

TRACING THE DYNAMICS OF ERRORS. ALBERT THE GREAT AND THE PRESOCRATICS ON THE VOID

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Abstract: This article brings to light a complex ‘dynamic of errors’ which Albert, in his Commentary on Aristotle’s *Physica*, uses to elaborate on the problem of the void. In his analysis, the Dominican philosopher addresses issues such as the void’s definition, its existence, or its relationship to motion, while stating his own position on the matter, which heavily relies on Aristotle. Albert argues that the errors made by certain pre-Socratic philosophers (in particular, Anaxagoras, Leucippus, Democritus, Xuthus, and Pythagoras) contributed to the formation of flawed doctrines in the Middle Ages, such as that of Avempace (alongside whom Albert mistakenly places Avicenna). By identifying and exposing ‘errors’ Albert creates a valuable vantage point to address the problem of the void, whilst emphasizing the significant role played by pre-Socratic thinkers in the emergence and evolution of scientific discourse on the issue.

Keywords: Albert the Great; *Physica*; void; Presocratics; mistake; Avempace.

1. Introduction: A Brief History of the Void

As James Owen Weatherall writes in *Void: The Strange Physics of Nothing*:

Newton’s picture of bodies in space traces back to the ancient Greeks, most notably Democritus and Epicurus, who developed variants of a theory they called atomism. [...] Newton believed that bodies have smallest parts, which could not be further divided, so he believed in something like the Ancients’ atoms. [...] If you imagine sitting at a café with a friend, it is very natural to think that there’s you, your friend, and in between, some distance of space where there’s nothing. [...] If this idea does seem intuitive, it is because we are brought up in a world shaped by three and a half centuries of Newtonian science. But for millennia before that, the idea was extremely controversial.¹

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1 WEATHERALL 2016, 16–17.

The problem of the existence of the void officially became part of scientific discourse with the emergence of atomistic theory. Leucippus (500 BCE) was the first to hypothesize that matter is composed of indivisible, fundamental units called 'atoms', which can move within a necessarily empty space. According to him, this 'vacuum' or void was necessary to enable change and motion. His disciple, Democritus (460–370 BCE), built upon this idea, proposing an infinite universe made of empty space inhabited by solid, indivisible particles of different shapes and sizes, all in motion.

The Stoics also supported the idea of empty space. However, unlike the atomists, they believed that the void existed beyond the material world, whose contents, animated and unified by *pneuma*, could not be spread out.

Later, the Latin poet Lucretius (98–55 BCE), a prominent advocate and interpreter of atomism, discussed the necessity of the void in his cosmological poem *De Rerum Natura*: "[...] if there were not void, would not so much be robbed and balked of restless motion, but rather could in no way have been born at all, since matter would on every side be in close-packed stillness."²

The problem of the void also came up in Empedocles' doctrine of pores. Should such pores, understood as channels through which effluences pass, be considered empty or full? Empedocles responded by denying the existence of a void: "in the whole there is no void" (DK31B13); Philoponus, on the other hand, claimed that pores are filled with a fine substance, like air.³

Aristotle⁴ disagreed with the atomists' concept of the void and instead embraced Empedocles' idea that the space of the universe was not empty but filled with an amorphous substance, *aether*. For Aristotle, the notion of a void that could not be defined, categorized, or perceived by the senses was inconceivable. Moreover, the void would be uniform and symmetrical, lacking any spatial differentiation and rendering distinctions such as up and down, left and right, or front and back meaningless. This absence of spatial orientation would make any type of movement impossible. Even if an object could theoretically move within a void, it would encounter no resistance or obstacles, resulting in uni-

2 LUCRETIUS 1921 (38, l. 329). See also THUAN 2017, 44–45.

3 Cf. CASERTANO 2009, 121.

4 About Aristotle's discussion of the void, see FURLEY 1989.

form straight-line motion, an outcome that the Greek philosopher considered absurd.⁵

Aristotle presented another argument: if an object stopped moving in a perfectly homogeneous void, why would it stop at one point rather than another? Furthermore, he affirmed that, if the void were ‘something’ and an object were placed in it, then two ‘somethings’ would be occupying the same space, which is impossible. Therefore, a void could not exist beyond the limits of the material universe. Aristotle’s concept of *horror vacui*⁶ dominated scientific discussions about the void for the next two millennia.⁷

During the 13th and 14th centuries, several positions regarding the void emerged, each with its own theological implications. Some thinkers adopted the Stoic notion of a void beyond the universe of things: God, being omnipresent, was found in every point of the void. But was the void finite or infinite? According to the Dominican Thomas Aquinas, the Earth was the center of everything, and God resided in the Empyrean.

However, to confine God within a finite universe and in a single place would cast doubt on God’s boundless power. In 1277, Étienne Tempier condemned thesis 49 that the void could not exist, since denying its existence would imply questioning divine omnipotence.⁸ Yet, in 1325, this decree was revoked, and Aristotelian teachings prevailed.

As Pasquale Porro puts it, “in general, scholastic physics adhered to the Aristotelian rejection of the void, but not without some hesitation, due to the need to safeguard divine omnipotence in some way: although excluded from the domain of *potentia ordinata*, the possibility of a void survived, to varying extents, in that of the *potentia absoluta*.”⁹

5 Xuan Thuan reminds us that one of Newton’s laws of motion, expressed in his *Philosophiæ Naturalis Principia Mathematica* (1687), states that objects that encounter no resistance move in a constant straight line. See THUAN 2017, 46–47.

6 The notion of *horror vacui* refers to a theory formulated by Aristotle, which states that nature rejects the existence of vacuum (*natura abhorret a vacuo*) and thus constantly fills it; every gas or liquid continually seeks to occupy every space, without leaving any empty portions.

7 See THUAN 2017, 47–48.

8 See THUAN 2017, 50–51. Regarding the articles condemned by Tempier in 1277, see PICHÉ 1999, 97; HISSETTE 1977, 118–120. See also GENZ, HEUSCH 1999, 90; BARROW 2000, 81.

9 PORRO 1996, 315: “In generale, anche la fisica scolastica si attiene al rifiuto aristotelico del

For some Scholastics, there was no way to produce the void: if logic did not conceive its existence, God could not transcend logic, and therefore could not create the void. For Robert Grosseteste and Roger Bacon, for instance, real void could not exist.¹⁰ In line with Aristotle and Averroes, Albert the Great also agreed with those who denied the void, especially the possibility that the void, lacking resistance or external impediments, could cause local motion.

This article highlights the ‘dynamic of errors’ which Albert uses to elaborate on the problem of the void.¹¹ He tackles various related issues such as the void’s definition, its existence, and its relationship to motion, while always reiterating his strong Aristotelian stance.

