

Chapter 2

Aristotle's Account of Place in *Physics* 4: Some Puzzles and Some Reactions



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Abstract This contribution focuses on Aristotle's account of place (not: space) as it is developed in *Physics* 4, 1–5, a difficult text which has proved to be both influential and a source of problems and discussions in the ancient and medieval Aristotelian tradition. The article starts out by briefly positioning this account within the *Corpus Aristotelicum*, within the later ancient and medieval Aristotelian tradition, and within the tradition of theories of place and space in general. It goes on to examine the argument of *Phys.* 4, 1–5, showing that proper attention to Aristotle's dialectical procedure is crucial for a correct understanding and evaluation of the various claims that we find scattered throughout his text. It then zooms in on the most important questions, problems and loose ends with which Aristotle's theory confronted his commentators (ancient, medieval and modern): the puzzling arguments for the rejection of the rival conception of place as an independent three-dimensional extension (and of the void); the supposed role of Aristotelian places in the explanation of motion; the supposed role of Aristotelian natural places in the explanation of natural motion; the problem of the required immobility of Aristotelian places; and the problem of the emplacement of the heavens.

2.1 Introduction: Aristotle's Account in Context

This paper offers a synthesizing discussion of Aristotle's 'classic' account of place, as the "first immobile limit of the surrounding body," as it is worked out in *Physics* 4, 1–5, and of the main problems with which this account has saddled its interpreters in antiquity and beyond.¹ In passing, we will also be able to cast occasional

¹ Although this paper offers a fresh, synthesizing perspective, it covers a number of items which I have discussed, sometimes at greater length and in more detail, in earlier publications as well. Inevitably, therefore, there will be some overlap (from slight to considerable) with my earlier work, in particular with Algra 1995 in Sections 2.1 and 2.5, and with Algra 2014 in Sections 2.3, 2.4, 2.6 and 2.7.

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glances at how this text relates to some other parts of the *Physics* (in particular the discussion of the void in *Physics* 4, 6–9 and the discussion of the dynamics of natural motion in *Physics* 8), as well as to some other texts from the *Corpus Aristotelicum* (most notably the *Categories*).

Aristotle's account of place in *Physics* 4 has had a long and varied reception history. It started with the early Peripatetics Eudemus of Rhodes and Theophrastus of Eresus. Eudemus' *Physics* basically appears to have been a paraphrasing commentary that preserved the sequence of subjects of Aristotle's work, whereas Theophrastus' similarly entitled treatise was more of an independent work.² From the fragments of these two works, preserved by Simplicius, it appears that they both critically discussed Aristotle's account of place, albeit without straightforwardly rejecting it. Strato of Lampsacus, however, who succeeded Theophrastus as head of the Lyceum, did in fact reject it and opted instead for the conception of place as a three-dimensional extension.³ Sympathy for the latter conception can also be detected in the testimonies on the work of the first century BC Peripatetic Xenarchus of Seleucia, whom we know to have defused Peripatetic arguments against the Stoic conception of the (extracosmic) void.⁴ Aristotle's conception of place was further discussed and criticized by other philosophers in the Hellenistic and early Imperial periods, perhaps most notably by the sceptic Sextus Empiricus at the end of the second century AD.⁵

The account of *Physics* 4, 1–5 first became 'classical' in later antiquity when the *Corpus Aristotelicum*, of which the *Physics* was a prominent part, had become canonized and integrated into the standard philosophical curriculum. In order to be able to function in such a context the *Physics*, like other difficult Aristotelian texts, had to be opened up and explained in exegetical paraphrases (Themistius) and commentaries (Alexander of Aphrodisias, Simplicius, Philoponus).⁶ The same goes for the subsequent practice of the study of Aristotle in the medieval Islamic world: we still

²On the character of Eudemus' work, see Gottschalk 2002 and Sharples 2002. On Theophrastus' work and the nature of his Aristotelianism, see Gottschalk 1998 and Sharples 1998. Their reactions to Aristotle's theory of place are discussed in more detail in Algra 2014, 25–29 (Eudemus) and 29–38 (Theophrastus).

³On Strato in general see the edition by Sharples (2011) and the studies collected in Desclos and Fortenbaugh 2011. On his theory of space and void, see Algra 2014, 38–42.

⁴On the evidence on Xenarchus on the void, see Algra 2014, 42–47. For the Stoic conception of extracosmic void see Section 3.2 of Bakker's Chapter 3 in this volume.

⁵On the discussion of place in Sextus Empiricus, also in relation to the text of *Physics* 4, see Algra, 2015.

⁶English translations of the commentaries on *Physics* 4 by Themistius, Simplicius and Philoponus are available in Richard Sorabji's invaluable series *Ancient Commentators on Aristotle*. For Themistius, see Todd 2003; for Philoponus, see Furley and Wildberg 1991 and Algra and Van Ophuijsen 2012; for Simplicius, see Urmson 1992 and Urmson and Siorvanes 1992. Alexander's commentary is no longer extant. Fragments are discussed and a reconstruction attempted in Rashed 2011. On the later ancient commentary tradition, in general and in relation to the school practice, see Sorabji 1990. Some of the most important passages on (Aristotle's conception of) place from the ancient commentary tradition have been conveniently collected and translated, with brief introductions, in Sorabji 2004, 226–243. Much of this material has been discussed at greater length in Sorabji 1988, esp. 125–218.

have commentaries on the *Physics* by, among others, Ibn Bajja (Avempace) and Ibn Rushd (Averroes). It goes for the world of Latin late medieval scholasticism as well, where the *Physics* was discussed in commentaries and series of *quaestiones* by Thomas Aquinas, John Buridan, William Ockham and others.⁷ Part of the ancient reception of Aristotle's conception of place had been critical – apart from Strato and Xenarchus, already referred to, we should in particular mention John Philoponus (sixth century AD), who offered a sustained critique in the so-called *Corollary on Place*, inserted in his commentary on *Physics* 4, while the commentary of his near-contemporary Simplicius is quite critical as well.⁸ On the whole, however, the Arabic and Latin commentators in the Middle Ages basically appear to have attempted to defend Aristotle's account of place and to work out solutions for the problems it raised. Its strong presence in the late scholastic tradition may partly explain its rather surprising reappearance, in the guise of the concept of *locus externus*, in Descartes' *Principia Philosophiae* (II, 14), published in 1644.⁹ Also in more recent times Aristotle's theory of place has kept attracting the attention of philosophers. Henri Bergson, for example, devoted his dissertation to it.¹⁰ In a more recent and much more ambitious monograph on the subject Ben Morison put up a lively defense and even claimed that the theory is “of enduring philosophical interest.”¹¹ Those who are into postmodern feminist interpretations may enjoy the ‘total makeover’ offered by Luce Irigaray (“The female sex organ is neither matter nor form but vessel” – and so on).¹²

Back to Aristotle's text. In so far as the account of *Physics* 4, 1–5 is about the location of individual substances rather than about a *system* of such locations, it presents us with a theory of *place* rather than *space*.¹³ If we count out the specific *metaphysical* conceptions of space or place defended in late antiquity – in which place or space figures as a channel, so to speak, through which being, order and unity are conveyed to the physical world in a process of emanation from higher principles – and confine ourselves to conceptions of *physical* place, we may see that in antiquity as well as in the Middle Ages and the early modern period, such conceptions basi-

⁷For the reception of the *Physics* in the Arabic world, see Lettink 1994. For the Latin medieval tradition of interpreting Aristotle's account of place (and his critical account of the void that follows), see Grant 1981a, b.

⁸A translation of Philoponus commentary on *Physics* 4, 1–5 is available in Algra and Van Ophuijsen 2012. The philosophically more significant *Corollary on Place* has been translated separately by Furlley and Wildberg 1991. On the relation between the *Corollary* and the commentary proper, see Algra 2012. Simplicius's *Corollary on Place* is available in translation in Urmson and Siorvanes 1992.

⁹Text quoted and discussed in Algra 1995, 17, n15.

¹⁰Bergson 1889, a shortish and mainly paraphrasing study.

¹¹Morison 2002. “Enduring philosophical interest” is a quote from the somewhat over-excited blurb text.

¹²The quotation is from Irigaray 1998, 48 (English translation of a chapter from her 1983 *Éthique de la différence sexuelle*).

¹³On concepts of place *versus* concepts of space see Algra 1995, 20–21.

cally came in three types.¹⁴ Place could be identified with matter, or the extension of the emplaced body itself (a view that can be found in Plato's *Timaeus*, certainly as it was read by Aristotle¹⁵; another instance is Descartes' notion of *locus internus*); or with an independent extension (or part of space) coextensive with the located body, in which bodies are located and through which they can move (Epicurus, Newton); or place could be defined in terms of a body's *surroundings*, either by identifying it as a surrounding *something* (as in the case of Aristotle: a surrounding surface) or by defining it as the *relation* between the emplaced thing and its surroundings (a view suggested as an alternative to Aristotle's by his pupil Theophrastus, and famously defended by Leibniz in his correspondence with Clarke).

Unlike modern physics, early modern and pre-modern physics was still to a considerable extent moored in common sense ways of thinking and speaking about reality. And indeed, all three main conceptions of place just outlined are in their own way rooted in the way spatial concepts are used in ordinary thinking and speaking. We may be said to use the first, when we say that a thing 'occupies so and so much room.' After all, we are, then, in fact focusing on the thing's own extension, the extension of its matter, and not necessarily implying that the room 'occupied' exists in its own right. We use the second when we are talking about things moving 'through space' (their place then being the part of space they occupy at any given moment). And we use the third conception, defining location in terms of surroundings, when we say that a fish is swimming 'in' the water or that I am presently 'in' the city of Utrecht. Aristotle acknowledges as much when he claims that the difficulty of arriving at a coherent theory of place is precisely due to the fact that the *phainomena* from which physics should take its start – and which for Aristotle famously include the ways in which we ordinarily speak and think about reality – point in different directions.¹⁶ He does so right at the start of his account:

Text 1. The question what place is, is beset with difficulties. For it does not appear as the same thing, according as we consider the matter on the basis of the various available data (*Phys.* 4, 208a32-34).¹⁷

¹⁴This threefold typology is further worked out, with references to the relevant texts, in Algra 1995, 15–22. What I here call 'metaphysical' conceptions of place or space can be found in the works of some Neoplatonists of late antiquity: Iamblichus, Proclus, Syrianus, Damascius, Simplicius. They all somehow connect place or space with form, causation and creation (*dēmiourgia*). This is consistent with the Neoplatonic tendency to claim that the lower hypostases are somehow 'in' the higher and formative ones. Thus Iamblichus can claim that place is a power that "sustains bodies and holds them apart, raising up those that have fallen [i.e. disintegrated into prime matter, KA] and uniting those that are scattered, filling them up and surrounding them on every side" (Iamblichus *ap.* Simplicium *In Phys.* 640, 2–6). On these theories, see Sambursky 1982, 11–29; Sorabji 1988, 202–215, with comments in Algra 1992, 157–162.

