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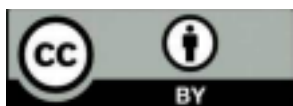
*Aristotelica*

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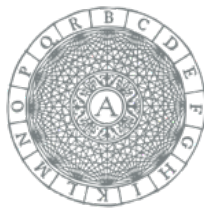
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MAJID AMINI

## FROM SYLLOGISM TO LOGICISM: WAS ARISTOTLE THE FIRST LOGICIST?

### Abstract

The question, “Was Aristotle the first logicist?”, may appear anachronistic and elicit skepticism since the doctrine of logicism as a fully-fledged idea emerged only in the nineteenth century in the context of the debates surrounding the foundation of mathematics. Indeed, Bertrand Russell credits Gottlob Frege with being the first in “logicising” mathematics (Russell 1919, p. 7), where the thesis espouses that mathematical concepts and propositions are ultimately reducible to or derivable from a number of fundamental logical concepts and principles. However, anachronistic appearances aside, in a fresh reexamination of some of the specific Aristotelian texts in *Metaphysics* and *Prior Analytics*, and especially focusing on Aristotle’s particular remarks on the status and significance of the principle of non-contradiction, one may textually argue for a nascent and burgeoning form of logicism in Aristotle, albeit within a much larger metaphysical context than mathematics.

### Keywords

Logicism, Metalogic, Principle of Non-Contradiction,  
Skepticism, Syllogism

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The French historian, Lucien Febvre, in one of his seminal work tells his readers that, from a historiographical point of view, in looking at past figures, the problem is not so much “to catch hold of a man” in isolation from his contemporaries or, just because a certain passage in his work fits in with the direction of one of our own modes of thinking, to decide that he fits under one of the rubrics we use nowadays for classifying those who do or do not think like us. Rather, “the problem is to determine what set of precautions to take and what rules to follow in order to avoid *the worst of all sins, the sin that cannot be forgiven – anachronism*” (emphasis added).<sup>1</sup> Now, judging by the extraordinary expanse of time amounting to more than two millennia between Aristotle and the advent of logicism in the second half of the nineteenth century, as well as the apparent unavailability of the logicist conceptual wherewithal in the ancient world, any question along the lines of the subtitle of this paper, ‘Was Aristotle the First Logicist?’, is obviously nothing short of the blatant anachronism that Febvre exhorts his readers to avoid. In the realm of ideas, using Febvre’s similes for our context, “it is like giving Diogenes an umbrella and Mars a machine gun”.<sup>2</sup> Yet my contention here is that there may be mitigating circumstances where the attribution of logicism to Aristotle might not after all be misguided and guilty of anachronism.

To begin the endeavor, before locating the presumed logicist landmarks in the Aristotelian text, the first port of call is to look at the genesis and germination of logicism. Although Russell traces the first explicit and intentional implementation of logicism to the works of Gottlob Frege (1848-1925),<sup>3</sup> recent scholarship on the history of logicism seems to put equal, if not occasionally more, emphasis on the pioneering works of Richard Dedekind (1831-1916) and Giuseppe Peano (1858-1932).<sup>4</sup> However, Russell himself in an earlier work suggests that the trail of the idea of logicism stretches back to Gottfried Wilhelm Leibniz (1646-1716) and remarks that the general doctrine underpinning the idea “was strongly advocated by

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<sup>1</sup> Febvre (1982) p. 5.

<sup>2</sup> *Ibid.*, p. 353.

<sup>3</sup> Russell (1919).

<sup>4</sup> See, for example, Demopoulos & Clark (2007), Franchella (2019), Reck (2013), Stein (1998).

Leibniz”.<sup>5</sup> Yet Max Black seems to take umbrage at Russell’s overestimation of the Leibnizian contribution in this context and offers the somewhat conservative characterization that Leibniz’s “work contained the germ of” the logistic conception.<sup>6</sup> Yet Frege himself in his classic logicist landmark, *The Foundations of Arithmetic*, approvingly quotes Leibniz that “algebra derives its advantages from a much higher art, namely, true logic”.<sup>7</sup> Indeed, in *New Essays on Human Understanding*, Leibniz observes that “geometer’s logic – that is, the methods of arguments which Euclid explained and established through his treatment of propositions – can be regarded as an extension or particular application of general logic”.<sup>8</sup>

In tracing the logicist threads of the Leibnizian corpus, where historically the first explicit Aristotelian connections appear on the horizons of logicism, Russell highlights Leibniz’s idea of *characteristica universalis* or “universal mathematics”:

This was an idea which he cherished throughout his life, and on which he already wrote at the age of 20. He seems to have thought that the symbolic method [...] could produce everywhere the same fruitful results as it has produced in the sciences of number and quantity.<sup>9</sup>

Russell then goes on to say that for Leibniz the “Universal Characteristic seems to have been something very like the syllogism”.<sup>10</sup> In fact, Leibniz himself portrays the significance of the Aristotelian syllogism in the following way:

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<sup>5</sup> Russell (1996) p. 5.

<sup>6</sup> Black (1958) p. 16.

<sup>7</sup> Frege (2007) p. 31. John Austin renders the quotation from Leibniz in his translation of Frege thus: “the benefits of algebra are due to its borrowings from a far superior science, that of the true logic.” See Frege (1978) p. 21e.

<sup>8</sup> Leibniz (1985) p. 370.

<sup>9</sup> Russell (1958) p. 169. Similarly, in one of his unpublished papers dating back to 1880-81, Frege notes that this idea of Leibniz is one of: “a profusion of seeds of ideas [...] that is now to all appearances dead and buried [but] will one day enjoy a resurrection” (Frege 1979, pp. 9-10) and sees his own work in *Begriffsschrift* published in 1879 as “a fresh approach to” it in anticipation of the implementation of his logicist agenda”.

<sup>10</sup> Russell (1958) p. 170.

I hold that the invention of the syllogistic form is one of the finest, and indeed one of the most important, to have been made by the human mind. It is a kind of universal mathematics whose importance is too little known. It can be said to include an *art of infallibility* [...].<sup>11</sup>

And the profuse portrayal is expanded to such an extent that Leibniz makes his fictional representative of John Locke in *New Essays on Human Understanding*, Philalethes, backtrack from his dismissal of the syllogism, and to admit that:

I am beginning to form an entirely different idea of logic from my former one. I took it to be a game for schoolboys, but I now see that, in your conception of it, it involves a sort of universal mathematics.<sup>12</sup>

The significance of the relationship between Aristotle's syllogistic formalization and Leibniz's *ars charateristica universalis* can be better appreciated when it is set against the backdrop of a number of cardinal features of the logicist program. First, for the logicism project to get off the ground, the initial necessary step is to set up a formal deductive system of logic adequate for formalizing the reasoning of one domain into another one. Specifically, in the case of Fregean logicism and its recent descendants in the form of neo-logicism, the formal deductive system must possess the ability to formalize mathematical reasoning. This constitutes the principal *prerequisite* or *pre-condition* at the implementation of logicism, and this is, indeed, where Aristotle's syllogistic formalization looms large in the question of his logicist inklings and tendencies.

Secondly, the logicist program involves an unequivocal and unambiguous process of *conceptual reduction* whereby the concepts of the prospective target domain for reduction can be defined in terms of logical concepts. Accordingly, in the preface to *The Principles of Mathematics*, Russell explicitly sets out a twofold task as one of the main objectives of his logicism, whereby

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<sup>11</sup> Leibniz (1985) p. 478. In a letter dating to 1696 to Gabriel Wagner on the value of logic against Wagner's anti-scholasticist attack on Aristotelian logic, Leibniz interestingly describes Aristotle in his attempt at syllogistic formalization as the first one to write mathematically outside of mathematics. See Loemker (1969) p. 465: "It is certainly no small matter that Aristotle reduced these forms [paralogisms] to unerring laws, having been the first actually to write mathematically outside of mathematics."

<sup>12</sup> Leibniz (1985) pp. 486-87.

the first fold is to provide “the proof that all mathematics deals exclusively with concepts definable in terms of a very small number of fundamental logical concepts”.<sup>13</sup> This clearly captures the second characteristic of the logicist prospectus.

As for the second fold of Russell’s first objective in *The Principles of Mathematics*, namely, to demonstrate that all the propositions of pure mathematics “are deducible from a very small number of fundamental logical principles”,<sup>14</sup> there arises a third trait of logicism in terms of disambiguating or determining the *scope* of the logicist implementation. Neil Tennant suggests that the claim of logicist reduction can be understood in one of two senses: either in the *strong* sense of claiming that all *truths* of the reduced domain comprise a subset of logical truth or in the *weak* sense of claiming that all *theorems* of the reduced domain comprise a subset of logical truth.<sup>15</sup> Judging by the high hopes and ambitions that Leibniz harbors for his dream of *ars charateristica universalis*, it might not be that controversial to attempt to determine where Leibniz stands on this distinction. But, in the case of Aristotle, should he turn out to be a logicist after all, the verdict might not be that clear and incontrovertible.

With this perfunctory prelude to a few features of logicism, the question is whether the Aristotelian corpus affords any textual evidence in support of his allusion and allegiance to the doctrine of logicism. In this regard, one of the most promising sources is Aristotle’s epistemological and ontological ruminations and pronouncements in one of his later works, the *Metaphysics*. There is a notable consensus among scholars that Aristotle’s *Metaphysics* is intentionally concerned with the problem of skepticism as an integral part of a universal or special science of being. Indeed, his discussion of the Protagorean doctrine, arising out of the problem of conflicting appearances, is purposefully tied to the denial of the *law of non-contradiction*, which in turn is epitomized in the Aristotelian corpus as radical skepticism.

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<sup>13</sup> Russell (1996) p. xv.

<sup>14</sup> *Ibid.*

<sup>15</sup> Tennant (2023).

*Prima facie*, one may suspect a dissonance here as any discussion of the law of non-contradiction seems to be more ensconced in the domain of logic and its foundation in contrast to a study of the content and details of a universal or special discipline dedicated to the overarching subject of being and existence. However, Aristotle in his pioneering role as the first *metalogician*<sup>16</sup> attempts to shed light on the nature of proof and consequence and, in particular, the status of the law of non-contradiction in his *Metaphysics* with the ultimate aim of demonstrating the *intelligibility* of the broad structure of *reality* in the same breath.<sup>17</sup>

In Aristotle's own articulation, this metaphysical and metalogical interplay and interaction takes place in the following manner:

Obviously then it is the work of one science to examine being *qua* being, and the attributes which belong to it *qua* being, and the same science will examine not only substances but also their attributes. (*Metaph.* Γ 2.1005a13-16; McKeon 1941, p. 735)

And, lest there is a minimalist or broad understanding of substances and their attributes in this context, Aristotle takes a maximalist or anti-minimalist approach to the universal science of being and adds that:

We must state whether it belongs to one or different sciences to inquire into the truths which are in *mathematics* called axioms, and into *substance*. Evidently, the inquiry into these also belongs to one science [...] for these truths hold good for everything that is, and not for some special genus apart from others. (*Metaph.* Γ 2-3.1005a18-24; McKeon 1941, pp. 735-6)

Therefore, the question arises, who is qualified to undertake the special science of being in this Aristotelian worldview. To reinforce the point, Aristotle continues by cautioning against two sets of false contenders here. For the first set, he targets mathematicians and, specifically, geometers and arithmeticians:

since these truths clearly hold good for all things *qua* being (for this is what is common to them), to him who studies being *qua* being belongs the inquiry into these as well. And for this reason no one who is conducting a special inquiry tries to say anything about their truth

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<sup>16</sup> Lear (1980).

<sup>17</sup> Similarly, Martin (1964) p. 85: "Aristotelian logic is seen [...] to be a complicated mixture of logic, metalogic and metaphysics, and Aristotelian metaphysics contains logical and metalogical considerations".

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or falsity – neither the geometer nor the arithmetician. (*Metaph.* Γ 3.1005a27-31; McKeon 1941, p. 736)

That is, not only are the mathematical axioms not the fundamental principles of what Aristotle's special science is going to ascertain, but they are also not in themselves sufficiently *sui generis* to form an independent set of their own.

For the second set of contenders, Aristotle rebukes natural philosophers for harboring such ontological ambitions. This is quite interesting in view of Aristotle himself being a naturalist *par excellence* as evidenced by his iconoclastic revolt against his master's suprasensible and supernatural entities of the platonic forms. In his dismissal of natural philosophy as the home of being *qua* being, he writes:

Some natural philosophers indeed have done so, and their procedure was intelligible enough; for they thought that they alone were inquiring about the whole of nature and about being. But since there is one kind of thinker who is above even the natural philosopher (for nature is only one particular genus of being), the discussion of these truths also will belong to him whose inquiry is universal. (*Metaph.* Γ 3.1005a31-35; McKeon 1941, p. 736)

In particular, he goes after those who offer the discipline of physics as furnishing the foundational principles of existence. Although Aristotle readily acknowledges the status of physics as “a kind of Wisdom”, he chides the advocacy of physics as the special science of being “due to a want of training in logic [*analytics*]” (*Metaph.* Γ 3.1005b1-3; McKeon 1941, p. 736).

Thus, the question is which discipline or branch of knowledge has the necessary wherewithal and the *logical* capability to deliver the objectives and goals of the universal or special science of being? Aristotle's answer is unhesitatingly categorical with a tantalizing twist: “Evidently then it belongs to the philosopher, i.e. to him who is studying the nature of all substance, to inquire also into *the principles of syllogism*” (*Metaph.* Γ 3.1005b6; McKeon 1941, p. 736).

The significance of the twist – the reference to the theory of syllogism – can be best appreciated against the backdrop of the forgoing first observation about the project of logicism: the prerequisite or precondition of the availability of a formal deductive system of logic adequate for formalizing the reasoning of one domain into another one.

Against this backdrop, it is important to bear in mind that for Aristotle this appeal to the syllogistic formal system in the context of studying being *qua* being is neither accidental nor incidental. The idea of a reduction process in the discovery, classification, and ordering of the principles of *each* genus of being is a fundamental feature of his formal methodology. Indeed, the burden of his *Prior Analytics* is primarily to provide a formal apparatus through which such determinations and reductions can take place with apodeictic necessity. Aristotle reiterates the same commitment here in the context of the *Metaphysics* again: “he who knows best about each genus must be able to state the most certain principles of his subject, so that he whose subject is existing things *qua* existing must be able to state the most certain principles of all things” (*Metaph.* Γ 3. 1005b8-10; McKeon 1941, p. 736).

Before continuing with the logicist reading of the Aristotelian text, an interesting exegetical matter may not be amiss here. In his commentaries on the foregoing *Metaphysics*’ passage 1005b1-10, Alexander of Aphrodisias offers two emendations. In the original Aristotelian text, the sequence of argumentation seems to stream thus:

- (1) Physics is a kind of wisdom but it is not first philosophy.
- (2) People can only engage in the study of truth with a training in or grasp of logic.
- (3) It belongs to the philosopher to study the principles of syllogism. And,
- (4) the person who knows best about each genus is the one who states its most certain principles.

In his commentary, nevertheless, Alexander of Aphrodisias recommends a juxtaposition of the second and third stages in the series; for, in his logical reconstruction of the Aristotelian reasoning, the second step “follows more closely from” the third one and “would properly be prefixed to” the fourth phase (Alex. *In Metaph.* 267, 19-22; Madigan 1993, p. 47).<sup>18</sup> This, though unwittingly on the part of Alexander, gives more poignancy to the specific

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<sup>18</sup> Consequently, some Aristotelian scholars have come to regard this second step of the sequence in this passage as a later addition to the text by Aristotle. See Madigan (1993) p. 154 n. 253.



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significance of the syllogistic theory in the manner of a logicist line of thinking with regard to the understanding of Aristotle's ultimate philosophical approach.

The second emendation of Alexander to the text, which again encourages or heightens a logicist approach to Aristotle's outlook here, is his gloss on who is qualified to carry out the demonstrations when drawing on the syllogistic formalization. Alexander writes:

By principles of syllogism he [Aristotle] means the principles of demonstration, for the axioms are the universal principles of demonstration. For the principles and premises corresponding to each science, which are proper to the things demonstrated in that science, belong to the one who demonstrates in each science; it is their task to know these principles and premises; each of them will do this, while taking from the expert in demonstration, the philosopher, [knowledge of] how one should derive the premises of the demonstration from the properties of that which is being demonstrated, and of how one should combine these premises with one another, as well as of the other matters discussed in the works on demonstration. (Alex. *In Metaph.* 267, 34-268, 6; Madigan 1993, p. 47)

In other words, "the one who demonstrates," in Alexander's commentary, is not merely any practitioner who demonstrates in this or that science, but a *bona fide* expert in demonstration as specified in the Aristotelian analytical text. Consequently, this appears to imply that the *first philosopher* is strictly speaking the *logician*. Moreover, Alexander's circumscription of first philosophy to logic is not only going to be congenial to the proponents of logicism but also proffers a wider perspective in terms of situating Aristotle's approach in a new light.

Now, picking up the earlier thread in Aristotle's own text in terms of its logicist leanings, we may pose the question: what is after all the outcome of the study of being as being by inquiring into "the principles of syllogism"? The result is a principle, remarks Aristotle, that "is the most certain of all": "*It is, that the same attribute cannot at the same time belong and not belong to the same subject and in the same respect*": that is, the law of non-contradiction. (*Metaph.* Γ 3.1005b17-20; McKeon 1941, p. 736). Yet, to leave no room for doubt as to the core fundamentality and centrality of this principle *vis-à-vis* any other principles, including *mathematical* ones, Aristotle sharpens his 'logicist' stance by the following observation:

This, then, is the most certain of all principles [...] *that all who are carrying out a demonstration reduce it to this as an ultimate belief; for this is naturally the starting-point even for all the other axioms.* (*Metaph.* Γ 3.1005b22, 1005b31-34; McKeon 1941, pp. 736-7, emphasis added)

From a comparative point of view, it is worth noting Leibniz's take on the law of non-contradiction here. He writes:

The great foundation of mathematics is the *principle of contradiction* [...] This single principle is sufficient to demonstrate every part of arithmetic and geometry, that is, all mathematical principles.<sup>19</sup>

This statement of Leibniz not only displays an exact echo of Aristotle's approach to the law of non-contradiction as presented in the preceding passage from the *Metaphysics* but also highlights the logicist implication of it in an important and immediate manner.

Given such a reading of the Aristotelian text, the philosophical upshot is that, in Aristotle's ontology, what ultimately underwrites being and existence is logic, or, more specifically, the law of non-contradiction. This thus paves the way for the claim that metaphysics and metalogic seem to be intrinsically co-extensive in the Aristotelian architecture. On this basis, it may not therefore be an anachronism to think of Aristotle as an early proponent or a precursor of logicism, except on a grander scale than its circumscribed mathematical variety as presented in the works of Leibniz, Frege, Russell and later neo-logicists when it comes to the overall ontological structure of reality.

Philosophically, however, there is a question or puzzle here that deserves some attention, albeit very briefly, which forms the concluding part of this paper. If, as I contend, there is a logicist undertone, if not an outright overtone, in Aristotle's *Metaphysics* in arguing for the reduction of *all axioms* to the most certain of all principles, the law of non-contradiction, why do not we see an application or extension of this project either in a wholesale or piecemeal fashion by Aristotle himself or his disciples and successors? Other than an exegetical clarification by Alexander of Aphrodisias that the first philosopher in Aristotle's *Metaphysics* is intended to be the logician, the

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<sup>19</sup> Loemker (1969) p. 677.

prototypical Aristotelian logicist project appears to be immediately stalled after its inauguration.

There may be two explanations for the arrested development of the Aristotelian logicism. One thought is the apparent overcommitment to certain *rigid* and *irreducible* categories within the Aristotelian conceptual architecture such that the idea of a reduction process in the discovery, classification, and ordering of the principles of *each* genus of being becomes an inflexible fundamental feature of Aristotle's formal methodology. Indeed, the burden of his *Prior Analytics* is primarily to provide a formal apparatus through which such determinations and reductions can be established with necessity. In the *Posterior Analytics*, in particular, he seems to set up such stringent conditions for conceptual reducibility that a logicist reduction becomes for all intents and purposes a punitive practice. Specifically, on the relationship between geometry and arithmetic, not only does Aristotle express full recognition and awareness of the purported possibility of reducing geometrical truths to arithmetical ones, but he also expressly argues against it:

we cannot in demonstrating pass from one genus to another. We cannot, for instance, prove geometrical truths by arithmetic. For there are three elements in demonstration: (1) what is proved, the conclusion – an attribute inhering essentially in a genus; (2) the axioms, i.e. axioms which are premisses of demonstration; (3) the subject-genus whose attributes, i.e. essential properties, are revealed by the demonstration. The axioms which are premisses of demonstration may be identical in two or more sciences: but in the case of two different genera such as arithmetic and geometry you cannot apply arithmetical demonstration to the properties of magnitudes unless the magnitudes in question are numbers. (*An. Post.* 74a37-75b5; McKeon 1941, pp. 121-2)

Although in his general discussion of the topic of conceptual reduction Aristotle allows the distinction between *superior* and *subordinate* in relation to two domains or sciences such that “optical problems are subordinated to geometry, mechanical problems to stereometry, harmonic problems to arithmetic, the data of observation to astronomy” (*An. Post.* 78b39-79a1; McKeon 1941, p. 130), the inflexibility and inelasticity of his categorical classifications appear to pose an obstacle to satisfying the second characteristic of the logicist project mentioned earlier. That is, the requirement of providing a transparent process of *conceptual reduction* whereby the concepts of the prospective target domain for reduction can be defined in terms of the

concepts of, what ironically Aristotle himself calls, a “more exact than and prior to” domain (*An. Post.* 87a33; McKeon 1941, p. 153).

The other explanation for the underdevelopment of logicism in Aristotle and his heirs may be sought in the overgeneralization of the syllogistic theory to all domains of knowledge in the sense of neglecting to recognize the prevalence of *asyllogistic* deductive reasoning and argumentation. This could be partly attributed to overestimating both (i) the applicability of Aristotle’s dichotomy between *perfect* and *imperfect* syllogism and thereby ambitiously assimilating all asyllogistic reasoning to species of imperfect syllogism and (ii) the ability to convert the presumed imperfect cases of syllogism to the perfect one. Thus, Russell’s remark is fitting here that the “syllogism in all its figures belongs to Symbolic Logic, and would be the whole subject if all deduction were syllogistic, as the scholastic tradition supposed. It is from the recognition of asyllogistic inferences that modern Symbolic Logic, from Leibniz onward, has derived the motive to progress”.<sup>20</sup>

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ANTÓNIO DE CASTRO CAEIRO

**THE SNUBNESS-STRUCTURE AND  
THE INEXTRICABLE SOUL-BODY RELATIONSHIP**

**Abstract**

This paper is conceived in the footsteps of *The Undivided Self: Aristotle and the Mind-Body Problem* by David Charles, OUP 2021. It examines the intricate relationship between mind and body through the lens of Aristotle's 'Snubness-structure' ('S-structure') according to David Charles's interpretation in *The Undivided Self*. I explore how this conceptual framework, exemplified by the distinction between nasal concavity and geometric concavity, provides a comprehensive approach to understanding the inseparability of form and matter in natural phenomena. The study extends this analysis to various psychological faculties, including perception (*aisthēsis*), desire (*epithymia*), thought (*nous*) and emotions (*pathē*). By investigating the application of the S-structure across these domains, I aim to elucidate Aristotle's nuanced view of the mind-body relationship, challenging both reductionist and dualist interpretations. This research contributes to ongoing debates in philosophy of mind, offering insights into how ancient philosophical concepts can inform contemporary discussions on the nature of consciousness and embodied cognition.

**Keywords**

Snubness in Aristotle, Aristotle's *On Soul*, Mind-Body Relationship, Hylomorphism, Aristotle's Philosophy of Mind

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In a recent book (2021),<sup>1</sup> David Charles interprets the soul as essentially embodied (or somatized) and the body as essentially ensouled (psychic or mental): Aristotle’s psychophysicalism eliminates the mind-body problem since they are “inextricably intertwined”.<sup>2</sup>

David Charles formulates the mind-body problem in the following way:

**T1.** Charles (2021) p. 1:<sup>3</sup>

Our mind-body problem can be expressed, at first approximation, as follows: how can the physical, defined without any explicit reference in its definition to the psychological, give rise to the psychological with its distinctive features, where the psychological is defined (in part or in whole) without any explicit reference in its definition to the physical?

