that it is along these lines that we are to understand all cases of rarefaction and condensation, as for example that of a gas.

This is what Descartes says rarefaction is. What does he say it isn’t? What is the preconceived opinion concerning it which might be supposed to cast doubt on his ‘thin’ conception of matter?

According to what I have called an easy misunderstanding, the preconceived opinion is one that rarefaction is a matter of the parts of a body becoming separated, not, as in Descartes’ view, by other matter, but by empty spaces or interstitial vacua. Now given that Descartes does come to reject the vacuum, consistency would require him to reject any account of rarefaction that proceeds by appeal to it. But, as I have already claimed, the question of the vacuum does not come up till rather later, till section 16 in fact. And in any case, it is demonstrable that this is not the account which is the ‘preconceived opinion’ concerning rarefaction which might prevent acceptance of Descartes’ ‘thin’ conception of matter. What is?

My description of Cartesian matter as ‘thin’ turns out to be somewhat infelicitous. Quite possibly it encourages, and so sets up as an Aunt Sally, the very interpretation which I reject — namely that Descartes’ central concern in these sections is with the vacuum. And, more to the immediate point, it invites the idea that it has an opposition only with accounts according to which body is ‘thicker’ than merely extended. Descartes himself often invites this idea. He talks of matter as consisting ‘simply’ (PP 2.4, 19) or ‘solely’ (PP 2.5) in extension. Yet, besides being no more than extended, Cartesian matter is also no less. It does therefore have an opposition with any account which denies to matter even an essence of extension.

The traditional Aristotelian account of ‘prime matter’ is just such an account and the conception of rarefaction which goes with it is precisely that ‘preconceived opinion concerning rarefaction’ which obscures Descartes’ own account of matter.

In the earlier work, The World, Descartes contrasts his view of
matter with that of ‘the philosophers’. Using Aristotelian terminology to describe it, he says that matter ‘does not have the form of earth, fire, or air, or any other more specific form, like that of wood, stone, or metal’; ‘it lacks the qualities of being hot or cold, dry or moist, light or heavy’; and, finally, it lacks taste, smell, sound, colour, light. But we should not think, he says, that what he is describing is ‘the “prime matter” of the philosophers.’ Their matter has been ‘stripped so thoroughly of all its forms and qualities that nothing remains in it which can be clearly understood’ (my emphasis), whereas his is still positively conceived ‘as a real, perfectly solid body, which uniformly fills . . . space’.

Pleading that his matter is perfectly intelligible he says that their’s is not, and that it produces ‘difficulties in things which seem extremely clear to other men’. ‘The whole difficulty they face with their matter arises simply from their wanting to distinguish it from its own quantity and from its external extension — that is, from the property it has of occupying space’. On the other hand, ‘the quantity of matter I have described’, he says, ‘does not differ from its substance any more than number differs from the things numbered. . . . I conceive its extension, or the property it has of occupying space, not as an accident, but as its true form and essence’.

So, in the ‘prime matter’ of Aristotelian tradition (in which both quantitative forms such as extension and qualitative forms such as colour were taken to be accidental) is matter even ‘thinner’ than Descartes’ own. Even the property of occupying space is inessential to the ‘prime matter’ or ‘the philosophers’. Thin and emaciated as its extended body may be, Cartesian matter at least has body, and in that sense his account of matter is far ‘thicker’ than that of ‘prime matter’. Though one gets from Descartes a clear sense of revolution he was not totally original in his rejection of quantity or extension as an accident, and in his conception of essentially extended matter. Though themselves embodied in the Aristotelian tradition medievals such as William Ockham, and John Buridan, had argued against Aquinas’ view that a quantity such as extension is distinct from any substance which accidentally is extended.

10 Philosophical Writings of Descartes, vol. 1, p. 91.
Possibly implicit in the passage in *The World* and quite explicit in the *Principles* is reference to a supposed distinction, not merely between the substance of a body and its quantity or extension, but rather between a body's extension and its quantity. The allusion is presumably not to the simple fact that extensive form was not taken to be the *only* quantitative form — number, for example, was another. Perhaps it is to some view like that of Franciscus de Marchia according to whom extension was a variable mode of a so-called 'quantity of mass', or of John Buridan who distinguishes the 'magnitude' of a body from its extension.\(^\text{12}\)

What is the account of rarefaction and condensation that goes with this merely accidentally extended and qualified 'prime matter'? Since Descartes clearly has medieval Schoolmen in mind rather than Aristotle himself in his rejection of prime matter, the same will go for what he says of rarefaction. But medieval discussion of this topic is set against the background of Aristotle and I hope it will be sufficient here to outline his position and not dare into its later complications.