2. Albert the Great and the Void

2.1 Anaxagoras’ Error

In the second treatise of Book IV of his Commentary on Aristotle’s *Physica*, Albert investigates the concept of the void and raises the question of its existence.

vuoto. Ma non senza qualche limitazione, dovuta all’esigenza di salvaguardare in qualche modo l’onnipotenza divina: esclusa senz’altro dall’ambito della *potentia ordinata*, la possibilità del vuoto sopravvive – in misura diversa – in quello della *potentia assoluta*.” See also PORRO 1996, 35–36.

10 For a detailed analysis of the scholastic positions on the real existence of the void, see GENZ, HEUSCH 1999, 92, 94.

11 In my article, I support a methodological hypothesis introduced by Nadia Bray in a study entitled *For a Theory of the Stemmatics of Conceptual Errors in Albert: The Pre-Socratics in Albert’s Criticism of David of Dinant*, whose text I had the opportunity to read. The conference was held in Paris as part of the event *Materialism in the Middle Ages and Renaissance, 19–20 September 2024, CNRS-SPHERE (Paris)*, organized by A. Robert. In studying Albert’s critique of David of Dinant’s materialism, Bray focused on the constellation of different pre-Socratic sources associated with David, arguing that they show a solid internal coherence: “Starting from the recognition of specific errors and errors common to different philosophical traditions, Albert reconstructs a sort of stemmatics of the theories discussed [...] The instrument developed by Albert,” she suggests, “has a function: just as in philology, a *stemma codicum* is functional to the eventual ascribing of a new manuscript witness to one of the families represented by the *stemma*, in the same way, the stemmatic by which we can describe the relationship between errors common to different doctrines, which Albert reconstructs, is the instrument by which one can check the scientific theories of the past, the present and the future. Starting from a coherent and privileged system, in this case, that of Aristotle’s philosophy, such instrument let us measure the coherence of another complex theoretical system, made up of related theses and possible corollaries, to refute or correct it.”

In case the void exists, he investigates how it can be supposed to exist and how it can be defined.¹²

Albert opens his discussion with the theory of the ancient *physici*, who classified the void under the category of space (*locus*), identifying it as a place or a container (*vas*). For the *antiqui*, the full is a space or container that contains something visible and tangible, while an empty receptacle is a void.¹³

Revisiting Aristotle's position, Albert presents the view of certain thinkers (*quidam*), who seek to demonstrate that the void is non-existent.¹⁴ However, they do not universally (*universaliter*) prove the nonexistence of the void; instead, they counter the claims of those who assert its existence through specific experimental observations (*particulariter*), ultimately concluding that the void is nothing. In this approach, they fall into the same error as Anaxagoras,¹⁵ who, in attempting to deny the existence of the void, argued that matter is never empty but always contains a latent form within itself.¹⁶ These thinkers (*quidam*) attempt

12 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (230,49–54): “Eodem autem modo accipiendum est per intellectum quod physici est considerationem facere de vacuo, sicut suum est considerare de loco. Et eadem problemata quaerenda sunt de vacuo, quae quaeruntur de loco, quae sunt tria, si est scilicet aut non est, et si ponitur esse, quomodo est et quid est.”

13 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (230,60–71): “Cum ergo locus sit de consideratione physici, erit et vacuum de consideratione physici. Hoc autem manifestum est ex hoc, quod physici ponunt vacuum esse in genere loci, quia ponunt esse vacuum sicut locum quendam et vas quoddam. Videtur autem plenum et vacuum et locus idem esse subiecto, sed differunt secundum esse et diffinitionem, quia antiqui dixerunt esse plenum id quod est ut locus et vas, cum habet in se grave aliquid et grossum, visibile et tangibile, cuius ipsum est susceptivum, cum autem privatum est illo, tunc dicebant idem receptaculum esse vacuum.”

14 GRANT 1981, 3: “The atomist identification of real, albeit empty, space with nothing guaranteed that the history of spatial concepts would, from its inception, be rooted in paradox and enigma.” See also GENZ, HEUSCH 1999, 66.

15 CASERTANO 2009, 162: “Per quanto riguarda la fisica terrestre, Anassagora dipende molto dalla scienza ionica. Per lui la terra è piatta, librata nell’etere, perché non esiste il vuoto, è cava e contiene acqua nella cavità.”

16 In this regard, particularly noteworthy is Nadia Bray’s contribution, wherein she writes: “Il principale limite imputato ad Anassagora da Aristotele e sottolineato da Alberto consiste nella generale imprecisione, tanto concettuale quanto espositiva, delle sue dottrine, supposta all’origine di fuorvianti teorie circa la natura dell’intelletto, dei suoi rapporti con l’anima umana e della sua relazione con la materia [...] quella particolare concezione ilemorfica della realtà che Aristotele, criticandola per poi correggerla, ascrive appunto ad Anassagora e che, secondo Alberto, si distingue dall’ilemorfismo aristotelico per il fatto di intendere le forme presenti nella materia, non allo stato potenziale, bensì attuale [...]. La negazione della trascendenza della forma è in fondo incompatibile con la teologia cristiana.” See BRAY 2020, 46, 51. Also, see ALBERTUS MAGNUS 1987, *Physica*, 2, 1, 1 (15,35–55).

to prove that the void does not exist but they do so *particulariter*, by performing experiments with containers that appear empty but are actually filled with air, thereby demonstrating that air is something, not nothing.¹⁷

For Albert (and Aristotle), there are errors in both the Anaxagorean doctrine of *latentia formarum*¹⁸ and Anaxagoras' objection to the thesis supporting the existence of the void, defined as a space devoid of any visible or tangible body. Anaxagoras argued that air, though neither visible nor tangible, is nonetheless something that occupies space and cannot be equated with nothingness.

It is very likely that Albert found trace of Anaxagoras' line of thought in Avicenna's work *Sufficientia*, where we read:

The first thing that incited the imagination to believe in the void was air. [...] Moreover, their initial opinion about existing bodies was that they are perceptible by sight, whereas whatever is not perceptible by sight was supposed not to be a body and so, then, must be nothing. Therefore, it was imagined, in the case of air, not that it was something that fills but that it was nothing. On their initial view, then, the air in the container was imagined to be void intervals, not some thing.¹⁹

For Albert, as well as for Aristotle, in opposing the thesis of the supporters of the void, one need not merely prove that space is filled with air and that air is something (as Anaxagoras claims). Instead, one must argue that no empty space exists either separate from or between bodies, nor any empty space beyond the world. Accordingly, it would be more appropriate to prove that a void of such kind does not exist; and this should be done by disproving the positions

17 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (231,10–24): “Sunt igitur quidam qui volunt ostendere vacuum nihil esse; et non probant generaliter vacuum non esse, sicut intendunt universaliter affirmare vacuum illi qui ponunt vacuum esse, sed potius contradicunt particulariter et ostendunt quoddam vacuum non esse, quod illi dicebant esse vacuum, et ex illo universaliter volunt affirmare, quod nihil est vacuum. Et ideo peccant peccato Anaxagorae, qui cum deberet ostendere nihil esse vacuum, conatus est ostendere materiam non esse vacuum, sed potius in se latentem habere formam. Et ideo non eodem modo argumentantur, quo illi dicunt esse vacuum, sed ferunt contra eos contradictionem particularem ostendentes vasa esse plena, quae vacua esse dicebantur ab antiquis; probant enim quod aer aliquid est et non nihil [...]” Regarding Anaxagoras' experiment, see BARROW 2000, 65: “Anaxagoras concluded that we have no observational evidence for the existence of empty space.” See also SORENSSEN 2022, 93–94.