¹⁵Cf. *Phys.* 4, 209b11-13: "That is why Plato in the *Timaeus* says that matter and space (χώρα) are the same thing." On ancient and modern interpretations of the receptacle of the *Timaeus* as either space or matter (or both), and on Aristotle's critique, see Algra 1995, 72–120.

¹⁶On Aristotle's (dialectical) method in his *Physics*, see the seminal paper by Owen 1961; a more detailed discussion in Algra 1995, 153–181.

¹⁷Translations throughout this paper are my own, unless otherwise indicated. Of course I have benefitted from consulting existing standard translations, such as Hussey 1983 and Waterfield and Bostock 1996 for Aristotle's *Physics*.

He is even more explicit in chapter 4, in a passage in which we recognize our three main conceptions of place, with the identification of place as *form* added as a fourth possibility (I have numbered the four candidates (i)–(iv))¹⁸:

Text 2. Place seems to be something profound and difficult to grasp, both because the notions of (i) matter and (ii) form present themselves together with it (παρεμφαίνεσθαι), and because of the fact that change of position of a moving body occurs within a surrounding body which is at rest; for [from this] it appears to be possible (ἐνδέχεσθαι γὰρ φαίνεται) that there is (iii) an extension in between which is something other than the magnitudes which move. Air, too, contributes to this suggestion, by appearing to be incorporeal; place seems (φαίνεται) to be not only (iv) the limits of the vessel, but also (iii) that which is in between, which is considered as being void (*Phys.* 4, 212a7-30).

According to the methodology laid out in the first chapter of *Physics* 1, the philosopher, in his search for the principles of nature, should start out with “what is more intelligible to us,” i.e. the *phainomena*, in order to arrive at these principles, which are what is “more intelligible in itself.”¹⁹ However, in the present case, or so Aristotle claims, the *phainomena* at first sight seem to lead us to different conclusions. The notions of matter and form are somehow intricately bound up (παρεμφαίνεσθαι) with our experience of place. In addition, our experience of moving objects – especially things moving through air – seems to suggest that place exists as a three-dimensional extension independent of the extension of the emplaced bodies. So *prima facie* one might be inclined, on the basis of the *phainomena*, to identify place with matter, form, or an independent three-dimensional extension. As a matter of fact, the latter conception was apparently at first sight so appealing that we even find Aristotle using it himself elsewhere, in less technical (or not strictly physical) contexts within the *Corpus Aristotelicum*.²⁰ In the *Categories*, for example, place is presented as a continuous three-dimensional extension, ‘doubling,’ so to speak, the continuous extension of the emplaced body:

Text 3. Place belongs to the quantities which are continuous. For the parts of a body which join together at a common boundary occupy a certain place. Therefore also the parts of place which are occupied by the several parts of the body join together at the same boundary at which the several parts of the body do. Therefore also place is seen to be continuous. For its parts join together at one common boundary (*Cat.* 5a8-14).

That Aristotle is here presenting place in this way is probably due to the fact that in the *Categories* (a treatise dealing with the way in which we generally *name* things) he tends to be speaking “in accordance with widespread usage” (*secundum famositatem*), to quote John Buridan quoting Averroes.²¹ *Physics* 4, 1–5 however, is the

¹⁸ On the reason why Aristotle thinks (perhaps, at first sight, surprisingly) that we might be tempted to identify place with *form*, see below, p. 26 ff.

¹⁹ *Phys.* 4, 184a16-18. See above, n16.

²⁰ See also below, text 7.

²¹ The quotation is from Buridan's *Questiones super octo Physicorum libros Aristotelis*, Paris 1509 (first printed edition), f. lxxiii rb. Some modern scholars have suggested that the *Categories* presents us with an *early* view, and that Aristotle had changed his mind on the subject of place by the time he was writing the *Physics*. This possibility cannot be excluded, but is less likely, since (i) the underlying conception of place in *Cat.* does not appear to be very coherent anyway, and (ii) the

text in which he delivers his fullest philosophical discussion of all issues to do with place, and in such a context he seems to see it as the philosopher's task to disentangle the various conceptions that are around and to show which one can be coherently maintained after a careful dialectical investigation. And it is here (*Phys.* 4, 212a20) that he thus arrives at his 'considered view' of place as "the first immobile surface of the surrounding body."

The intrinsic difficulty of the subject is not the only problem with which Aristotle confronts his reader. There is also the difficulty of his own presentation: the text of *Phys.* 4, 1–5 is not as smooth and well organized as we might have wished it to be. It is patchy and at times crabbed and obscure. It is a text which was meant for, or which at least reflects, Aristotle's classroom practice, where it could be elucidated by the *viva vox* of the teacher. Nevertheless, it is not an unintelligible text, as I will try to show in Section 2.2 of this paper, which offers an overview of its contents, and the way they cohere.

Finally, and most importantly, the conception of place Aristotle ends up with is puzzling, and has in fact puzzled commentators, in various respects. Sometimes the puzzlement merely occurs if we look at things from a non-Aristotelian point of view and (partly) disappears once we take the larger context of Aristotle's physics and ontology into account. In other cases we are dealing with problems which should also bother an Aristotelian, but which Aristotle appears not to have solved or even recognized in the *Physics* or anywhere else in what remains of the *Corpus Aristotelicum*. In the present paper I will address what I think are the five most prominent puzzling features, which all left their traces in later ancient, medieval and even modern discussions of Aristotle's theory: the strange arguments for rejecting the rival theory of place as a three-dimensional extension (Section 2.3), the way in which Aristotelian places are supposed to figure in the explanation of locomotion (Section 2.4), the role of natural place in the explanation of the natural motion of the elements (Section 2.5), the problem of securing the required *immobility* of place (Section 2.6), and the problem of the emplacement of the heavens (Section 2.7).

By going through these difficulties, and through some possible solutions, we will get a better grasp of Aristotle's theory, and will be in a better position to understand the way in which it was received in antiquity and in the Middle Ages. For, as Simplicius already noted at the beginning of his own systematic *Corollary on Place* (a rich and very informative excursus appended to his discussion of *Phys.* 4, 1–5), Aristotle's account contains "many difficulties and offered many lines of examination to those who came after him."²²

conception of place as three-dimensional extension also recurs in non-technical contexts in a later work such as the *Meteorology*; see below, text 7. On this, on the relation between the two treatises and their respective conceptions of place in general, and on some later interpretations of the differences, see Algra 1995, 121–153.

²² Simplicius *In Phys.* 601, 1–3. Here, and in the rest of this contribution, references to the texts of Themistius, Philoponus and Simplicius use the page and line numbers of the standard editions in the series *Commentaria in Aristotelem Graeca* (CAG).

2.2 The argument of *Physics* 4, 1–5

Physics 4, 1–5 covers various items that are all connected to the subject of place: various possible conceptions of place, an intricate analysis of what it means to be ‘in’ something, a discussion of Zeno’s paradox of place, a discussion of proper and derived (or ‘incidental’) senses of moving and a separate discussion of the way in which the heavens with their eternal circular motion exhibit locomotion and can be said to be in a place. However it does not explicitly connect these little mini-treatises in a linear account that is easy to follow. Still, behind this patchy ‘surface structure’ there is an argumentative or dialectical ‘deep structure’ which Aristotle himself lays out in the following passage (of course the numbering of the various items in this ‘dialectical programme’ is mine):

Text 4. We must try to make our inquiry in such a way that (i) the ‘what-it-is’ is provided, (ii) the *aporiai* are solved, (iii) the apparent facts about place are accounted for, and, finally, (iv) so that the reason for the difficulty and for the problems around it are clear. Any discussion which achieves all this, on any topic, has succeeded admirably (*Phys.* 4, 211a3–11).

The passage is from chapter 4, and it is indeed there and in chapter 5 that Aristotle actually can be seen to assemble his own theory, albeit with the help of the findings of the slightly more aporetic chapters 1, 2 and 3. We can also see that he practices what he preaches:

- Ad* (i): A definition is provided, in chapter 4, first at 212a6 (“the limit of the surrounding body,” τὸ πέρας τοῦ περιέχοντος σώματος), and then again, with the requirement of immobility added, at 212a20 (“the first immobile limit of what surrounds,” τὸ τοῦ περιέχοντος πέρας ἀκίνητον πρῶτον).
- Ad* (ii): In the second half of chapter 5 a number of *aporiai* that had been set out in the first three chapters – such as Zeno’s paradox of place – are shown to be soluble for Aristotle’s own conception of place or not to apply to it (while it seems to be assumed, though not explicitly stated, that they cannot be solved for, and thus in fact demolish, the rival conceptions).
- Ad* (iii): The apparent facts are accounted for – that is, evidently not *all* apparent facts, for as we saw in the previous section, the apparent facts (*phainomena*) seem to support various different conceptions. In fact, it is presumably because the first list of *phainomena* offered in chapter 1 contains various ways of speaking and thinking about place that are on closer scrutiny untenable (e.g. the assumption that there is such a thing as the void), that we are given a *fresh* list in the opening section of chapter 4: the properties which appear *truly* to belong to place in its own right (ὄσα δοκεῖ ἀληθῶς καθ’ αὐτὸ ὑπάρχειν αὐτῷ, 210b32–34).
- Ad* (iv): Finally, Aristotle manages to indicate the reason for the difficulties, also in chapter 4, at 212a7–30, the passage quoted above as text 2.

In sum, the conception of place which can account for the list of true *phainomena*, and for which the relevant *aporiai* can be solved or shown to be harmless, will be the winner, which can and will be accurately defined, whereas it will be shown at the same time why the rejected candidates could have been thought of as candidates in

the first place. With this general, unifying programme in mind we may now walk through the text as a whole.

Chapter 1 starts out by setting out a number of apparent facts (*phainomena*) concerning the existence of place, framed as a number of possible reasons for assuming that place exists. But, as we saw, Aristotle does not think we are required to accept *all* of these *phainomena* as true or even plausible. And indeed, a brief glance at the list shows that it contains various ways of thinking and speaking about place that will turn out to be wrong: the idea that place has three dimensions, the idea that there is such a thing as void, the idea that place seems to be (ontologically) prior to all things, as Hesiod is here said to have thought. This should be taken as a warning that, if this same context contains the claim that the natural motions of the elements show us that place “has a certain *dunamis*” (208b10-11), we should not too readily take this at face value as something to which Aristotle is in the end firmly committed himself. I will discuss the question of the exact role of place in the explanation of natural motion below, in Section 2.5, and will there return to the question of how this phrase should be interpreted.