Like Descartes, Aristotle was a plenist and denied the existence of vacua or of empty space. Moreover, and unlike for Descartes, the vacuum provides the context for his account of rarefaction.

In the *Physics* Aristotle sets about establishing plenism by way of considering and refuting the arguments that may be put on the other side, in favour of the vacuum. Presumably having in mind the earlier atomists he says that 'there are some who think that the existence of rarity and density shows that there is a void'.\(^\text{13}\) In response to this, he marshalls his account of matter and form, potentiality and change, and says that *our* statement [about rarefaction] is based on the assumption that there is a single matter for contraries'.\(^\text{14}\) Thus just as the same matter can be actually hot and potentially cold at one time, actually cold and potentially hot at another, so, '[t]he same matter serves for both a large and a small body'. 'When air is produced from water, the same matter has become something different, not by acquiring an addition to it, but has become actually what it was potentially, and, again, water

\(^{12}\) See Adams, *Ockham*, vol. 1, pp. 178, 185.

\(^{13}\) *Physics* 216b22–24; see also 213b15–18. Quotations from Aristotle are from the translation in R. McKeon, ed. *The Basic Works of Aristotle* (New York: Random House, 1941).

\(^{14}\) *Physics* 217a20–217b.
is produced from air in the same way, the change being sometimes from smallness to greatness, and sometimes from greatness to smallness. Similarly, therefore, if air which is large in extent comes to have a smaller volume, or becomes greater from being smaller, it is the matter which is potentially both that comes to be each of the two.\textsuperscript{15} He says, further, that ‘the greatness and smallness of a sensible volume are extended, not by the matters’ acquiring anything new, but because the matter is potentially matter for both states; so that the same thing is dense and rare, and the two qualities have one matter’.\textsuperscript{16}

The Aristotelian idea that in rarefaction the extended form of a substance is corrupted and replaced by another, without there being any addition to the substance (as there is in growth) had its supporters and critics in the middle ages.\textsuperscript{17} Clearly, it is this idea which is ‘the widespread belief’ of Principles, part 2, section 5, that ‘bodies can be rarefied and condensed in such a way that when rarefied they provide more extension than when condensed’. It is the ‘preconceived opinion about rarefaction’ which provides a possible reason for doubting that ‘[t]he true nature of body consists solely in extension’. To Descartes’ mind this account of rarefaction and its underlying view of matter is a ‘complete contradiction’ and ‘unintelligible’ — things which, he says in section 7, ‘will become clearer from what follows’. What does immediately follow are sections 8 and 9 in which he argues against the idea that matter could be unextended.

What, now, of the second preconceived opinion which Descartes says might obscure the truth of his account of matter? As I have said, the apparent reason for doubt is not that his account rules out the possibility of empty space; it is not that on his account of it matter is so ‘thin’ that space automatically becomes filled with it. It is simply that in defining one thing, body, Descartes seems to have ended up defining another, space. This will certainly seem a serious problem to anyone who takes the relation between body and space to be that body is ‘in’ and ‘contained by’ space. And my suggestion is that it is precisely this supposition, that space is

\textsuperscript{15} Physics 217a20–217b.

\textsuperscript{16} Physics 217b8–10. For some discussion of this account of rarefaction and condensation see Grant, Much Ado, pp. 71–3.

\textsuperscript{17} Of the first group was Richard Middleton, of the second was William Ockham (see Adams, Ockham, vol. 1, p. 178f; Grant, Much Ado, pp. 71–3).
conceptually separate from ‘contained’ body, which is the ‘preconception concerning empty space’. So it is precisely this supposition against which Descartes proceeds to argue. He argues that the nature of space and the relationship between it and body (on any account of the nature of body) is not that body is ‘in’ and ‘occupies’ space. This supposition is a misconstrual of the relation between corporeality and dimensionality for, or so Descartes argues from sections 10 to 15, corporeality has its own dimensionality, produces its own space, and needs no antecedent space to be ‘in’ or to ‘occupy’.