18 See BRAY 2020, 33–51.

19 AVICENNA 2010, II, 6, 11 (167). In this regard, see LAMMER 2018, 327–328.

of Democritus and Leucippus, who claimed that no body is truly continuous but is instead interrupted by many voids (micro-voids), and refuting the Pythagoreans' view that the void is something separate from bodies, an infinite continuous space beyond the heavens (macro-void).²⁰

Here, Albert presents the arguments of the supporters of the void, who claim that without the void local motion would not be possible, as it involves movement from one place to another, either towards the full or the empty. According to this reasoning, motion could not occur toward what is already full, because nothing else can be contained therein, and because, in such a case, two bodies would occupy the same place, contradicting the property of the impenetrability of matter. Therefore, the only remaining possibility for movement would be toward the void. Yet, Melissus and Parmenides (Aristotle mentions only Melissus, while Albert includes both) deemed this argument inappropriate: they argue that, if a body (*ens*) moves, it could not move toward the full for the reasons stated above, nor toward the void, which does not exist. Hence, for Melissus and Parmenides, the *ens* is one and immobile.²¹ Albert does not directly chal-

20 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (231,55–54; 232,1–19): “Sunt autem aliis his oppositum dicentes, in eo etiam quod particulariter vacuum esse affirmant, quia dicunt quod vacuum est spatium, in quo nullum corpus grossum sensibile est ad visum et ad tactum. Opinantur enim, quod omne quod est, sit corpus grossum et sensibile, quod resistit tactui et terminat visum. Et dicunt, quod in quo nullum corpus tale est, quod hoc est vacuum. Cum autem illi qui negant esse vacuum, volunt contradicere illis qui dicunt vacuum esse aliquid, non oportet probare, quod aer sit aliquid, sed oportet adducere rationes ad hoc, quod nullum esset spatium vacuum separatum a corporibus, sive infra caelum sive extra, nec etiam quod sit spatium vacuum infra corpora, quod sit actu. Oporteret igitur probare eos, quod tale vacuum non sit, quod captat totum mundum, et quod nullum corpus sit vere continuum, sed interceptum multis vacuis, sicut dixerunt Democritus et Leucippus et alii multi physiologorum. Aut oporteret eos probare et ostendere, si vacuum sit aliquid, quod sit extra omne corpus separatum extra caelum, cum sit spatium continuum infinitum extra caelum existens, sicut dixit Pythagoras.”

21 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (232,25–57) : “et hoc est, quod motus secundum locum non erit, si vacuum non esse ponatur; motus autem secundum locum, qui destruitur non posito vacuo, est loci mutatio et augmentum et decrementum [...]; non enim videbitur loci mutatio esse, quocumque modo fiat, nisi sit vacuum; id enim quod quocumque modo mutat locum, aut movetur ad plenum aut ad vacuum. Sed ad plenum moveri non potest, quia plenum nihil amplius recipere potest. Si vero recipiat, tunc erunt duo corpora in eodem loco, quod esse non potest [...]. Et haec omnia inconvenientia putabant sequi Melissus et Parmenides, si poneretur ens moveri, et ideo dixerunt ens esse unum immobile; si enim moveatur, cum his rationibus non possit moveri ad plenum, necesse est esse vacuum, ut dicunt. Vacuum autem non dicebat esse Melissus, et ideo dixit ens esse immobile.”

lenge Parmenides and Melissus, despite their denial of movement.²² Instead, he focuses more on the correct conclusion: that the void does not exist.

Aristotle and Albert also present the position of the *physici*, including the ancient Greek philosopher Xuthus. According to this group, the processes of condensation and rarefaction, which enable movement, could not be explained without the void. Moreover, the voids present within natural bodies, referred to as ‘pores’, also facilitate quantitative motion (*augmentum*) and nourishment. Food, they argue, is a body that enters an animal’s empty body, which cannot be full, as two bodies cannot occupy the same space. To support this claim, they conduct an experiment: a jar filled with ashes can hold as much water as an empty jar due to the voids separating the ash particles.²³

The Pythagoreans²⁴ also affirm that beyond the heavens and the world exists an infinite void. They propose that the heavens resemble a great living being that, in the act of breathing, draws the void from the infinite emptiness. This

22 In the lecture delivered in Paris at Université Paris Cité on September 19, 2024 (see footnote 11), Nadia Bray highlighted Albert’s explicit view regarding the doctrine of Parmenides and Melissus on motion: “Parmenides’ position, in which the one is finite, indivisible, simple, immutable, and immobile, has a solid internal coherence for Albert; precisely because it excludes motion, it is not a physical theory. An example of deviation from orthodox monism is represented by Melissus’s version, which is incorrect in two ways: it deduces from the ungenerated nature of the one its infinity concerning time and mistakenly extends this to the category of quantity; furthermore, it deduces from quantitative infinity the negation of spatial movement and thus immobile. Albert presents this idea while questioning its validity. The denial of motion, upheld by Melissus, completely overlooks the existence of qualitative motion (*alteratio*), which, from an Aristotelian perspective, is compatible with the infinite.” See ALBERTUS MAGNUS 1987, *Physica*, I, 1, 2, 1; *Physica*, I, 1, 2, 6.

23 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (233,14–27): “Amplius autem, omnibus istius sectae physicis videtur fieri augmentum et nutrimentum per vacuum, quod est intra corpora, quae nutriuntur, quae nos poros vocamus. Dicunt enim omnes philosophi huiusmodi, quod alimentum, per quod nutritur animal, est corpus. Constat autem quod intrat in corpus animalis. Cum ergo duo corporea non sint in eodem loco, constat, quod non intrat in plenum; ergo intrat in vacuum; ergo vacuum est intra corpora naturalia ad minus. Testimonium autem ad hoc idem inducunt experimentum de vase cum cineribus; cineribus enim vas plenum tantum recipit aquae, quantum vas vacuum sine cineribus. Cuius causam dicunt esse vacuum, quod separat inter particulas cineris.”