Aristotle goes on (*Phys.* 4, 209a2-209a31) to list a number of *aporiai* on the nature of place, which he claims may make us doubt in the end not just *what* place is but even *whether* it exists at all. Some of these *aporiai* merely apply to the notion of place as a three-dimensional extension. For example:

- (i) how can place be three-dimensional, yet not be a body (209a4-7);
- (ii) if bodies have a three-dimensional extension as their place, then surfaces, lines and points must have underlying places too, which seems absurd (209a7-12).

Neither of these two *aporiai* will be solved, and hence they will continue to count against the rival conception (as will be made explicit for (i) in chapter 4). Other *aporiai* may be taken to apply to Aristotle’s own conception of place as well, for example:

- (iii) even if place is taken to have a certain *dunamis*, it is nevertheless not one of the four causes (209a18-22);
- (iv) Zeno’s paradox: if everything that exists is in a place, place itself, if existent, will be in a place as well, and so on *ad infinitum* (209a23-25).

Some of the *aporiai*, such as (iv), are explicitly solved in the rest of Aristotle’s account in *Physics* 4, others are not, or not very clearly and explicitly. *Aporia* (iii), for example, left some uncertainty in the later Aristotelian tradition about the precise role of (natural) place in natural motion. As noted, this will be the subject of Section 2.5 of this paper.

Chapter 2 (*Phys.* 4, 209a31-210a13) turns to the nature of place, by working out two basic intuitions: place as a three-dimensional extension, and place as a surrounding container, and explores and criticizes two definitions of place to which these intuitions might be thought to give rise, *viz.* the identification of place as form (surrounding) or as matter (extension). Aristotle’s most important objection to these definitions is that both form and matter are intimately bound up with the substance

to which they belong, whereas the place of a substance should be separate.²³ Later on, in chapter 4, he will accordingly add two further candidates for consideration: an *independent* surrounding container (the limit of the surrounding body) and an *independent* three-dimensional extension, so that we then have *four* candidates. Here, in chapter 2, the elimination of two of these four candidates (matter and form) is already being prepared.

Chapter 3 has as its most important element a discussion of the different senses of 'being in,' which is brought to bear upon the solution of Zeno's paradox of place. Interestingly, the first premise of this paradox – which in chapter 1 (209a23-25) had been rendered as "everything that exists is in a place" – is now (210b22-23) rewritten as "everything that exists is in something." Aristotle gives no explicit reason for this reformulation, but various remarks in the context of *Phys.* 4, 1–5 suggest that he thinks that the premise "everything that exists, is in a place" can only be accepted as true if we take "everything that exists" to refer to (mobile) physical substances.²⁴ And in that form the paradox loses its force against *all* the conceptions of place he discusses, for none of these takes place itself as a physical substance or a mobile body. However, in the form in which it has now been rephrased, the paradox can be defused only for his own conception of place as a surface (which he has at this point of the discussion not yet proven to be right), because such a place is indeed 'in something else' (*viz.* in the substance of which it is the surface), though in a non-local sense of 'in' – i.e. in the sense (outlined by Aristotle in what preceded) in which a property is in a thing. No such defense is possible, we may realize (although this is not spelled out explicitly), for the most important rival conception of place as an independent three-dimensional extension.

Aristotle appears to have regarded the text of what we nowadays demarcate as chapters 1, 2 and 3 as primarily aporetic.²⁵ Chapter 4 returns to the main question – "but what actually is place?" – and seems to make a fresh constructive start. In a kind of prefatory section (210b32-211b5) we are presented, as we saw, with a revised list of characteristics that seem to "genuinely belong to place" (210b33-34) – i.e. presumably characteristics that do not involve the difficulties discussed in the previous chapters.²⁶ Aristotle then states his 'research programme' on place (quoted

²³A second, related objection is: "how could a thing move to its own place, if its place was its matter or its form" (210a2-3); presumably the idea is that, if a thing's form or matter were its place, it would always by definition be in its own place. A third objection (210a5-9) is that form and matter move along with the thing of which they are the form and matter, which would mean that place itself would be moving, and thus changing place.

²⁴See 208b28: "every perceptible body is in a place;" 209a26 "every body is in a place;" 212b28 "only a movable body is in a place, not everything."

²⁵He concludes chapter 2 by claiming that "we have now reviewed the arguments which force us to conclude that place exists, and also those which make it difficult to know what it is," and chapter 3 by saying that "that concludes our discussion of the difficulties."

²⁶They are, briefly: (i) that place is the first thing surrounding that which is in place; (ii) that it is separate from the emplaced object; (iii) that it is neither larger nor smaller than the emplaced object; (iv) that it can be left behind by the object and is separable; (v) that it exhibits the directions 'above' and 'below;' (vi) [that it helps to explain] that each body should naturally move to its own

as text 4 above), which, as we saw, gives the argumentative ‘deep structure’ underlying chapters 4 and 5. He goes on by squarely linking the notion of place to the notion of locomotion, and appends some rather disjointed notes on real *versus* incidental motion and on the difference between being in a place and being in a whole. In the central section of chapter 4 (211b5-212a7) he then sets out his fourfold division of possible conceptions of place and eliminates three of the four candidates (form, independent three-dimensional extension, matter; 211b9-212a2). Hence place must be the fourth and only remaining candidate: the limit of the surrounding body (τὸ πέρας τοῦ περιέχοντος σώματος, 212a6).

Aristotle next (212a7-30) discusses the cause of the difficulty of the subject (our text 2, quoted above) and goes on to elucidate the difference between a vessel and a place, by claiming that a vessel is a mobile place and place an immobile vessel, thus adding immobility as a further requirement for the correct conception of place, partly with the help of an example – a boat on a river – which has puzzled most subsequent commentators. The river example and the problem of immobility will be discussed below, in Section 2.6. The chapter ends with some rather sketchy notes (212a21-30) that may serve to show that the resulting final definition of place (i.e., with the feature of immobility added, the “first immobile limit of that which contains” (212a20)) fits a number of the characteristics that belong to place according to the common conception of it: (i) that the cosmos has an ‘above’ and a ‘below;’ (ii) that place is like a vessel and a surrounder; (iii) that place is together with the object – after all, on this view “the limits are together with what is limited.”²⁷

Chapter 5, finally, roughly consists of two parts. The first part (212a31–212b22) deals with the question whether and to what extent the heavens and the cosmos as a whole are in a place; this as well is a section of which both the wording and the implications have puzzled commentators over the centuries. I will discuss the relevant problems below, in Section 2.7. The second part of the chapter (212b22–213a11) then finally shows that the (or rather: some) puzzles that were raised with respect to place can be solved on Aristotle’s theory, and that the phenomenon of natural motion in connection with natural places can be accounted for, although the latter section is very sketchy and leaves much to be explained (I will briefly revert to it in my discussion of the question of natural place and natural motion below, in Section 2.5).

From this overview of the contents of *Physics* 4, 1–5 it will already transpire that this text does provide us with a general idea of how Aristotle works and of the main arguments that support his conclusions. However, there are many loose ends as well: not all the *aporiai* that are brought up are explicitly discussed and solved, some arguments are rather baffling in their brevity, important aspects of the argu-

place. Note, by the way that strictly speaking (i) has by this time not yet been established (the rival conception of place as a separate three-dimensional extension is only eliminated in the course of chapter 4). This illustrates what has been noted in the text above, *viz.* that the argument in *Phys.* 4, 1–5 is not ‘linear.’

²⁷Of course, as we saw, the common conception of place is not *confined* to the idea of place as a ‘vessel and surrounder.’ But Aristotle seems to be referring back to the revised list of *phainomena* presented at the beginning of this chapter (and by now the rival conception of place as three-dimensional extension *has* indeed been eliminated).

ment and of the theory are left implicit. Moreover, although Aristotle seems to think that he has successfully eliminated the three possible rival theories by showing how they lead to inconsistencies and irresolvable puzzles, questions can be raised about the coherence and usefulness of his own theory as well. His own pupil Theophrastus already produced a list of five puzzles generated by the conception of place defended in *Physics* 4, 1–5, and later commentators repeat these puzzles and add others of their own making.²⁸ The interpretative and conceptual problems raised by Aristotle's text will be the subject of the remaining sections of this paper.

2.3 Place as Three-Dimensional Extension: A Puzzling Rejection

By the time Sextus Empiricus was writing his sceptical account of physical theories of place, at the end of the second century AD, there were only two main options around: Aristotle's conception of place as a surrounding surface, or the conception of place as an independent three-dimensional extension, versions of which had in the meantime been endorsed by Epicurus and the Stoics. Also for Aristotle himself the conception of place as three-dimensional extension constituted the most formidable rival view.²⁹ Where form and matter could be rather easily disqualified as suitable candidates for the identification of place, the conception of place as a three-dimensional extension was one which had a more solid foundation in ordinary thinking and speaking, and which possibly for that very reason even figured in Aristotle's own *Categories*, as we saw. In *Physics* 4 he intends to prove that, from the strict point of view of philosophical physics, ordinary thinking and speaking are wrong in this respect. Given that there is this much at stake, the arguments adduced are surprisingly obscure and puzzling. This was in fact what triggered Philoponus' insertion of a separate excursus (now known as his *Corollary on Place*) right in the middle of his commentary on chapter 4. It starts out with a refutation of Aristotle's arguments (*In Phys.* 557, 12–563, 25) before turning to its main task: offering a vindication of the rival conception of place as extension.

Let us first have a closer look at the two arguments Aristotle applies in chapter 4. They can be paraphrased as follows:

- (i) On this conception of place, there would be an infinity of places in the same spot (ἐν τῷ αὐτῷ ἅπειροι ἂν ἦσαν τόποι, 211b20–21), for in a continuous emplaced body we can distinguish an infinity of parts which will all have their own places, so that we have an infinity of juxtaposed (and, we may presume, in fact also overlapping) three-dimensional places 'in the same spot;' and

²⁸Theophrastus *ap.* Simplicium *In Phys.* 604, 5–11 (= Theophrastus fr. 146 FHSG). On Theophrastus' position and the interpretation of these *aporiai*, see Algra 2014, 29–38.