*1. Various Strategies Attempt to Make the Connection*

**T2.** Charles (2021) pp. 1-2:

(a) Reductionist materialism: “the psychological [...] can be fully explained in terms of the physical”,

(b) Non-reductionist materialism: “the psychological, so defined, ‘arises out’ of the physical but is not fully explicable in terms of it.” [...] “[p]sychological properties are not reducible to physical properties but rest on, or emerge out of, them”.

(c) Functionalism: “The psychological itself, phenomenal consciousness and rational commitments [...] all psychological phenomena can be unproblematically realized in physical events or states”.

(d) Pan-psychism or spiritualism: “the physical [...] or some parts of it, is redefined as alive with consciousness or proto-consciousness, primitively disposed to have conscious experience”.

(e) Neutral monism: “the physical and the psychological, defined as above, are each to be understood as emerging from a more basic type of stuff which is neither physical nor psychological but neutral between them”.

These interpretations put the emphasis on the mind or the body in a radical way. In a general ontology: form or matter, respectively. They all seem to

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<sup>1</sup> Charles (2021). See also Charles (2023).

<sup>2</sup> This is how Corcilius (2023) p. 304 puts it. For critical reviewing, cf. Hahmann (2023); Shields (2023); Simpson (forthcoming).

<sup>3</sup> The texts with the acronym T, followed by the corresponding numeral indicating the order of the cited occurrence, are from Aristotle and David Charles. It seemed to us that this way the reader can more easily follow the line of argumentation. As a rule, the translations used for Aristotle are by Hett (1957), Rackham (1926), Rackham (1935) and Cooke & Tredennick (1938). The passages translated by Charles are marked.



differ from Aristotle's attempt to understand beings in terms of a hylomorphic structure.<sup>4</sup> This has the effect of failing to bear in mind that it is precisely the relationship between *psychē* and *sōma* that is essential. In other words, if *psychē* is the *eidos* of human beings and *sōma* is their *hylē*, then it is the inextricable relationship between the two that ought to be established and fixed at various points:

- 1) one referring to the other,
- 2) one not existing without the other,
- 3) one definitionally interdependent on the other.
- 4) The action of *psychē* is on extra-mental objects. Extra-mental objects: other people, other things, are understood through the inextricable reference to *psychē*.

## 2. *Enmattered Forms*

T3. Charles (2021) p. 6 n. 12:  
Forms can be enmattered other than in bodies.

- 5) Forms can be 'embodied' and 'enmattered'.

Isolating *psychē*, abstracted from the body, does not abolish the structuring hylomorphic relation in explaining mental activity. Similarly, the isolation of material bodies, abstracted from mental intervention, does not remove either the hylomorphic structural relation in explaining them. Charles gives an alternative interpretation that there is an inextricable relationship between mind and body in Aristotle. According to this interpretation, phenomena are essentially psychophysical, psychosomatic or, to use another formulation, hylomorphic. "Emotions, desire, and perception are, in his view, inextricably psycho-physical." (Charles 2021, p. 6).

T4. Charles (2021) pp. 2-3:  
He (*sc.* Aristotle) developed a way of thinking about psychological and physical phenomena which, once properly set out, dissolves the mind-body problem that these proposals are

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<sup>4</sup> Cohen (1992) pp. 5-22.

designed to address. [...] [I]n his view, [perception, desire, emotion] are inextricably psycho-physical activities whose essential properties are inextricably psycho-physical. [...] Neither can be adequately defined without reference to the other. [...] “The phenomena at issue cannot be defined by decomposition into two definitionally separable components, one purely psychological (defined without explicit reference to the physical), the other purely physical (defined without reference to the psychological).

What I want to do here is, first, to present Charles’s actual research program, the contemporary debate that has taken place and continues to do so, a truly *gigantomachia peri tēs ousias* about the mind-body relationship. I will then briefly present the lines of research in which it is possible to understand the thesis of the indivisibility of the self in action.

### *3. Aristotle’s Account*

**T5.** Charles (2021) p. 5:

[A] The psychological activities involved in emotions, desire and perception (and their essential properties) are defined as inextricably psycho-physical, not definable by decomposition into two separately defined types of phenomena, one purely psychological, the other purely physical. Being psycho-physical is (in a way to be explicated) an essential aspect of their nature.

[B] The relevant specific type of physical activity cannot be defined without explicit reference in their definition to some psycho-physical activity. It too is an essentially psycho-physical activity, even though the relevant matter is not itself primitively endowed with consciousness.

Three fronts are being developed to solve the problem. These are 1) perception, 2) desire and emotion, 3) artifacts. First, in perception, the indivisibility of the relationship between perception and perceived must be attested, not as divisible but as inextricable.

### *4. Explaining Perception*

**T6.** Charles (2021) p. 7:

We can grasp somewhat more precisely what is involved in Aristotle’s claim [A] by considering his discussion of snubness, which he defined, I shall suggest, as nasal concavity: a type of concavity which cannot be defined without essential reference to the nose. Snubness is not, in his view, a type of concavity, defined independently of noses, which is realized by or related (in some way) to noses. It is, instead, an essential (de re) aspect of the nature of the relevant type of concavity that it is nasal concavity. This type of concavity is, we might say,

or intrinsically, nasal. The form in question contains, in Aristotle's own terminology, being nasal 'as a part'. [...] Snubness is to be defined in ways which explicitly refer in its definition to a distinctively nasal way of being concave. It is because snubness is, in its nature, this specific type of concavity that it can only be realized in noses.

Aristotle's example is that of *simotēs* as a description of a type of nose shape other than concavity, a formal geometric description of a shape that does not necessarily apply to a nose but can describe, for example, bowls, certain types of legs, cavities and so on.

The sigma structure model is used to analyse emotions.<sup>5</sup> Psychologically, anger is a desire for revenge. When we take a closer look at emotions, particularly to anger but also to fear and desire, we find the same inextricability *sōma psychē* or *hylē morphē* that we have found in snubness as a nose kind of concavity, or a concave kind of geometric pattern captured by perception. We find in Aristotle's emotion analysis a parallel to contemporary developments, although the inextricability comprehension of mind connecting to the body seems to be different to the alternative post Cartesian versions and check them out. What is interesting here is trying to apply the sigma structure to the emotional level, so that, each emotion, like each perception, should be interpreted as a mental activity that essentially refers to a somatic state, process or activity, just as a somatic state, process or activity refers to a morphologically defined emotional activity in the mind.

### 5. Aristotle's Account of Anger

T7. Charles (2021) p. 6:

The type of desire for revenge which defines anger is, in his view, an essentially embodied, 'hot' type of desire, defined in terms which explicitly refer to its being a specific type of bodily activity. Its form, in Aristotle's terminology, is captured in this definition. One cannot define its form simply as the desire for revenge without referring to it as an embodied-in-heat type of desire. The type of desire for revenge which defines anger, and constitutes its form, is, in his account, an inextricably psycho-physical, enmattered, activity with essential properties of the same type. Its form itself is, in Aristotelian terms, definitionally enmattered.

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<sup>5</sup> Koslicki (2008); Shields (2012); Reeve (2012).

Let us concentrate on some fundamental aspects of *De Anima* I 1 in the light of the foregoing. Aristotle begins by posing the problem that creates our ‘*aporia*’: are there passions of the soul that occur in isolation from the body, or are there not? For Aristotle, the soul can be an agent or a passive subject, it can act, produce actions or be subjected to them. Most of the soul’s passions seem to involve the body. Even pure thought does not seem to be exercised without imagination, and imagination is involved in the body. (Arist. *De An.* I 1.403a3-9)

**T8.** Arist. *De An.* I 1.403a5-10:

If we consider the majority of them, there seems to be no case in which the soul can act or be acted upon without involving the body, e.g. anger, courage, appetite, and sensation generally. Thinking seems the most probable exception; but if this too proves to be a form of imagination or to be impossible without imagination, it too requires a body as a condition of its existence.

φαίνεται δὲ τῶν μὲν πλείστων οὐθὲν ἄνευ τοῦ σώματος πάσχειν οὐδὲ ποιεῖν, οἷον ὀργίζεσθαι, θαρρεῖν, ἐπιθυμεῖν, ὄλως αἰσθάνεσθαι, μάλιστα δ’ ἔοικεν ἰδίῳ τὸ νοεῖν· εἰ δ’ ἐστὶ καὶ τοῦτο φαντασία τις ἢ μὴ ἄνευ φαντασίας, οὐκ ἐνδέχοιτ’ ἂν οὐδὲ τοῦτ’ ἄνευ σώματος εἶναι.

Aristotle is cautious. If it were the case that pure thought could not be involved with the body, then the mind could have a “separable” existence (*chōristē*).

**T9.** *De An.* I 1.403a10-12:

If there is any way of acting or being acted upon proper to soul, soul will be capable of separate existence; if there is none, its separate existence is impossible.

εἰ μὲν οὖν ἐστὶ τι τῶν τῆς ψυχῆς ἔργων ἢ παθημάτων ἰδιον, ἐνδέχοιτ’ ἂν αὐτὴν χωρίζεσθαι· εἰ δὲ μὴ ἐστὶν ἰδιον αὐτῆς, οὐκ ἂν εἴη χωριστή.

It would be incapable of having a separate existence just like:

**T10.** *De An.* I 1.403a12-15:

In the latter case, it will be like what is straight, which has many properties arising from the straightness in it, e.g. that of touching a bronze sphere at a point, though straightness divorced from the other constituents of the straight thing cannot touch it in this way.

ἀλλὰ καθάπερ τῷ εὐθεῖ, ἢ εὐθύ, πολλὰ συμβαίνει, οἷον ἄπτεσθαι τῆς [χαλκῆς] σφαίρας κατὰ στιγμήν, οὐ μέντοι γ’ ἄψεται οὕτως χωρισθὲν τι εὐθύ.

It would be like a straight line in geometry compared to a hockey stick if the soul were separated from the body. The hockey stick hits the tip of a hockey ball. The straight line does not have a point of contact with the geometric sphere. This is the sigma structure in action. Just as the stick is different from the straight line, the nasal concavity (snubness) is different from the geometric concavity.

**T11.** *De An.* I 1.403a15-19:

The mind it cannot be so separated at all, since it is always found in a body (μετὰ σώματός τινος). It therefore seems that all the affections of soul involve a body-passion, anger, gentleness, fear, pity, courage, joy, loving, and hating; in all these there is a concurrent affection of the body (πάσχει τι τὸ σῶμα).

ἀχώριστον γάρ, εἴπερ αἰεὶ μετὰ σώματός τινος ἐστίν. ἔοικε δὲ καὶ τὰ τῆς ψυχῆς πάθη πάντα εἶναι μετὰ σώματος, θυμὸς, πραότης, φόβος, ἔλεος, θάρσος, ἔτι χαρὰ καὶ τὸ φιλεῖν τε καὶ μισεῖν· ἅμα γὰρ τούτοις πάσχει τι τὸ σῶμα.

In the list of emotions, perception, desire and thought, there is a dichotomy between the separability or inseparability of the mind from the body. The indivisibility of the mind is formulated here in theory. The mind cannot be separated from the body – except in certain circumstances, as we shall see – by abstraction in the way that we can abstract from the nose its concavity in its geometry and from the stick its rectilinearity. In the case of anger, we can also isolate the desire for revenge from the boiling of the blood. But the research project must aim at an essence that is “enmattered formulae” or embodied *eidē* (*ennuloi logoi*).

**T12.** Charles (2021) p. 20:

Sometimes one is not stimulated or made afraid by great external misfortunes. But sometimes one is moved by small and insignificant things, when the body is stirred up (*orgai*) and is in the type of condition one is in when angry. Sometimes, even when nothing frightening happens, one is in the emotional states of one afraid.

**T13.** *De An.* I 1.403a19-27:

In support of this is the fact that, while sometimes on the occasion of violent and striking occurrences there is no excitement or fear felt. (μηνύει δὲ τὸ ποτὲ μὲν ἰσχυρῶν καὶ ἐναργῶν παθημάτων συμβαινόντων μηδὲν παροξύνεσθαι ἢ φοβεῖσθαι).

a) On others faint and feeble stimulations produce these emotions, viz. when the body is already in a state of tension resembling its condition when we are angry. (ἐνίστε δ' ὑπὸ μικρῶν καὶ ἀμαυρῶν κινεῖσθαι, ὅταν ὀργᾷ τὸ σῶμα καὶ οὕτως ἔχη ὥσπερ ὅταν ὀργίζηται).

b) Here is a still clearer case: in the absence of any external cause of terror we find ourselves experiencing the feelings of a man in terror. (ἔτι δὲ μᾶλλον τοῦτο φανερόν· μηθενὸς γὰρ φοβεροῦ συμβαίνοντος ἐν τοῖς πάθεσι γίνονται τοῖς τοῦ φοβουμένου).

c) From all this it is obvious that the affections of soul are enmattered formulae. (εἰ δ' οὕτως ἔχει, δῆλον ὅτι τὰ πάθη λόγοι ἐνυλοὶ εἰσιν).

d) It follows that their definitions will be of this type: to be angry is a certain kind of process of a body of this type (or a part or a capacity of it) brought about by this for this goal. (ὥστε οἱ ὅροι τοιοῦτοι οἷον “τὸ ὀργιζέσθαι κίνησις τις τοῦ τοιοῦδι σώματος ἢ μέρους ἢ δυνάμεως ὑπὸ τοῦδε ἕνεκα τοῦδε”).

### *6. Hypersensitive Killing Machine*

**T14.** Charles (2021) p. 8:

Achilles (to take the case of a famously angry person) would not be a properly unified subject, endowed with an integrated capacity to respond appropriately when wronged. In Aristotle's view, by contrast, Achilles' capacity for anger is an inextricably psychophysical capacity of an inextricably psycho-physical subject, an essentially integrated organism with its own unified teleological goals. A capacity of this specific type is required to generate the one unified activity that ensued before the walls of Troy.

Aristotle sees Achilles as a psycho-physical unity,<sup>6</sup> where his mental and physical states are intertwined and inseparable. This integrated nature means that Achilles's anger is not just an isolated emotion but a reflection of his entire being, influenced by his body, mind and soul in concert. This integration ensures that his responses are not only appropriate but also aligned with his overall goals and nature. Achilles's anger, then, is an expression of his *undivided self*. It is a part of his *telos*, or purpose, which drives him towards specific ends. This unity allows for the seamless generation of actions that are coherent and directed towards his goals. In the context of the Trojan War, this means that his anger and subsequent actions are not random or disjointed but are part of a unified activity stemming from his *undivided self*. His assault on the walls of Troy is thus a manifestation of his coherent and unified psycho-physical nature, embodying his teleological drive towards achieving honour and responding to perceived slights in a manner consistent with his character.

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<sup>6</sup> Cf. Gill (1989).

**T15.** *De An.* I 1.403a25-b2:

That is precisely why the study of the soul must fall within the science of Nature, at least so far as in its affections it manifests this double character. Hence a physicist would define an affection of soul differently from a dialectician; the latter would define e.g. anger as the appetite for returning pain for pain, or something like that, while the former would define it as a boiling of the blood or warm substance surround the heart. The latter assigns the material conditions, the former the form or formulable essence.

καὶ διὰ ταῦτα ἤδη φυσικοῦ τὸ θεωρῆσαι περὶ ψυχῆς, ἢ πάσης ἢ τῆς τοιαύτης. διαφερόντως δ' ἂν ὀρίσαιντο ὁ φυσικὸς [τε] καὶ ὁ διαλεκτικὸς ἕκαστον αὐτῶν, οἷον ὀργή τί ἐστίν· ὁ μὲν γὰρ ὀρεξίν ἀντιλυπήσεως ἢ τι τοιοῦτον, ὁ δὲ ζέσιν τοῦ περὶ καρδίαν αἵματος καὶ θερμοῦ. τούτων δὲ ὁ μὲν τὴν ὕλην ἀποδίδωσιν, ὁ δὲ τὸ εἶδος καὶ τὸν λόγον.

A physiologist would define an affection of the soul differently from a dialectician. The dialectician would define anger as the intention of returning pain for pain (*orexis antilupēseōs*) or something like that. The physiologist would define it as a boiling of the blood (*zesis tou peri kardian haimatos*) or warm substance surround the heart (*tou peri kardian thermou*). The physiologist assigns the material conditions (*tēn hylēn apodidōsin*). The dialectician assigns the form or formulable essence (*to eidos kai ton logon*). But this would be insufficient; for if the dialectician seeks to formulate well the essence of the situation, he should state its actual existence there as the embodiment of it in a material body such as it exists and can be described by the physiologist.

**T16.** *De An.* I 1.403b2-7:

This logos here of this type is the logos of the thing, though it must be embodied in such a matter (ἐν ὕλῃ τοιαύτῃ) if it is to be at all. Thus, the logos (formal cause) of a house is such that can be so formulated 'a shelter against destruction by wind, rain, and heat'; the physicist would describe it as 'stones, bricks, and timbers'; but there is a third possible description which would say that it was that form in that material with that purpose or end.

(<οὗ> ἕνεκα τῶνδ᾽). ὁ μὲν γὰρ λόγος ὅδε τοῦ πράγματος, ἀνάγκη δ' εἶναι τοῦτον ἐν ὕλῃ τοιαύτῃ, εἰ ἔσται. ὡσπερ οἰκίας ὁ μὲν λόγος τοιοῦτος, ὅτι σκέπασμα κωλυτικὸν φθορᾶς ὑπ' ἀνέμων καὶ ὄμβρων καὶ καυμάτων, ὁ δὲ φήσει λίθους καὶ πλίνθους καὶ ξύλα, ἕτερος δ' ἐν τούτοις τὸ εἶδος <οὗ> ἕνεκα τῶνδ᾽.

The dialectician formulates the formal cause, the logos, of the house in the same way as he formulates anger. The house is a shelter against external causes of destruction: wind, rain and heat, just as he had defined anger as a tendency, inclination or intention to retaliate pain for pain.

**T17.** *De An.* I 1.402b25-403a2:

Dialectician point of view:

For the starting-point of every demonstration is the statement of the subject's essential nature, and definitions which do not enable us to know the attributes, or even to make a tolerable guess about them, are clearly laid down merely for argument's sake and are utterly formal and empty.<sup>7</sup>

πάσης γὰρ ἀποδείξεως ἀρχὴ τὸ τί ἐστίν, ὥστε καθ' ὅσους τῶν ὀρισμῶν μὴ συμβαίνει τὰ συμβεβηκότα γνωρίζειν, ἀλλὰ μὴδ' εἰκάσαι περὶ αὐτῶν εὐμαρές, δῆλον ὅτι διαλεκτικῶς εἴρηγται καὶ κενῶς ἅπαντες.

The reductionist physiologist formulates the house in terms of matter. He may have a house in view, but he sees only stones, bricks and wooden planks, just as he can have in view an emotion in its total ontological meaning but reduces it down to the boiling of the blood or to a hot substance around the heart.

**T 18.** *De An.* I 1.403b7-16:

Which of these is the student of nature? Is it the one who speaks about the material, ignoring the form, or the one concerned only with the logos? Or is it rather the one combining both? But in that case who is each of the others. Or is no one concerned with the affections of material that are neither separable nor treated as separable? The student of nature is concerned with all the works and affections of a certain sort of body and a certain sort of material, while for other sorts it is someone else.

τίς οὖν ὁ φυσικός τούτων; πότερον ὁ περὶ τὴν ὕλην, τὸν δὲ λόγον ἀγνοῶν, ἢ ὁ περὶ τὸν λόγον μόνον; ἢ μᾶλλον ὁ ἐξ ἀμφοῖν; ἐκείνων δὲ δὴ τίς ἐκάτερος; ἢ οὐκ ἔστιν εἷς ὁ περὶ τὰ πάθη τῆς ὕλης τὰ μὴ χωριστὰ μὴδ' ἢ χωριστὰ, ἀλλ' ὁ φυσικός περὶ ἅπανθ' ὅσα τοῦ τοιοῦδι σώματος καὶ τῆς τοιαύτης ὕλης ἔργα καὶ πάθη, ὅσα δὲ μὴ τοιαῦτα, ἄλλος.

There is a need for a point of view that analyses the inextricability of form in matter and the non-cancellable formal conditions in matter. Achilles is a *nomen agentis*. Anger and Achilles are synonyms. Just as in order to think about what *phronēsis* is we have to understand how the *phronimos* behaves, or by understanding *sophos* we understand *sophia*, so the indivisible self is understandable as a concrete being and not as a dialectically isolated substance.

**T19.** Arist. *EN* VI 5.1140a24-25:

We may arrive at a definition of prudence by considering who are the persons whom we call prudent.

Περὶ δὲ φρονήσεως οὕτως ἂν λάβομεν, θεωρήσαντες τίνας λέγομεν τοὺς φρονίμους.

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<sup>7</sup> Charles (2021) p. 23.



T20. *De An.* I 1.403b16-19:

The affections of soul are inseparable from the material substratum of animal life, to which we have seen that such affections, e.g. passion and fear, attach, and have not the same mode of being as a line or a plane.

τὰ πάθη τῆς ψυχῆς οὕτως [εἶναι] ἀχώριστα τῆς φυσικῆς ὕλης τῶν ζώων, ἢ γε τοιαῦθ' ὑπάρχει <οἶα> θυμὸς καὶ φόβος, καὶ οὐχ ὥσπερ γραμμὴ καὶ ἐπίπεδον.

It looks like, agreeing with Charles, anger and fear, unlike the line and the square/the surface are very much like the snubness:

- (a) not being abstractable from matter and
- (b) not definable independently of matter.

### 7. Let Us Wrap Up

1) Cartesian dualism identifies and isolates two entities: *cogitatio* and *extensio*, which are so different that they cannot be thought of as compatible. For how can a being that is by definition non-extensive be related or connected in any way to a being that is by definition spatially extended?

2) This is why some expressions ‘psychosomatic phenomena’, ‘psychophysiology’, on closer analysis, do not make any sense at all, for they are connecting a physical body with a disembodied mind. The meaning of which corresponds to the expression ‘squaring the circle’: *eidē enmūla* ‘enmattered essences (or forms)’ (Charles 2021, p. 6).

3) Therefore, interpreting Aristotle’s self or the relationship between *psychē* and *sōma* based on Cartesian dualism is anachronistic.

If this conclusion is correct, we understand far better Hector’s murder and the degrading treatment of his body in light of Achilles’s desire for revenge. We get what Achilles went through, the tension, the boiling blood, the hot substance around his heart, the inextricable emotion: the desire for revenge that each of us knows so well. Achilles’s intention has a motive, it has an occasion, it has a perpetrator, it has an agent, it has an end, it has the power to be in control of the action. The efficient cause and the final cause are determined by the inextricable relation between desire for revenge (formal cause)

and the boiling of the blood (material cause)<sup>8</sup> in this kind of body. We need to think about the concrete situation that triggers anger (efficient cause: death of Patroclus). We need to put ourselves in Achilles's shoes. Achilles is "a hypersensitive killing machine".<sup>9</sup>

### 8. *Phenomena Generated in the Soul (EN II 4.1105b19-1106a7)*

Aristotle identifies *pathos* as one of the three phenomena generated in the soul (*ginomena en tēi psychēi*), alongside *dynamis* and *hexeis*. Aristotle seeks to identify ethical excellence as a *hexis* (state of having). I aim to study the applicability of the S-structure model and the inextricability thesis to the different levels of the *psychē*'s involvement (*dynamis*, *pathos*, and *hexeis*) with what can emotionally happen to us. *Pathē*, *dynamis* and *hexeis* are structures of the human soul, and they can be articulated in relation to each other. What is specifically the relationship between *pathos*, *dynamis* and *hexeis*? The experience begins with *pathos* and ends in *pathos*, regardless of the level considered. Therefore, between *dynamis* and *hexis* lies *pathos*. If we accept that *aretē* is the best possible choice for an action and *kakia* is the worst, what is their relationship on the emotional pathological level? The analysis of *pathē* is decisive for understanding the practical horizon (*praxis*). But in what way? Is there a pathological plasticity in the way we experience *pathē*?

#### 8.1 *Pathos*

**T21.** *EN II 4.1105b19-23:*

I speak of such affections as desire, anger, fear, audacity, envy, joy, friendship, hatred, longing, jealousy, compassion, and, in general, everything accompanied by pleasure or suffering. ὅλως οἷς ἔπεται ἡδονή ἢ λύπη.