24 CASERTANO 2009, 64, 66: “Dalla testimonianza aristotelica, emerge un’immagine del vuoto come ciò che avvolge il cielo: il vuoto è ciò [...] che è caratterizzato dall’interminato, [...] dall’interminato penetra nell’universo. Ed è probabile che l’antico pitagorismo abbia usato la metafora del respirare e dell’aspirare: a ulteriore conferma del dialettico rapporto che esiste tra i contrari. [...] [Il vuoto] si trova innanzi tutto nei numeri, perché è il vuoto che distingue la natura loro (DK58B30).”

process, they argue, allow the void to separate the essences of things within the world: it is the void that distinguishes and separates all that exists. Furthermore, they contend that the void determines the distinction between numbers and, through numbers, governs sensible things. What distinguishes or divides is determined by the full or the void; not by the full, because the full is continuous in each local dimension.²⁵

2.2 Plato's Error

In the second chapter, Albert the Great, like Aristotle, discusses the definition of the void (*quod significatur per nomen vacui*), beginning with ancient definitions. Some thinkers (*quidam*) consider the void as a space in which there is nothing, defining void as the capacity of a thing understood in any way, but not as the surface of the body that contains it or the space between surfaces. Consequently, they fail to define the specific nature of the void; for them, every entity is a body, every body occupies a space, and the void is simply a place where nothing exists. Under this view, even a point represents an empty space where there is nothing. Thus, the void is understood as a space lacking a tangible, qualitatively differentiated body. For instance, the heavens are considered empty because they are not filled with a heavy or light body.²⁶

According to Albert, Plato aligns closely with these ancient philosophers (Aristotle, in contrast, does not explicitly mention Plato, instead referring to an

25 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 1 (233,34–49): “Pythagorici autem dicunt infinitum vacuum esse et extra caelum et mundum esse et caelum dixerunt esse magnum animal, quod spiritu suo anhelando et respirando in se ipsum attrahit vacuum ex infinito vacuo, quod est extra caelum, et illud vacuum sic inspiratum separat naturas rerum in mundo distinctarum ab invicem, tamquam vacuum sit id quod separat ea quae sunt, ab invicem, et quae sunt consequenter. Et dicunt determinans hoc quidem primum esse in numeris faciens discretionem; vacuum enim est, quod facit in numeris discretionem et per numeros determinat alia [...]”

26 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 2 (234,4–23): “Ad quale autem se habet secundum veritatem [...] non potest declarari, nisi prius accipiatur, quid est, quod significatur per nomen vacui [...]. Describitur autem vacuum ab antiquis pluribus descriptionibus. Quidam enim dicunt, quod videtur vacuum esse locus, in quo nihil est, et non vocant locum superficiem continentis corporis vel spatium, quod est inter superficies continentis superpositum, sed vocant locum cuiuslibet rei capacitatem quocumque modo dictam; et ideo haec descriptio est valde generalis, non ponens vacuum aliquam esse naturam determinatam [...]”

indefinite group with the pronoun *quidam*). Plato defines the void as a space devoid of material substance, containing only unformed matter. Some Platonists argue that the void consists of unshaped material matter before it acquires form (in the *Timaeus*, Plato describes matter as the womb of forms); for them, the void is synonymous with both place and matter.²⁷

In agreement with Aristotle, Albert rejects Platonic dualism, which separates matter from form.²⁸ To admit that the void is matter distinct from form implies the existence of a separate void, which Albert deems absurd. As Genz and Heusch write, for Aristotle and his followers, matter exists only by virtue of its union with form.²⁹

3. Void and Motion

3.1 *The Error of the Physici, Pythagoreans and Atomists*

In the third chapter, while maintaining the Aristotelian view, Albert critiques the thesis that the void facilitates local and quantitative motion (*augmentum*). He addresses in detail the experiment conducted by the *physici* involving a jar filled with ashes and water, wherein a body is said to increase due to the presence of

²⁷ Thuan refers to Plato as an opponent of the existence of the void. However, this would not be evident from Albert's Commentary: see THUAN 2017, 46–47. See especially *Tim.* 58a4–b5. According to Lammer, “a natural assumption would be to take al-Ġurġānī as referring to Plato's account of $\chi\acute{o}\rho\alpha$ in the *Timaeus*. Of course, Plato's doctrine of $\chi\acute{o}\rho\alpha$ in the *Timaeus* is enigmatic and controversial, and there is no consensus among interpreters on what it actually amounts to. On one account, Plato identified $\chi\acute{o}\rho\alpha$ with matter. The earliest evidence for this reading is Aristotle; cf. *Phys.* IV, 2, 209b6–17. What is interesting, here, is that the Arabic tradition – at least as exemplified by al-Ġurġānī – apparently categorised Plato as someone who defended the view that space is an independently existing three-dimensionally extended magnitude which in itself is empty and undifferentiated, i.e., an extension which underlies the spatially finite world, in which bodies come-to-be, and which bodies can occupy, instead of taking heed of Aristotle's remark that for Plato, place was actually matter.” See LAMMER 2018, 385.

²⁸ ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 2 (235,12–23): “Alio autem modo et tertio dicitur esse vacuum secundum Platonem id in quo non est hoc aliquid quod est substantia corporea, perfecta per formam substantialem, in qua ratione vacui dicunt quidam Platoniorum corporis materiam esse vacuum, antequam habeat formam, et hoc innuit Plato in *Timaeo*, ubi dicit, quod materia est formarum gremium. Hoc enim vacuum verissime dixerunt esse locum, eo quod locum et materiam idem esse dixerunt [...]; non bene autem in hoc dixerunt, materia enim non est separabilis universaliter a rebus, ita quod ipsa sit per se sola ab omni forma separata.”

²⁹ See GENZ, HEUSCH 1999, 87.

the void. Albert identifies three possible objections: (1) the body increases, but not toward a specific direction; (2) the body increases through something incorporeal; (3) two bodies would occupy the same space. In the first case, if the body were to increase without a specific direction, it would imply that the void exists only in a particular part of the body; however, if this were true, the body itself would be void and, as a result, would not increase. In the second case, it would be inconvenient for the body to increase through something incorporeal (the void), as a body cannot gain additional substance from something that lacks corporeality. In the third case, if the body increases by means of something corporeal (which would imply that the void is a body), this would result in the coexistence of two bodies in the same space, which is impossible.³⁰ Therefore, Albert concludes that it cannot be demonstrated that the void facilitates motion through increase (*per augmentum*).³¹

Albert also refutes the position of those who advocate for the void as a separate space, among whom we find the ancient philosopher Xuthus. The only distinction in Xuthus' argument is that he and his *secta* posit the existence of multiple voids within natural bodies, rather than *extra caelum* or *infra caelum*. Additionally, Xuthus believes that the void exists only in rarefied bodies, specifically those that are light and move upward. Based on this view, Albert concludes that the void cannot be the cause of all local motion but may, at most, explain upward motion.³²

30 Grant notes that, in general, for Aristotle (and also for Albert), such empty space was conceived either as a corporeal dimension, incapable of accommodating material bodies due to the obvious violation of the principle that two bodies cannot simultaneously occupy the same place, or as something entirely superfluous. See GRANT 1981, 18.