²⁹Averroes (Ibn Rushd) in his *Short Commentary* suggests that the main rival views of place as either a surrounding surface or an extension should be presented as alternatives in a hypothetico-disjunctive argument. See Lettink 1994, 313.

- (ii) On this conception of place, place will be moving (ἄμα δὲ καὶ ὁ τόπος ἔσται μεταβάλλον, 211b23).

Later on in the same book, in the course of his discussion of the void (which of course is supposed to be the kind of self-subsistent three-dimensional extension we are here discussing) in chapter 8, Aristotle uses another argument to reach the absurd conclusion of an infinity (or at least: an indefinite number) of places ‘in the same spot.’ This time he no longer seems to be thinking of a process of *dividing*, but rather of a process of *doubling* the three-dimensional extension which can go on *ad infinitum*:

- (iii) “What will be the difference between the body of the cube and the void and place which are equal to it? And if two things can behave like this, why cannot any number of things coincide?” (216b9-11).

Arguments (i)–(iii) thus represent a threefold *reductio ad absurdum* of the view that place is an independent three-dimensional extension. But do the alleged absurd consequences really follow? In the case of (i) it is not *prima facie* clear what precisely the supposed absurdity consists in. That a continuous three-dimensional place can be divided in a *potentially* infinite number of parts should not be particularly objectionable, given that the same operation can be performed on the emplaced *body* – in fact the possibility of infinite potential divisibility is part and parcel of Aristotle’s own theory of infinity and the continuum as set out in *Physics* 3.³⁰ What seems to be suggested, therefore, is rather that the conception of place as a three-dimensional extension would involve an *actual* infinity of overlapping or nested places. That, however, is simply not true. The rival view would at most involve the idea that the (only *potentially* infinite number of) parts of a continuous substance, however specified, would occupy (a potential infinity of) correspondingly specified parts of one and the same absolute extension, *not* that an *actual* infinity of places ‘co-exist.’

But perhaps the supposed absurdity should not primarily be located in the element of infinity, but rather in the very idea of parts of a continuous substance having a place of their own. After all, in Aristotle’s own theory the parts of continuous substances do not move in their own right (but only incidentally, κατὰ συμβεβηκός), and accordingly do not have a place in their own right: they move *with* the substance of which they are part, and accordingly their place is the place *of* this substance as a whole (211a17-22 and 211a29-34). Parts of a continuous substance, in other words, are not the sort of things to be emplaced in any proper sense. However, apart from the fact that it is in principle perfectly legitimate not to share this part of Aristotle’s substance ontology and to think, by contrast, that a theory of place would do well to be able to account for the emplacement of continuous parts of substances, it is just not true that the rival conception of place as extension *necessarily* involves the idea that such parts have places of their own. This is in fact shown by the example of

³⁰On which see his discussion in *Physics* 3, with the excellent introduction in Hussey 1983, xviii-xxvi.

Philoponus' own theory of place, which combines the conception of place as a self-subsistent three-dimensional extension with a world view that for the rest preserves Aristotle's substance ontology, including the concomitant idea that what may count as a place is only the extension occupied by a whole, separate, substance.³¹ A place, for Philoponus, accordingly is a part of space occupied by a substance. So apart from not involving the idea of an *infinity* of places of parts (except in the harmless sense of a potential infinity), the rival conception of place here discussed by Aristotle does not even necessarily involve the whole idea of places of parts to begin with. We may conclude that argument (i) fails to produce the required absurd consequences, however we choose to construct it.

The argument behind (ii) appears to rest on a misleading or mistaken interpretation of the words "some kind of extension between the limits" (διάστημα τι τὸ μεταξύ τῶν ἐσχάτων, 211b7-8), as if this 'extension between the limits' is *part* of the vessel, wedged in between its limits and thus moving along with it when the vessel moves. However, the view criticized here by Aristotle implies no such thing, since it looks upon this extension as self-subsistent, or as we might say: absolute. As Philoponus puts it in his *Corollary on Place*:

Text 5. For the jar that moves does not move the internal extension that receives the water along with it, but rather the whole thing changes its whole place. For the void is immovable (Philoponus, *In Phys.* 562, 3-6).

On the rival view of place as extension, in other words, the notion of a moving place makes no sense at all, let alone that it can be presented as one of its implications.

If we now turn to (iii), we may note, for a start, that it actually presupposes Aristotle's conviction that there is only one kind of three-dimensional extension, *viz.* the extension of substances themselves. As he puts it in the context of chapter 4, "what is in between a place is whatever body it may be, but not the extension of a body" (σῶμα γὰρ τὸ μεταξύ τοῦ τόπου τὸ τυχόν, ἀλλ' οὐ διάστημα σώματος, *Phys.* 4, 212b26-27). Once you admit, or so the argument seems to go, that this extension can be 'doubled' by conceiving of a second separate extension, you can go on repeating this move, so that you will end up with a (potential) infinity of coinciding extensions, a conclusion which is supposedly absurd. In his *Corollary* (e.g. at *In Phys.* 561, 27–562, 3) Philoponus defuses this argument as well. First of all, he argues, the idea of a plurality of coinciding extensions or dimensions is not logically absurd at all, as long as these extensions are not the extensions of *bodies*, for you cannot have more than one body in the same place. Secondly, however, in physical reality you will as a matter of fact always find two, and no more than two, coinciding extensions: the extension that is intrinsic to body (substance) plus the extension of place (which is in its own nature void).

Philoponus was not the first to be dissatisfied with Aristotle's arguments here. As we noted, in the third century BC the third head of the Lyceum, Strato of Lampsacus, had simply swapped Aristotle's conception for the rival conception of place as extension, and in the first century BC the Peripatetic Xenarchus of Seleucia appears

³¹ See e.g. *In Phys.* 577, 32-578, 4; and Algra 2012, 9.

to have been prepared to do so as well. However, Sextus Empiricus' accounts of place in *PH* 3, 119–135 and *M* 10, 1–36, written down in the late second century AD, show us that the late Hellenistic arsenal of sceptical (and in this case: originally Peripatetic) arguments from which he could draw still used versions of Aristotle's unsatisfactory arguments against the conception of place as a three-dimensional extension. So there were still people who took these arguments seriously. In general, the at first sight slightly surprising fact that so many other commentators in antiquity and in the medieval tradition were prepared to follow Aristotle in rejecting this rival conception of place (and to accept his arguments) may well be largely due to the fact that in the end this conception simply could not be integrated within an Aristotelian ontology (and ultimately this may well have been the idea behind (iii)). Being self-subsistent such a place or space could not be considered as an accident, i.e. a quantity; but neither could it be seen as a substance in the sense of a combination of form and matter. It is not a point, by the way, which Aristotle explicitly makes in *Phys.* 4, although it is probably *implied* in one of the *aporai* in chapter 1, which claims that it is unclear what genus we should ascribe to place: it has three dimensions but is not a body (209a4-6).

Philoponus acknowledges the underlying ontological problem in his *Corollary*, but argues that, in the face of the strong arguments in favour of the existence of space as a three-dimensional extension, we should rather conclude that there is something wrong with the Aristotelian ontology, in particular with the idea that a quantity cannot subsist by itself (*In Phys.* 578, 5–579, 17).

2.4 Place and the Explanation of Motion

The explanation of motion, or change of place in general (which includes the quantitative changes of expansion and contraction), is explicitly adduced as the *raison d'être* for the discussion of place within the context of the *Physics*.³² On closer view, however, it is less clear how it is actually supposed to function in the context of the explanation of locomotion. There are at least two problems. First, Aristotle's theory of place appears to be primarily a theory of the *location* of *static* bodies, whereas it is not easy to use his conception of place to describe the trajectory of bodies *in motion*. In fact, using Aristotle's conception of place, we should describe a body in motion as traversing an infinity of instantaneous two-dimensional places. In his *Corollary on Place* Philoponus takes Aristotle to task for the element of two-dimensionality:

Text 6. If place is the boundary of the container and is not some different extension between the boundaries over and above the bodies that come to be in it, then clearly during my motion from Athens to Thebes the parts of air that yield up their own place to me (for motion is a change of places and a continuous exchange) yield up nothing but surfaces. But

³²See *Phys.* 3, 200b20: "Change seems to be impossible without place and void and time, and in any case place, void and time are pervasive and common to all kinds of change, so for both these reasons we shall obviously have to look into each of them" (transl. Waterfield).

when surfaces alone are put together, even an infinite number of them, coinciding with each other they make the whole no bigger. So how can the moving body move forwards? (Philoponus, *In Phys.* 567, 12–18).

It is perhaps no coincidence that in contexts like these, where we are describing the *trajectory* of a moving body, Aristotle sometimes consciously or unconsciously resorts to the very concept of place as a *three-dimensional* extension which in *Physics* 4, 1–5 he rejects for theoretical reasons³³:

Text 7. [...] the celestial element is eternal and the spatial path (τόπος) through which it moves is endless, though always complete, while the terrestrial bodies each have their distinct and limited regions (τόπους) (*Meteor.* 1, 339a25–28).

In spite of all this, we may note that the problem signaled by Philoponus will in actual practice not have counted as fatal among ‘mainstream’ Aristotelians. Being able to serve to indicate the location of *static* substances may well have been what most Aristotelians expected from the theory of place, even within the context of a theory of locomotion. After all, Aristotle and Aristotelians were used to analysing changes, including locomotion, first and foremost in terms of their starting point and end point. True, Aristotle claimed that change (whether of form, size or place) is observed to proceed “from opposite to opposite *and what is in between*” (*Cael.* 4, 310a24–25), but the focus of the analysis was in general on the ‘from opposite to opposite’ part. Think, for example, of the general analysis of change in *Phys.* 1 (esp. chapters 1 and 5) as a process occurring between opposites. Within such a general descriptive framework Aristotle’s conception of place sufficed to describe the situation at the outset as well as the situation at the end of a process of locomotion.

Or did it? Here we seem to encounter a second problem, next to the one that a succession of two-dimensional surfaces does not make for a three-dimensional trajectory. As Richard Sorabji has well brought out, the surrounding surfaces in the course of such a trajectory are *instantaneous*.³⁴ Hence, a boat moving through water should be taken to traverse a series of instantaneous limits, so that strictly speaking it could never return to a place, for once a place is left it no longer exists. In principle this may not count as an odd result, if we recall the explicit claim (*Phys.* 4, 212a29–30) that “place is together with the object, for the limits are together with what is limited” (ἅμα τῷ πράγματι ὁ τόπος· ἅμα γὰρ τῷ πεπερασμένῳ τὰ πέρατα).³⁵ However, it *does* appear to be an odd result, if we take account of another requirement also introduced by Aristotle, namely that place should be something that can be left behind, like a vessel: “the place where the thing is can be left by it, and is therefore separable from it” (*Phys.* 4, 211a3).³⁶ For then the problem is simply this:

³³ Cf. Philoponus *In Phys.* 567, 8–29. On unorthodox conceptions of place in the *Corpus Aristotelicum* see Algra 1995, 182–188.