1) Emotions, with their multiplicity of content, shape our experiences. They involve us, leaving us in certain states and creating lasting impressions within us.

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<sup>8</sup> Cf. Henry (2020).

<sup>9</sup> "Achilles, the most hypersensitive killing machine in the history of warfare": Meyer (2003) p. 5.

2) The diverse configurations in which emotions manifest have distinct outlines, closely linked, yet clearly different, such as envy and jealousy. These are well-known phenomena.

3) Feelings and emotions are formally defined, though not abstractly. Emotions (affections, feelings) give rise to impressions, leave us in specific mental states and shape life situations.

These are phenomena that, in general, are accompanied by pleasure or suffering. Each emotional experience is typically accompanied by either pleasure or pain. In a corresponding passage of the *Eudemian Ethics*, Aristotle states that *pathē*:

**T22.** *EE* 1220b12-14:

Are phenomena such as wrath, fear, shame, and desire, that in general are accompanied by a perceptive pleasure or a perceptive suffering from their own constitution, in and of themselves.

λέγω δὲ πάθη μὲν τὰ τοιαῦτα, θυμὸν φόβον αἰδῶ ἐπιθυμίαν, ὅλως οἷς ἔπεται ὡς ἐπὶ τὸ πολὺ ἢ αἰσθητικὴ ἡδονὴ ἢ λύπη καθ' αὐτά.

That is, *pathē* are perceptive phenomena, neither blind nor empty. The soul's affections are endowed with a 'sensitive' element. There is an apperception peculiar to any pleasure and pain accompanying each emotion, which differs from a purely theoretical and cognitive evaluation or apperception of pleasure and suffering. Emotions intrinsically carry within themselves (*kath' hauta*) the sensation (*aisthēsis*) of each content (sweet or sorrowful).

**T 23.** *EE* 1221b36-37:

The passions are defined by suffering and pleasure.

τὰ δὲ πάθη λύπη καὶ ἡδονὴ διώρισται.

It is within the intimacy of each passion, so to speak, that one finds an apperception of the intrinsically particular way it affects us and leaves us in a certain state. That which is impressive makes an impression on us, carrying with it the possibility of its own interpretation. An emotion is both perceptive and perceivable, as it manifests and discloses its presence within us, allowing us to sense what is happening to us, who is affecting us and how it all unfolds.

The S-structure and the thesis of the inextricable relationship between body and soul are at work here. As we saw in *De Anima* A.1, hylomorphism accounts not only for how a *pathos* is described as psychological content but also for how it objectively and physiologically occurs in the body. The qualitative interrelation between body and soul precedes the dual accounts of emotions. However, the implication is even deeper. Every emotion constitutes an intentional desire (*orexis*) for either pursuit (*diōxis*) or flight (*phygē*). We try to avoid and escape situations or objects when we feel the threat of suffering, and we pursue when we feel the promise of pleasure. The world's intelligibility implicates us sensorially and perceptively in each of its contents, as well as in the interpretative mobility of pursuit and escape. If this is correct, every time we feel like 'something', this 'something' is different for each person and in each instance, yet we all understand the potential pleasure and suffering it triggers.

Apperception is a dynamic concept, so to speak. It is not just a theoretical notion, but rather a type of desire (*orexis*). Every emotion carries a certain level of pleasure or pain that shapes each situation in which we find ourselves; however, the pleasure and pain we experience are determined by our pursuit or avoidance of them. This is precisely how we could have desiring (*orexis*) and thinking (*dianoia*) in the same structuring level.

**T24.** *EN* VI 2.1139a21-22:

It is precisely the same (*ὅπερ*) what in thought is affirmation and negation, what in *orexis* is pursuit and flight.

*ἔστι δ' ὅπερ ἐν διανοίᾳ κατάφασις καὶ ἀπόφασις, τοῦτ' ἐν ὀρέξει διώξις καὶ φυγή.*

## 8.2 *Dynameis*

**T25.** *EN* II 4.1105b23-25:

Potencies (*δυνάμεις*) are the conditions of possibility of our being affectable by affections. We say according to each *δύναμις*, we can become angry, suffer, or feel compassion.

*δυνάμεις δὲ καθ' ἅς παθητικοὶ τούτων λεγόμεθα, οἷον καθ' ἅς δυνατοὶ ὀργισθῆναι ἢ λυπηθῆναι ἢ ἐλεῆσθαι.*

*Dynamis* is the capacity we have to be affected by certain emotions (*pathē*). There is for each of us a unique way that we are affected by emotions. Each emotion leaves an impression on us, putting us in a particular state. Without

such a condition, the possibility of being affected would be non-existent, rendering us unable to be affected in certain ways. Conversely, we can recognize that some *pathē* may disturb us intensely, while others leave us indifferent. Whether we pursue certain pleasures (*hēdonai*) and avoid certain pains (*lupai*) depends on whether we are susceptible of being affected (*pathētikoi*) by or likely to take pleasure in or suffer from them. The specific content of the pleasure pursued, or the suffering avoided can differ from person to person and may also change over the course of an individual's life. What brings pleasure or suffering to one person may not affect another person at all. The formulations of the *Eudemian Ethics* seem to make it clear that *dynamais* are the conditions of possibility for having the experience of a specific content of affection.

**T26.** *EE* II 4.1221b35-37:

For the faculties and the states are concerned with the modes of emotion, and the emotions are distinguished by pain and pleasure.

αἱ μὲν γὰρ δυνάμεις καὶ αἱ ἕξεις τῶν παθημάτων, τὰ δὲ πάθη λύπη καὶ ἡδονὴ διώρισται.

There is no abstract relationship between the condition of possibility, capacity or faculty, on the one hand, and emotions in general, on the other. In the *Eudemian Ethics*, capacity is conceived as the specific possibility of being affected by a specific emotional content. The composition is as follows: real content: battle; emotion: fear. The capacity is not merely the possibility of feeling fear but the possibility of feeling fear in the given circumstances in which someone finds themselves on the battlefield. Feeling fear affects the battlefield and also affects the person who has the capacity to be frightened and feel fear.

### 8.3 *Hexeis*

**T27.** *EN* II 4.1105b25-28:

The dispositions are the formed states of character in virtue of which we are well or ill-disposed in respect of the emotions; for instance, we have a bad disposition in regard to anger if we are disposed to get angry too violently or not violently enough, a good disposition if we habitually feel a moderate amount of anger; and similarly in respect of the other emotions.

ἕξεις δὲ καθ' ἃς πρὸς τὰ πάθη ἔχομεν εὖ ἢ κακῶς, οἷον πρὸς τὸ ὀργισθῆναι, εἰ μὲν σφοδρῶς ἢ ἀνεπιμένως, κακῶς ἔχομεν, εἰ δὲ μέσως, εὖ-ὁμοίως δὲ καὶ πρὸς τὰ ἄλλα.

In the *EE* formulation:

**T28.** *EE* II 2.1220b7-10:

it will be in respect of our faculties (*δυνάμεις*) for emotions according to which people are termed liable to some emotion, and also of the dispositions (*ἕξεις*) according to which people receive certain designations in respect of emotions, because of their experiencing or being exempt from some form of emotion.

ἔστι δὲ κατὰ τε τὰς δυνάμεις τῶν παθημάτων, καθ' ἃς ὡς παθητικοὶ λέγονται, καὶ κατὰ τὰς ἕξεις, καθ' ἃς πρὸς τὰ πάθη ταῦτα λέγονται τῷ πάσχειν πως ἢ ἀπαθεῖς εἶναι.

Each emotion has *pathēmata* as its specific content (*nomen rei actae*), triggering specific reactions. The emotional *definibilia* are interpreted and understood in their *morphē* as pleasure (*hedonē*) and pain (*lupē*). Therefore, the proto-*orexis* we live in unfolds into different *orexeis*, leading us to pursue (*diōkein*) pleasure and avoid (*pheugein*) pain. According to the affective disposition (the specific way we relate to emotional content), we are good or bad, i.e., we behave well or badly in response to the emotions triggered.

According to the affective dispositions, we are well- or ill-disposed with respect to the emotions (*hexeis de kath' has pros ta pathē echomen eu ē kakōs*) (*EN* 1105b25-26). The *nomen agentis* is our way of dealing with the emotions. The way we become depends on our behaviour and attitude towards these emotions. The *terminus ad quem*, like the *terminus a quo*, involves 'emotional experiences', but it is no longer a matter of whether or not we have the potential for a particular emotion that can be triggered. Each emotional experience appears to be linked to a latent capacity that becomes activated when we encounter certain circumstances. The specific situation acts as a catalyst, unleashing what can be unleashed. We can navigate through various emotional experiences, some of which we may be indifferent to or unaffected by, depending on our sensitivity and receptiveness.

In the case of *hexeis*, it involves knowing how to handle a declared passion. You are already in a particular situation. The challenge is to determine how to manage your emotions, cope with what you are experiencing and make sense of the moments you are going through.<sup>10</sup>

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<sup>10</sup> The sense of 'ἔχειν' constructed with mode adverbs is intransitive. 'Πρὸς τὰ πάθη' expresses the specific content of the relationship category, indicating the nature of this content. Terms such as 'τὰ πάθη', 'τὰ παθήματα', 'ὀρέξεις', 'δίωξις', 'φυγή' and their respective

- 1) Every emotional content is now morphologically constituted by a *pros ti* that contextualizes every aspect of life.
- 2) The *pros ti* determines the way we experience every situation.
- 3) The *pros ti* is determined by how we manage our feelings: *pōs* (*EE* 1220b10). The adverbs “*eu*” or “*kakōs*” are precise determinations that can be specified and made concrete depending on how “*pathos*” is being experienced at a particular time (*EN* II 4.1105b25-26).
- 4) Irrespective of how *pathos* affects us, whether it is sudden and violent or almost unnoticed, it is our way of constituting our relationship with it—a relationship that cannot be undone and is constitutive of our condition—that determines whether we develop a positive or negative attitude towards that particular content.

According to the conditions of possibility (*dynameis*), we are susceptible to experiencing certain emotional states (*pathētikoi pathēmatōn*) and can at least experience one episode of ‘feeling emotional’:

- 1) we are liable to become angry. We can at least experience one episode of anger and being angry (*pros to orgisthēnai*) (*EN* II 4.1105b25, 27);
- 2) we are liable to feel depressed or in distress. We can at least experience one episode of sadness, depression, distress and being sad or in distress (*pros to lupēthēnai*) (*EN* II 4.1105b25, 1106b20) and
- 3) we are liable to feel pity or compassion. We can at least experience one episode of pity, compassion and pitying someone (*pros to eleēsai*). (*EN* II 4.1105b27, 1106a25).

Now, in accordance with our affective dispositions (*hexei*), we find ourselves in a second-order relationship. The issue is not whether we are angry, distressed or compassionate, as these are emotions, we indeed experience, but rather how we are to deal with or behave in response to what we feel. We can, therefore, expand the formula: in respect to all emotional experiences (*pros ta pathē*), how do we deal with them? How do we behave in response

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contents, like ‘ἡδονή’ and ‘λύπη’, are not viewed as being driven by a ‘δύναμις’ that compels us to feel in a certain way.

to all emotional experiences? The answer is formally well- or ill-disposed (*echomen eu ē kakōs*). However, for each situation, our relation to the given emotions depends on our understanding of and coping with what we feel.

**T29.** *EN* II 4.1105b25-28:

For instance, we have a bad disposition in regard to anger if we are disposed to get angry too violently or not violently enough, a good disposition if we habitually feel a moderate amount of anger; and similarly in respect of the other emotions.

ἔξεις δὲ καθ' ἅς πρὸς τὰ πάθη ἔχομεν εὖ ἢ κακῶς, οἷον πρὸς τὸ ὀργισθῆναι, εἰ μὲν σφοδρῶς ἢ ἀνειμένως, κακῶς ἔχομεν, εἰ δὲ μέσως, εὖ· ὁμοίως δὲ καὶ πρὸς τὰλλα.

There is a good and badly way to deal with:

- 1) anger (*orgē*)
- 2) distress (*lupē*)
- 3) pity or compassion (*eleos*).

Misbehaviour with regard to anger (*orgē*) depends on our reaction of excess or defect (*ei men sphodrōs ē aneimenōs*). We have the correct attitude if our response neither exceeds the appropriate measure nor falls short of what is deserved. We behave well if we feel a moderate amount of anger (*ei de mesōs, eu*). The same holds true for other emotions (*homoios de kai pros talla*).

### *9. Active Assimilation (Homoiosis) in De Interpretatione I 1*

Aristotle precisely addresses this complex involvement in *De Interpretatione* when he equates the coming into being of mental affections such as perceptions, desires, emotions and thoughts with 'likenesses' or 'assimilations' of objects (*pragmata*). I would now like to delve into this relationship between mental affections (*pathēmata tēs psychēs*) and objects (*pragmata*). What is the meaning of (*homoiosis*)? Can we straightforwardly translate it as conformity (*adaequatio*). Truth is the conformity of a thing and the intellect (*adaequatio res et intellectus*). What is the meaning of the verb *homoioō*? In the active sense, it means 'to make like', and in the passive sense, 'to be made like'. To assimilate seems to work both ways, from inside our minds to the outside world and from the outside world into our minds.



The perception of a nose, the desire for revenge and feeling pity are affections of the mind. A nasal concavity, an insult and a sad event are objective situations (*pragmata*). Affections of the mind and objective situations (in the world, outside our minds) are likened to each other. The *pragma* is already understood in our minds. The affections (*pathēmata*) are objectively referred to the objective situations occurring.

**T 30.** *De Int.* 16a3-8:

There are, first of all, in the voice symbols of the affection that exist in the mind, just as written words are symbols of the symbols that exist in the voice. And just as even the written words are not the same for all human beings, neither are the spoken words the same. Yet the affections of the mind of which the written and spoken words are signals are the same for all human beings. So, too, there is identity in the things of which the affections are assimilations.

Εστι μὲν οὖν τὰ ἐν τῇ φωνῇ τῶν ἐν τῇ ψυχῇ παθημάτων σύμβολα, καὶ τὰ γραφόμενα τῶν ἐν τῇ φωνῇ. καὶ ὥσπερ οὐδὲ γράμματα πᾶσι τὰ αὐτά, οὐδὲ φωναὶ αἱ αὐταί· ὧν μέντοι ταῦτα σημεῖα πρῶτων, ταῦτα πᾶσι παθήματα τῆς ψυχῆς, καὶ ὧν ταῦτα ὁμοιώματα πράγματα ἤδη ταῦτα.

Let us break down this passage:

- 1) Written words are symbols of spoken words.
- 2) Words are signals of the affections of the mind.
- 3) Languages made up of spoken and written words are not the same for all human beings.
- 4) Affections of the mind (*pathēmata tēs psychēs*) are the same for all human beings (*tauta pasi*).
- 5) States of affairs (*pragmata*) are the same for all human beings.
- 6) Mental affections are assimilations (*homōiomata*) of states of affairs.

There thus seem to be affections (*pathēmata*) in the mind, on the one hand, and objects (*pragmata*), on the other. Anachronistically, we can add that it is not just about objects or parts of objects, but also about states of affairs, circumstances, conjunctures and extramental situations. However, mental affections are inseparable from objects. Mental affects are expressed in objects, just as objects are mentally constituted. There is no *pathēma* that does not refer to a *pragma*, and there is no *pragma* that is constituted without requiring or admitting a mental affection. The relationship of assimilation

operates in both directions: from extramental objective reality to the mind, and from within the mind to the external world. What we experience is already the assimilable or ‘assimilating’ situation in which the mind is inextricably intertwined with the *pragmata*, and the *pragmata* are already interpretable in the mind. The S-structure governs this relationship. There are not two different realities here, two substances or two properties with different qualities. The *pathēmata* are inseparable from the *pragmata*. For *pragmata* to be *pragmata*, they must affect the mind – they are mental affections. We find ourselves in the correlation of assimilation. Assimilation is the interface between mind and body, and extramental contents.

We find a similar formulation in Aristotle when we read:

**T31.** *De An.* III 8.431b29:

The stone is not in the mind, but the form of the stone is.

οὐ γὰρ ὁ λίθος ἐν τῇ ψυχῇ, ἀλλὰ τὸ εἶδος.

What is in the mind is the *eidōs* of the stone. In this sense, it is about understanding the relationship between the stone and the mind through the *eidōs*. Is it the *eidōs* that differentiates geometric concavity from nasal concavity? In any case, it seems we can assert that the *eidōs* lies between the mind and the stone. We perceive the stone from a distance, from a certain point of view (from above), cutting out its silhouette with our gaze, the outline defined by the encounter between perspective and the stone.

The assimilation of a stone by perception is possible because perception enables us to perceive a stone from a particular perspective. The stone presents itself in a specific aspect. I do not perceive the stone in its entirety; I can only see the side of it facing me, which lies between my point of view and the stone’s surface. How is it possible for assimilation to occur between my perception and the stone? How is it possible for an act of the soul to assimilate a being in the world? The stone is not in my head. It is the form of the stone that is in the mind (*psychē*). This can also happen with an entire city. I can leave Lisbon, but Lisbon does not leave me.

**T32.** *De An.* III 8.431b21-23:

Let us say again that the soul is in a sense all existing things; for what exists is either object of perception or objects of reason; and knowledge is in a way the objects of knowledge, and perception the objects of perception.

πάλιν ὅτι ἡ ψυχὴ τὰ ὄντα πῶς ἐστὶ πάντα· ἢ γὰρ αἰσθητὰ τὰ ὄντα ἢ νοητά, ἐστὶ δ' ἡ ἐπιστήμη μὲν τὰ ἐπιστητὰ πῶς, ἢ δ' αἰσθησις τὰ αἰσθητὰ.

The model of the S-structure can be seamlessly applied here. Soul and body are inextricably linked. The close relationship between soul and body (one's own body and other beings in the world) enables the actualization of mental acts such as perception, emotion, volition, thought and matter (both organic and inorganic). The relationship between *pathēma* and *pragma* is one of assimilation. *Homoiōsis*, when applied to noses or bowls, allows for different interpretations of formal geometric configurations ('concavity' and 'convexity'). A nose is snub and not concave, a nose is aquiline and not convex, and so on. The same applies to emotions. When we get angry, we are affected and project our feelings onto the world: whether at a politician on television, a driver in traffic or in any other context. Psychology defines 'anger', but it is experienced differently by people with anger issues compared to so-called ordinary people. Anger is different every time we experience it. The relationship between psychic *morphē* and hyletic content is already inextricable. If this interpretation holds, the isolation of each of the two elements (*pathēma* and *pragma*) comes later. In the Aristotelian sense, however, the world seems to be a psychic content. The same is true of desire, emotions and thinking.

#### 10. *Diathesis* (*Metaph.* Δ 19.1022b1-3)

**T33.** *Metaph.* Δ 19.1022b1-3:

'Disposition' (διάθεσις) means arrangement (τάξις) of that which has parts, either according to space (κατὰ τόπον) or according to potentiality (κατὰ δύναμιν) or according to form (κατ' εἶδος). It must be a kind of position (θέσις), as indeed is clear from the word disposition. Διάθεσις λέγεται τοῦ ἔχοντος μέρη τάξις ἢ κατὰ τόπον ἢ κατὰ δύναμιν ἢ κατ' εἶδος. θέσιν γὰρ δεῖ τινὰ εἶναι, ὡσπερ καὶ τοῦνομα δηλοῖ ἢ διάθεσις.

Describing the phenomenon identifies a basic structure S. X has parts. X possesses the elementary parts it has included. The intrinsic organization

(*taxis*) points to a positive possibility of a relationship between the elements. The elements are in relation to each other and to the whole.

Arrangement (*taxis*) produces intrinsic organization in three ways:

- 1) according to their place (*kata topon*);
- 2) according to their potentiality (*kata dynamin*);
- 3) according to their aspect (*eidōs*) or form (*kat' eidōs*).

*Diathesis* affects each of these horizons. When it occurs, it impacts the place, the possibilities and the aspects (*eidē*) of the whole situation we are in (*pragma*). *Diathesis* is a horizon that allows for changes, modifications and transformations within it. *Diathesis* affects the whole situation we are in. If we take emotions as an example,

A) such as anger, we understand that it transforms each of these fundamental structures. For example, when a car driver performs a dangerous overtaking manoeuvre, we feel the adrenaline rush, our blood boiling and the desire for revenge. The road ceases to be merely a means for us to reach our destination. The functional possibility of the road becomes 'blind'. We scream at the driver, wanting to make him pay for what he has done.

B) Similarly, with craving, when I have a massive craving for coffee, the space I am working in loses its sense of habitation. The kitchen appears on the horizon as the place that offers me coffee. The room I work in no longer holds this possibility; it is the kitchen that provides it. The aspect or form of things changes completely. The place I am in tells me nothing; the place I want to go offers me the prospect of possibility.

C) A friendly smile makes a place welcoming.

The street, the office, the kitchen or a meeting with someone may not inherently change our disposition. However, when they do, they affect the place where we are and the possibilities they offer (driving, studying, drinking coffee, socializing with someone). The usual aspect of things changes we may not even see the road, and the place where we meet someone pleasant changes the look of things, and so on. The S-structure is always involved in

transforming the ‘definibile’. It happens to me that I find myself in this position, having the internal organization of things either in their proper places or out of them. I either fit where I am, or I feel inadequate. I can endure where I am, or I cannot stand being there. The appearance of things affects everything. Mood has a structural emphasis on ‘having’, on a ‘*ratio habendi*’ (Bonitz). Therefore, the shape of the ‘nose’ of things changes for me according to what I feel when an emotion affects me.

### 11. *Hexis*

**T34. *Metaph.* Δ 20.1022b4-14:**

“Having” means (a) In one sense an “having” or “state” activity, as it were, of the haver and the thing had, as in the case of an action or motion; for when one thing makes and another is made, there is between them an act of making. In this way between the man who has a garment and the garment, which is had, there is a “having.” Clearly, then, it is impossible to have a “having” in this sense; for there will be an infinite series if we can have the having of what we have. But (b) there is another sense of “having” which means a disposition, in virtue of which the thing which is disposed is disposed well or badly, and either independently or in relation to something else. E.g., health is a state, since it is a disposition of the kind described. Further, any part of such a disposition is called a state; and hence the excellence of the parts is a kind of state.

Ἐξίς δὲ λέγεται ἓνα μὲν τρόπον οἷον ἐνέργεια τις τοῦ ἔχοντος καὶ ἐχομένου, ὡς περ πρᾶξις τις ἢ κίνησις (ὅταν γὰρ τὸ μὲν ποιῇ τὸ δὲ ποιῆται, ἔστι ποιήσις μεταξύ· οὕτω καὶ τοῦ ἔχοντος ἐσθῆτα καὶ τῆς ἐχομένης ἐσθῆτος ἔστι μεταξύ ἔξις). – ταύτην μὲν οὖν φανερόν ὅτι οὐκ ἐνδέχεται ἔχειν ἔξιν (εἰς ἄπειρον γὰρ βαδιέται, εἰ τοῦ ἐχομένου ἔσται ἔχειν τὴν ἔξιν), ἄλλον δὲ τρόπον ἔξις λέγεται διάθεσις καθ’ ἣν ἢ εὖ ἢ κακῶς διακείμενον, καὶ ἢ καθ’ αὐτὸ ἢ πρὸς ἄλλο, οἷον ἢ ὑγίεια ἔξις τις· διάθεσις γὰρ ἔστι τοιαύτη. ἔτι ἔξις λέγεται ἂν ἢ μόριον διαθέσεως τοιαύτης· διὸ καὶ ἢ τῶν μερῶν ἀρετὴ ἔξις τις ἔστιν.

‘Having’ means:

- 1) In one sense a particular activity (*energeia tis*) of the haver (*echontos*) and the thing had (*echomenou*).
- 2) It can mean a particular action (*praxis tis*) or
- 3) process (*kinesis*).
- 4) production (*poiēsis*).

In production or in the act of making, one thing makes (*to men poiei*), the other thing is made (*to de poiētai*). The act of making lies between both the active and the passive element (*poiēsis metaxu*).

5) *Metaxy* or the space in between.

This is exemplified as what is going on when we wear a piece of clothing. A person wears a garment. The garment is had by the person who wears it. Between the man who has a garment and the garment, which is had, there is a 'having'.

6) Disposition (*diathesis*).