31 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 3 (236,50–66): “Universaliter autem ratio, quam inducunt de augmento et de experimento aquae diffusae in cinerem, destruit seipsam in hoc, quod non probat esse augmentum [...]. Detur enim quod corpus augetur per vacuum, sicut dicunt. Adhuc sequitur unum trium inconvenientium; aut enim corpus non secundum partem aliquam augetur aut augetur non per corpus augens, sed per incorporeum, aut oportet, quod duo corpora sint in eodem loco. Si enim augeatur in qualibet parte, et sic corpus est ipsa vacuitas et non augetur ita. Aut si augetur per plenum, tunc aut augetur incorporeo, et hoc est inconveniens, quia corpus non accipit additionem per incorporeum, aut augetur per corpus, et tunc duo corpora secundum eos erunt in eodem loco.”

32 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 9 (255,8–38) : “Si quidem igitur dicunt multa vacua separata habens et distincta a partibus plenis, tunc per eadem destruitur positio eorum, per quae destructa est positio ponentium vacuum locum esse separatum, quia tunc hec positio non differt ab illa, nisi quia in diversis ponitur vacuum, scilicet extra caelum vel

In the next two chapters, Albert, following Aristotle, seeks to demonstrate conclusively that the void is not the cause of local motion. Albert refers to his *tractatus de loco* (*Phys.*, IV, 1), where he specifies that a place possesses an inherent attraction or natural power influencing objects moving toward a single spatial direction; a condition that cannot occur in a uniformly dimensioned void, lacking distinctions such as up, down, center, and so on.³³ Albert argues that some ancient philosophers believed that the Earth remains stationary (in the absence of motion) because it is equally attracted from all sides – and not just one – of its circumference. For Albert, this could apply to the void: if the void possessed an attractive force, it would be uniform, attracting equally from all directions, thereby resulting in no differentiation in motion (greater or lesser). Thus, Albert concludes that the void cannot serve as the cause of local motion.³⁴

infra mundum vel in quibusdam partibus corporis physici, semper autem ponitur actu existens et distinctum a pleno. [...] Si autem non est separatum, sed immixtum est vacuum pleno non distinctum ab eo nisi secundum potentia, qua plenum potest esse vacuum et e converso, quando de denso fit rarum et e converso, et ita ponitur aliquid esse vacuum, tunc minus est impossibile ponere ipsum quam primum, eo quod posito priori vacuo sequitur motum localem non esse [...] contingit secundum istam positionem, quod vacuum non est causa omnis motus, sed motus qui est sursum tantum; vacuum enim secundum actum non efficitur nisi in raro et rarum est leve et ascendit sursum.”

33 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 4 (237,43–50): “Ostendimus enim supra in tractatu de loco, quod locus connaturalitatem habet ad locatum et ideo habet potentiam trahentem ad se locatum in ipso, quando movetur ad ipsum. Talem autem connaturalitatem et potentiam non potest quisquam ostendere in vacuo, cum vacuum non sit nisi dimensiones, quae sunt unius rationis ubique, et nusquam est in ipsis natura superioris et medii natura.” Here Albert adopts an Aristotelian concept. As Genz and Heusch notice: “The vacuum or empty space of Aristotle’s is isotropic; it contains no preferred direction. Today, we might say there is no gravity acting in or on it [...] in a void, all bodies will move with the same velocity.” See GENZ, HEUSCH 1999, 73.

34 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 5 (238,56–68): “Dixerunt enim quidam physicorum terram quiescere propter hoc, quod ubique aequaliter attrahitur a circumferentia orbis, et non ex hoc, quod aliquam habeat connaturalitatem ad medium locum, sed potius ex hoc, quod circumferentia orbis sit in circuitu eiusdem dispositionis, cuius convexum aequaliter distat a terra per circuitum et ideo attrahit terram undique aequaliter [...]. A simili ergo ostenditur de eo quod imponitur in vacuo; si enim ponatur naturam attractivam habere, oportet, quod ab omnibus partibus aequaliter attrahat, et sic positum in ipso non est, quo magis vel minus moveatur [...]” The same argument used by Aristotle can be found in Avicenna. To this regard, see Avicenna 2010, II, 8, 20–21 (197): “The defenders of the void, however, were at their most outrageous when they gave it a certain attractive or motive power, even if in some other way, such that they claimed that the cause of water’s being retained in the vessels called clepsydrae and its being attracted into the instruments called siphons is nothing but the attraction of the void and that it first attracts what is denser and then what is more subtle. [...] We say that, if the void were to have some at-

Moreover, Albert critiques the claims of the *physici* and Pythagoreans, who asserted that natural motion could occur within a void distinct from bodies. He argues that such a void would necessarily be infinite, rather than finite, as a finite void would require limitation by the full, which is impossible. In an infinite void, no distinctions such as up or down, center, or beginning would exist; the void would be a non-being (*privatio simplex*), lacking differences and natural potential. If a change in location were to occur, the form of what moves upward would differ from that of what moves downward, and so forth. Albert concludes that the void cannot permit distinct types of motion, as such differentiation arises from the diversity of the medium through which movement occurs and the weight of the moving object.

3.2 *The Error of Aristotle and Avicenna*

In the following chapter, Albert argues that the speed at which a body moves depends on the thickness of the medium it traverses. He explains that a stone moves more quickly in air than in water because air is a thinner medium than water. Albert further examines the motion of two bodies of different weights within the same medium: the lighter object moves upward more quickly, while the heavier one falls more rapidly. Thus, the speed of motion varies according to the properties of the medium and the weight of the bodies. The resistance or obstruction posed by the medium is what slows down the motion. Moreover, if the objects have the same weight, this hindrance (*ex parte medii*) can arise in three ways: (1) when the medium obstructs movement by opposing the direction of motion (e.g., a stone thrown against the force of the wind); (2) to a lesser extent, when the medium offers resistance even while moving in the same direction as the motion (e.g., a stone moving along with the wind); and (3) when the intrinsic nature of the medium itself impedes motion. The time required for motion is proportionate to the type of medium: it increases in denser media (e.g., water) and decreases in thinner ones (e.g., air). For instance, if a stone moves through both air and water, and water is twice as dense as air, it will take twice as long for the stone to move through water as it does through air.

tractive power, there could be no differences in strength and weakness in it, since the way that each part of the void would attract would be like any other."

The disparity in motion is thus determined by the type of medium and the resistance it presents.³⁵ As Edward Grant notes, in medieval physics, the main function of resistance was to prevent instantaneous motion and to ensure motion remained finite. In the sublunar realm of the Aristotelian cosmos, the *plenum* fulfilled precisely this function.³⁶ Consequently, Albert (like Aristotle) specifies that if motion were to occur in the void, it would happen instantaneously, without duration. This is because the void is indivisible, lacks the obstructive potential of a medium (such as air or water), and would thus bear no correlation with time, which would be absurd.