Central to the discussion here are the notions of ‘internal’ and ‘external’ space. These notions are found by name in the writings of Franciscus Toletus (1532–96), though whether he is Descartes’ actual source I do not know. To understand them we must again turn to Aristotle. In Aristotle are found the roots of an approach to space and dimensionality which has a long tradition of opposition to the idea, which I sketched earlier, of an incorporeal extended space, conceptually separate from contained extended body.

In the Physics (Book IV) Aristotle gives an account of ‘place’, the notion we use when we speak of something’s occupying a place, of displacement, or of motion as change of place. His considered conclusion is that the place of a body is the inner surface of the body which contains it. A view he rejects is that place is the interval defined by that surface — a view which supposes an independence of place from body and, in effect, the ‘preconceived opinion’ of which Descartes speaks.

Though basically sympathetic to Aristotle’s rejection of any separation of place and body Toletus felt that Aristotle’s account of ‘place’ attempted too much with too little; and so he comes to distinguish between ‘external place’ and ‘internal place’. ‘External place’ is ‘what surrounds the located itself, namely the containing body or its ultimate surface’. Obviously, and as indeed Toletus explicitly confirms, his ‘external place’ is effectively Aristotle’s

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‘place’. It is also obvious that it is this same notion that appears in Descartes’ sections 13 and 15.

It is his introduction of ‘internal place’ that takes Toletus beyond Aristotle. A similar notion can be found in his contemporary Francisco Suarez (1584–1617), and, earlier, in the fourteenth century, in John Buridan. ‘Internal place’, Toletus says, is ‘the place of the thing [or body, namely] the space itself which the thing occupies within itself in accordance with its corpulence’. The space which a body occupies is, as it were, provided by that body itself. Body and space, Toletus says, ‘imply each other as a mutual consequence. For if there is a body, there is a space; and if there is a true space, there is a body in it’. In illustration of this conception of a two-way relationship between corporeality and spatial dimensionality Grant quotes Buridan who, believing with Toletus that material extension and internal space are identical, says that if you were located beyond the last heavenly sphere and were to stretch out an arm then ‘before you raise your arm outside this [last] sphere nothing would be there; but after your arm has been raised, a space would be there, namely the dimensionality of your arm’. Clearly, this idea of internal place is completely at odds with the idea that extended bodies are ‘contained in’ an independent space. This quotation captures it well: ‘Physical objects are not in space, but these objects are spatially extended. In this way the concept of “empty space” loses its meaning.’

Though I know people who find the idea of ‘internal place’ of a body perfectly natural, it does seem foreign to others who, no doubt under the influence of twentieth-century versions of late seventeenth-century physics, unthinkingly assume the ‘container’ view. But, like the Aristotelian world, with its connection between dimensionality and corporeality, the Newtonian world with its separation of the two, was not here to stay — for the last quotation I gave, to the effect that ‘physical objects are not in space’, is neither from nor about some pre-modern scholastic but from Albert Einstein and speaking for himself.

It is this conception of the relationship between space and body, that spatiality is a function of corporeality, which is being

19 All the quotations in this paragraph are in Grant, Much Ado, pp. 15, 273n43; ‘Place and Space’, pp. 155, 156.
20 Albert Einstein, 15th ed. Relativity, the Special and the General Theory: A Popular
proposed by Descartes in his discussion in sections 10, 11, and 12, about ‘internal place’. The detailed points made in section 12, to the effect that ‘the difference between space and corporeal substance lies in our way of conceiving them’, mirror ones already made by Toletus.\textsuperscript{21}

It cannot be stressed too heavily that this account of the nature of space and its relation to body is completely independent of any question about the ‘thickness’ or ‘thinness’ of body. Descartes' claim in paragraph 10 that ‘the extension in length, breadth and depth which constitutes a space is exactly the same as that which constitutes a body’ does not depend on, and is completely neutral with respect, to the ‘thinness’ of his matter.

There is a passage which might seem to cause difficulty for my understanding that the arguments in these sections are quite independent of whether the essence of matter is solely or more than extension, and that Descartes is not arguing for an identity of space and body on the basis of his ‘thin’ conception of matter. Arguing at section 11 that ‘there is no real difference between space and corporeal substance’, he suggests a way in which ‘it is easy for us to recognize that the extension which constitutes the nature of a body is exactly the same as that constituting the nature of a space’. We are to ‘attend to the idea we have of some body, for example a stone, and leave out everything we know to be non-essential to the nature of body’. In the end ‘nothing remains in the idea of the stone except that it is something extended in length, breadth, and depth’. And this, he says, is ‘just what is comprised in the idea of space’.