This is that in virtue of which the thing which is disposed of is disposed well or badly, and either independently or in relation to something else. E.g., health is a state (*hexis*), since it is a disposition of the kind described. Further, any part of such a disposition (*diathesis tis*) is called a state (*hexis*); hence the excellence of the parts is a kind of state.

The explicit relationship between *diathesis* and *hexis* can be understood from this perspective. We can begin to comprehend how the S-structure operates. There is a producing element, the active, and a produced element, the passive. There is a relationship between the acting and the 'acted upon'. This is not a mechanical causal relation of unilinear time. The relation of having to what is had covers a semantic field almost as broad as 'being'.

The process of walking is better described when we refer to the walker. Describing locomotion by pointing to the materials of the road or the parts of the body involved in walking does not fully convey what is happening. When we walk or see someone walking, it is easy to understand. We use our legs, placing one foot after the other, stepping on the ground, starting with the first step and finishing with the last. However, walking is not the ground. The wanderer's walk along their path lets us truly understand what is happening.

Every action involves both an agent and a recipient of the action. When an agent performs an action, such as walking along streets, running along tracks or going up and down stairs, it requires the intervention of the whole body. The material of which the road is made is inert. Moving the legs is necessary, but the interaction – a *hexis, kinēsis* – between both allows us to understand walking one's way.

Walking the streets like a pilgrim or a traveller requires an entirely different disposition. In Aristotle's analogy: wearing a coat. The coat is worn. I am wearing a coat. I have the coat. The coat has been put on. Having and having had implies understanding how to get dressed and undressed. This relationship suggests understanding how I fit into the clothes I am wearing and how well they suit me.

Everything we 'do', 'make' and 'act' has this structure. Reading books and having them read, giving lectures and having them delivered, being on the beach in the summertime, being at war. The involvement of each of us in an atmosphere is considered a *hexis*. In 6), we read about the explicit relationship between *diathesis* (the organization of place, possibility and aspect) and *hexis* (the condition, state and *habitus*). By having, what is possessed by the one who has it is arranged well or poorly in relation to another thing or person or in relation to oneself. This is exemplified by health. When we are in good health, there is a state of being, a good form of being, which allows us to inhabit life. When we are ill, the opposite happens; everything changes. On the clinical curve of our relationship to health, the states of health and illness exist. We can extend this to our relationships to life – whether the days and parts of the days, the seasons or the stages of life are 'inhabited' by us well or poorly.

### 12. Some Aporetical Questions

My objective here has been to delve into David Charles's analysis of emotional life. The aim was not merely to confirm or verify the veracity of his interpretative hypothesis or his exegetical work, but to understand how *psychē* has the power to transform phenomena both within itself and in extramental objects. What kind of phenomena are emotions, such that they not only occur inside our minds but also concretely affect our bodies, the objects outside our minds and the situations we find ourselves in? Is there any sense in talking about the difference between our point of view, the perspective it opens and the horizon it defines? Is there room to define inside and outside? Or should perception, emotions, desire and thought not be defined as separate entities but rather as interacting inextricably within a

unified psychophysical self?<sup>11</sup> From a Cartesian perspective, the *res cogitans* is opposed to the *res extensa*. The *res extensa* is divisible, material, corporeal and extensive. The *res cogitans* is indivisible, immaterial, incorporeal and non-extensive. For Aristotle, if we interpret him from a modern point of view, there appear to be phenomena that are, strictly speaking, ‘mental’ or ‘psychic’: *aisthēsis*, *mnēmē*, *pathos*, *epithymia*, *phantasia*, *dianoia*, *nous*. Conversely, noses, legs, houses and looms can all be described as entities of the external world. What is the relationship between phenomena of the *psychē* and phenomena that appear to be extramental? At first glance, it may seem that there are entities that exist exclusively and independently of *sōma*, and others that are strictly somatic or corporeal, without any involvement in *psychē*. However, there appear to be phenomena that must be understood as definitionally inseparable, not analysable into strictly somatic and exclusively non-somatic entities. The inextricability thesis of *psychē-sōma* means precisely that *one* cannot be *conceived* of without the *other*. Aristotle, it seems, understands the relationship between *psychē* and *sōma* in this inextricable manner. Therefore, what embodies the mind? What ‘minds’ the body, if we may phrase it this way? The S-structure operates on the ground of the inextricable relation between mind and body, allowing a better understanding of its variations: psychophysiology and psychosomatics. What we have seen in the emotional life of the mind, in structural phenomena identified by Aristotle such as *diathesis* and *hexis* is the working out of the inextricable relationship between mental affections and objects. The *homoiosis* (conformity, assimilation) between affections and objects is possible due to the inextricable relation between mind and body. If I am correct in my application of the S-structure, proving the inextricable relationship between mind and body, perhaps I have highlighted a problem that we can only formulate here. The mind is somehow all the beings. Therefore, mind = *ta onta*. It remains to be fully understood how this is possible.

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<sup>11</sup> Cf. Peramatzis (2011); Scaltsas (1994).



The idea of this parallel seems to be:

- A) one cannot define mental affections without reference to their objects, and
- B) one cannot define these objects without reference to mental affections.

However, are the objects internal (forms without matter) in us? Or are the external objects external forms which we grasp?

From Charles's point of view, one could argue [A] and possibly [B]. It might be easier in the internal object case. It can be done in the case of external objects also (as in the case of danger, beauty etc.). Either way: this use of the S-structure goes beyond Charles's use:

- C) one cannot define mental affections without reference to matter, the body [embodied cognitions] and
- D) one cannot define the relevant bodily affections [the type of blood boiling] without reference to the mental.

Let us take *phōnē* to be the physiological aspect of *pathēma*. The *phōnē* can be acoustic, optical and even tactile. The *pathēma* can be *aisthēsis*, *pathos*, *epithymia*, *dianoia* or *nous*. There are numerous elements to take into consideration with multiple possible relations at stake: affection (*pathēma*), thing (*pragma*), *pragma* expression (*phōnē*), *psychē* phenomena (*noēmata*).

1) Let there be a nose *pragma* A and concave shape, *pragma* B, i.e., the nose's shape. A is a nose. B is its peculiar concave shape. There are noses that are not concaves (e.g. convex). There are concavities that are not noses (e.g. lenses, spoons, etc.). When we describe or think of this particular nose as concave we can explicitly say: 'this nose is concave', or 'this nose has a concave shape'. The concavity peculiar to this person's nose permeates every bit of its flesh and covers all its spatial extension. The concave shaped nose is the referent (*Bedeutung* in Frege's sense of the word).<sup>12</sup>

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<sup>12</sup> Frege (1892) pp. 25-50. Engl. tr. Frege (1980) *passim*.

2) Now, consider *pathēma* A and *pragma* X. A being an *aisthēsis* as a way of ‘getting’ to an object (*pragma*). X being the concave shaped nose of this person here in front of me. Now, we do not ‘feel’ the presence of an *aisthēsis*. We do not perceive our own perception of the X: this nose ‘is’ concave or ‘has’ a concave shape. We just ‘get’ the person’s concave shaped nose.

3) Let us take a further step. Consider that *pathēma* is a *mnēmē*: M. How does *mnēmē* relate to the concave shaped nose of this person I am recalling? I mean the person’s concave shaped nose as well. Sometimes I can ‘feel’ I am remembering but usually I do not ‘reflect’ upon it. The object of M (*mnēmē*) is the same as the object of A (*aisthēsis*), because both M and A have the same referent. What is different is the way of getting to X (a person’s concave shaped nose), for an *aisthēsis* presupposes the availability of the *pragma*, and the *mnēmē* does not.

4) No one would describe a nose as a geometrically shaped concavity. We ‘see’ in perception as in memory that it is snub. The meaning (*Sinn*, in Fregean sense) is different, though. But what comes first into our ‘eyes’, in perception as in memory, is the snub shape nose.

What is the relationship between *pathēma* and *pragma*? A *pragma* shows up in its full-fledged referential power: remembering Socrates’s nose as it is sculpted or seeing someone’s concave shaped nose. The relationship between any particular *pathēma* (*aisthēsis*, *epistēmē*, *doxa*, *mnēmē*, *hupolēpsis*) and the snub nose has a conformity to the nose as the nose (*pragma*) shows up being as it is in every single way we get it. The meaning (*noēma*) is embedded in the referent (*pragma*). The *noēma* is pervading in every single *pathēmata* of the soul. But what shows up is already the inextricable relation of body and mind, shape and matter. Therefore, we get at the *pragma* as already available as a snub nose. Can we infer that all objects are the content of thought and are thinkable (*noēta*)? Is this a ‘normal’ consideration of things as they are? Do we not see just snub noses?

E) It is only because we are inextricably embodied that we perceive the external bodies we do and in the way we do.

Let me argue in favour of the S-structure in the following cases.

- 1) Any mental act (*aisthēsis* – *mnēmē*, *hupolēpsis*, *doxa*, *epistēmē*, *dianoia* – *pathos*, *epithymia*, *orexis*, *orgē*) involves the S-structure.
- 2) The content of any mental act exists in spite of our ‘spatial’ localization in the external world or in the internal world. A fight in phantasy or dreaming has spatial contents: in front of, behind, right, left, above, beneath, inside and outside. A real event has emotional content. In the football stadium, supporting our team and opposing the other team.
- 3) Thinking of how we feel in any given situation anticipating, remembering it, feeling it.

Is it possible that I, as an undivided self, have the same way of perceiving, emoting, desiring, thinking as any other human being, or is my way different? Or does this question go beyond Aristotle? Being me is different from being someone or anyone else. The perception of a new white sheet of paper is the same due to being the sheet of paper in the world. The perception of a white sheet of paper is the same for any person who can catch the sheet of paper in her or his perception. But being the self I am, my perception of the white sheet of paper is mine, just as anyone else’s perception of the white sheet of paper is hers or his. Mine is not theirs, and their perception of an object is theirs and not mine. Can the S-structure of any content (external or internal) be the undivided self of each self and any self? If so, we somehow refer to the same sheet of paper, neutralizing the singular form it is perceived by any person or by the same person at different times.

**T35. *De An.* III 8.431b21-23:**

Let us say again that the soul is in a sense all existing things; for what exists is either object of perception or objects of reason; and knowledge is in a way the objects of knowledge, and perception the objects of perception.

πάλιν ὅτι ἡ ψυχὴ τὰ ὄντα πῶς ἐστὶ πάντα· ἢ γὰρ αἰσθητὰ τὰ ὄντα ἢ νοητὰ, ἔστι δ’ ἡ ἐπιστήμη μὲν τὰ ἐπιστητὰ πῶς, ἢ δ’ αἴσθησις τὰ αἰσθητὰ.

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SERGEY TROSTYANSKIY

## INDIVISIBLES AND THE TEMPORAL CONTINUUM: ARISTOTLE AND NEOPYTHAGOREAN THOUGHT

### Abstract

This article aims to shed light on the reception of Aristotle's theory of the continuum in late antique thought. It starts with a brief introduction to Aristotle's theory and then moves on to analyze its reassessment in the philosophy of Pseudo-Archytas, a thinker whose significance for the development of Neopythagorean thought was unprecedented but whose theoretical heritage, as far as the theory of the continuum is concerned, has not yet been fully scrutinized. The main thesis of this article is that Pseudo-Archytas's appropriation and creative reworking of Aristotle presents us with a full-fledged theory of the temporal continuum which at its core is a mathematical continuum. As such, this continuum is antithetical to that of Aristotle, as its key point is to substantiate the possibility of a continuum made of indivisibles (or, to use more up-to-date language, of infinitesimals) as a new philosophical orthodoxy.

### Keywords

Pseudo-Archytas, Aristotle, Neopythagoreanism, Time, Continuum

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*1. Aristotle's Approach to Continuity and Continua*

Aristotle's discussion of continuity and continua appears to be complex and not very easy to understand. There is a range of meanings concerning the continuous: it can be what does not cease, or that which is uninterrupted, or that which allows for no gaps, etc. The meanings attributed to the opposite of continuous, i.e., discrete, are antithetical. The discrete can stand for that which is subject to termination, that which is interrupted, marked by the presence of gaps, by empty spaces, etc. Continuous and discrete are quantities (and quantity is defined as that which is divisible).<sup>1</sup>

Aristotle speaks of the continuous, first and foremost, as of a unified whole.<sup>2</sup> That which is not unified and not a whole is not continuous. For instance, that which is not unified is not one but rather many. Hence, it is a collection, a multitude or a sum of some kind. Its units or pieces do not make up a whole; there remain gaps between them. Such quantities are divisible into indivisibles, i.e., discrete entities, the opposite of continuous. Again, what is continuous is one and whole and not many, not a multitude. Number, i.e., 'scientific number' with which we number or count, on the other hand, is defined as a limited multitude. It is thus many and cannot be continuous. Its units are indivisible and, hence, the 'whole' number (which is divisible into these indivisibles) is a 'whole' as a figure of speech, while in reality it is a sum.<sup>3</sup> Body and magnitude, on the other hand, are one and continuous and whole. So are motion and time. They are continuous *qua* divisible into divisibles (i.e., infinitely divisible as "the infinite presents itself first in the continuous."<sup>4</sup> This is Aristotle's first definition of continuous.<sup>5</sup>

Aristotle's world is first and foremost continuous, since it is made up of quantities such as body, magnitude, motion and time, and these are continuous. Moreover, this world is such that even a number instantiated in bodies,

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<sup>1</sup> Arist. *Metaph.* 1020a7-8: Ποσὸν λέγεται τὸ διαιρετὸν εἰς ἐνυπάρχοντα ὧν ἑκάτερον ἢ ἕκαστον ἔν τι καὶ τὸδε τι πέφυκεν εἶναι.

<sup>2</sup> Arist. *Phys.* 227a13-6: Continuity belongs to things that, by virtue of their mutual contact, naturally form a unity; and in whatever way that which holds them together is one, so too will the whole be one.

<sup>3</sup> *Metaph.* 1024a6-8.

<sup>4</sup> *Phys.* 200b17-8.

<sup>5</sup> *Phys.* 232b24-5: λέγω δὲ συνεχὲς τὸ διαιρετὸν εἰς αἰεὶ διαιρετά.



motions, etc., according to Aristotle, becomes continuous, (i.e., a number counted in motion, etc., not the number with which we count, since it is, again, discrete). For instance, he defines time as a number of some kind (i.e., the number of motion in respect of before and after) and understood this number as continuous.<sup>6</sup>

Yet what is continuous is continuous, according to Aristotle, either simply or with qualification. For example, a particular motion or time, etc. can be interrupted. It will remain continuous *qua* divisible into divisibles. Hence, what is continuous with qualification can also be discontinuous *qua* interrupted, since it will not share a common boundary with a motion that comes next. Thus, Aristotle's second definition of the continuous is a unified whole whose parts share a common boundary,<sup>7</sup> or whose touching limits become one and the same,<sup>8</sup> or whose extremities are one.<sup>9</sup> It follows that a particular motion is continuous with qualification, in that it is continuous *qua* divisible into divisibles but discontinuous *qua* having a termination point and thus *qua* not sharing a common boundary with what comes next, as their extremities are not one but two. Aristotle therefore asserts that in a different, i.e., qualified sense, a motion/change will be discontinuous, as "change with respect to what is not continuous, changes, that is to say, between contraries and between contradictories."<sup>10</sup> Such changes are from or to something (i.e., opposites). They have termination points. A change in respect to contraries and contradictories will thus cease at some time. Yet that which is continuous simply or without qualification is that which does not cease, whereas a particular unified whole (e.g., a particular motion) can cease and also be discontinuous.

The world, nevertheless, remains one and a unified whole, according to Aristotle. We thus live in a continuum. And yet things in the world are also many and interrupted, etc. Moreover, not all of them are unified and whole. For instance, the mind can see things in the world in the form of a multitude

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<sup>6</sup> *Phys.* 220b8-9: ὁ δὲ χρόνος ἀριθμὸς ἐστὶν οὐχ ᾧ ἀριθμοῦμεν ἀλλ' ὁ ἀριθμούμενος.

<sup>7</sup> *Arist. Cat.* 4b27: κοινὸς ὄρος.

<sup>8</sup> *Phys.* 227a11-2: ταῦτὸ γένηται καὶ ἐν τὸ ἐκατέρου πέρασ οἷς ἄπτονται.

<sup>9</sup> *Phys.* 228a30: τὰ ἔσχατα ἓν. It is interesting to note that Corish found this definition circular. Cf. Corish (1969) p. 526.

<sup>10</sup> *Phys.* 237a35-237b2.

of discrete pieces or units when it works with abstracted entities, i.e., mathematical entities. Moreover, it can apprehend as discrete quantities such as interrupted and completed motions in the universe, among other things. Yet, overall, things that are out there remain parts of a unified whole, i.e., this world order in its fullness. That which is discrete without qualification is number (i.e., scientific number and, by implication, ratio, proportion, and other numerical relations) and *logos* (thought, speech),<sup>11</sup> among other things, and such quantities first and foremost belong to the mind, whereas when they are found instantiated in nature, they are no longer discrete without qualification.

It is important to note in this context that Aristotle introduces the relation of dependency which holds between quantities, i.e., body, magnitude, motion, time, etc. in respect to continuity. Thus, the continuity of magnitude depends on that of the body, and the continuity of motion depends on that of magnitude, etc. The body of the world is a unified whole whose elements do not cease (without qualification, as some of them, i.e., the four simple bodies, transmute and turn into each other while the fifth body remains stable). The continuity of world's magnitude is premised on that of body/bodies. Yet bodies in the world move, and motion is from or to something. How can this changing world be continuous? Aristotle's solution is that there is prime motion, i.e., that of the sphere, which moves in a circle.<sup>12</sup> That which is cyclical reverts on itself and has no termination. It is continuous without qualification. Hence,

of that which moves, only that which moves in a circle is continuous in such a way that it is always continuous with itself. This, then, is what produces continuous motion, namely, the body which is moved in a circle, and its movement makes time continuous.<sup>13</sup>

Such is the motion of the sphere. So, it is the motion of simple bodies as they revert on themselves by completing the circle of transmutation. These are continuous without qualification; they are the causes of continuity for other things that are continuous with qualification.

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<sup>11</sup> *Cat.* 4b23-4.

<sup>12</sup> Arist. *GC* 336b3-4: "The movement of the whole is the cause of the continuity."

<sup>13</sup> *GC* 337a31-2.

Aristotle's world is thus a unified whole which is continuous. Its course does not allow for any pauses, gaps, empty spaces, etc. All quantities in this world are mereologically unified. Moreover, they are also unified and connected causally so as to represent an unceasing chain of causes and their effects, as all things in nature are subject to motion (since nature is the principle of motion). They are thus unified continuous wholes, and these wholes are linked together in causal chains as things act on and move one another. Their eternal and unceasing character is secured by the prime and unmoved mover.<sup>14</sup>

Aristotle thus seems to suggest the possibility of different kinds of continuum when he says that a continuum can be conceptualized in various ways, although not all these ways are permissible. For instance, in different treatises he speaks, as I understand it, about the following kinds of continuum: 1. Mereological, i.e., a unified whole made of parts that are causally inapt in respect to each other. 2. Causal, i.e., a union of things causally linked. 3. Revised Mereological, i.e., a whole whose parts have causal efficacy in respect to other parts. 4. Infinitesimal, i.e., one that is made of indivisibles.

The predominant thread in Aristotle's theories of the continuous and continua concerns the mereological continuum as discussed in *Physica* V and VI. There he conceptualizes the continuum as a whole whose parts are unified by a common boundary and contain the infinite. Yet the parts under consideration are analyzed in a way that does not imply their mutual capacity to act on each other.

Aristotle defines the main terms of his theory of the mereological continuum. First, things can be together (*ἅμα*) or apart (*χωρίς*). To be together entails to be together in place.<sup>15</sup> This requires them to have position. What is positioned in place can touch (*ἄπτω*) or be in contact (*ἄπτόμενον*). Things touch when their extremities are together (*ἄπτεσθαι δὲ ὡν τὰ ἄκρα ἅμα*),<sup>16</sup> and they are in succession (*ἐφεξῆς*) when there is nothing of the *same* kind as itself between it and that to which it is in succession. He defines "in between" as "that which a changing thing, changing continuously and naturally,

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<sup>14</sup> *Phys.* 258b30-1: "because this causal relation must be eternal and necessary."

<sup>15</sup> *Phys.* 226b21-2.

<sup>16</sup> *Phys.* 226b24.

naturally reaches before it reaches that to which it changes last.”<sup>17</sup> Contiguous is defined as that which is in succession and touches.<sup>18</sup> Aristotle then tells us that the continuous (συνεχής) is a subdivision of the contiguous (μὲν ὅπερ ἐχόμενον τι) and defines it in the following way: “things are called continuous when the touching limits of each become one and the same and are, as the word implies, contained in each other: continuity is impossible if these extremities are two.”<sup>19</sup> Parts thus joined (and situated next to each other) have a common boundary (κοινὸς ὄρος) at which they unite.

This theory is not altogether unproblematic, and there is an ongoing dispute as to whether it is coherent.<sup>20</sup> One of the challenges is that Aristotle permitted too many exceptions to the general rule governing continua. This mainly concerns the term touch. For instance, we learn from Aristotle that “being in succession” (ἐφεξής) is the condition of being in contact/touching (ἄπτόμενον).<sup>21</sup> Aristotle, however, allows points to touch without meeting the condition of being in succession. Moreover, what touches must have magnitude. Yet a point does not. How can it then touch? How can points be positioned?<sup>22</sup> Moreover, for things to touch is to have their extremities together. However, points do not have extremities. Extremities belong to things that have a middle, i.e., wholes made of parts.<sup>23</sup> Things are in contact

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<sup>17</sup> *Phys.* 226b27-9.

<sup>18</sup> *Phys.* 227a6: ἐχόμενον δὲ ὁ ἂν ἐφεξής ὄν ἄπτηται.

<sup>19</sup> *Phys.* 227a11-3: λέγω δ' εἶναι συνεχὲς ὅταν ταῦτὸ γένηται καὶ ἐν τὸ ἐκατέρου πέρασ οἷς ἄπτονται, καὶ ὡσπερ σημαίνει τοῦνομα, συνέχεται. τοῦτο δ' οὐχ οἶόν τε δυοῖν ὄντων εἶναι τοῖν ἐσχάτων.

<sup>20</sup> There are a number of studies on Aristotle's continuum. Bostock's (1991) study, in my opinion, encapsulates the ethos of modern explorations of Aristotle's theory. Among the most recent attempts to shed light on the subject matter, I would mention Heinemann (2023). Also worthy of attention is Hasper (2003) along with Jakubowicz (1999).

<sup>21</sup> *Phys.* 227a17-9: “of these terms ‘in succession’ is primary; for that which touches is necessarily in succession, but not everything that is in succession touches.”

<sup>22</sup> *GC* 322b32-323a6: “for things to be in contact they must have their extremities together, only those things would be in contact with one another, which, possessing definite magnitudes and a definite position, have their extremities together.” Owen rightly noted Aristotle's definition of contact; see Owen (1986) p. 246: “holding between terms whose extremities are together, i.e., in one the same place [...] is an unhappy suggestion, since in themselves extremities can have no magnitude and so no position.”

<sup>23</sup> *Phys.* 231a28-9: “that which has no parts (τοῦ ἀμεροῦς) can have no extremity, the extremity and the thing of which it is the extremity being distinct.” How then do they touch?

when their parts touch other parts. Yet points are wholes without parts. Therefore, points – and by implication other indivisibles (e.g.,nows) – can only touch as a whole touches a whole. In doing so, they simply co-cluster and do not make up a magnitude.<sup>24</sup>

The most problematic aspect of the theory, as far as modern scholarship is concerned, is that contiguous things that are next to each other and touch have their extremities together; that is, their limits (i.e., points,nows, etc.) overlap and hence become continuous. Consequently, terms such as touch, contiguous and continuous do not have, so to speak, clear conceptual limits.<sup>25</sup> This issue pertains above all to geometrical objects but also to material ones.<sup>26</sup> For example, two contiguous circles with a single point of intersection appear to become continuous and hence a unified whole. How can they remain two circles?<sup>27</sup> How are they apart and not together, i.e., in two different places? Thus, the term contiguous entails continuity. However, all such exceptions make sense and have a special explanatory role in Aristotle's theory.