³⁴ Sorabji 1988, 190.

³⁵ Here again, we may note, the focus seems to be on place as a ‘locator’ of static substances.

³⁶ One may compare the earlier claims that place is “different from all the things that by replacement come to be in it,” and something “which they alternately leave and enter” (*Phys.* 4, 208b1–8), and the fact that Aristotle more than once describes place as a kind of vessel that can be filled, but also left behind (212a14–15).

in what sense does Aristotle's theory allow us specify the place I occupied this morning while standing in the garden, or of the place where I will be tonight while having dinner, if the relevant surrounding surfaces exist no longer or not yet?

Aristotle's pupil Eudemus of Rhodes appears to have been sensitive to this problem:

Text 8. Eudemus says that a further cause of the difficulty of the problem of place is that [the notion of] place is not easy to grasp, because it altogether escapes us when the body in it is removed, and it is not possible to apprehend it in itself, but, if at all, in combination with something else, like the sounds of the so-called consonants. For with 'a' added the sound of 'b' and 'c' becomes clear (Simplicius *In Phys.* 523, 22–28; Eudemus fr. 73 Wehrli).

The early-twelfth-century Arabic commentator Ibn Bajja (Avempace) argued, along the same lines, that place exists as long as the body that is in it exists, and that if a body is removed from its place and no other body replaces it, the place “breaks down.”³⁷ For the rest, however, there is not much evidence that this problem greatly bothered ancient or medieval commentators. And, once again, as long as we expect Aristotelian places to provide the location of individual static (non-moving) substances, they will do fine. The problem merely arises as soon as we want to endow place with a certain stability and see it as something that can be left and re-filled, indeed like a vessel. Perhaps we should conclude that Aristotle's suggestion that place served as some kind of ‘vessel’ (ἀγγεῖον) was in this respect not a particularly fortunate one after all.

2.5 Natural Place and the Explanation of Natural Motion

It is clear that for Aristotle in *Physics* 4, 1–5 the phenomenon of the natural motions of the elements is something which any theory of place should help account for. Yet his statements on the issue do not all unambiguously point in the same direction, and this has given rise to divergent interpretations, both in the ancient and medieval commentary tradition and among modern exegetes. In particular, it has proved difficult to square two of Aristotle's statements, both made in chapter 1:

- (i) place appears to have some sort of power (208b8-11; part of the initial list of *phainomena*); and
- (ii) place is not one of the four causes (209a18-22; part of the initial list of *aporiai*).

Simplicius (*In Phys.* 533, 31–32) claims that the problem has been passed over by previous commentators. This may well have been the case because they saw that Aristotle, especially if we also take into account what he says about the dynamics of natural motion in *Physics* 8, provides enough indications that (i) is not to be taken at face value, whereas (ii) is to be taken very seriously. This, at any rate is how

³⁷Lettink 1994, 303.

Simplicius himself and Philoponus saw things, and it is also what I am going to argue in this section.

Some medieval and modern readers, by contrast, have ignored or explained away (ii) and interpreted (i) in the sense that Aristotle saw natural place as the formal, final or even moving cause of natural motion.³⁸ Quite apart from the fact that Aristotle nowhere says such a thing, it is doubtful whether it would make any philosophical sense. For in what sense can we imagine a surface working as a cause? As a final cause? But, to quote John Philoponus:

Text 9. It is quite ridiculous to say that place has any power in its own right; it is not through desire of a surface that things desire that station in the order that they have been given by the creator (Philoponus, *In Phys.* 581, 17–21).

Moreover, as both Simplicius (*In Phys.* 533, 26–30) and Philoponus (text 15 below) point out, a final cause is something the changing object strives to *become*, and in that sense it is internal to the changing object, whereas place, even an object's natural place, is not what the object strives itself to become: it remains external to it. Should we then assume that place is a formal or a moving cause? But a formal cause and a moving cause are supposed to precede, or at least to be contemporaneous, with the change they cause, whereas as we have just seen, during the trajectory of natural motion the eventual natural place in an important sense does not yet exist.

Fortunately, it turns out that if we give due attention to all the pointers in the text of *Physics* 4 and if we adduce the account of the dynamics of natural motion provided in *Physics* 8, we can reconstruct a much more plausible position on Aristotle's part concerning the role of place in the explanation of natural motion. So let us have a closer look. As I have indicated in Section 2.2 of this paper, (i) need not be taken at face value (since Aristotle is not automatically committed to the truth of the *phainomena* he mentions in chapter 1). Moreover the cautious phrasing (ἔχει τινὰ δύνάμιν) should make us pause before being prepared to ascribe to place any kind of full-blown causal status. Next, (ii) cannot be simply dismissed or played down as "merely a part of a puzzle or *aporia*,"³⁹ for it is nowhere countered or defused. Then again, it is surely significant that Aristotle *nowhere* explicitly speaks of place as a cause. The most plausible way to take these statements together, therefore, would be to regard (i) as describing a *phainomenon* that might *seem* to be the case, but that in the end will turn out to need to be explained in different terms: place does play a role in the explanation of natural motion, though not as a cause. Indeed, three further passages in Aristotle's dialectical discussion of place in *Phys.* 4, 1–5 may be adduced to support an interpretation which denies to place any causal status.

³⁸Just some examples: Bonaventura *Sent.* II, dist. 14, pars I, art. III, qu. 2 thinks of place as a moving cause in speaking of "the force of the place that attracts and of the place that expels" (*virtus loci attrahentis et virtus loci expellentis*). Thomas Aquinas *De physico auditu*, liber IV, lectio I, objects to such a view by claiming that place rather attracts like a final cause (*sicut finis dicitur attrahere*). Some modern scholars have taken natural place in Aristotle to figure as a formal cause (Pierre Duhem); others see it as a final cause (Michael Wolff, Richard Sorabji). For references and further discussion, see Algra 1995, 195–221, esp. 196–197 and 219–221.

³⁹Thus Sorabji 1988, 187, n6.

First of all, as part of his attempt, in chapter 3, to show that place cannot be matter or form, Aristotle uses the following argument:

Text 10. Further, how could a body be carried to its own place, if place was the matter or the form? It is impossible that that which has no reference to motion or the distinction of above and below can be place. So place must be looked for among things which have these characteristics (*Phys.* 4, 210a2-5).

We define locomotion with reference to place, not with reference to matter or form. And to explain what it is for a body to move to its own (i.e. its natural) place, we need to be able to differentiate places in terms of ‘above’ and ‘below,’ but there is no such differentiation to be discerned in form or matter. This passage thus clearly confirms that natural place cannot be identified as a formal or material cause.

Next, at the beginning of chapter 4, where Aristotle offers his revised list of *phainomena* as “the things that are supposed *truly* to belong to it,” he makes clear that the need to be able to differentiate places in terms of ‘above’ and ‘below’ is among these *phainomena*:

Text 11 We assume [...] that all place admits of the distinction of above and below, and each of the bodies is naturally carried to its appropriate place and rests there, and this makes the place either above or below (*Phys.* 4, 211a3-6).

The suggestion is not that natural place helps to explain natural motion as a cause, but that a proper theory of place is able to account for the difference between places that are ‘above’ (where the light elements naturally are or move to) and those that are ‘below’ (where the heavy elements are or move to).

Finally, after having established, in chapter 4, his own account of place as the first immobile limit of the surrounding body, Aristotle explicitly returns to the phenomenon of natural motion in order to show how his own conception of place is able to account for it:

Text 12. Also, it can be explained that each kind of body should be carried to its own place (φέρεται [...] εὐλόγως). For a body which is next in the series and in contact (not by compulsion) is akin, and bodies which are united do not affect each other, while those which are in contact interact on each other. Nor is it inexplicable that each should remain naturally in its proper place (μένει [...] οὐκ ἀλόγως). For parts do, and that which is in a place has the same relation to its place as a separable part to its whole [...] (*Phys.* 4, 212b29-35).

The details of the analogy between places and parts need not concern us here.⁴⁰ What is important in the present context is that, once again, there is no hint that place has any causal status. Instead, we get the more modest suggestion that the Aristotelian concept of place as a surrounding surface allows us to *make sense* (note the use of the terms εὐλόγως and of οὐκ ἀλόγως) of our talking about bodies moving to their own, or their natural, place. It is precisely because the natural motion or rest of the elements is in one way or another dependent on the bodies that are *surrounding* them, that Aristotle’s concept of place as the limit of the *surrounding* body allows for meaningful talk about natural motion. Or, as we might put it, Aristotelian places are not isotropic: it makes a difference whether a body is contained by the

⁴⁰More details in Algra 1995, 205–206 and 216–217.

limit of the *right* body (its natural place) or by the limit of the *wrong* body (a non-natural place). That this is one of the reasons why according to Aristotle his own theory is to be preferred over its most important rival theory (place as independent three-dimensional extension) is further shown by a passage in chapter 8, where the void is being discussed:

Text 13. How can there be such a thing as natural motion, if there are no distinctions within that which is void and infinite? For since it is infinite, there is no above or below or centre; since it is void, there is no distinction between above and below (*Phys.* 4, 215a6-9).

The isotropic void-space of the atomists, it is suggested, makes all talk about natural motion and natural places meaningless.

Of course this leaves us with the question what, then, *is* the cause of the natural motion of the elements, if it is not their natural place. Aristotle's answer does not come in the context of his discussion of place, but only in book 8 of the *Physics* (with some further relevant information being provided in some passages in book 4 of the *On the Heavens*), where he describes the dynamics of natural motion. I will here not go into the details, but will briefly present the theory there outlined.⁴¹ The elements, as inanimate natural objects, have an inner tendency, or *nisus*, to move (or rather, as Aristotle puts it: "a principle of motion, not of moving something else or causing motion, but of suffering it," κινήσεως ἄρχην, οὐδὲ τοῦ κινεῖν, οὐδὲ τοῦ ποιεῖν, ἀλλὰ τοῦ πάσχειν, 255b30-31) which is activated when they are generated in unnatural surroundings, for example when the sun through its heat turns water into air and thus generates air in a place that is suitable for water. This means that there are two main factors involved: the external cause which triggers the whole process by generating the changed substance and the inner tendency of this new substance *to be somewhere*, namely in its natural place. The external generator actualizes the potentiality to acquire a new substantial form (the potentiality of water to become air, and thus light). Along with this new form two further, secondary, potentialities (in the categories quantity and 'where') will be actualized: unless prevented the new mass will expand (quantity) and it will tend to move to a new place, thus actualizing its lightness. In Aristotle's own words:

Text 14. The actuality of lightness consists in the light thing *being somewhere* (που), namely high up: when it is in the contrary place it is being impeded. The case is similar with regard to quantity and quality. But, be it noted, this is the question we are trying to answer: how can we account for the motion of the light things and heavy things to their proper places? The reason for it is that they have a natural tendency to go in a certain direction (πέφυκεν που); and this is what it is to be light or heavy, the former being determined by an upward, the latter by a downward tendency (*Phys.* 8, 255b11-17).