Since this passage occurs in the course of Descartes' attempt to dispel possible doubts about his ‘thin’ conception of matter it would, obviously, be no more than dogmatic reassertion if it appeals, as at first sight it certainly does, to that ‘thin’ conception itself. But even though Descartes asks us to leave out of our idea of a stone ‘everything we know to be non-essential to the nature of body’, we need not suppose he is asking us to leave it out as non-essential. We need not suppose that it matters to what he says here that everything but extension be non-essential. We can suppose he is simply asking us to leave out of the idea of the stone everything


\textsuperscript{21} See Grant, ‘Place and Space’, p. 157.
except extension. Since everything except extension has, in section 4, been proved (at least to his satisfaction) to be non-essential to body, a quick way for Descartes to ask us to leave out all but extension is simply to ask us to leave out everything non-essential.

But why should he ask us to leave everything except extension out of the stone? Quite simply, so that we might the more easily reflect on the relation of space to the extension of body. He is trying to get us to see that there is no need for a merely extended and independent space for extended body to be 'in'. He 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.

In effect Descartes is, presumably knowingly, adopting an argument from Aristotle's *Physics* (Book 4, chap. 8). Aristotle asks there how a wooden cube would differ from some supposed space which it occupies if all its attributes except for its volume were separated from it. If the volume of a body 'differs in no respect from its place, why need we assume a place for bodies over and above the volume of each, if the volume is conceived as free from attributes? It contributes nothing to the situation'.

Aristotle's argument is not about what is or is not essential to a body, but rather about the nature of extended space and its relation to extended body. The same goes too, I suggest, for *Principles* section 11, and, indeed, for all the sections from 10 onwards. In them Descartes is neither arguing for nor presupposing his 'thin' conception of matter. He is arguing for an account of the nature of space and its relation to body which, if it holds, holds independently of whether body is so 'thin' as to be solely extension or something 'thicker' as Leibniz, for example, will later argue.

So when, at sections 16, 17, and 18, he comes to argue that 'it is a contradiction to suppose there is such a thing as vacuum' since 'there is no difference between the extension of a space, or internal place, and the extension of a body' he is not arguing from his 'thin' conception of matter to there being no difference between space and body and therefore no possibility of empty space. He is, and quite independently of that 'thin' conception, arguing, as indeed a whole tradition had been doing since Aristotle, that in the way it is related to body, the *nature of space* rules out the possibility of empty space.

It is sometimes said that Descartes 'spatialises body', or says that
‘matter is space’. What seems to lie behind such assertions is the idea that Descartes begins with the picture of space as something independent of body, adds to this his ‘thin’ conception of body as mere extension, and so ends up with bodies as nothing other than ‘regions of space’. It is, of course, part of that picture of space that its parts or regions logically cannot move, and so the problem is raised for Descartes how body can move. A recent article on Descartes quotes Newton to the effect that ‘the parts of space are motionless’ and then says that ‘Cartesian bodies, since they are regions of space, must remain locked forever in their position in the “plenum space”’. The problem, says Hartz, ‘lies in supposing that body is in any sense identical with extension . . . . So long as it is, bodily extension . . . will be as immobile as spatial extension’. As I have argued, however, so far from beginning with the idea of space as something independent of body, it is precisely this idea which Descartes is against, and for reasons having nothing to do with his account of the nature of body. So far from ‘spatialising body’ or making matter into space, Descartes does quite the contrary. Drawing on a quite different tradition he corporealizes space. The ‘thinness’ of his conception of matter produces no problems about motion, for he does not have the view of space which together with that conception is supposed to produce them. This is not to say, I hasten to add, that Descartes faces no problem about motion. For the corporealization of space and the suggestion that there is no space without body has itself always been thought to raise problems for the motion of matter (be it ‘thick’ or ‘thin’). But it has not been my purpose here either to attack or defend what Descartes says. It has been only to suggest how it should be read.

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24 Hartz, ‘Place and Space’, p. 35.
26 I am grateful to Richard Francks for conversations which helped to work all of this out.