Another thread in Aristotle's theory is the continuum conceptualized as causal, which is scrutinized in *Physica* VII, *De generatione* and *De caelo*. Aristotle argues that two bodies can come together and act on each other so that they become one through fusion. Once, however, the fusion is complete, they become parts of a whole and lose their causal efficacy. Hence, "what is next to something and in contact (not forced) with it, is of the same

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<sup>24</sup> Aristotle argues in this context that (*Phys.* 231b2): "one thing can be in contact with another only if whole is in contact with whole or part with part or part with whole." As far as indivisibles are concerned, they have no parts. Thus, *Phys.* 231b3: "they must be in contact with one another as whole with whole."<sup>24</sup> What would this kind of touch entail? Perhaps this is a kind of quasi-touching, one that does not manifest full contact? Or, on the contrary, maybe this kind of contact represents a complete fusion? Simplicius added to this by saying that partless things (*Simpl. In Phys.* 927.7-9): "will touch upon each other neither by parts nor as whole to part, but rather, if [at all, then] as whole to whole, so as to be superimposed upon one another."

<sup>25</sup> For instance, Aristotle's examples of continuous things are the following (*Metaph.* 1016a1): "a bundle is made one by a band, and pieces of wood are made one by glue." Yet, such things can equally well be classified as contiguous (together and touch). Moreover, the pieces of wood, for example, do not lose their actuality in the whole. Yet, in a whole of a higher degree they should.

<sup>26</sup> See Jakubowicz (1999).

<sup>27</sup> Shatalov (2020) pp. 43-8.

kind – if they are fused, they are not capable of being acted on.”<sup>28</sup> Here we should add: a part is no longer capable of being acted on by another part. Yet, he notes, certain wholes are self-moving. That which primarily moves locally and corporeally must be either in contact with or continuous with that which is moved; the things moved and the movers must be continuous or in contact with one another, so that together they all form a unity.<sup>29</sup> In this case, the union is such that both the mover and the moved retain their capacities to move and to be moved while being causally connected and unified. Here the terms used, e.g., *ἅμα*, *ἀπτόμενον*, *συνεχής*, etc. are the same as in the theory discussed in *Physica* V and VI. Thus, Aristotle continues:

that which is the first mover of a thing – in the sense that it supplies not that for the sake of which but the source of the motion – is always together with that which is moved by it (by “together” I mean that there is nothing between them). This is universally true wherever one thing is moved by another.<sup>30</sup>

He argues that this pertains to all kinds of change (i.e., in the category of quantity, quality, and place). For instance, “both that which causes increase and that which causes decrease must be continuous; and if two things are continuous there can be nothing between them.”<sup>31</sup> Here it seems that we have a slightly different and perhaps simpler understanding of continuous, defined by the notions of being together and having nothing in between. And here he does not add the clause “of the same kind” so as to make “having nothing in between” identical to “being next to” or “in succession.” Nevertheless, we may assume that “having nothing in between” here is a preliminary and incomplete definition of “in succession.”

The problematic aspect of continuity reaches its high point in Aristotle’s theory of the causal continuum. For instance, in the theory of touch in *De Generatione et Corruptione*, where what touches does not always need to be touched in return, the contact is not necessarily reciprocal so as to ensure that the prime cause, the one that initiates a causal chain, acts without being

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<sup>28</sup> *Phys.* 212b30-3.

<sup>29</sup> *Phys.* 242b59-63.

<sup>30</sup> *Phys.* 243a32-4.

<sup>31</sup> *Phys.* 245a15-6.

affected.<sup>32</sup> If to touch is to have extremities together, and if what touches is not itself touched, the original definition of touch simply does not apply here. In this way, continuity seems to be secured without touch.

Moreover, it appears that things capable of self-motion are mereological compounds whose parts retain their causal efficacy and can act on other parts so as to set them in motion. It is intuitively clear that parts of a self-moving unified whole can act on each other, e.g., one part of a human body can both act on and be acted on by another part of the same body. The parts under consideration will still remain continuous, sharing a common boundary, being divisible into divisibles, etc. The part which represents the prime mover is such that it acts on other parts non-reciprocally, without touching them. Moreover, things that are unified as parts of a causal relation, one that is not made into a mereological whole, preserve their independent existence otherwise. Hence, they are both together and apart. The bottom line, however, is that a causal continuum is – perhaps paradoxically – a unified whole, whether it is mereological or not, whether its existence is fleeting or lasting.

Yet Aristotle also envisions the possibility of thinking, though incoherently, about a continuum made of indivisibles, e.g., of points, nows, etc., as touching and being next to each other, and having a common boundary. The possibility of this latter continuum is ruled out (*ἀδύνατον ἐξ ἀδιαίρετων εἶναι τι συνεχές*)<sup>33</sup> by Aristotle for two reasons: first, that it is impossible to conceptualize indivisibles as being next to each other or in succession;<sup>34</sup> and second, that it is impossible for continuous things (i.e., divisible into divisibles, infinitely divisible) to be divided through and through so as to arrive at divisions or limits (e.g., points, nows, moves, cuts, etc.), since extended things are not made of these.<sup>35</sup> One of the aims of *Physica* VI, in particular, is to refute the theory of a temporal continuum made of infinitesimals. Aristotle's critique of this theory and the fact that he keeps coming back to it in different parts of his treatise suggests that such theories may have been entertained either by his predecessors or his contemporaries.

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<sup>32</sup> *GC* 324a34-5.

<sup>33</sup> *Phys.* 231a24.

<sup>34</sup> *Phys.* 231b6-10.

<sup>35</sup> *GC* 316a25-34.

It is the first kind of continuum in Aristotle's thought that represents a theoretical orthodoxy, i.e., a full-fledged theory which was the subject of scholarly scrutiny. The second and third kinds remained somehow underdeveloped. Marmodoro rightly pointed out that the theory of causal union needs some further metaphysical justification.<sup>36</sup> On the other hand, Aristotle conceptualizes the fourth kind as a sheer impossibility. Yet, at the turn of the first millennium, a mysterious thinker of Neopythagorean extraction offered an account of an infinitesimal continuum. To this theory I shall now turn.

### *2. The Time and the Now in Pseudo-Archytas*

Pseudo-Archytas, a Neopythagorean thinker whose identity was concealed behind a pseudonym (i.e., Archytas),<sup>37</sup> was active during the first century BC. He seems to have had a particular agenda in mind, i.e., to correct "mistakes" made by Aristotle.<sup>38</sup> Those mistakes were apparently associated with Aristotle's betrayal of his own allegedly Pythagorean roots. Aristotle was indeed critical of various philosophers among his predecessors and contemporaries, including those whom he called "Pythagoreans." Most likely, by this name he lumped together such thinkers as Archytas, Philolaus, and Eurytus, among others. Yet it is also clear that some of Aristotle's own philosophical underpinnings were Pythagorean.<sup>39</sup> This becomes obvious once we investigate his theory of time, which he defines as a number of some kind. By doing this, he aimed to present time as limited and knowable through number. It is thus evident that Aristotle's epistemic commitment to number as a principle of knowledge was Pythagorean.<sup>40</sup> Aristotle's ontology of number, however, was by no means Pythagorean and was considered heterodox by the Neopythagoreans. As one of the main proponents of Neopythagorean thought, Pseudo-Archytas's reassessment of Aristotle's thought sought to

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<sup>36</sup> See Marmodoro (2007).

<sup>37</sup> Archytas was Plato's contemporary and one of the Pythagorean thinkers of the first generation of the Pythagoreans. See Huffman (2014); Horky (2021). Cf. also Ulacco (2016).

<sup>38</sup> *Ibid.*, p. 202.

<sup>39</sup> See Goldin (2016).

<sup>40</sup> *Ibid.*, p. 695.



bring the heritage of the Stagirite back to its roots and, in this way, to make his revised theory of Aristotle sound authentically Pythagorean.

Pseudo-Archytas's approach to Aristotle was, not surprisingly, either antithetical to or corrective of Aristotle's theories. Pseudo-Archytas's theory of time, in the framework of his agenda of reassessing Aristotle's theory, offered an account of what we might call an infinitesimal continuum, i.e., one made of indivisibles. This account aimed, above all, to express an authentically Pythagorean way of thinking about the subject. However, it was also clearly antithetical to that of Aristotle, since it sought to present as a matter of philosophical orthodoxy what Aristotle thought of as the product of an aberrant mind, i.e., a sheer impossibility.

Let us now review Pseudo-Archytas's theory of time and how it relates to his theory of the continuum. What first captures our attention is that the issues of time's being and of the temporal continuum in Pseudo-Archytas's discourse are linked to the now. On the one hand, he tells us that "the now always was and will be and will never fail."<sup>41</sup> Moreover, he also says that "there was never nature when there was no time, nor movement, when the now was not present."<sup>42</sup> In addition, the now is the only part/aspect of time "which appears to exist," even if it exists as something which is partless and which retreats, simultaneously with its being, into non-being.<sup>43</sup> By implication, existing/moving things must exist in the now, since they cannot exist in that which is not. Yet Pseudo-Archytas speaks of the now as both partless and indivisible.<sup>44</sup> To move or to change in the now or in an instant was a sheer impossibility for Aristotle.<sup>45</sup> Pseudo-Archytas, on the contrary, seems to suggest that to exist (i.e., as incomplete actuality, to move) is to move in the now. Again, according to Aristotle, the now is not subject to motion except accidentally.<sup>46</sup> Pseudo-Archytas accepts this, but with qualifications, i.e., attributing ontological stability only to the higher phase of

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<sup>41</sup> Ps.-Arch. *Fr.* 30.9.

<sup>42</sup> *Fr.* 30.7-8.

<sup>43</sup> *Simpl. In Cat.* 354.10-12.

<sup>44</sup> ἀμερές και ἀδιαίρετον.

<sup>45</sup> *Phys.* 234a24: ὅτι δ' οὐθὲν ἐν τῷ νῦν κινεῖται. Cf. Sorabji (1983) p. 14.

<sup>46</sup> *Phys.* 240b8-9: τὸ ἀμερές οὐκ ἐνδέχεται κινεῖσθαι πλὴν κατὰ συμβεβηκός.

the now, while, as far as its lower phase is concerned, the now seems to be subject to motion.

With regard to the higher and lower phases, it should be noted that Pseudo-Archytas's Pythagoreanism was Platonizing: his commitment to Plato's two-world metaphysics is clearly seen in his extant treatises and in doxographic reports concerning him.<sup>47</sup> He also rejected Aristotle's theory of homonymy. Hence, things of the intelligible world and of the sensible world do not fall under different genera of beings. So, their name and the account of their substance remains the same. Nevertheless, they exhibit different characteristics in respect to their instantiation (in the intelligible and the sensible worlds) and represent different phases of the same entity. This is applicable to time and the now, which therefore have higher and lower phases.

Pseudo-Archytas in this context states that:

the now, being indivisible, is <already> in the past while being spoken of and apprehended, and does not stay (τὸ γὰρ νῦν, ἀμερὲς ὄν, λεγόμενον ἅμα καὶ νοούμενον παρελήλυθεν καὶ οὐκ ἔστιν παραμένον). For it is continuously becoming and is never preserved according to number, yet it is indeed so according to its form (γινόμενον γὰρ συνεχῶς τὸ αὐτὸ μὲν οὐδέποκα σώζεται κατ' ἀριθμὸν, κατὰ μέντοι γε τὸ εἶδος). The present time, which is now, and the future are not the same as the past; the one has gone and is not anymore, the other, having been apprehended and become present, has passed by (ὁ γὰρ ἐνεστῶς νῦν χρόνος καὶ ὁ μέλλον οὐκ ἔστιν ὁ αὐτὸς τῷ προγεγονότι· ὁ μὲν γὰρ ἀπογέγονεν καὶ οὐκέτι ἔστιν, ὁ δὲ ἅμα νοούμενος καὶ ἐνεστακῶς παράχρηκεν). And thus, the nows are always continuously linked together, becoming and perishing at every changing moment (καὶ οὕτως αἰεὶ συνάπτει τὸ νῦν συνεχῶς ἄλλο καὶ ἄλλο γινόμενόν τε καὶ φθειρόμενον), yet the form is the same (κατὰ μέντοι γε τὸ εἶδος).<sup>48</sup>

In this passage, the now, as far as its higher phase is concerned, is always the same, since it preserves its form (i.e., κατὰ τὸ εἶδος), and it is always one thing after another as far as its lower phase is concerned (i.e., κατ' ἀριθμὸν). Pseudo-Archytas thus does not follow Aristotle and does not entertain the idea that the now is not subject to change, except accidentally, or that it does not move (from or to opposites, progressing part by part) but rather has moved/changed without ever being in the process of changing.<sup>49</sup> On the contrary, he insists that we should understand the lower now as subject to

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<sup>47</sup> Edited by Thesleff (1965) and Szlezák (1972).

<sup>48</sup> *Fr.* 29.12-8.

<sup>49</sup> See Sorabji (1983) pp. 10-3.

motion/change, i.e., as a moving thing, while suggesting that its motion is swift (either due to or despite its partlessness).

The now is fleeting and swift. The argument associated with the fleeting now is very interesting. It appears in the philosophical tradition of the previous centuries;<sup>50</sup> and it will reappear again in the following centuries.<sup>51</sup> What it tells us is that the mind is always a bit behind in registering the nows (i.e., the lower nows that are always one thing after another, perhaps due to the speed with which the now comes-to-be and ceases-to-exist. We may not immediately infer this swift character of the now from its partlessness; this is because the faster and the slower, according to Aristotle, belong to things that move in time by traversing a greater or lesser distance in time. And motion is gradual, i.e., a part by part transition from or to something. The now, on the other hand, is partless. Consequently, its apparent motion cannot be fast or slow. And if it moves by jerks, in that it has moved without ever being in the process associated with a gradual transition, it will be neither swift nor slow but rather timeless (i.e., instantaneous and sudden). What Pseudo-Archytas asserts, however, is that the lower nows become and cease and that this becoming can be grasped by the mind and expressed in speech but not simultaneously with its passage or, rather, with its having become. Yet the now, contrary to Aristotle, moves, and its motion is swift.

What is important is that swiftness does not allow the now, i.e., the only real thing as far as time is concerned, to be in existence for more than an instant. The previous nows are no longer in existence, while the present now has expired before having been apprehended. Therefore, all that is real in time (as far as the lower aspect of the now is concerned) is unreal, since it does not stay but ceases (or has ceased) instantaneously. Yet, as far as its higher phase is concerned, the now is motionless and real. The now appears to be both the motionless principle of time (responsible for time's generation) as far as its higher (i.e., formal) phase is concerned and also the moving element of time at the lower phase.

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<sup>50</sup> Marc. Aur. *Medit.* 4.48. Cf. Rist (1969) p. 286.

<sup>51</sup> Basil, *Hex.* 1.5.23-5: "Is not this the nature of time, where the past is no more, the future does not exist, and the present escapes before being recognized?" (Ἡ οὐχὶ τοιοῦτος ὁ χρόνος, οὗ τὸ μὲν παρελθὸν ἠφανίσθη, τὸ δὲ μέλλον οὐπω πάρεστι, τὸ δὲ παρὸν πρὶν γνωσθῆναι διαδιδράσκει τὴν αἴσθησιν;).

What can we make of its swiftness? The now is continuously becoming. It is subject to motion. As such, it must traverse a certain magnitude and touch parts of it with its own parts, as *per* Aristotle's suggestion. Moreover, the now, *qua* subject to continuous change, cannot make leaps by simply disappearing from one place and reappearing in another, since that would indicate that its motion is discrete. Yet, *qua* indivisible, it cannot move part by part by touching parts of a magnitude, etc. At this point, it may seem that we have reached an impasse, since it is clear that the lower now does not move by jerks. The lower now is not one but many. Hence, it cannot be just the same now disappearing and then reappearing again without ever being in motion. We may, however, take a different route and, as *per* Iamblichus's suggestion, argue that the now by merging with motions becomes extended while retaining its partlessness. Moreover, at this point it is not clear how something partless can be 'together with' and 'next to' another partless thing, how they can touch so that their extremities are together, etc.

More interestingly, it appears that Pseudo-Archytas does not accept Aristotle's thesis, according to which the now is a mere limit (*πέρας*) and division of time, a boundary (*ἄρος*) which separates the proper parts of time;<sup>52</sup> and that the now itself it is not a proper part of time. Aristotle argued that a part is measure of a whole and that into which a whole is deconstructed. Yet time, according to Aristotle, is not made of nows (i.e., of limits) and is not measured by nows.<sup>53</sup> He also argued that the now, i.e., the instant of time, is not subject to motion, and nothing moves in it.<sup>54</sup> Instead, things move in time. The now is thus neither an actuality of its own kind (since its potentiality precedes actuality and since it is actualized by the mind) nor an incomplete actuality.<sup>55</sup>

Both Aristotle and Pseudo-Archytas classify time as a kind of number and the now as that which is analogous to the unit of number. Yet Aristotle's

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<sup>52</sup> *Metaph.* 1022a4-12. The limits mark off the boundaries of each thing.

<sup>53</sup> Thus, see *Phys.* 218a8: ὁ δὲ χρόνος οὐ δοκεῖ συγκείσθαι ἐκ τῶν νῦν.

<sup>54</sup> *Phys.* 240b8-9. Cf. Bostock (1991) pp. 201-3.

<sup>55</sup> Here we should recall Simplicius's comment about Aristotle (*In Cat.* 351.4-8): "And," says Iamblichus, 'the Peripatetic opinion seems to have deviated from the Pythagorean instruction. The reason for this is that the recent [thinkers] have not held that the same view of number and movement as the ancients, but think that they are accidents, and consider them to be externally adventitious, whereas [the ancients] regard them as substantial.'"

number of motion and its unit are motionless. This was the opposite of the Pythagorean theory of the moving number and its monad.<sup>56</sup> Once again, Aristotle's allegedly Pythagorean background with regard to the epistemic role of number and its unit in science were in conflict with his non-Pythagorean ontology of number.<sup>57</sup>

Overall, the excerpt from Pseudo-Archytas quoted above seems to present us with a theory which is antithetical to that of Aristotle. Yet the phrase that comes next may suggest that Pseudo-Archytas, on the contrary, accepts Aristotle's thesis about the now: that it is a mere limit of time. At least, Sambursky's translation gives us that impression: "every now is a partless and indivisible limit of the former time and a beginning of the future."<sup>58</sup> This sentence can, indeed, be understood in the Aristotelian sense. I think, however, that this conjecture is mistaken. Pseudo-Archytas's now is the Pythagorean unit of time. And a unit/monad is spoken of as either the principle of a thing or as the smallest indivisible part/element into which a whole is deconstructed. It is an actuality of some kind. At least, it is an incomplete actuality at its lower aspect or phase (as extension, in the sense of an offshoot of being). Finally, it can also be understood as a mere limit or division.

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<sup>56</sup> Iambl. *De An.* 4.6-9.

<sup>57</sup> Simplicius restates Pseudo-Archytas's definition of time as: "a kind of number of movement and the general interval of the nature of the universe (κινάσιός τις ἀριθμὸς ἢ καὶ καθόλου διάστημα τᾶς τῶ παντὸς φύσιος)" (*In Phys.* 786.12-3). He also tells us that (*In Phys.* 786.14-8): "the divine Iamblichus in his first commentary to the *Categoriae* [...] interprets the definition <by pointing out> that the movement referred to here is not <some random> movement among many movements (for the others too require time) [ὡς κινήσεως μὲν εἴρηται τινος οὐχὶ μίας τῶν πολλῶν (αἱ γὰρ ἄλλαι χρόνου λελείψονται)] nor is it the communion of many movements (for such a communion would not be one) [οὐδὲ τῆς τῶν πολλῶν κοινότητος (αὕτη γὰρ οὐ μία)], but he refers to the movement which in reality is one, and which exists prior to all the others, as a kind of monad of motions (ἀλλὰ τῆς τῶ ὄντι μίας καὶ πασῶν τῶν ἄλλων προὑπαρχούσης οἷον μονάδος τῶν κινήσεων)." "A kind of number of movement" entails the presence of some particular movement. The meaning of "a kind of number" is clearly attached to a kind of movement. What can that primary motion be? Iamblichus gives us the following solution to the issue at stake (*In Phys.* 786.17-20): "This is the first change of the soul growing out of the projection of thoughts; it is justly primary and the cause of all motions. The number of this motion does not originate as something secondary or from outside, as Aristotle believes."

<sup>58</sup> *Fr.* 29.19-20.

The role of the now in time's being and generation, according to Pseudo-Archytas, is analogous to that of the unit of number. This, we may reasonably suggest, seems to imply that the now, which he also calls present time, is either an actuality (*qua* form/universal) or an incomplete actuality (*qua* numerical differentiation and *qua* subject to change) or even a potentiality (*qua* limit).<sup>59</sup> On the other hand, for Aristotle, limits and divisions are present only potentially (δ' ἐνυπάρχει δυνάμει),<sup>60</sup> and their actualization is premised on the activity of the thinking mind (which can impose limits and make the duration of motions quantifiably assessable). They are not subject to motion/change. Their being is therefore shattered by the lack of actualization.

As far as Pseudo-Archytas's now is concerned, it is clear that the formal now is not a limit in the sense of a boundary. Pseudo-Archytas elsewhere spells out his theory of form/universal and maintains that the form is not a mere limit.<sup>61</sup> What about numerically differentiated nows? Iamblichus's exegetical comment on Pseudo-Archytas's discourse is important in this context, since it highlights the role of the limit of time.

Time is continuous, but it is not held together by a permanent becoming and perishing of the limit. The limit is at rest in its own form in order to be indeed continuous and always to remain so. In another context the now is seen as something which successively becomes different numerically.<sup>62</sup>

We need to bear in mind that Pseudo-Archytas's now, as well as his theory of time in general, seem to bifurcate or even trifurcate. Hence, the now can be understood under one aspect as principle (*qua* pre-existing and as it "encompasses in itself <the essence of time> and produces it out of itself," perhaps, as something similar to Philolaus' limiter),<sup>63</sup> and under another as part

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<sup>59</sup> *Fr.* 6.12-5.

<sup>60</sup> *Metaph.* 1051a23-4.

<sup>61</sup> *Fr.* 38.10-2 (trans. by P. Horky): "for the Form (τὸ εἶδος) is neither a limit nor a boundary of the body (οὔτε πέρασ σώματός ἐστιν οὔτε ὄρος), but only an imprint of being, insofar as it is existent (τύπωσις τῶ ὄντος, ἢ ὄν ἐστιν)."

<sup>62</sup> *In Cat.* 355.25-8: συνεχῆς δὲ ἐστὶν ὁ χρόνος, οὐ μέντοι διὰ πέρατος αἰεὶ γινομένου καὶ ἀπολλυμένου συνέχεται· ἐστηκεν γὰρ τοῦτο ἐν τῷ οικείῳ εἶδει, ἵνα καὶ ὄντως ἢ συνεχῆς καὶ αἰεὶ συνέχεται. περὶ ἄλλο δὲ νῦν θεωρεῖται τὸ κατ' ἀριθμὸν ἄλλο καὶ ἄλλο γινόμενον.

<sup>63</sup> *In Phys.* 355.20-1: τὴν αὐτοῦ ἐν ἑαυτῷ περιέχον καὶ παρεχόμενον ἐξ ἑαυτοῦ. Cf. Huffman (1993) p. 121.

(*qua* being identical to present time:  $\delta\ \gamma\alpha\rho\ \acute{\epsilon}\nu\epsilon\sigma\tau\acute{\omega}\varsigma\ \nu\acute{\upsilon}\nu\ \chi\rho\acute{\omicron}\nu\omicron\varsigma$ ), and, in yet another context, also as Aristotle’s limit (i.e., a mere boundary). Iamblichus makes multiple comments on Pseudo-Archytas’s theory in an effort to clarify it. While interpreting Pseudo-Archytas’s statement, he takes the term limit as capable of designating not a mere boundary but also a principle and part.<sup>64</sup> Consequently, this term in Pseudo-Archytas’s discourse is not tied to the meaning attributed to it by Aristotle.

### 3. *Temporal Continuum*

I assume that one of the keys to Pseudo-Archytas’s understanding of time lies in his reassessment of Aristotle’s theory of the continuum. It is premised on a different understanding of continuity and continua. Let us first revisit what Pseudo-Archytas says about the now: “It is <already> in the past while being spoken of and apprehended, and does not stay.”<sup>65</sup> Here two things come about together ( $\acute{\alpha}\mu\alpha$ ): that it is spoken and apprehended and that it is already gone. Again, one way of interpreting this passage is by assuming that Pseudo-Archytas’s now cannot come-to-be and cease-to-exist gradually, so that the mind can register the successive steps of its coming and going. It is sudden.<sup>66</sup> Perhaps it is not in time. It does not come (or is not coming) but perhaps has come.<sup>67</sup> On the other hand, the passage may also entail that the mind fails to grasp it instantaneously, i.e., as it has passed. Yet it is a part of time. Perhaps the mind grasps it not through a kind of contact (or intuition) but through an inference.<sup>68</sup> This thread may thus run counter to Aristotle in that it apparently attributes to the now the status of a part proper but denies the possibility that the mind can grasp the now and stabilize it in imagination simultaneously with its passing (or, rather, having passed).