So it is a thing's *being somewhere*, as the actuality of its lightness or heaviness, that constitutes the goal, and thus the final cause of its natural motion, which in turn is a concomitant (a secondary actualization) of a substantial change (with the original external generator acting as the moving cause that sets the whole process going). It

⁴¹ For a fuller discussion of the dynamics of natural motion (including the relevant passages in the *On the Heavens*), see Algra 1995, 195–221.

is important to note what some commentators have missed: ‘being somewhere’ is not the same thing as ‘place.’ We need to get the ‘semantics of natural motion’ right. A light or heavy thing’s ‘being somewhere’ in the sense of being in its natural place is an attribute of the heavy or light thing itself, and as such following upon the actualization of the thing’s new substantial form, just as this change of form may involve a change of size. Place, by contrast, is external to the thing itself. As Philoponus puts it,

Text 15. Also otherwise, final causes are seen to be present in the things of which they are the ends, but place is different from all the things that are in it, having no share in the emplaced object (Philoponus, *In Phys.* 509, 30–510, 2).

We can now see Aristotle’s position more clearly. The claim in chapter 1 of *Physics* 4 that place appears to ‘have a certain power’ should not be taken literally. At any rate, place itself is not a cause, whether final or otherwise. But we still do need the concept of place to specify the ‘somewhere’ in the element’s ‘being somewhere’ that *is* the final cause of its natural motion. And since, as we saw, in the case of natural place this ‘being somewhere’ essentially means ‘having the right surroundings’ (being in its surroundings as a part in a whole), Aristotle’s conception of place (as the surface of the surrounding body) is better equipped, or so he believes, to describe this process than any other conception of place, including the concept of an isotropic empty space defended by the atomists.

Some commentators, such as Simplicius and Philoponus, did in fact recognize that this was Aristotle’s considered view.⁴² We may surmise that later interpretations went astray mainly for two reasons. First, they failed to appreciate the different force of the various claims in *Phys.* 4, in particular of the claims (i) and (ii) as outlined above, against the background of its overall dialectical programme of sifting out *phainomena* and bringing in *aporiai*. Secondly, in interpreting book 4 of the *Physics* they may not have paid sufficient attention to the details of the relevant discussion in *Physics* 8. It is only after reading *Phys.* 8 that we can fully appreciate how the concept of natural place is to play an important role in the explanation of natural motion without this in any way implying that natural places are causes.

2.6 The Problem of the Immobility of Place

At some point in the middle of his account in chapter 4 Aristotle adds the requirement that place should be immobile (βούλεται δ’ ἀκίνητος εἶναι ὁ τόπος, 212a18), so he qualifies his definition of place accordingly: it is not just the limit of the surrounding body, but the first (or nearest) *immobile* limit of the surrounding body. In

⁴²For Simplicius, see *In Phys.* 533–22–25 where it is argued that “if place is not the same as being in a place [...] and the goal of bodies, if anything, is to be in a particular place, then place [itself] is not the final cause.” On Philoponus’ similar position see the reconstruction in Algra 2012, 7–9. On similar qualifications in Averroes and even in Thomas Aquinas, see Algra 1995, 219–220, with n67 and n68.

the same context he adds that a thing located in a mobile container is in a vessel rather than in a place. So a vessel is a mobile place and a place is an immobile vessel. We have seen above (Section 2.4) that the vessel analogy suggests a stability which Aristotelian places actually lack. We are now faced with a *disanalogy* between vessels and places – unlike vessels, places are said to be immobile – which raises problems of its own. In principle the requirement that place should be immobile seems to make sense: after all, places are supposed to figure as an immobile frame of reference against which the change of position of moving bodies can be measured. However, for a theory that defines place in terms of a thing's surroundings it is not so obvious how this can work, for in most circumstances a thing's surroundings consist of mobile substances. Even in the case of the layers of the elements we see that water and air are mobile and in fact moving; the same goes for fire, and for the aether of the heavenly bodies. This is why, faced with the immobility criterion for Aristotelian places, Simplicius (*In Phys.* 604, 3) rhetorically asks: “where, then is such a place to be found and what things are properly in place?”

Aristotle adds to the difficulty by providing a rather obscure example: a boat in a river. Presumably what he has in mind is a boat flowing along with the current of the river. He claims that in such a case the boat is in the flowing water as in a vessel (with respect to which, we may add, it does not move), whereas its immobile place is ‘the whole river’ (with respect to which, we may add, it does move):

Text 16. Just as a vessel is a mobile place, so place is an immobile vessel. That is why, when something is in motion inside a moving object (imagine a boat on a river), it uses its surroundings as a vessel rather than as a place. But place is meant to be immobile. For that reason rather the whole river is the place (ὁ πᾶς μᾶλλον ποταμὸς τόπος), because taken as a whole it is immobile (ἀκίνητος ὁ πᾶς) (*Phys.* 4, 212a14-20).

This passage was much debated by ancient and medieval commentators and various interpretations were put forward.⁴³ Some commentators took the claim about ‘the whole river’ being the place to refer to the immobile river *banks* (as opposed to the mobile, flowing water). But that would be to violate one of the criteria for place which Aristotle had set up himself, *viz.* that it should be contiguous (πρῶτον πέρας) and of the same size (“neither larger nor smaller,” 211a2). In order to save both the contiguity and the immobility of Aristotelian place (*qua* surface of the surrounding body) some later medieval commentators introduced a distinction between material place (the actual surface of the immediately surrounding body, which may be mobile) and formal place (the surrounding surface, considered *in abstracto*, and with its immobility defined in terms of its location in relation to the outer sphere of the heavens).⁴⁴

A modern variant of this theory is presented by Ben Morison.⁴⁵ Whereas the medieval commentators specified the relevant immobile surface as the surface of the immediately containing substance, but taken *in abstracto*, Morison specifies it as

⁴³ For an overview of the problems and solutions, see Grant 1981b; Sorabji 1988, 190; Algra 1995, 222–230.

⁴⁴ On the concepts of formal and material place in the medieval discussions, see Grant 1981b, 63–72.

⁴⁵ See Morison 2002, 155–161.

the containing surface taken as the surface of a larger surrounding entity, or of a group of entities, and in the end – and this is crucial – even as the surface of the surrounding cosmos or universe as a whole. And the cosmos as a whole is immobile; indeed it *could* not even move, because there is nothing outside it.

Now it is not easy to derive this interpretation from what Aristotle actually says: “rather the whole river is the place.”⁴⁶ Moreover, the role which this interpretation accords to the immobility of the cosmos as a whole seems questionable. For the immobility of the cosmos as a whole does not appear to be the kind of immobility we are looking for. We are discussing *intra-cosmic* motion and rest, so we need an immobile reference point *within the cosmos* which allows us to determine whether a particular body is moving or at rest. This is what Aristotle makes clear in the passage immediately following on the river example and the statement of the immobility requirement. For there he goes on to talk about the centre of the world and the inner limit of the sphere of the heavens as ‘above’ and ‘below’ in the basic, or ‘absolute’ sense, because they are both at rest. It is with respect to these two items that we can determine the natural rest or natural motion of the elements. Eudemus explicitly works out this line of thought by specifying that we define immobile places with reference to the heavenly sphere which is immobile in the relevant, *intra-cosmic*, sense:

Text 17. Having said that place must be the limit, in so far as it surrounds, of the surrounding body which was immobile he [i.e. Eudemus] added: “For that which moves is like a vessel, and *that is why we determine places in relation to the heavens*. For they do not change place, except in their parts” (Simplicius *In Phys.* 595, 5–8; part of Eudemus fr. 80 Wehrli).

No sign here of the supposed relevance of the immobility of the cosmos as a whole in this connection. In fact, we may well ask what this relevance could possibly have been. Imagine a situation where the cosmos is surrounded by an infinite empty space and where – as imagined by the Stoic Cleomedes and in medieval thought experiments – it moves or is moved so that it exhibits a rectilinear translation through this space.⁴⁷ Would that change the way in which we define mobile *versus*

⁴⁶Morison, appears to support his interpretation by offering a different translation of the words ὁ πᾶς μᾶλλον ποταμὸς τόπος. He takes them to mean: “rather the whole river is *a* place,” i.e. *one* of the possible ways of identifying the surrounding surface, next, for example, to the identification of this surface as the limit of the surrounding universe. In this reading, in other words, the eventual identification of the surrounding surface as the surface *of the surrounding immobile universe* is thus at least *implied*. However, the fact that the noun τόπος here occurs without the article is perfectly normal Greek idiom for nouns in a predicate position. It does not indicate that Aristotle is talking about ‘a place’ rather than ‘the place.’ Indeed the equivalent of ‘a place’ would probably have been something like τόπος τις. The context seems to suggest that we are being told that it is not the immediately surrounding water, but the river as a whole that is said to be *the* place of the boat.

⁴⁷See Cleomedes *Cael.* 1, 1, 39–43 Todd. More or less the same thought experiment was referred to in the 49th proposition of the famous Parisian condemnation of 1277 issued by bishop Étienne Tempier (which argued against those (Aristotelians) who claimed that God could *not* shift the world) and it was taken up by philosophers such as Thomas Bradwardine, John de Ripa and

immobile substances *within* the cosmos? Wouldn't we still regard the centre and the periphery as fixed reference points for determining *intra-cosmic* motion and rest? Conversely, of what use would the immobility of the cosmos as a whole be, for the purpose of locating things within the cosmos, if we imagine it as containing *no* fixed elements, but consisting of substances which all move helter-skelter all the time? It appears, in other words, that the search for immobile places would in principle not be thwarted by any supposed motion of the cosmos as a whole, whereas it would indeed be thwarted if we had no immobile reference points *within* the cosmos. So it appears that the immobility of the universe is of no help in securing the required immobility of places.