Albert also discusses the objections raised by Avempace (whom he mistakenly associates with Avicenna³⁷), who outlined three arguments in response to Aristotle's theory.³⁸

1) The medium that hinders or slows down movement cannot be natural, as Aristotle asserts, since what is natural should facilitate rather than obstruct the

35 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 6 (241,3–30): “[...] nos videmus, quod idem corpus grave retinens eandem quantitatem una vice velocius movetur quam alia propter alteram duarum causarum aut propter ambas. Aut enim movetur velocius aut tardius, quia movetur per diversa media, quorum unum est spissius altero et alterum magis tenue, sicut idem lapis citius movetur per aerem quam per aquam, eo quod aer est magis tenuis quam aqua. Aut etiam si dicatur non retinere eandem gravitatem, sed dicantur esse duo corpora per idem medium mota, tunc enim quod habet excessum in levitate, citius ascendet, et quod habet excessum in gravitate, citius descendet [...]].”

36 See GRANT 1981, 28.

37 See AVICENNA 2010, II, 8, 8 (186). Here Avicenna, contesting the opinion of the defenders of the void, writes: “there can be no circular motion in the void as they suppose.” See also AVICENNA 2010, II, 8, 9–10 (186–187): “We also say that there would be no natural rectilinear motion [...] Natural motion must either be naturally directed in some direction or not [...] Now, it is absurd that [the void] be an intellectual object that has no position, because no motion is directed toward that.” In addition to her observation that Avicenna rejected motion in a void, A. Maier shows the corrupt status of the medieval Latin translation of Avicenna's treatise (see MAIER 1951, 129–132). Because of the poor quality of the available text of Avicenna's *Sufficientia*, it is likely that Albert misinterpreted Avicenna's true opinion. See also GRANT 1981, 30. For further confirmation of Avicenna's position against the existence of the void, see LAMMER 2018, 327: “It is known that the Baṣrī branch of Mu'tazilism avowed the existence of the void and criticized the conception of place as a two-dimensional surface. In his response, Avicenna attacks their terminology and reproaches the Baṣrī Mu'tazilites for their belief in the existence of the void, which he blames on a misguided judgment of the imaginative faculties.” See also at 389: “By contrast, Avicenna, in addition to having been aware of the ancient debate, had to face not only the atomism propagated by the Baṣrī branch of Mu'tazilism and the emerging school of the Aṣ'arites, both of whom allowed for actual void spaces within atomic compositions.”

38 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245,10–19).

motion of an object. If, as Aristotle suggests, the full were an impediment or a factor slowing down motion, it would follow, for Avempace, that no full space could be a natural medium through which a natural body could move. Given that a natural medium must exist, Avempace concludes that this medium would necessarily have to be the void. In this argument, he aligns with those (such as the Atomists) who claim that a void separate from bodies is essential for movement.³⁹

2) If motion in the void is assumed to occur in an indivisible instant of time, it would follow that the motion of celestial bodies also happens instantaneously, as their movement – the orbit of the celestial spheres – does not occur within any medium. Moreover, since the motion of each sphere is its rotation around a shared center, there is no need for the sphere to move away from its location. Instead, it remains in its position, rotating with uniform motion, as is said of celestial spheres.⁴⁰

3) For Aristotle, it would also follow that the proportion between two motions depends on what is secondary and *per accidens* in motion (the medium or the impediment), rather than on what is primary and intrinsic (*per se*) to the motion itself.⁴¹ According to Avempace, however, motion depends on the mover's power exceeding that of the object being moved. Thus, motion will necessarily be faster when the mover's power surpasses that of the object, and slower when

39 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245,20–33): “Medium impeditivum motus non est medium naturale, eo quod naturalia rei rem in nullo impediunt, sed potius promovent ad motum. Omne autem plenum, ut hic supponitur, est impedimentum transitus eius quod movetur per ipsum; ergo videtur, quod nullum plenum sit naturale medium, per quod movetur corpus naturale. Cum igitur oporteat habere aliquod medium naturale [...] oportet quod medium naturale [...] sit vacuum et ita redibit opinio dicentium vacuum separatum oportere poni propter motum.”

40 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245,34–41): “Secundum autem inconveniens est, quia si motus est in indivisibili temporis, qui est per medium non resistens motui eius quod fertur per ipsum, sequitur, quod motus corporum caelestium sit indivisibili temporis, eo quod motus ipsorum, qui est circulatio sphaerarum caelestium, non est per medium aliquod, neque resistens neque non resistens, sicut motus omnis circuli, qui est circulatio circa centrum unum et idem.” See also ARISTOTLE, AVERROES 1962, *Physica*, IV, 2 (f. 160C–F).

41 Anneliese Maier has noted that “for Aristotle there are only two possible efficient causes of natural motion in inanimate bodies: the generans, which is the *per se* efficient cause of all the motions consequent upon the nature generated, and the *removens prohibens* or *removens impedimentum*, which is the *per accidens* cause of that actual motion.” See MAIER 1952, 147–49.

the mover's power does not.⁴² To the resistance of the medium Avempace attributes the sole function of delaying motion, that is, extending the time virtually required for an object to move in the absence of resistance.

Avempace presents the case of celestial bodies, where motions of varying speeds can be observed: the *Primum mobile* moves exceedingly fast, while the fixed stars move very slowly; so slow, in fact, that the *Primum mobile* completes its orbit in 24 hours, whereas, as Aristotle notes, the fixed stars require 36,000 years to complete theirs. For Avempace, this suggests that there can be a proportionality of faster and slower motion, allowing for finite motion over time even in the void. Thus, it would be incorrect to assert that differences in the speed of motion arise solely from the nature or disposition of the medium.⁴³

Albert introduces yet another argument attributed to Avempace (and, due to a misunderstanding by Albert, also to Avicenna)⁴⁴ against Aristotle's position in Book VI of *Physica*. Aristotle asserts that nothing can move through a space

42 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245, 47–57): “Tertium autem inconueniens est, quod cum proportio motus sit ex duobus, ex uno principaliter, ex alio secundo, sequitur secundum dicta, quod motus non proportionatur motui nisi secundum id quod secundo et per accidens est in quodam motu, et non per id quod primo et per se est in omni motu. Cum enim omnis motus fiat ex victoria potentiae motoris super mobile, oportet necessario, quod motus sit velocior, in quo potentia motoris sit magis vincens suum mobile, et motus sit tardior, in quo potentia motoris minus vincit mobile.” See also ARISTOTLE, AVERROES 1962, *Physica*, IV, 2 (f. 160C–F).

43 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245, 57–76). See also ARISTOTLE, AVERROES 1962, *Physica*, IV, 2 (f. 160E–F). Grant highlights that for Avempace the difference in the velocities of celestial motions depends on the difference in perfection (*nobilitas*) between the mover and the mobile. See GRANT 1981, 27.