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<sup>64</sup> *In Cat.* 355.25-7.

<sup>65</sup> *Fr.* 29.12-3.

<sup>66</sup> Sambursky (1971) p. 14, makes an inference about the now’s non-existence based on the premises of its indivisibility and transient mode of existence: “the present, too, is unreal because it is a point and indivisible.”

<sup>67</sup> See Sorabji (1983) pp. 10-3; Sorabji (1976) pp. 69-89; Kretzmann (1976) pp. 91-114.

<sup>68</sup> Sextus Empiricus has a similar thread which states that the present (now) is beyond the grasp of the mind (i.e.,  $\acute{\alpha}\nu\epsilon\pi\iota\nu\acute{\omicron}\eta\tau\omicron\varsigma$ ) due to the rapid flux of things in the world. Cf. *Sext. Emp. Pyrrh. hyp.* III 19.145.

More interesting is Pseudo-Archytas's understanding of *ἄμα* in this context. According to Aristotle, things can be together (*ἄμα*) and apart (*χωρίς*). To be together entails to be together in place.<sup>69</sup> This requires things that are together to have position. Some indivisibles have position. Iamblichus's report tells us that Pseudo-Archytas's now, which "successively becomes different numerically [...] has acquired a position and possesses an order with regard to becoming."<sup>70</sup> We should not infer from Pseudo-Archytas's statement about the now and the act of apprehension that they are together in the sense of both having position, being in the same place, etc. The meaning of *ἄμα* in this context is that of simultaneity. What is important here is that Pseudo-Archytas's discourse in this clause shifts so as to incorporate the terms of Aristotle's orthodox (i.e., mereological or causal) theory of the continuum. What we can infer from this is that nows of the lower phase of time have position.

That which has position, according to Aristotle, can touch (*ἄπτω*) or be in contact. Things touch when their extremities are together (*ἄπτεσθαι δὲ ὧν τὰ ἄκρα ἄμα*).<sup>71</sup> But how do indivisibles touch? Indivisibles have no extremities. Aristotle's odd idea that a point which is indivisible and, by implication, without extremes can touch another point was useful in explaining how things can be or become continuous (have extremities together or share a common boundary) when their extremities come together and merge. In this case, however, touch entails unification. Yet the idea of a whole without parts and thus without boundaries touching another partless whole (so as to merge with it), as strange as it seems, apparently allowed for exceptions to the rule that to touch entails the necessity of having extremities. Pseudo-Archytas's *καὶ οὕτως ἀεὶ συνάπτει τὸ νῦν συνεχῶς* seems to lie along the same lines by allowing a partless (*ἄμερῆς*) now to touch the now which is apparently next to it. It is important in this context to find out whether Pseudo-Archytas's nows simply co-cluster at the same indivisible instant or, instead, appear to be arranged in a successive series.

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<sup>69</sup> *Phys.* 226b21-2.

<sup>70</sup> *In Cat.* 355.27-8.

<sup>71</sup> *Phys.* 226b23. See also *Phys.* 231a22-3: *ἄπτόμενα δ' ὧν ἄμα*.



Pseudo-Archytas does not mention another term explicative of Aristotle's theory of the continuum: ἐφεξῆς. According to Aristotle, in order to touch, things (parts of a whole) must be next to each other/in succession. Aristotle defines ἐφεξῆς, i.e., "in succession" in the following way:

A thing is in succession when it is after the beginning in position or in form or in some other respect in which it is definitely so regarded, and when there is nothing of the same kind as itself between it and that to which it is in succession, e.g., a line or lines if it is a line, a unit or units if it is a unit, a house if it is a house (there is nothing to prevent something of a different kind being between).<sup>72</sup>

To be next to something, to be able to create a successive series, means to have nothing of its own kind in the middle (in between). If there is a middle, there are extremes.<sup>73</sup> So, the presence of quantities in succession, e.g., numbers in a numerical series that are next to one another, rules out the possibility that a quantity of the same kind, e.g., another number, can lie in between. Although Pseudo-Archytas did not use the term ἐφεξῆς, we nevertheless learn from Iamblichus's report that he apparently did use Aristotle's definition of ἐφεξῆς (as that which has nothing in the middle which is of the same kind) by saying that "the different nows are not separated from each other like the monads, because nothing falls between two nows which is not itself a now."<sup>74</sup> This phrase, however, needs some clarification.

Firstly, the phrase may indicate that there is nothing between two numbers which are next to one another in a numerical series, e.g., 2 and 3. Yet the notion of monad is indeterminate in this respect. It may stand for the building-block of number, i.e., its element. In that sense, any randomly picked monad may not necessarily be next to another monad. Therefore, between two monads, for instance, one that initiates and one that completes a number, there is a number and, hence, many monads (e.g., between the monad that initiates number 22 and one that completes it). By contrast,

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<sup>72</sup> *Phys.* 226b34-227a4: ἐφεξῆς δὲ οὐ μετὰ τὴν ἀρχὴν ὄντος ἢ θέσει ἢ εἶδει ἢ ἄλλω τινὶ οὕτως ἀφορισθέντος μηδὲν μεταξύ ἐστὶ τῶν ἐν ταύτῳ γένει καὶ οὐ ἐφεξῆς ἐστὶν λέγω δ' οἷον γραμμὴ γραμμῆς ἢ γραμμαί, ἢ μονάδος μονάς ἢ μονάδες, ἢ οἰκίας οἰκία· ἄλλο δ' οὐδὲν κωλύει μεταξύ εἶναι.

<sup>73</sup> *Phys.* 226b27-9.

<sup>74</sup> *Phys.* 226b34-227a4: οὐ γὰρ ὡς αἱ μονάδες διεστήκασιν ἀλλήλων, οὕτω καὶ τὰ νῦν· οὐ γὰρ παρεμπίπτει τι μεταξύ τῶν νῦν, ὃ μὴ νῦν ἐστὶ.

there is nothing between two nows that is itself not a now in the sense that there is no time apart from nows, no time which they delimit, since they are not limits but parts. Consequently, there is no time apart from a successive series of nows. This is one possible meaning of the phrase.

Secondly, the phrase may indicate that whereas monads are discrete (in that two monads that are in succession have nothing in between them), time is continuous; and thus between any two nows there is time and hence an infinite number of nows. Therefore, any definite (delimited by two nows) stretch of time, no matter how small, contains a (potentially) infinite number of nows in between, since time is continuous and thus divisible into divisibles, i.e., infinitely divisible (by the now). Yet, in this scenario, two nows cannot be in succession. Iamblichus seems to suggest that Pseudo-Archytas's phrase had the latter meaning by saying that he meant to contrast time as continuous, i.e., divisible into divisibles, with number, which is discrete. However, I think that Pseudo-Archytas opted instead for the former meaning, with the aim of presenting time as a series of continuously linked nows.

What is clear, however, is that a series described in this way is quite unusual, at least from Aristotle's standpoint. It is a series in which apparently partless nows touch and become contiguous so as to form a common boundary, etc. The nows are continuously linked together, coming-to-be and ceasing-to-be, while preserving their form.<sup>75</sup> Again, if we assume that *συνάπτω* entails *ἐφ'εξῆς* here,<sup>76</sup> then the phrase will not merely refer to the now as a limit and unifier of the parts of time, but to the now as a part/element which is situated next to another now (being together, touching, being continuous, etc.).<sup>77</sup> Thus, Pseudo-Archytas infers from a given set of

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<sup>75</sup> *Fr.* 29.17-8: καὶ οὕτως αἰεὶ συνάπτει τὸ νῦν συνεχῶς ἄλλο καὶ ἄλλο γινόμενόν τε καὶ φθειρόμενον, κατὰ μέντοι γε τὸ εἶδος τὸ αὐτό.

<sup>76</sup> Indeed, *συνάπτω* appears to mean "to lie next to", which is a less refine term indicating the same thing as *ἐφ'εξῆς*.

<sup>77</sup> This conjecture, again, would seem nonsensical to Aristotle, who argues that (*Phys.* 231b4-6): "if they [i.e., indivisibles] are in contact with one another as whole with whole, they will not be continuous (*ἅλον δ' ἅλου ἀπτόμενον οὐκ ἔσται συνεχές*); for that which is continuous has distinct parts, and these parts into which it is divisible are different in this way, i.e., spatially separate." He defines continuous is the following way (*Phys.* 227a11-3): "things are called continuous when the touching limits of each become one and the same and are, as the word implies, contained in each other: continuity is impossible if these extremities are two."

premises the conclusion that one now is continuous with another now, as suggested by *ἀεὶ συνάπτει τὸ νῦν συνεχῶς*. The end of the phrase asserts that the nows are always one thing after another: *ἄλλο καὶ ἄλλο γινόμενόν τε καὶ φθειρόμενον*.

This last phrase may also imply that the nows must be in succession and that the now comes (or perhaps has come) and then ceases at the now which is next to it. This conjecture would seem like sheer nonsense to Aristotle. It was one of his points of concern that nows cannot be one thing after another, since that would entail that the previous now must have ceased at the now which is next to it.<sup>78</sup> Yet, the nows are not next to each other, according to Aristotle.<sup>79</sup> Pseudo-Archytas, on the other hand, seems to support the opposite case. At least, we may read his statement as implying this: that nows are next to each other, touch, create the continuum of time. Moreover, apparently time is nothing other than a successive series of nows.<sup>80</sup> Pseudo-Archytas understood continuous to mean having parts with a common boundary (*κοινὰ τμήματα*), basically elaborating on Aristotle's (second) definition of continuous.<sup>81</sup>

Is time, then, nothing more than a mere successive series of nows? Pseudo-Archytas makes contradictory assertions about this. In one place, he asserts that time is continuous, like a line and a figure and place. These are continuous wholes made of parts. The parts, "when separated, form sections with a common boundary (*τὰ γὰρ μέρη τούτων κοινὰ τμήματα ποιέει διαιρούμενα*); a line is cut by a point, a plane by a line, a solid by a plane."<sup>82</sup> Each part, when separated from a whole is thus capable of preserving its continuous existence (as a new unified continuous whole). We may thus expect the now to perform the same operation for time. However, just a few lines

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<sup>78</sup> *Phys.* 218a16-20: "The prior now cannot have ceased to be in itself (since it then existed [*οἷόν τε διὰ τὸ εἶναι τότε*]); yet it cannot have ceased to be in another now. For we may lay it down that one now cannot be contiguous to another (*ἔστω γὰρ ἀδύνατον ἐχόμενα εἶναι ἀλλήλων τὰ νῦν*), any more than a point to a point (*ὥσπερ στιγμὴν στιγμῆς*).” Cf. Cooper (2005) pp. 26-30.

<sup>79</sup> *Phys.* 227a4.

<sup>80</sup> *Phys.* 227a6: *ἐχόμενον δὲ ὃ ἂν ἐφεξῆς ὄν ἄπτηται*.

<sup>81</sup> *Phys.* 227a11. The first definition is that it is divisible into divisibles, i.e., infinitely divisible. Cf. *Phys.* 231b16.

<sup>82</sup> *Fr.* 30.5-7.

above we find a contradictory assertion about the partless now, which is the limit of what has already come about and the beginning of what is about to come. Pseudo-Archytas tells us here that the now is like “the point of a straight line which is broken, <namely the point> at which the breaking occurs and which becomes the beginning of one straight line and the end of another.”<sup>83</sup> What does this mean?

Perhaps following Aristotle, he meant to say that chopping off a continuous and uninterrupted whole is the operation performed by the mind when it aims to identify the limits of a continuous whole so as to apprehend it *qua* quantifiable? Otherwise, if it is chopped off in the sense of being actually divided or interrupted, the whole will no longer be a whole, one, continuous, etc., since its quasi-parts will no longer have a common boundary but will turn into separate and dissociated entities that are not together. It will become a sum of some kind. Time in the latter scenario will not be continuous. Yet we learn that nows are continuously linked. This linkage is the condition of time’s continuity.

Moreover, if time is something other than a series of nows, and if it is a continuous whole made up of parts, what are its parts? Pseudo-Archytas mentions the present, the past, and the future parts of time. He also indicates, however, that these parts or, rather, qualities of time (i.e., expired-ness and not-yet-ness) are nothing other than different modalities of the now at its lower phase when it is self-differentiated, multiplied, etc., without becoming indeterminate due to the linkage which assures continuity. Hence, time is and is not something other than a series of nows. This tension runs through the entire fragment.

It is important to note, however, that the higher now, the one that is the same in form, seems to assure the unbroken continuity of the lower nows that are always one after another, along with their unceasing cessation. Iamblichus calls this now the principle of time, that from which time stems.<sup>84</sup> Yet he also notes that it functions as the efficient cause of time as things that become touch this now (of the higher phase). It seems to act on them. On the other hand, the lower now may also be understood as having

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<sup>83</sup> *Fr.* 29.20-30.1.

<sup>84</sup> *In Cat.* 355.32.

efficacy to transmit its form to the now which is next to it, if we assume that nows are next to each other. It would therefore be reasonable to suggest that the previous now does not cease or has not ceased at another now but rather into another now, i.e., it acts on the now next to it in the series, so as to introduce its form into it. Hence, this continuum will no longer represent a mere mereological continuum (i.e., a whole of parts that are not causally linked) but rather a causal continuum, i.e., a series/chain of some kind.

The most puzzling aspect of Pseudo-Archytas's theory in this context is associated with the following situation: let us we assume that nows are indivisible and that they are always other and other; let us also assume that nows are next to each other and share a common boundary. Yet nows *qua* indivisibles have no boundaries, and they can touch one another only as a whole touching a whole. They must then merely co-cluster so as to be simultaneous. A possible solution to this puzzle is to assume that they are not indivisible. That, however, would run counter to Pseudo-Archytas's attribution of the property of indivisibility/partlessness to the now (and time) at its lower phase.<sup>85</sup> On the other hand, we may also understand a kind of continuum described in this way as a causal continuum in which the now is such that it does not cease (or has not ceased) in itself or at another now but rather into another now in the sense of acting on what is next to it in the series, so as to introduce the form of time into it, at the instant of its cessation. So far, we have learned that the now is subject to motion. It must therefore be moved by something and must have a capacity to be acted on or moved. In this scenario, the temporal continuum is causal. Yet this understanding tacitly presupposes the existence of something in the series that is to be acted on so as to be actualized, something that is not yet a now but can potentially become one.

Aristotle did not reject the idea that the parts of a continuum can act on each other *qua* parts. Moreover, we should not rule out the possibility of two separate things being causally linked before they are unified as parts of a continuous whole. The problematic aspect associated with such a theory is that it must loosen the unity and, instead, argue for a multiplicity of subjects that come into contact, act on one another and cease into one another. Yet Pseudo-Archytas's intention may have been to argue that unity proper is

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<sup>85</sup> *Fr.* 29.11-2.

seen in the formal now (i.e., at its higher phase), whereas numerical differentiation is true of time at its lower phase. He perhaps meant to say that at the lower phase the now must be dissolved into a multiplicity of ontologically related and yet separate nows.<sup>86</sup>

Again, the theory understood in this way must assume the existence of the future now in a series, one that is next to the present now and is subject to being acted on by the present now so that it may cease into this future now. This assumption will, in turn, involve many difficulties.<sup>87</sup> Nevertheless, this train of thought has its roots in Neopythagorean philosophy. One way of thinking of it is to assume that nows are prearranged in the form of an already existing and stable serial order. Iamblichus refers to this as a pre-ordained order of becoming.<sup>88</sup> This ordered series could perhaps experience cessation, one now after another having been removed from the series while expiring or having expired. Another possibility is to think of the previous now as capable of self-augmentation, in which case there will be no pre-existing now in the series to be acted on so as to be actualized.

#### 4. *The Flow of Quantity and Numerical Continuum*

In this context we should perhaps dissociate ourselves from the Aristotelian versions of continuity, whether mereological or non-mereological. Instead, we should direct our gaze to the Neopythagorean theory of the continuum, associated with the notion of the moving monad. It will not be out of place to call this continuum mathematical. For instance, time, according to Pseudo-Archytas, is a kind of number.<sup>89</sup> What is number? Unfortunately, we only possess a set of scattered remarks by various doxographers on Pseudo-Archytas's theory of number. These remarks do not allow us to reconstruct

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<sup>86</sup> See Marmodoro (2007) p. 225.

<sup>87</sup> We should bear in mind that this theory is paradoxical in that it implies that the now which is next to the current now must pre-exist it, so that the current now can cease into it. However, it is also clear that the nows, according to such a theory, cannot be together, since, as Aristotle persuasively argues (*Phys.* 218a11-6): “the nows too cannot be together in relation to one another (ἀμα μὲν ἀλλήλοις), but the prior now must always have ceased to be (ἐφθάρθαι δὲ ἀνάγκη αἰεὶ τὸ πρότερον).”

<sup>88</sup> *In Phys.* 786.20-2.

<sup>89</sup> *In Phys.* 786.12.

his thought on this matter. Yet we may turn for help to Nicomachus of Gerasa, another Neopythagorean thinker of the first/early second century AD. Nicomachus gave us three commonly accepted definitions of number: number is (1) a limited multitude or (2) a combination of units, or (3) a flow of multitude (i.e., quantity) made up of units.<sup>90</sup> Number therefore is that which is limited by a limit; it is a collection of monads; and, finally, a flow of quantity. Time as a kind of number, by implication, must be either a limited (by the *nows*) multitude, or a collection/combination of its units (the *nows*), or, finally, a flow of the *now/nows*.

Whereas the first definition corresponds to a commonly accepted notion of time as a definite multitude delimited by *nows*, the second definition may be legitimately understood as presenting time as a collection of *nows*. The second definition of number, and corresponding to it the second understanding of time, do not imply the necessity of one *now* ceasing into the one next to it. The *nows*, in this scenario, are not causally linked, and the continuum is mereological. Time, according to the second definition of number, however, cannot be understood as a number which is in the process of a constant and uninterrupted cessation of passing *nows* or of an augmentation by newly added *nows*. On the contrary, it is perhaps also possible to conceptualize time in the form of a fixed series of *nows*, a series which is infinite and, yet, pre-existing and therefore allows things that come into being or move to be contained by this pre-ordained and ordered series of prior and posterior. This latter conjecture may not immediately accommodate Pseudo-Archytas's theory of time. It is incomplete in that it does not account for the fact that the lower *nows* come and cease and do not stay, and that time *per extension* is immersed in the flow of becoming, turning into "the general interval of the nature of the universe."<sup>91</sup>

What about the third definition and the theory of the continuum which may be premised on it? Nicomachus himself seems to prefer precisely the "flow" account. However, the meaning of "flow" (*χύμα*) needs to be qualified. One meaning of it is a confused mass or aggregate. If we assume that

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<sup>90</sup> Nicom. *Intr. Arith.* 1.7.1.1-2: Ἀριθμὸς ἐστὶ πλῆθος ὠρισμένον ἢ μονάδων σύστημα ἢ ποσότητος χύμα ἐκ μονάδων συγκείμενον.

<sup>91</sup> *In Phys.* 786.13.

Nicomachus's definition makes use of the term flow in the sense of aggregate, then number is an aggregate of monads. In this case, the *συγκείμενον* may be indicative of that which is a sum, etc. Moreover, it may also be used in the sense of continuous and without interval or pause, thus indicating that the monads are continuously linked. This, in turn, implies a multiplicity of monads. They cannot comprise a mere aggregate, i.e., some sort of unordered and random constellation. A series of the nows is framed in an ordered sequence (of prior and posterior or earlier and later) or, at least, presupposes the presence of such a sequence. However, having appeared together with the flow, the sum or aggregate (which is also continuous) should contain the infinite or indefinite, which is what makes it appear fluid-like. What is important in this context is the tacit premise that the flow of the multitude is a collection or composition or a continuous linkage. This entails the presence of many monads.

The other meaning of the flow is associated with motion or, in other words, with the lack of ontological stability. Things of this world are flowing in the sense of not being able to preserve their unitive subsistence, to be present as simultaneous wholes, in the sense of gradually slipping into indeterminacy, etc. This, in turn, implies the presence of a flowing or moving subject. Another word with a similar meaning which is often used in the literature on the subject of time is *ῥεῖν*, i.e., "to flow" or "to stream."<sup>92</sup> This meaning also connotes that the subject is progressing or moving, making a gradual transition from or to something. However, this term may not immediately connote the unity of the flowing subject. For instance, Pseudo-Archytas sometimes spoke of time in this sense, clearly indicating that the now at its lower phase cannot preserve its numerical unity and turns into many. Iamblichus, on the other hand, classifies generated (i.e., of the lower phase of) time as flowing (*ῥέοντος*) and speaks of the now coming-to-be as subject to augmentation and multiplication.

The difference in the meaning of the term is largely due to variations in the understanding of unity. Aristotle's unity of motion, premised on the unity of the moving subject (whose unity, in turn, is premised on the unity of parts continuously linked within the whole), is here juxtaposed with the

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<sup>92</sup> Gersh (1978) p. 18.



Neopythagorean-fashioned multiplicity of the sensible subject whose unity is arguably derivative and participatory (or simply perceptual). In general, however, the “motion” account of number is normally associated with some assumed unity of the subject. Nicomachus’s flow of the multitude is out of the monad (or, the point, the now, etc.).<sup>93</sup> Hence, the unity of the flow is due to the unity of its principle, i.e., its cause or that from which it stems.

Robbins in this context argued that “of the three [definitions of number, the third definition] is the most truly Pythagorean, and it evidently has reference to that conception of number as a stream, moving out from the monad.”<sup>94</sup> How does he explain it? Robbins envisions it as a series which, like a stream, proceeds out of unity. The monad then generates number by being set in motion. Does it mean that the indivisible (and perhaps immaterial eternal being) is immersed in the flow of becoming and thus starts moving? We need to recall in this context Nicomachus’s definition of number (and of the monad of number) as pure actuality and not subject to change. It is something which abides in eternal repose, whereas the passions or affections belong to the participant.<sup>95</sup>

The notions of flow and of the moving number/unit of number here are not premised on Aristotle’s theory of motion as incomplete actuality but instead on the Platonic idea of the power of the intelligible to transmit its efficacy to lower levels. Pseudo-Archytas’s account seems to accept this. Again, he tells us that the now “always was and will be, and the now will never fail to change at any changing moment, being different numerically and the same in its form.”<sup>96</sup> So, it is subject to motion, flow, etc. Yet the form of the now remains motionless and always the same. This is the reason why

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<sup>93</sup> Thus, Robbins (1926) p. 116 tells us that: “in geometry we begin with the point, which is indimensional. This is the beginning of the first dimensional form, the line, and by movement the point generates the line. Now Nicomachus had a similar idea of the nature of multitude and number; they form a series, as it were a moving stream, which proceeds out of unity, the monad, just as the point is not part of the line (for it is indimensional, and the line is defined as that which has one dimension), but is potentially a line, so the monad is not a part of multitude nor of number, though it is the beginning of both, and potentially both.”

<sup>94</sup> *Ibid.*, p. 115.

<sup>95</sup> *Intr. Arith.* 1.1.3.10-2. Cf. *Simpl. In Phys.* 787.17.21.

<sup>96</sup> *Fr.* 30.9-10.

the temporal continuum of nows is not dissolved into unordered multiplicity and unordered magnitude. Moreover, in this scenario, things that move will be in number, and the now will be the number which numbers, as *per* Aristotle.<sup>97</sup>

How can a number move? The notion of a moving number greatly puzzled Aristotle. In one scenario, when a unit is subtracted from, say, the number 5, what we have appears to be motion/change of some kind. Aristotle's point, however, was that motion is in the moving object, which is one and continuous. Yet number is not one, nor is it continuous. Hence, when the operation of subtracting a unit from a number is performed, the result is not a motion but rather generation and destruction, i.e., the generation of a new sum and destruction of the previous total.<sup>98</sup> Number therefore cannot be subject to motion.