On the basis of these considerations I do not think it very likely that Aristotle's claim that "rather the whole river is the place" refers to the surrounding surface of the boat-sized hole in the cosmos, as Morison suggests. One would rather expect it to refer to the surface of the surrounding river, taken *in abstracto*, i.e. as a geographic entity, following the interpretation of the earlier mentioned medieval commentators (an interpretation which has been taken up some time ago in a slightly different way by Myles Burnyeat).⁴⁸ This surface, we may surmise, derives its immobility from the immobility of the river *qua* geographical entity, which has a fixed position on the immobile earth, which in turn has a fixed position with respect to the heavenly spheres. Nevertheless, even this solution cannot be smoothly extracted from Aristotle's text. It presupposes a rather specific unpacking of the roughshod phrase "the whole river is the place." In addition, it still presupposes a distinction between the surface *qua* surface of the surrounding water and the surface *qua* surface of the surrounding immobile river as a geographical entity – a distinction which is not provided in the context of these particular passages, nor indeed elsewhere in *Phys* 4. Consequently, we need not be surprised that the problem of the immobility of place remained on the agenda in the later ancient and medieval commentary traditions, starting with Theophrastus, who included the fact that "place will be in motion" among the *aporiai* raised by Aristotle's conception of place as a surrounding surface (Simplicius *In Phys.* 604, 5–11; Theophrastus fr. 146 FHSO).

2.7 The Emplacement of the Heavens

Two further *aporiai* raised by Theophrastus in the same context concern the fact that on Aristotle's theory not every body will be in a place – not the sphere of the fixed stars – and that also the heavens (*ouranos*) as a whole will not be in a place. These *aporiai* are related to the text of the first part of chapter 5 of *Phys* 4, which deals

Nicolas Oresme. See Grant 1979, 230–232. In these contexts, the thought experiment was actually used to prove that there is, or can be, an extra-cosmic void space. As Palmerino's Chapter 12 in this volume documents, this thought experiment plays a central role in the *Leibniz-Clarke Correspondence*.

⁴⁸Burnyeat 1984, 230, n15.

with the subject of the emplacement of the (outer sphere of the) heavens (212b8-21), and which is extremely condensed and difficult. Aristotle appears to claim that the *ouranos* is not in a place as a whole, but that it has places for its parts in so far as they move and contain each other (hence, they somehow act as each other's places). The very fact that Aristotle designates his subject as 'the *ouranos*' does not make matters easier. After all, in Aristotle, even in this single context, the word *ouranos* can refer either to (1) the whole cosmos (as a synonym of 'the universe' or *to pan*), or to (2) the outer sphere of the heavens, or to (3) the heavens as a whole. Interpretations of what Aristotle says (and especially of what he means by 'the parts' of the *ouranos*) naturally differ according as one opts for (1), (2) or (3).⁴⁹ Simplicius (*In Phys.* 594, 35–37) actually complains that "it is clear that he was calling either the whole universe or the whole of that which revolves 'the heavens,' but he created much unclarity in the passage before us by meaning sometimes 'the heavens' and sometimes 'the universe'."

But let us leave the problem of the lack of clarity in the presentation for what it is and move on to the underlying conceptual problems. Whether the referent of the word *ouranos* is the outer sphere, or the heavens as a whole, or the cosmos as a whole, it is said not to be in a place. One *could* argue that these three entities all do indeed lack a container, so that they are not 'in something' in the required sense and that they exhibit no locomotion apart from rotation, so that it is hardly a problem if we have to conclude that they are not in a place. We have evidence that this was the interpretation opted for by Alexander of Aphrodisias, in his now lost commentary. He added that it is not impossible for something to exist without being in a place, because being in a place is not an essential property (belonging to the definition) of a body.⁵⁰ We may note that this might be a way to take up Aristotle's repeated suggestion that not everything that exists, but only mobile substances, are in a place.⁵¹ The additional claim to make would then be that the *ouranos* is not a mobile substance in the relevant sense, because it exhibits no rectilinear motion, whereas its rotation of its parts does not count as locomotion properly speaking and thus does not need places as a frame of reference.⁵² However, in chapter 5 Aristotle seems reluctant to take this line. Despite everything, he now seems so much swayed by the "universally accepted" (208a39) idea that that all existing things are somewhere as to want to show that the *ouranos* for sure does have a place, even if only in a derivative sense, and he also appears intent on maintaining the idea that its rotation, or the rotation of its parts involves places. And indeed, how could rotation be explained without invoking some conception of place?

⁴⁹The translation by Waterfield and Bostock 1996, for example opts for (1) and takes the whole of 212a31–b22 to be about the (place of the) universe. Hussey 1983, 119 rather assumes that Aristotle is moving between the various senses of *ouranos*, as indeed does Philoponus in the various sections of his commentary, on which see Algra and Van Ophuijsen 2012, 118, n201, n202, n203.

⁵⁰This is how Averroes describes Alexander's position in his *Long Commentary*, as paraphrased by Lettink 1994, 308.

⁵¹On which see above, n24.

⁵²This additional claim was indeed made by Alexander, on which see below, the text to n56.

Accordingly, his own solution in the obscure first part of chapter 5 seems to come down to two claims:

- (i) the *ouranos*, in whatever meaning of the word we have in mind here, is indeed in place, but only incidentally, in virtue of the fact that its parts are in place; and
- (ii) the kind of locomotion involved is rotation; this involves the idea that its parts exchange places without the *ouranos* as a whole doing so.

So the *ouranos* is said not to exhibit locomotion in its own right; only its parts change place. And thus the *ouranos* is not in place in its own right, but only incidentally, in virtue of the fact that its parts, presumably all of them, *are* in place. But does this work? In particular – and here we are back at the problem we started with – what is the *ouranos* in this connection and what, accordingly, are the parts that are moving and emplaced?

The commentary tradition comes up with two ways in which this could be worked out, each of them equally unsatisfactory. One option is to take this passage to be about the heavens as a whole, in which case the reference to the ‘parts’ and their respective motions is taken to be to the nested spheres. The problem with this is that it does not leave us with a place which can serve as the measure of rotation; for during its rotation each inner sphere remains in the same outer sphere. Secondly we are left anyway with the problem of the outermost sphere, which on this interpretation should still be taken not to be in a place at all, for it has nothing to surround it from outside, unless we take it to be located, exceptionally, not in a concave *surrounding* surface, but in the convex surface of the *inner* sphere of Saturn, as Themistius appears to have suggested.⁵³ Some Arabic commentators extended this solution from the sphere of the fixed stars to *all* celestial spheres. Thus Ibn Bajja (Avempace), basically followed by Ibn Rushd (Averroes), claims that a surrounding surface on the outside figures as the place for bodies exhibiting rectilinear motion, whereas bodies that exhibit rotation (i.e. the heavenly spheres) have as their place a surrounding surface on the inside.⁵⁴ Philoponus knows Themistius’ solution, but objects that such a place for the sphere of the fixed stars (the outer surface of the sphere of Saturn) would not be of equal size (as demanded by Aristotle’s own constraints on the theory, 211a1-2).

The second option mentioned in the commentary tradition is to take the passage to be about the *outer sphere*, i.e. the sphere of the fixed stars, alone, and to take the reference to the parts, which in so far as they are surrounded by each other supposedly *are* emplaced, to be to the continuous parts of this outer sphere itself.⁵⁵ The problem with his interpretation is that on Aristotle’s own line of thought, and as we noted above in Section 2.3, the parts of a continuous whole are not in a place, properly speaking. Moreover, in the process of the rotation of the outer sphere these parts do not in fact change place rela-

⁵³ Cf. Themistius *In Phys.* 121, 1–5.

⁵⁴ For the arguments, see Lettink 1994, 297 (Ibn Bajja) and 309–310 (Ibn Rushd).

⁵⁵ See, for example, Philoponus *In Phys.* 594, 5–10; Simplicius *In Phys.* 593, 13–15 with reference to Alexander of Aphrodisias.

tively to each other: they rotate *along with* each other. As such they, or their surfaces, can hardly constitute the places that measure the rotation of the sphere.

Once again, a possible way out for an Aristotelian might be to claim that locomotion as such is restricted to the kind of rectilinear motion that we witness in the sublunary world, and that only substances in that region are the sort of things that need places to explain their motions. In that case the fact that the outer sphere and the heavens as a whole are not in place, although they rotate, could be seen as no longer problematic, provided that rotation would no longer be treated as a subspecies of locomotion, but as a separate species of change in its own right (next to locomotion, qualitative change etc.), one which does not require a place to start from, nor a place to move into. And this indeed appears to have been the option chosen by Alexander of Aphrodisias.⁵⁶ However, as Simplicius notes in the first part of his *Corollary*, there are many passages where Aristotle emphatically does claim that rotation is in fact one of the subspecies of locomotion or *kinêsis kata topon*.⁵⁷ So he would have to revise that aspect of his theory to be able to take Alexander's line of approach.

All in all, then, the first part of chapter 5 appears to reveal that Aristotle did not manage to really sort out some rather crucial aspects of his theory of place: whether and to what extent we should be committed to the truth of the first premises of Zeno's paradox of place, what should be considered to be the sort of things that need places, and whether or not rotation is a species of locomotion that requires places to measure it.

In his *Corollary on Place* Philoponus has this to say on the attempts by the commentators to save this part of Aristotle's account:

Text 18. Hence, when they try to explain how the sphere of fixed stars could move in place when it is not in place, they throw everything into confusion rather than saying anything clear and persuasive. For they cannot deny that the sphere moves in place, because they cannot even make up a story about what {other} kind of motion it would have. However, they cannot explain what is the place in respect of which it moves, but like people playing dice they throw out first one account, then another, and through them all they destroy their original assumptions and agreements. For by concealing the weakness of his account with obscurity, Aristotle licensed those who want to change their stories however they wish (Philoponus, *In Phys.* 565, 12–21).

Even Aristotle's staunch defender Ben Morison has to conclude that the problem of the emplacement of the *ouranos* is "a problem which is recognized and tackled by Aristotle, but unsatisfactorily."⁵⁸

2.8 Conclusions

Physics 4, 1–5, as we have seen, is a difficult text in many respects, and the conception of place which it eventually works out is not in all respects a viable or very useful element in any theory of locomotion. In the present paper I have discussed

⁵⁶ See Simplicius *In Phys.* 595, 20–21; see also 589, 5–8; 602, 31–35.

⁵⁷ Simplicius *In Phys.* 603, 4–16.