44 Here, Albert seems to have misunderstood Avicenna's position and reasoning, likely focusing only on the initial words of the argument. Avicenna explains: “So, when the mobile undergoes motion in the void, it will cross the void medium either in a certain amount of time or in no time. Now, it is absurd that that would take no time, because it crosses some of the medium before crossing all of it, and so it must take some time.” Avicenna adds afterward: “Now, it is absurd that the proportion of the motion's time, where there is absolutely no opposition, should be like a proportion of some amount of time of a motion during a certain opposition. [...] Also, every motion in a void is a motion in what does not oppose, and this premise is likewise true. Also, any motion in what does not oppose will not at all be equal to some motion during a certain opposition having a given proportion, were it to exist. So, from these premises, it necessarily follows that, in a void, there is no motion whose time is equal to some amount of time of a motion during a certain opposition, were there such. From these [premises] and the first, it necessarily follows that none of the motions in the void is a motion in the void, which is a contradiction.” See AVICENNA 2010, nn. 12–13 (191–192).

larger than itself without first moving through one that is smaller or equal. If we accept the existence of a separate void, as the ancients argued, and object A moves within it, then A would first have to move in a void smaller or equal to itself. This implies that within the void there must be a distinction between 'before' and 'after', and, consequently, the presence of time. Motion in the void thus cannot occur in an indivisible instant, as Aristotle would claim. Moreover, even within an empty space, there is proximity and distance; motion within such a space unfolds over a span of time, which necessarily involves a sequence of before and after.⁴⁵

Quite likely, Avempace's arguments reflect the ideas expressed by Philoponus in his Commentary on Aristotle's *Physica*, though Philoponus' work was only discovered in the Latin West in the sixteenth century. From Averroes, we know that Avempace denied that the motion of a stone, for instance, required time simply because it moved in a medium.⁴⁶ In this context, Avicenna presents (though rejecting it) the argument of *distantia terminorum*: the necessity for a body to traverse the preceding parts of an empty space before reaching the subsequent parts. This idea would later be addressed by Roger Bacon⁴⁷ and Thomas Aquinas to explain Avempace's position on how movement in a resistance-free medium, or the void, would be finite rather than instantaneous.⁴⁸

Avempace criticizes Aristotle's position regarding motion, because even though there is no resistance coming from the medium in the void, there is still a difference in velocity between two motions, which depends on the proportion

45 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (245, 80–86; 246,1–14).

46 See GRANT 1981, 26. For Philoponus, the medium functions only as a factor of slowing down. Thus, true motion could only occur in the void, where the time taken to cover a given distance represented the true motion time of that particular body. When traversing the same distance through a material medium, the same body required additional time proportional to the density of the medium. See also SORABJI 1988, 146: "What you would achieve by removing resistance is not the necessity for time, but the necessity for extra time spent in overcoming the resistance. In this Philoponus is followed by Avempace."

47 See GRANT 1981, 27. Roger Bacon states that motion in a void would be finite, because "every body is divisible and has a distance [or separation] between its boundaries; therefore it has a prior part and another posterior part, and will traverse one part and then another. For this reason, before and after [or prior and posterior] occur within the parts of the magnitude, and there will be a before and after in the motion and, therefore, in the time." See ROGER BACON 1935, *Physica*, 234.

48 GRANT 1981, 29.

between the mover and the moving object, or better, on the mover's power exceeding that of the object.

3.3 *The Error of Avempace*

Albert then presents Averroes's counterarguments to Avempace, whom he describes as "deceived" (*deceptum*).⁴⁹

Averroes stresses that the motion of celestial bodies does not require a medium, since whatever moves on its own has the principle of motion within itself, is animated, and possesses both an active mover and a perfect actual *mobile*. The same applies to the soul, which moves the body: both move within their own respective places, not outside of them. Because they are perfect, they do not require a medium for their motion. Even though their motion does not occur within a medium, this does not imply that it takes place in an indivisible instant, but rather within time.⁵⁰ In contrast, the motion of simple bodies requires a medium, in addition to a mover and a *mobile*, as only the mover is in actuality (form), while the *mobile* is potentiality (matter). Since form is not a distinct entity within an inorganic body, it cannot serve as the efficient cause of natural motion. An inorganic body cannot move by itself because its form cannot act upon its matter; likewise, as its matter is being moved, it cannot be separate and cannot serve as a resistance to the moving force. How, then, do these bodies move naturally? For Averroes the form of an inorganic body moves it *per accidens* by overcoming the resistance of an external medium. Such bodies can only move if they are within an external, material medium. Thus, the form of the body and the external medium are both essential for motion to occur.

Therefore, if motion occurs within the void, there is no medium to facilitate or slow down the motion; it occurs instantaneously.⁵¹ Aristotle argues that, in the absence of a resisting medium to either slow or accelerate motion – resulting from the mover's excess power over the moving object and enabling the genera-

49 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (247,59–61).

50 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (247,86–94; 248,1–10).

51 Averroes argued that motion must always result from the combined action of two forces or powers: one driving and the other resisting, with the latter usually identified as the object being moved. It is the resisting force that ensures motions do not occur instantaneously. See GRANT 1981, 40; see also WEISHEIPL 1985, 87–88.

tion of the mover's form within the object – motion would occur instantly rather than over time, as the relationship between motions relies on the proportion of the medium. According to Albert, this demonstrates Aristotle's precision. Albert's alignment with Aristotle and Averroes on this issue is evident.

Albert is not alone in addressing the two main perspectives on the possibility of motion in the void, i.e., Averroes' position, according to which a resistant, material medium is necessary for the finite movement of all bodies within the sublunar realm, while Avempace's standpoint, contending that a resistant medium is not essential for temporal motion, thus allowing for finite rather than instantaneous speeds in a hypothetical void.⁵² Without directly mentioning him, Thomas Aquinas appears to align with Avempace on this point. Aquinas challenges Aristotle's assertion that there would be no relationship between motions within a void and within the *plenum*. "Indeed" he argues, "any motion has a definite velocity [arising] from a ratio of motive power to mobile, even if there should be no [external] resistance."⁵³ For Aquinas, the speed of a moving body is not caused by resistance but by the time required to cover a given distance. Therefore, even without a medium of resistance, as in a void, a body would fall with a specific speed due to the time needed to travel that distance.⁵⁴

52 In this regard, see GRANT 1981, 26. On the position of Egidius Romanus on motion in a void, see PORRO 1996, 337. Regarding Duns Scotus' position, PORRO 1996, 360 writes: "Ogni movimento è in esso impossibile; tuttavia, ammettendo per ipotesi una simile eventualità, il moto sarebbe comunque successivo, perché il mobile si troverebbe ad attraversare prima una parte del vuoto e poi un'altra (in questo modo, evidentemente, Scoto si schiera con Avempace e gli altri sostenitori dell'approccio cinematico." Concerning Hervaeus Natalis's position, PORRO 1996, 368 writes: "Come Tommaso, Erveo nega invece che i movimenti angelici possano aver luogo nell'istante, adottando per altro lo stesso approccio cinematico al problema del rapporto tra velocità e resistenza. Anche un ipotetico movimento nel vuoto avrebbe comunque natura temporale a causa della *distantia terminorum*."