What about the unit of number? Perhaps it can be set in motion? The absurdity of such an assumption, according to Aristotle, is associated with the idea that a simple and indivisible unit/monad cannot make a gradual transition from or to something, since it is partless. At best, it can disappear and then reappear without ever being in motion. It cannot be subject to incomplete actuality. By implication, mathematical and the physical entities belong to different subject-genera. In that sense, number and motion are antithetical.

It is worth noting, in this context, the Neopythagorean order of mathematical sciences whose common genus is quantity. According to Pseudo-Archytas, "quantity has produced four sciences: immovable continuous quantity – geometry; movable continuous quantity – astronomy; immovable discrete quantity – arithmetic; and the movable – music."<sup>99</sup> Here two sub-disciplines, one associated with discrete quantity and another with the continuous, embrace *kinesis*. Thus, the mathematical sciences include motion as their core subject. Quantity is that which is limited by number. Nicomachus, on the other hand, speaks of quantity and number as that which

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<sup>97</sup> Cf. *Phys.* 220a20.

<sup>98</sup> *Metaph.* 1024a12-4.

<sup>99</sup> *Fr.* 6.12-5: ἀπὸ δὲ τοῦ ποσοῦ καὶ αἱ τέσσαρες τῶν ἐπιστημῶν ἐξευρέθησαν· τὸ γὰρ συνεχὲς ποσὸν ἢ ἀκίνατον καὶ ποιεῖ τὰν γεωμετρίαν ἢ κινατὸν καὶ ποιεῖ τὰν ἀστρονομίαν· τὸ δὲ διωρισμένον ἢ ἀκίνατὸν ἐντι καὶ ποιεῖ τὰν ἀριθμητικὰν ἢ κινατὸν τὸ δὲ διωρισμένον ἢ ἀκίνατὸν ἐντι καὶ ποιεῖ τὰν ἀριθμητικὰν ἢ κινατὸν καὶ ποιεῖ τὰν μουσικὰν.

turns infinite magnitude (*μέγεθος*) and multitude (*πλήθος*) into limited magnitude (*τὸ πηλίκον*) and multitude (*τὸ ποσόν*).<sup>100</sup> It is also clear that, according to Pseudo-Archytas, quantity extends its domain into the physical. It cannot exclusively belong to the mathematical sciences, unless we assume that all sciences are at their core mathematical. Since this was the original Pythagorean ideal, perhaps Pseudo-Archytas silently assumed that quantity was the common genus of all sciences.

There are further considerations associated with this question. Everything, according to Pythagorean and Neopythagorean thought, is known through number. This first and foremost implies that mathematical entities are known through their own principle. Yet this applies equally to physical realities. How is that possible? To say this is to assume that bodies, motions, times, etc. are numbers of some kind. Aristotle rejected this assumption as nonsensical. This did not, however, seem nonsensical to the Neopythagoreans. Thus, Nicomachus, aiming to spell out his theory and to incorporate into it the ancient Pythagorean intuition, asserted that when monads combine, they introduce shapes – a train of thought associated with the tradition initiated by Eurytus.<sup>101</sup> Nicomachus thus spoke about linear number, plane number, solid number.<sup>102</sup> Hence, the potential and the actual physicality of number is implicit in this theory. What is important is that number, in this scenario, is the principle of quantity. Consequently, whatever contains quantity also contains number. This may also pertain to virtues, etc. It is therefore legitimate to explain matters of ethics, physics, etc. through number.

Nevertheless, the question of how a number moves still needs to be answered. The Neopythagorean number moves motionlessly but not in the Aristotelian sense. It moves in the sense of allowing its lower phase, which delimits and orders the infinite/unlimited, to be in contact with the unordered

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<sup>100</sup> *Intr. Arith.* 1.2.5.2-9.

<sup>101</sup> Casertano (2013) p. 360 n. 55, understands this contention as the fundamental point: “Pythagoreans had a ‘spatial idea of number’, so that number turns into a concept with dimensions; and *μέγεθος* is the right word to describe this ambiguous nature, including both *μαθηματικά* and *αἰσθητὰ σώματα*.”

<sup>102</sup> R. McKirahan observes in this context that the Pythagoreans went so far as ultimately to identify things with number. See McKirahan (2013) p. 182: “The Pythagorean belief that number is fundamental to everything led to an attempt to discover the numerical nature of various things – which consisted in associating or identifying things with number.”

multitude and magnitude so as to order them in respect to number and, thus, make them limited, knowable *qua* before and after, etc. This was the reason why Iamblichus demanded that we set aside Aristotle's theory of time as an accident of motion.<sup>103</sup> According to Iamblichus and in agreement with Neopythagorean thought in general, time does not supervene on motion. It is not that which comes after but rather that which precedes.<sup>104</sup> As such, it orders and measures motion.<sup>105</sup> Therefore, it is not something ordered by motion but instead the principle of order of motion. In Iamblichus's words: "time moves as possessing the cause of the activity proceeding outside from it and perceived as divisible in the movements and being extended together with them."<sup>106</sup> Thus, it moves motionlessly. It acts without being acted on. It touches participants without being touched. Here the continuity of the numerically changing nows is secured by the eternity of their cause. Hence, the cessation of nows is not interrupted.

But at each phase the relation of the now to motion needs to be qualified. The lower phase of Pseudo-Archytas's time is marked off by the now's cessation or, perhaps, self-augmentation, multiplication, etc. It contains difference (being one thing after another), the flow of becoming (transition from one to another), and qualified non-existence. It does not become dissolved into the infinite and limitless. The being of time, however, loses its ontological stability in its lower phase.

Is a mathematical continuum possible in this scenario? Aristotle rejected the idea of a mathematical continuum. Number is divisible into divisibles, i.e., discrete entities. Yet any continuum, according to Aristotle, is possible only if it is divisible into divisibles, if the infinite presents itself in it. So, in order for a mathematical continuum to exist, the infinite must present itself in number. That would entail the existence of irrational numbers. And, indeed, at the time of Aristotle, a theory of irrational numbers was

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<sup>103</sup> Simpl. *In Tim.* 3.32.4-6: πρὸς ὃ καὶ μόνον ὁρῶντες οἱ φυσικοὶ τῆς κινήσεως αὐτὸν ᾤθησαν εἶναι τὸ ἀριθμητὸν, τὸ αἴτιον τούτου κατιδεῖν οὐ δυναθέντες.

<sup>104</sup> *In Tim.* 3.31.19-27.

<sup>105</sup> *In Tim.* 3.31.29-30.

<sup>106</sup> *In Tim.* 3.31.32-3.32.2: οὕτω γὰρ καὶ ὁ χρόνος κινήτος, ὡς ἔχων τὴν αἰτίαν τῆς ἐνεργείας τῆς ἕξω προΐουσης ἀπ' αὐτοῦ καὶ ἐν ταῖς κινήσει μεριστῶς ὁρωμένης καὶ συνδισταμένης αὐταῖς.

introduced by Hippasius.<sup>107</sup> Irrational numbers, however, were a major threat to the Pythagorean theory, according to which number is the principle of rationality and knowability. Hippasius's theory was thus rejected by both the Pythagoreans and Aristotle. Hence, this kind of continuum is impossible, according to Aristotle, because number is divisible into indivisibles. Moreover, the notions of decimals and fractions, although known to ancient and late antique thinkers, were not commonly entertained in Aristotle's day. Therefore, number is divisible into its unit or monad (what we nowadays call number 1), which itself is not number but its principle. Therefore, number is not divisible beyond the limit of its unit/monad. In addition, number is many and not properly unified; hence, it cannot be continuous.

On the other hand, Aristotle asserted that, although a number can be next to another number in a series, it cannot touch a number next to it, since it does not have extremes. Consequently, it cannot touch and be contiguous with another number, since there is no common boundary, and the (non-existent) extremes cannot be shared.<sup>108</sup> Hence, this kind of continuum is impossible also because a number cannot touch another number and does not have a common boundary with it, and is not a whole, etc. This concerns only scientific numbers, however, and not numbers instantiated in bodies, motions, etc., which are continuous.

Moreover, Aristotle's number (i.e., that with which we count) is not actual. Its actualization is premised on the activity of a mind capable of actualizing number and numerical relations by abstracting them from quantities and studying them *qua* separate. The Neopythagoreans, however, conceptualized number as, above all, a substantial quantity and actuality, and its principle as a substantial unit which can limit things by being present to them and impose number and measure on limitless magnitude and multitude.

According to the Neopythagoreans, the principle of number, i.e., the unit of number, is a whole without parts. Yet at its higher phase the now is the principle of continuity of the temporal continuum made up of nows of the lower phase. Those are parts of the whole of time, continuously linked so as to make the flow of time uninterrupted. By implication, the unit/monad, while

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<sup>107</sup> See von Fritz (1945).

<sup>108</sup> *Cat.* 4b26-7.

flowing, can become linear, self-augmented and multiplied. In a similar fashion, a point generates a line in Neopythagorean thought.

This mathematical continuum is such that it is not divisible into divisibles. Perhaps the main reason for this is Pseudo-Archytas's commitment to the rational character of number. Hence, the infinite does not present itself in it *per se* but only *per accidens*, i.e., at its lower phase, once it meets unlimited magnitude and multitude so as to make them limited and knowable. What is so peculiar about this continuum understood through the concept of a numerical series is that the now is and is not next to another now. Perhaps it does not cease (or has not ceased) at or into another now which is next to it. Instead, the now may have ceased in itself. It is interesting to note that the meaning of Aristotle's phrase at *Phys.* 218a16-17 (ἐν αὐτῷ [...] τὸ εἶναι τότε)<sup>109</sup> was, arguably, that the now cannot have ceased when it existed. "For example, let the current time be five o'clock. When will the instant that is now first have ceased to exist? It cannot have ceased to exist at five o'clock, for that is when it exists."<sup>110</sup> Yet, as Coope has rightly pointed out, "indivisibles only exist in a continuum in so far as they are marked out in some way."<sup>111</sup> They have to be actualized by the mind. The temporal continuum, according to Aristotle, is not made up of them. Hence, there was no "when" for the now to exist in the first place. Only parts proper can be and cease. Moreover, Aristotle's now cannot cease or have ceased in the first place, since it is not subject to change unless accidentally. Hence, it is always the same in whatever it is (ὁ δὲ ποτε ὄν ἐστι τὸ νῦν, τὸ αὐτό) and one thing after another in definition or account.<sup>112</sup> Pseudo-Archytas's continuum, on the other hand, is made up of nows. The now is always the same in form, i.e., as far as its higher phase is concerned, and always one thing after another in number, i.e., in respect to its lower phase. Again, Pseudo-Archytas understood the now not as a mere limit but as that which exists, as an actuality or incomplete actuality at its lower phase. It is therefore possible to think of it as of ceasing or having ceased in relation to some "when."

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<sup>109</sup> *Phys.* 218a16-7: ἐν αὐτῷ μὲν οὖν ἐφθάρθαι οὐχ οἶόν τε διὰ τὸ εἶναι τότε.

<sup>110</sup> Coope (2005) p. 26.

<sup>111</sup> *Ibid.*, p. 28.

<sup>112</sup> *Phys.* 219b11-2: τὸ δὲ νῦν τὸν χρόνον ὀρίζει, ἢ πρότερον καὶ ὕστερον.

Moreover, the lower now augments itself without augmenting, in the sense that time as a whole remains partless.<sup>113</sup> Perhaps what Pseudo-Archytas had in mind was that nows continuously become through the flow and self-augmentation of the monad. The now is not one but many, as it cannot preserve its unity numerically. Yet neither can the now become many so as to be a complex whole made of parts, both one and many. Perhaps the now comes and ceases without having acted on another now. Hence, it does not cease into another now. Neither does it cease (or have ceased) at the now which is next to it in a series, as that would again presuppose that there is something next in a series. It is possible that the best way to think about Pseudo-Archytas's numerically differentiated nows is to assume that the now has ceased in itself and that a new now emerges at the point of cessation of the previous now.

The previous now, at the instant of its cessation, touches the now which emerges in its place. The whole is in touch with a whole in this scenario. By touching, they unify. Hence, time is a series of nows which come and cease through unification. They are and are not next to each other. They are not next to each other in the sense of being the parts of a series that remain. But they are next to each other in another sense, in that there is nothing in between them that is not of the same nature. Yet, ultimately, the series of nows is compressed into a partless whole.

Pseudo-Archytas's theory thus differed from that of Aristotle in that it apparently favored a different theory of the continuum in which the partless (yet extended) nows can create a continuous series that makes up time (which is, again, not something apart from nows). Perhaps this temporal continuum was conceptualized by Pseudo-Archytas in order to make it immune from Aristotle's dilemma. The now is part of a series which does not last but is compressed in an instant. This strange series is uninterrupted by the cessation of one now and the appearance of another now, which are mereologically linked, as there is nothing in between them. It seems that the best way of thinking of when in respect to its cessation is to think of it

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<sup>113</sup> Again, as Pseudo-Archytas asserted, the property of time (at its lower phase) is the indivisible and the unreal. See *Fr.* 29.11-2: τὸ δὲ ποικῶ καὶ ὁ χρόνος καθόλου μὲν ἴδιον ἔχει τὸ ἀμερὲς καὶ τὸ ἀνυπόστατον.

as occurring in itself. Hence, it has come and has ceased in itself precisely when it existed. It is fleeting. This is the reason why the mind is always behind in registering nows.

It is clear that Pseudo-Archytas's now is not similar to the infinitesimals of the modern mathematical continuum theory.<sup>114</sup> Rather, this now is very peculiar and is grounded in the late antique understanding of number and continuum. Perhaps it would not be out of place to conceptualize Pseudo-Archytas's now at its lower phase as a particle which is extended (i.e., has size), has a position in a series and is in a place of some kind, i.e., as of an indivisible individual.<sup>115</sup>

In general, Pseudo-Archytas's theory of the continuum is as puzzling as it is fascinating. It aimed to preserve unity in a numerical series and in time so as to keep them limited, ordered, measurable, etc. according to an overarching Neopythagorean agenda of conceptualizing becoming as limited and ordered in respect to number. Time, considered in this way, is not dissolved into a mere sum. Instead, it is one and continuous and held together by the now which is always the same and always other and other but not in the same sense. Yet the sense here is framed into the idea of phases.

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<sup>114</sup> See de Freitas (2018).

<sup>115</sup> *Fr.* 5.36-7.



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LAURA FOLLI

**THE AUTHENTICITY OF *METAPHYSICS ALPHA ELATTON* IN THE *SCHOLIUM PARISINUM* AND IN ALEXANDER OF APHRODISIAS' *RECENSIO ALTERA***

**Abstract**

The present note offers a brief new analysis of the well-known *scholium* found in codex Parisinus gr. 1853 (E) on folio 234r. My analysis will compare it to the exegetical approach that Alexander of Aphrodisias adopts at the outset of *Alpha elatton* – attested by two different *recensiones* – and to Asclepius' exegesis of the first lemma of Aristotle's *Metaphysics*.

**Keywords**

Aristotle's *Metaphysics*; Book *Alpha Minor*; *Scholium* Parisinus Gr. 1853, f. 234r (E); Alexander of Aphrodisias's Commentary; Asclepius's Commentary

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The present note offers a brief new analysis of the well-known *scholium* found in codex Parisinus gr. 1853 (E) on folio 234r. My analysis will compare it to the exegetical approach that Alexander of Aphrodisias adopts at the outset of *Alpha elatton* – attested by two different *recensiones*, one of which is especially at stake here, the *recensio altera* (Laur. 87.12) – and to Asclepius’ exegesis of the first lemma of Aristotle’s *Metaphysics*.

I begin by citing the *scholium* of codex Parisinus gr. 1853 (E), located in the right margin of folio 234r, between the end of *Alpha meizon* and the beginning of *Alpha elatton*:

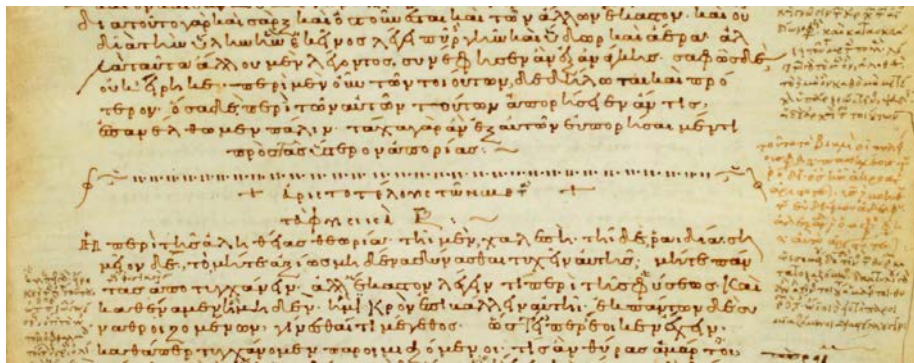


Figure 1: Parisinus gr. 1853 (E), f. 234r

τοῦτο τὸ βιβλίον οἱ πλείους φασὶν εἶναι Πασικλέους τοῦ Ροδίου ὃς ἦν ἀκροατὴς Ἀριστοτέλους· υἱὸς δὲ Βοηθοῦ τοῦ Εὐδήμου ἀδελφοῦ, Ἀλέξανδρος δὲ ὁ Ἀφροδισιεύς φησὶν εἶναι αὐτὸ Ἀριστοτέλους.

Most say that this book is by Pasicles of Rhodes, who was a pupil of Aristotle and the son of Boethus, brother of Eudemus. But Alexander of Aphrodisias says that it is by Aristotle.

Although the text of this *scholium* shows affinities to Asclepius’ discussion of *Alpha meizon* (*In Metaph.* 4.21-22), the early editors of the *Metaphysics* believed that it referred to *Alpha elatton*.<sup>1</sup> The placement of the *scholium* –

<sup>1</sup> For previous analysis of the *scholium Parisinum*, see Hecquet (2005), Vuillemin Diem (1983), Berti (1982), Moraux (1967). Moraux argues that the *scholium*, first considered by C. A. Brandis in 1836 and later by W. Christ and W. Jaeger, is a valuable testimony in favor of attributing *Alpha elatton* to Pasicles. H. Bonitz, in his critical edition *Aristotelis Metaphysica* of 1848, also considered the *scholium* to be related to *Alpha elatton*. Berti

in the right margin at the end of *Alpha meizon* and near the start of *Alpha elatton* – clearly raised doubts among scholars as to which of the two ‘Alpha books’ the deictic phrase τούτο τὸ βιβλίον (“this book”) actually points. It is worth noting, however, the affinity between the beginning of the *scholium* and the phrase καὶ τούτο τὸ βιβλίον that begins the proem in the Laurentian codex to the second book of the *Metaphysics* (“this book, too ...”), where the exegete specifically addresses the Aristotelian authorship of *Alpha elatton*.

According to my analysis, the *scholium* in the Parisinus gr. 1853 exhibits similarities not only to Asclepius’ commentary but also to the *recensio altera*, i.e., the text of Alexander’s commentary found in Laurentianus 87.12.

The initial phrase of the proem to *Alpha elatton* as transmitted in the codex Laurentianus 87.12, f. 55r, reads as follows:

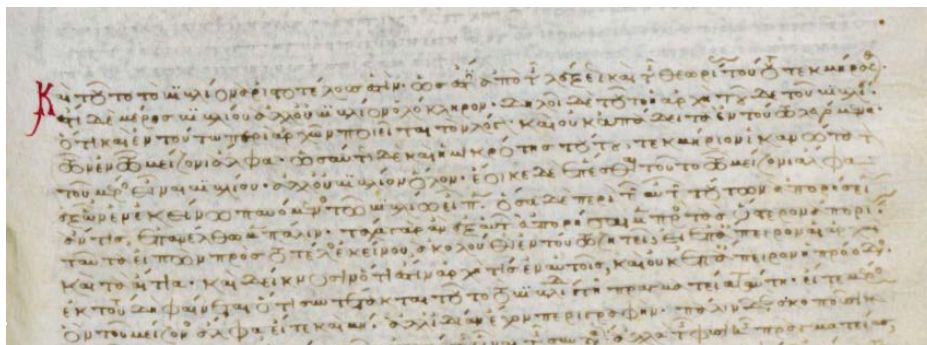


Figure 2: Laurentianus 87.12 (L), f. 55r

(1982) and Hecquet (2005), however, have opposed the attribution, which was adopted by German philologists up to Jaeger, and hold that the *scholium* refers to *Alpha meizon*, see also Vuillemin Diem (1983), esp. p. 174. Their arguments deserve consideration and could be analyzed more fully in a dedicated, comprehensive essay. On the relationship between the testimony of Asclepius, the *scholium* of the Parisinus gr. 1853 and *Alpha meizon*, see Primavesi (2012) pp. 418-9. Most interestingly, on folio 234r of Parisinus gr. 1853, in the upper margin and along the right-hand side of the folio, there is an extended *scholium*, in my view written by a later hand, which in its initial part quotes the entire content of the lateral marginal *scholium*, with only a few divergences. This upper *scholium* was edited by Brandis (1836) 589a41-b18, see also Vuillemin-Diem (1983), pp. 164-6. On the hands of the copyists of the Parisinus graecus 1853, see Moraux (1967).

Καὶ τοῦτο τὸ βιβλίον Ἀριστοτέλους ἐστὶν ὡς ἔστιν ἀπὸ τῆς λέξεως καὶ τῆς θεωρίας τούτου τεκμηρησθαι.<sup>2</sup>

This book, too, belongs to Aristotle, as can be inferred from its style and theoretical content.

The opening of the *recensio altera* begins with a καὶ (“also”), which I consider significant. The exegete firmly asserts that *Alpha elatton* is by Aristotle, underscoring its argumentative coherence with the preceding book.

The Laurentian codex continues:

ἔστι δὲ μέρος βιβλίου ἀλλ’ οὐ βιβλίον ὁλόκληρον. δηλοῖ δὲ τοῦτο ἡ ἀρχὴ τοῦδε τοῦ βιβλίου ὅτι καὶ ἐν τούτῳ περὶ ἀρχῶν ποιεῖται τὸν λόγον καὶ οὐκ ἀπάδει τὰ ἐν τούτῳ λεγόμενα τῶν ἐν τῷ μείζονι Α.

It is part of a book rather than a complete book; and the beginning of this work itself shows this clearly, since here too Aristotle deals with principles, and the statements found in it do not depart from those in the greater Alpha.

The repeated use of the present indicative form of εἶναι imparts a certain firmness to the argument. In this proem, the exegete of the Laurentian codex seems to contest an earlier opinion that may have questioned Aristotle’s authorship of *Alpha elatton*.

The commentary on *Alpha elatton* in the *recensio vulgata* presents differences in its opening, but it aligns with the *recensio altera* on one point: both focus on the brevity of *Alpha elatton*.<sup>3</sup> This brevity makes it challenging to classify the text as a complete book, suggesting instead that it might be part of one. In the proem of the *recensio vulgata*, the sequential use of the verbs ἔοικεν (“it seems”, 137.3) and δόξει (“it will appear”, 137.6) weakens the exegetical argument, rendering it uncertain. In this regard, it is illuminating to compare this uncertainty to the conclusion preserved in the Laurentian

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<sup>2</sup> Cf. Alex. *In Metaph.* 137.2-3 Hayduck. Laur. 87.12, as highlighted by Fazzo (2018), is the earliest witness of Alexander’s commentary on the *Metaphysics*. The new edition (*CAGB* III 1, Golitsis 2022), does not fully account for the significance of the *altera recensio*. Incorporating the readings of Laur. 87.12 could therefore provide valuable insights on specific textual and philosophical issues.

<sup>3</sup> Cf. Alex. *In Metaph.* 137.2-7 in Hayduck’s edition: τὸ ἐλαττον ἄλφα τῶν Μετὰ τὰ Φυσικὰ ἔστι μὲν Ἀριστοτέλους ὅσα καὶ τῆ θεωρίας τεκμηρησθαι, οὐ μὴν ὁλόκληρον ἔοικεν εἶναι. ἀλλ’ ἔστιν ὡς μέρος βιβλίου τεκμαιρομένοις τῆ τε ἀρχῆ καὶ τῆ τοῦ βιβλίου μικρότητι. ὅσον μὲν οὖν ἐπὶ τῷ περὶ ἀρχῶν καὶ ἐν τούτῳ ποιεῖσθαι τινὰ λόγον δόξει καὶ οὐκ ἀπάδειν τοῦτο τοῦ μείζονος Α ἀλλ’ ἔπεσθαι ἐκείνῳ περὶ ἀρχῶν καὶ αἰτίων.



commentary. Here, the arguments for and against the idea that *Alpha elatton* is part of *Alpha meizon* conclude with a succinct philological observation (cf. 137.9-12 H):

εἴτε μέρος ὄν τοῦ μείζονος ἄλφα εἴτε καὶ μὴ ἄλλ' ἰδίαν ἔχον περιγραφὴν.