⁵⁸ Morison 2010, 85.

five of the main exegetical or conceptual problems with which this text has confronted its later readers, starting with Aristotle's pupils Eudemus and Theophrastus.

These problems, as we saw, are not all of the same type, and in the end not all of the same weight and importance. The problem of the precise role of natural places in the explanation of the natural motion of light and heavy elements (discussed in Section 2.5) turns out not to be so much of a conceptual or philosophical problem after all, but rather a problem of presentation. One has to pull the pieces together, but the emerging picture makes sense, once we realize that the claim that place seems to have 'a certain power' need not be taken at face value, that Aristotle quite emphatically states that it is not one of the four causes, and that the dynamics of natural motion as sketched in *Physics* 8 isolates other causal factors (among which we find the element's 'being somewhere,' not its place, labeled as a final cause).

The problem of the unsatisfactory way in which the rival conception of place as three-dimensional extension is rejected (Section 2.3) and the problem of how places can figure in the explanation of locomotion (Section 2.4) arguably lose much of their edge, once we look at things from an Aristotelian perspective. Admittedly, the arguments against the conception of place as an independent three-dimensional extension do not work as they stand, but what seems to be the underlying problem – the inconceivability of such an extension within the context of Aristotle's substance ontology (and the concomitant theory of the categories) – was a real one for Aristotle and many of his followers. We may also admit that Aristotelian places are hopeless if we want to explain the trajectory of a body moving from place A to place B. However, in many contexts the fact that the theory is able to identify place A at the beginning and place B at the end of the trajectory arguably lends it sufficient explanatory power for an Aristotelian.

However, the problem of specifying the required immobility of Aristotelian places (Section 2.6), and the problem of clarifying whether and in what sense the outer sphere of the heavens, the heavens as whole, or the cosmos as a whole have a place, both represent aspects of the theory that Aristotle himself appears not to have thought through sufficiently. In everyday contexts we may for all practical purposes think it good enough to say that a boat moving along with the current in a river does not move with respect with the immediately surrounding water, but does move with respect to 'the river as a whole.' But once we want to translate this 'the river as a whole' in the more technical language of Aristotelian places as contiguous and immobile surfaces we run into problems and are forced to think up solutions (like the medieval 'nominalist' solution of taking these surfaces *in abstracto*) of which there is not a trace in the actual text of *Physics* 4, 1–5. When it comes to the problem of the emplacement of the *ouranos* (Section 2.7), in whatever sense of the word we take it, it appears that Aristotle has not managed to make clear to what extent precisely he is committed to the first premises of Zeno's paradox, and that he has failed to make clear in what sense the parts of the *ouranos* are to be thought of as being in a place, in what sense its rotation is or is not a species of locomotion and in what sense the explanation of rotation requires a place of the type developed in *Physics* 4 at all. Perhaps all this could be resolved, for example along the lines suggested by Alexander, but no such resolution is forthcoming from chapter 5 of *Physics* 4.

In spite of all this, it is fair to say that *Physics* 4, 1–5 is also an intriguing, rich and highly original text – the more so since it is the first in its kind. Right at the beginning of the account (208a34–36) Aristotle himself highlights this point by claiming that, apart from the inherent difficulty of the subject, a proper discussion is hampered by the fact that thinkers before him have neither shown any awareness of the problems inherent in thinking about place (οὐδὲν [...] προηπορημένον), nor offered any good insights (οὐδὲν [...] προηπορημένον). Certainly, later on he is willing to admit that “although everyone assumes that there is such a thing as place, Plato is the only one who tried to say *what* it is” (209b15–16). But in Aristotle’s view Plato’s account in the *Timaeus* has not been successful in doing so because it remains fundamentally unclear, and from a purely physical point of view he is surely right.⁵⁹ And so Aristotle’s *Physics* 4, 1–5 stands out, despite all its problematic features, as the first systematic discussion of various possible conceptions of place, of some of the problems inherent in thinking about place, and of new and necessary conceptual distinctions.

References

- Algra, Keimpe. 1992. Place in Context: On Theophrastus fr. 21 and 22 Wimmer. In *Theophrastus: His Psychological, Doxographical and Scientific Writings*, ed. William Fortenbaugh and Dimitri D. Gutas, 141–165. New Brunswick: Transaction Publishers.
- . 1995. *Concepts of Space in Greek Thought*. Leiden: Brill.
- . 2012. Introduction. In *Philoponus On Aristotle Physics 4. 1-5*, ed. Keimpe Algra and Johannes van Ophuijsen, 1–12. Bristol: Bristol Classical Press.
- . 2014. Aristotle’s Conception of Place and Its Reception in the Hellenistic Period. In *Space in Hellenistic Philosophy*, ed. Graziano Ranocchia, Christoph Helmig, and Christoph Horn, 11–52. Berlin: De Gruyter.
- . 2015. Place (*M* 10, 1–36). In *Sextus Empiricus and Ancient Physics*, ed. Keimpe Algra and Katerina Ierodiakonou, 184–216. Cambridge: Cambridge University Press.
- Algra, Keimpe, and Johannes van Ophuijsen. 2012. *Philoponus On Aristotle Physics 4, 1–5*. Bristol: Bristol Classical Press.
- Bergson, Henri. 1889. *Quid Aristoteles de loco senserit*. Paris: Alcan.
- Burnyeat, Myles. 1984. The Sceptic in His Place and Time. In *Philosophy in History: Essays on the Historiography of Philosophy*, ed. Richard Rorty, Jerome Schneewind, and Quentin Skinner, 225–254. Cambridge: Cambridge University Press.
- Desclos, Marie-Laurence, and William Fortenbaugh. 2011. *Strato of Lampsacus: Text, Translation and Discussion*. New Brunswick: Transaction Publishers.

⁵⁹This is a subject not discussed in this paper. But the long and the short of it is that Aristotle thinks that (i) the *Timaeus* leaves it fundamentally unclear whether the ‘receptacle’ can be seen as a separable self-subsistent space in which *phenomenal bodies* are and move around in the strictly local sense of ‘being in,’ or rather an inseparable constituent factor of the world in which immanent *qualities* are, in the non local sense of ‘being in’ which we might call ‘inherence;’ and that (ii) its identification of space or place with matter is of no use in a physical context dealing with the locomotion of substances. For a vindication of Aristotle’s critique of the *Timaeus* and its ‘receptacle,’ with a discussion of the relevant texts, see Algra 1995, 110–117.

- Furley, David, and Christian Wildberg. 1991. *Philoponus, Corollaries on Place and Void – With Simplicius, Against Philoponus on the Eternity of the World*. London: Duckworth.
- Gottschalk, Hans. 1998. Theophrastus and the Peripatos. In *Theophrastus: Reappraising the Sources*, ed. Johannes van Ophuijsen and Marlein van Raalte, 281–299. New Brunswick: Transaction Publishers.
- . 2002. Eudemus and the Peripatos. In *Eudemus of Rhodes*, ed. Istvan Bodnár and William Fortenbaugh, 25–37. New Brunswick: Transaction Publishers.
- Grant, Edward. 1979. The Condemnation of 1277: God's Absolute Power and Physical Thought in the Late Middle Ages. *Viator* 10: 211–244.
- . 1981a. *Much Ado About Nothing: Theories of Space and Vacuum from the Middle Ages to the Scientific Revolution*. Cambridge: Cambridge University Press.
- . 1981b. The Medieval Doctrine of Place: Some Fundamental Problems and Solutions. In *Studi sul XIV secolo in memoria di Anneliese Maier*, ed. Alfonso Maierù and Agostino Paravicini Bagliani, 57–79. Rome: Edizioni di Storia e Letteratura.
- Hussey, Edward. 1983. *Aristotle: Physics Books III and IV*. Oxford: Clarendon Press.
- Irigaray, Luce. 1998. Place, Interval: A Reading of Aristotle, *Physics* IV. In *Feminist readings of Aristotle*, ed. Cynthia A. Freeland, 41–58. University Park: The Pennsylvania State University Press.
- Lettink, Paul. 1994. *Aristotle's Physics and its Reception in the Arabic World: With an Edition of the Unpublished Parts of Ibn Bajja's Commentary on the Physics*. Leiden: Brill.
- Morison, Ben. 2002. *On Location: Aristotle's Concept of Place*. Oxford: Oxford University Press.
- . 2010. Did Theophrastus Reject Aristotle's Account of Place? *Phronesis* 55 (1): 68–103.
- Owen, Gwyl. 1961. Tithenai ta phainomena. In *Logic, Science and Dialectic, Collected Papers in Greek Philosophy*, ed. Martha Nussbaum, 239–251. London: Duckworth.
- Rashed, Marwan. 2011. *Alexandre d'Aphrodise: Commentaire perdue à la Physique d'Aristote (livres IV-VIII). Les scholies byzantines: Édition, traduction et commentaire*. Berlin: De Gruyter.
- Sambursky, Shmuel. 1982. *The Concept of Place in Late Neoplatonism*. Jerusalem: The Israel Academy of Sciences and Humanities.
- Sharples, Robert. 1998. Theophrastus as Philosopher and Aristotelian. In *Theophrastus: Reappraising the Sources*, ed. Johannes van Ophuijsen and Marlein van Raalte, 267–281. New Brunswick: Transaction Publishers.
- . 2002. Eudemus' Physics: Change, Place and Time. In *Eudemus of Rhodes*, ed. Istvan Bodnár and William Fortenbaugh, 107–126. New Brunswick: Transaction Publishers.
- . 2011. Strato of Lampsacus: The Sources, Texts and Translations. In *Strato of Lampsacus: Text, Translation and Discussion*, ed. Marie-Laurence Desclos and William Fortenbaugh, 5–231. New Brunswick: Transaction Publishers.
- Sorabji, Richard. 1988. *Matter, Space and Motion*. London: Duckworth.
- . 1990. The Ancient Commentators on Aristotle. In *Aristotle Transformed*, ed. Richard Sorabji, 1–30. London: Duckworth.
- . 2004. *The Philosophy of the Commentators 200-600 AD: A Sourcebook*, vol. 2, *Physics*. London: Duckworth.
- Todd, Robert. 2003. *Themistius, On Aristotle's Physics 4*. London: Duckworth.
- Urmson, James O. 1992. *Simplicius, On Aristotle's Physics 4, 1–5 and 10–14*. London: Duckworth.
- Urmson, James O., and Lucas Siorvanes. 1992. *Simplicius, Corollaries on Place and Time*. London: Duckworth.
- Waterfield, Robin, and David Bostock. 1996. *Aristotle's Physics*. Oxford: Oxford University Press.