53 GRANT 1981, 28; see also SORABJI 1988, 147: "The central defense of motion in a void, that removing resistance removes only the necessity for extra time, had a long subsequent history. It is next mentioned six hundred years later in the Islamic world, as already indicated, by Avempace. Averroes makes no mention of Philoponus and himself dissents from Avempace's view, but Thomas Aquinas agrees." On Thomas Aquinas' and Siger of Brabant's positions, Weisheipl writes: "However, Averroes' interpretation was explicitly rejected on all essential points by St. Thomas Aquinas [...] and even by Siger of Brabant, the eminent founder of Latin Averroism." See WEISHEIPL 1985, 89, 134–137.

54 THOMAS DE AQUINO 1965, *In Phys.*, IV, lect. 12, n. 10, p. 258: "Sed haec omnino videntur esse frivola. Primo quidem, quia licet quantitas tarditatis non sit secundum modum quantitatis continuae, ut addatur motus motui, sed secundum modum quantitatis intensivae, sicut cum aliquid est altero albius; tamen quantitas temporis ex qua Aristoteles argu-

According to Albert, Avempace's error arises from his notion that the speed caused by the medium in the motion of simple bodies and the speed caused by the difference in the mover's power were two independent and distinct elements. For Albert, this is mistaken, as the mover's power increases or decreases in relation to the medium and its resistance.⁵⁵ As James A. Weisheipl notes, "Averroes dismisses Avempace's position as mathematically erroneous, as Avempace discusses velocity in terms of adding or subtracting amounts of motion, while Averroes conceives of velocity as inversely proportional to resistance, that is, as a divisor. Thus, if resistance were zero, velocity would be infinite, that is, instantaneous, which for Averroes is impossible."⁵⁶

4. Conclusions

Albert the Great's stance concerning the question of the existence of the void and the possibility of finite motion within it is articulated in his Commentary on Book IV of Aristotle's *Physica*. He agrees with Aristotle and Averroes in denying the existence of the void (both macro-void and micro-void) and the possibility of finite motion occurring within it over time, as such motion would lack a medium to cause resistance or impede the motion itself.

Unwavering in his defense of Aristotle and infused with critical spirit, Albert's insightful approach focuses on the 'dynamic of errors' that can be identified in the positions of the various thinkers he analyses, from which he develops his discussion and explain his own position on the concept of the void. He

mentatur, est secundum modum quantitatis continuae, et fit tempus maius per additionem temporis ad tempus; unde subtracto tempore quod additur ex impediante, remanet tempus naturalis velocitatis. Deinde quia in gravibus et levibus remota forma, quam dat generans, remanet per intellectum corpus quantum, quod ex hoc ipso quod quantum est, in opposito situ existens, habet resistantiam ad motorem [...]. Et ideo melius et brevius dicendum est, quod ratio Aristotelis inducta, est ratio ad contradicendum positioni, et non ratio demonstrativa simpliciter." Cf. WEISHEIPL 1985, 93.

55 ALBERTUS MAGNUS 1987, *Physica*, IV, 2, 7 (249, 12–31): "Patet autem quod causa deceptionis Avicennae et Avempacis fuit, quod putabant, quod ad aliud et ad aliud refertur tarditas, quae causatur ex medio in motu simplicium, et tarditas, quae ex diversitate motoris causatur, cum hoc non sit verum, quia cum habitudine medii crescit virtus motoris et cum contrarietate eius decrescit, et ideo quod demonstratur in uno eorum, tenet in utroque eorum." Cf. also ARISTOTLE, AVERROES 1962, *Physica*, IV, 2 (f. 161H–M; 162A–C).

56 WEISHEIPL 1985, 88, 131–133. About Averroes' conception of the void, see also MARÓTH 2011.

argues that the errors of certain Presocratics (Anaxagoras, Leucippus, Democritus, Xuthus, and Pythagoras) and even Plato contributed to the formation of erroneous doctrines in the Middle Ages, notably that of Avempace (alongside whom Albert mistakenly includes Avicenna). Such ideas would later influence thinkers like Thomas Aquinas, Duns Scotus, Hervaeus Natalis, and many others.

It is important to note, however, that there are different kinds of errors:

- Anaxagoras' error is both doctrinal (the doctrine of *latentia formarum*) and methodological. According to Aristotle and Albert, while Anaxagoras correctly concludes that the void does not exist, he fails to present the correct argument to support this conclusion.

- Leucippus' and Democritus' error is doctrinal, as they argue for a void separate from bodies, in which atoms can move.

- The error of Xuthus and his 'sect' of *physici* is also doctrinal. They defend the existence of the void (micro-void), which they deem necessary to explain the processes of condensation and rarefaction that enable movement. According to them, the voids within natural bodies, called 'pores', also make possible quantitative motion and nourishment.

- Pythagoras and the Pythagoreans' error is doctrinal, as they believe in an infinite void (macro-void) beyond the heavens and the world, and that it is this void that determines the distinction between numbers and sensory things.

- Plato and the Platonists' error is doctrinal, as they define the void as a space devoid of corporeal substance, containing only matter without form. For them, the void is identical to shapeless matter, as place and matter are the same.

- Avempace's error is doctrinal, as he asserts that motion within a resistance-free medium, or the void, would be finite instead of instantaneous.

- Avicenna's error, which appears doctrinal, is really a misinterpretation by Albert ('Albert's error'). Avicenna, in fact, challenges the views of the thinkers who support the existence of the void.

- Aristotle's error, doctrinal in nature, is considered as such only by Avempace. The latter argues that there is no need to posit a medium or an impediment for motion to occur over time.

For Albert, identifying and discussing ‘errors’ serves as a useful tool to deepen the debate on the issue, including the arguments and counterarguments that arise from it, while also affirming, in an accurate and consistent manner, his alignment with Aristotle and Averroes in order to prevent harmful influences on medieval doctrines.

It is worth noting that, although Albert believes numerous errors by the ancient philosophers to be at the core of flawed medieval doctrines, the Presocratics played a fundamental role in the origin and progression of scientific discourse on the void and other questions of physics and metaphysics. As Henning Genz and Karin Heusch observe, “the so-called pre-Socratic philosophers in Ionic Greece, as Erwin Schrödinger [...] has put it, saw the world as a rather complicated mechanism, acting according to eternal innate laws, which they were curious to find out. This is, of course, the fundamental attitude of science up to this day.”⁵⁷

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⁵⁷ GENZ, HEUSCH 1999, IX, Preface.

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