Whether it is part of the greater Alpha or not, it nevertheless possesses its own distinct definition.

In his commentary on the opening lemma of *Metaphysics Alpha meizon* (Πάντες ἄνθρωποι τοῦ εἰδέναι ὀρέγονται φύσει), Asclepius<sup>4</sup> (*In Metaph.* 4.4-16)<sup>5</sup> acknowledges the existence of a *πραγματεία συγκεκριτημένη*,<sup>6</sup> that is, a treatise assembled in a particular manner, sometimes lacking unity and compactness. A bit further on, Asclepius discusses how many books make up Aristotle's treatise; and he refutes the claim of those who have attributed *Alpha meizon* to Pasicles of Rhodes, son of Boethus and brother of Eudemus, appealing to the clarity of the Aristotelian style and thought.<sup>7</sup> Asclepius' reasoning, which emphasizes stylistic and conceptual homogeneity to confirm Aristotle's authorship of *Alpha meizon*, is perfectly consonant – indeed, shares a similar firmness – with Alexander's testimony in the proem to *Alpha elatton* in the Laurentian codex.<sup>8</sup>

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<sup>4</sup> It should be borne in mind that Asclepius is the only Neoplatonic author of the sixth century whose consecutive commentary on the *Metaphysics* from book *Alpha* to book *Zeta* has come down to us in Greek. On the value of Asclepius as a useful source from a philological point of view for the reconstruction of the text of the *Metaphysics*, see the contributions of Luna (2001); Fazzo (2012); Primavesi (2012).

<sup>5</sup> Hayduck (1888).

<sup>6</sup> Cf. Asclep. *In Metaph.* 4.4-16.

<sup>7</sup> Cf. Asclep. *In Metaph.* 4.17-24: Εἶτα λοιπὸν δεῖ εἰπεῖν καὶ περὶ τοῦ μεγάλου ἄλφα καὶ περὶ τοῦ μικροῦ ἄλφα. εἰδέναι τοίνυν χρὴ ὅτι δεκατέσσαρα βιβλία ἔγραψεν ὁ Ἀριστοτέλης ἐν τῇ παρούσῃ πραγματεία· μέχρι γὰρ τοῦ ν στοιχείου ἔγραψε καὶ αὐτοῦ. τινὲς δὲ εἰρήκασιν ὅτι δεκατρία· τὸ γὰρ μείζον ἄλφα περὶ οὗ νῦν πρῶτως διαλέγεται, οὗ φασιν εἶναι αὐτοῦ ἀλλὰ Πασικλέους τοῦ υἱοῦ Βοήθου τοῦ ἀδελφοῦ Εὐδήμου τοῦ ἐταίρου αὐτοῦ. οὐκ ἔστι δὲ ἀληθές· σώζεται γὰρ ἡ τοῦ Ἀριστοτέλους δεινότης καὶ ἐκ τῆς λέξεως καὶ ἐκ τῆς θεωρίας.

<sup>8</sup> I would add that Asclepius also makes clear in the incipit to *Alpha elatton* his view about the authorship of the book, cf. Asclep. *In Metaph.* 113.5-8: Πληρώσαντες τὸ μείζον Α νῦν ἵκομεν ἐπὶ τὸ ἐλαττον Α. γνήσιον δὲ ἐστὶ καὶ αὐτοῦ τοῦ Ἀριστοτέλους τὸ βιβλίον καὶ τοῦτο δηλον

If Asclepius, after citing a contrary opinion, argues for the authenticity of *Alpha meizon*, and the exegete in the Laurentianus explicitly upholds the authenticity of *Alpha elatton*, then the scholiast of E seems to combine in a single note both the view refuted by Asclepius concerning *Alpha meizon* and the exegetical stance on *Alpha elatton*'s authenticity found in the *recensio altera*. After all, Alexander is never known to have questioned the authorship of *Alpha meizon*, nor did Asclepius ever deny it.

This brief interpretation of the *scholium* in the Parisinus gr. 1853, examined in relation to Alexander's introduction to *Alpha elatton*, could suggest the importance of the *recensio altera* in the historical processes of studying and commenting on Aristotle's *Metaphysics*. If my analysis is correct, it might be inferred that Asclepius possibly drew on the *recensio altera*, and that the scholiast of the codex Parisinus also knew it and took it into account.<sup>9</sup>

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ἔκ τε τῶν δογματῶν καὶ ἐκ τῆς λέξεως καὶ τῆς φράσεως γὰρ τὸ ποικίλον πατέρα τὸν Ἀριστοτέλην προσαγορεύει. Asclepius here shows argumentative affinities to what the exegete of the Laurentian commentary states in the beginning of the proem to the same book. The exegete is certain that Aristotle's authorship of *Alpha elatton* can be deduced from the theory expounded in it and the variety of argumentation.

<sup>9</sup> In the history of the analysis of this *scholium* of Parisinus gr. 1853 (f. 234r), there is no reference to the reading in the proem of the commentary on *Alpha elatton* witnessed in the Laurentianus 87.12.

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SILVIA FAZZO

## ARISTOTLE'S EARLIEST EXTANT MANUSCRIPTS. NEW DOUBTS AND PERSPECTIVES

### Abstract

This paper follows up on two previous contributions in *Aristotelica* (3 and 5) that focused on the early transmission of *Phys.* 250b13 as a case study. Here, the discussion broadens to general questions about the scribal hands behind Aristotle's earliest manuscripts J (ms. Vindobonensis Phil. gr. 100) and E (ms. Parisinus gr. 1853), their roles in textual history, and their connections to the earliest reconstructable archetype. Current scholarship holds that while the sources of J and E overlap for the *Metaphysics* (labeled  $\Pi$  by Jaeger's 1957 critical apparatus), they diverge entirely for the other works held by both codices, i.e. *Physics*, *De caelo*, *De generatione et corruptione*, *Meteorology*. How can this be explained? A major, recent development is Ronconi's (2012) identification of two distinct tenth-century volumes later combined into ms. E. Each has a main early scribe at work. Thereafter, no attempt has been made to differentiate their approaches to the text. In *Aristotelica* 5, E's two early scribes are distinguished and labeled, the one, E<sup>Met</sup> (responsible for the *Metaphysics*) the other, E<sup>Phys</sup> (responsible for the Corpus Physicum). The two exhibit differing approaches. Through closer analysis of their methodologies, it is possible to investigate and eventually to detect what I call a " $\beta$  agenda" in E<sup>Phys</sup>'s Corpus Physicum, by analogy with the so-called  $\beta$  manuscripts of the *Metaphysics*.

### Keywords

Textual Transmission of Aristotle's Works, Ms. Vindobonensis Phil. Gr. 100, Ms. Parisinus Gr. 1853, Maas's Theory

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1. *Premise*

This paper follows directly from my previous studies published in *Aristotelica* 3 and 5, both of which examined *Phys.* 250b13 as a case study.<sup>1</sup> There, a line of investigation highlighted a previously neglected reading in Aristotle's manuscripts J (ms. Vind. Phil. gr. 100, 9th c.) and E (ms. Paris. gr. 1853, early 10th c.). Here, the discussion broadens to general questions, exploring the transmission of Aristotle's text from the mid-ninth to the early tenth century. During this period, J and E were produced, checked, and revised, each under the supervision of a contemporary corrector (διορθωτής or *vetus corrector*).<sup>2</sup> These correctors are crucial witnesses. For this reason, we focus on J, E<sup>Met</sup>, E<sup>Phys</sup>, and their contemporary correctors only. They had access to the same exemplar from which the scribes were copying.<sup>3</sup> This inquiry, involving the role of ms. J, directly pertains to the mission of *Aristotelica*.<sup>4</sup> This focus fulfills a longstanding desideratum. Although J's discovery (Gercke 1892) was initially heralded as significant, it made little impact on critical editions of Aristotle's *Corpus Physicum*. Since 1936 (Ross 1936, Allan 1936), J's authority has been consistently dismissed in favor of E, the second oldest extant codex

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<sup>1</sup> Fazzo (2023) and (2024); less directly, this paper also builds on previous research on the transmission of the *Metaphysics*: see Fazzo (2017, 2022), where I summarize my earlier studies on the *Metaphysics* section of both manuscripts J and E. All new proposals in this paper are hypothetical in nature. My goal is to bring together various possible paths of inquiry to foster a continued and lively debate. This paper is deeply indebted to the same colleagues and friends with whom I discussed Fazzo (2024) (see p. 82 n. 1). I extend my warmest thanks to all of them, while remaining solely responsible for any errors.

<sup>2</sup> The key point (see Fazzo 2012, pp. 143-51) is that J must be treated as a combined witness (J<sup>1</sup>: original scribe + J<sup>2</sup>: contemporary corrector), as both derive from the same exemplar. J<sup>1</sup>'s errors have no independent stemmatic value and should not be treated as separate witnesses. In contrast, E must be analyzed without integrating later hands and considering only the contemporary *vetus corrector* for reconstructing the archetype.

<sup>3</sup> For these reasons, I will not address later hands or scholia here, although the outcome of this study might provide insights into their roles as well. Likewise, I will not consider works included in these manuscripts but not by Aristotle (notably Theophrastus's *Metaphysics*). On the most famous of E's scholia, see Laura Folli in the present issue of *Aristotelica*.

<sup>4</sup> Since its inception, the journal has emphasized the importance of ms. Vind. Phil. gr. 100 (J), the earliest extant codex of Aristotle's works. See the first 'Editorial', Fazzo-Kraye (2022) p. 2; Rossetto (2014).

containing most of Aristotle's theoretical works.<sup>5</sup> Both manuscripts were produced in Constantinople and are closer in time to each other than to any other extant Aristotelian manuscript (except for the fragmentary bifolium Y, Paris. Suppl. 687). Evaluating J thus entails evaluating E, and vice versa.

### *2. Focusing on Aristotle's Vetustissimi, in the Footsteps of Paul Maas*

In focusing on J and E, I follow Maas (1957<sup>3</sup>). Maas, in his final Appendix (see Baldissera 2012, p. 8f.) responded to Pasquali (1952<sup>2</sup>). He stressed that the oldest extant manuscript of a work is crucial because it is the only one guaranteed to be uncontaminated by later descendants. As Maas (1957<sup>3</sup>) p. 51 wrote: "The oldest existing witness is always completely 'independent', whereas the independence of later witnesses [...] must first be proved by 'separative errors'."

Here the chronological sequence is: J (ninth century), then E (early tenth century). If E's independence from J requires demonstration, so too does the independence of their exemplars. Before concluding E<sup>Phys</sup> followed a different branch, we must identify genuine separative errors. Simple differences in wording may be due to editorial activity rather than distinct sources. What is at stake deserves to be clarified: it is nothing less than the reconstructability of Aristotle's lost archetype. This, indeed, does not mean Aristotle's own writings as such. Therefore, the way we conceive of Aristotle's archetype must also be spelled out, as follows.

### *3. How to Conceive of a Late Ancient Scriptio Continua Archetype: In the Footsteps of Dain and Pasquali*

I use Π to denote a possible fourth-century *scriptio continua* parchment exemplar. This has probably been Aristotle's archetype. Following Dain (1949) and Pasquali (1952<sup>2</sup>) p. 477, an archetype might have been a critically constituted edition deposited in a library, possibly serving as a normative

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<sup>5</sup> See Fazzo-Ghione (2022) and Fazzo (2012) for initial considerations on the underlying factors.

reference copy. This “edition” would be distinct from the Lachmannian concept of an archetype as “the closest common ancestor.”

Pasquali (1952<sup>2</sup>) p. 477 noted that Dain’s archetype is often an authoritative edition – like the Alexandrian edition of Homer. Applying this logic to Aristotle, Π could have been a large-scale parchment copy reflecting earlier papyrus rolls produced by Aristotle’s school around the second to third centuries AD. If so, the parchment Π might have preserved lineation and structure that mirrored the original papyrus rolls. The main open issue here is: can the archetype be reconstructed for the physical works as well as for the *Metaphysics*, based on J and E chiefly, and to which extent? This is not to deny the contribution of other manuscripts. I investigate here how the common source of J and E can be reconstructed, and leave to elsewhere the issue whether or not other manuscripts can contribute, based on Maas rule as recalled in §2 above.

#### *4. Aristotle’s Manuscripts J and E: A Comparison*

J and E share Important similarities in content and sequence, and notable differences in the range of their content, their size, and composition.

1. Similarities: Aristotle’s works in J are found in E in the same order, although E also includes works not present in J. Their common works are: *Physics*, *De caelo*, *De generatione et corruptione*, *Meteorology*, and *Metaphysics* (from *Alpha minor* 994a to *Ny* 1089a27).

2. Differences in size:

- J is smaller: ca. 275 x 190 mm, V + 203 ff.

- E is larger: ca. 370 x 265 mm, 453 ff. E also contains more works, including psychological and physio-psychological treatises (*De An.*, *Sens.*, *Mem.*, *Somn. Vig.*, *Div. Somn.* and *Mot. An.*).<sup>6</sup>

3. Differences in composition:

- J is straightforward: one scribe and one corrector throughout the ancient portion.

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<sup>6</sup> Hence, Hecquet-Devienne (2000) suggest that E may have been planned as a reference copy – an interesting yet controversial view; see Ronconi (2012). Much depends on what we mean by “reference copy.” On this point, see also Dain (1949) (quoted below).



-E is complex and uneven in character. It has been originally composed of at least two distinct volumes, where two distinct early tenth-century early scribes are at work.<sup>7</sup> Thereafter, no attempt has been made to differentiate their approaches to the text.

In *Aristotelica* 5 (Fazzo 2024), I referred to those two early scribes as E<sup>Met</sup> (for the *Metaphysics* section) and E<sup>Phys</sup> (for the Corpus Physicum).<sup>8</sup> I put those hands into evidence, because they are central to understanding the earliest textual transmission. Other later hands in E are important, but do not concern the current inquiry, and are omitted here. Ronconi spells out exactly their respective contributions.<sup>9</sup>

As a result, we can categorize and compare the texts in each codex.

Works common to J and E (E split into E<sup>Phys</sup> and E<sup>Met</sup> sections):

- *Physics*: J ff. 1r-55v; E<sup>Phys</sup> ff. 3r-67v

- *De caelo*: J 56r-86r; E<sup>Phys</sup> 69r-106v

- *De generatione et corruptione*: J 86v-102r; E<sup>Phys</sup> 106v-129r

- *Meteorology*: J 102v-134r; E<sup>Phys</sup> 129r-175v

- *Metaphysics*: J 138r-201v (missing the initial segment 983a–994a<sup>10</sup>), E<sup>Met</sup> 225v-306r (ending at 1089a27, completed later by a 10th c. hand at f. 306a6-308a20).

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<sup>7</sup> See Ronconi (2012).

<sup>8</sup> In *Aristotelica* 5, p. 84 and n. 6, I designated this scribe as E<sup>Met</sup>. It is labeled E III by Moraux (1967); Hecquet-Devienne (2008); Ronconi (2012) (see n. 9 here below).

<sup>9</sup> For the different scribes at work in E, Ronconi (2012) still uses the sigla E I, II, III, IV, since these were introduced by Moraux (1967) and adopted by Hecquet-Devienne (2008). However, the order of the sigla, as emerges in Ronconi's article, does not reflect the copyists' relative chronology. E begins with a very large portion copied by an early 10th-century scribe (E I), followed by a few folios copied by a later hand (E II) that supplied parts from the *De anima*. After that, comes the part of the manuscript that originally belonged to a different volume, in which another early 10th-century hand, E III, copied Aristotle's *Metaphysics* until 1089a2, as well as parts of Aristotle's *Parva naturalia* and *De motu animalium*. Beyond E<sup>Met</sup>, other sections of E's second volume contain *Metaph.* from 1089a27ff. by E II; *PA, GA*, part of *IA, EN, MM* by E IV. Ronconi (2012) and Hecquet-Devienne (2008), *contra* Moraux (1967), identify this E IV hand with E II. Unlike Hecquet-Devienne, Ronconi does not identify this hand with E's principal annotator, which they call E2 (later in the 10<sup>th</sup> c.). This is the annotator at work in the *scholium* at f. 234r studied by Folli in the present issue.

<sup>10</sup> A 13th-century bifolium (ff. 137f.) was added to restore both the lost ending of Theophrastus's *Metaphysics* (11a2-12a2) and the lost incipit of *Metaphysics Alpha minor* (993a30-994a6). *Metaphysics Alpha maior* is missing, no doubt lost along with the entire

Additionally, examining the relations between J and E may shed light on works found only in E. For these, E is the earliest extant manuscript.

Works contained only in E<sup>Phys</sup>:

- *De anima* I and III (ff. 175v-202v).

Works contained only in E<sup>Met</sup>:

- *De sensu* (203r-210r),

- *De memoria* (210r-212v),

- *De somno et vigilia*,

- *De divinatione per somnum* (212v-221r),

- *De motu animalium* (221r-225v),

- *Metaphysics* A 1.980a21-α 2.994a6 (f. 225v ff.).

A section not contained in E<sup>Met</sup> or in E<sup>Phys</sup> but in J:

- *Metaphysics* N 2.1089a27-3.1093b29.<sup>11</sup>

### 5. The Two Main Hands of Ms. Parisinus Gr. 1853 as

#### *Textual Witnesses: E<sup>Met</sup> vs. E<sup>Phys</sup>*

Unlike J, E has been extensively studied and has become something of a research field in itself.<sup>12</sup> Ronconi (2012), building on Hecquet-Devienne (2008) and Moraux (1967), clarified that E as we have it results from the later assembling of two separate volumes. The order of texts in E is determined by the canonical sequence established as early as the first century BC by Andronicus of Rhodes, accomplished and solidified by Alexander of Aphrodisias ca. 200 AD, rather than by the relative chronology of the copyists. One volume (ff. 3-202) contains the *Corpus Physicum*, transcribed mainly by E<sup>Phys</sup>; the other volume (ff. 203-344) includes the *Metaphysics* and related

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quaternion containing the end of Theophrastus's *Metaphysics* (from 11a2) and the beginning of Aristotle's *Metaphysics* (up to 984a6).

<sup>11</sup> E<sup>Met</sup> does not include the end of the *Metaphysics*, i.e. N 2.1089a27-3.1093b29. So, this final section is preserved only in J and not in the ancient part of E. J and E differ here more than in the common part of J and E<sup>Met</sup>; see Marco Ghione's collations in Fazzo-Ghione (2022). Later in the tenth century, E's hand E II integrates the missing part at ff. 306r-308r.

<sup>12</sup> After the comprehensive review of Ronconi (2012), see Gyburg Uhlmann's ongoing (since 2019) DFG 418455551 research project "The Exclusive Corpus of Scholia on Aristotle in the Codex Parisinus graecus 1853 (E): First Critical Complete Edition"; see also Folli in the present issue.

texts, transcribed by  $E^{\text{Met}}$ . These two copyists thus could have worked independently and possibly at different times. Since Ronconi (2012), no attempt has been made to differentiate their approaches to the text. Do  $E^{\text{Met}}$  and  $E^{\text{Phys}}$  reflect distinct editorial agendas? If so, this distinction matters greatly.  $E^{\text{Phys}}$ , or its model, represents an important branch of the Aristotelian tradition. Identifying a distinct methodology in  $E^{\text{Phys}}$ 's approach to the text may help us understand the complex stemma of Aristotle's works.

#### 6. Volumes and Scribes in Ms. E: $E^{\text{Met}}$ at Work

Where  $E^{\text{Met}}$  worked (notably in the *Metaphysics*), the text is nearly identical to that of J. Marco Ghione's collations indicate, as an average, fewer than three differences per Bekker page between  $E^{\text{Met}}$  and J in the *Metaphysics*.<sup>13</sup> We can thus share the common view, that such slight differences do not constitute evidence of a different source. As a result, Jaeger (1957) as a critical editor has grouped  $E^{\text{Met}}$  and J under the same siglum  $\Pi$ , thus implying that  $E^{\text{Met}}$  and J derive from a common exemplar.

More exactly, the closeness of  $E^{\text{Met}}$  and J suggests that the scribe  $E^{\text{Met}}$  carefully followed its exemplar J, moreover, he probably checked in some special cases J's source ( $\Pi$ ) as well. In practical terms,  $E^{\text{Met}}$ 's fidelity allows editors to treat  $E^{\text{Met}}$  as a reliable witness aligned with J, which faithfully transmits the text. This gives us a stable textual base for the *Metaphysics*.

#### 7. Volumes and Scribes in Ms. E: $E^{\text{Phys}}$ at Work

The situation differs significantly for  $E^{\text{Phys}}$ . Unlike  $E^{\text{Met}}$ ,  $E^{\text{Phys}}$  diverges from J in numerous places. Since Allan (1936) on the *Meteorologica* and Moraux (1965) on *De caelo*, the consensus has been that  $E^{\text{Phys}}$  and J represent very different sources. Only recently has this assumption been questioned, by Ronconi (2012) p. 217 n. 80. For instance, in *De generatione et corruptione*,

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<sup>13</sup> According to Ghione's collations (in Fazzo-Ghione 2022), there are about 290 differences in roughly 100 pages covering books  $\alpha$ -N of the *Metaphysics* as extant in J, starting at 994a6. This figure is both reliable and approximate. In covering the entire *Metaphysics*, we did not record extremely minor differences that do not affect the purpose of verifying J and E's stemmatic relationship.

about 25 Bekker pages, Rashed (2005) counts approximately 400 differences between  $E^{\text{Phys}}$  and J (and J's related group  $\Omega^2$ ), that is, 16 differences per Bekker page. These differences include omissions, additions, rearrangements, and substitutions. As an average, they are five times more numerous than  $E^{\text{Met}}$ 's differences with J.

$E^{\text{Phys}}$ , unlike  $E^{\text{Met}}$ , is neither a copy of J nor, probably, of another minuscule exemplar. It seems to have been derived directly from a late ancient codex in *scriptio continua*. Modern editors have often favored  $E^{\text{Phys}}$  and this makes research on this manuscript especially relevant. While Allan (1936) considered many at least of its omissions “misguided corrections”, Rashed (2005) doubts that a scribe would arbitrarily remove “insignificant” words and, hence, tends to trust  $E^{\text{Phys}}$ 's brevity. Both views, however, assume that  $E^{\text{Phys}}$ 's changes are accidental or misguided. This may be too simplistic.  $E^{\text{Phys}}$ 's approach might instead reflect a deliberate “agenda” to refine or standardize the text. Moreover, it is possible that, as well as deliberate stylistic alignment (and obvious oversights), dictation practices or other intermediary steps were involved.

#### 8. A “ $\beta$ Agenda” in $E^{\text{Phys}}$ ?

I propose the hypothesis that  $E^{\text{Phys}}$ 's differences with J followed an editorial “ $\beta$  agenda,” analogous to that detected in the  $\beta$ -manuscripts of the *Metaphysics* (e.g. Laur. 87.12 (Ab), see Fazzo-Folli-Ghione (2023-2024) pp. 539ff., 548-51). A “ $\beta$  agenda” would involve semi-systematic, semantically neutral revisions intended to clarify or improve the text for contemporary readers, without altering Aristotle's meaning.<sup>14</sup> This hypothesis might explain the pattern of differences between  $E^{\text{Phys}}$  and J noted by various editors. Rather than accidental or “misguided” changes, these alterations could possibly reflect, at least in part, an editorial program to produce a smoother, more accessible Aristotelian text for a tenth-century scholarly readership.

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<sup>14</sup> See, for example, the use of *scriptio plena* in both Laur. 87.12 and  $E^{\text{Phys}}$ . This must have been the basis for the phenomenon detected by Hasper and Arnzen (2024) p. 64 in *Aristotelica* 5, as interpreted there by Fazzo (2024) p. 88.

This could be established if all of them, or representative samples, could be collected, analyzed, and classified to verify this hypothesis. The key question to keep in mind is: can E<sup>Phys</sup>' wording originate from J's? While doing so, one could compile a list of readings that cannot be reduced to *variae lectiones* stemming from J. Based on that list, E<sup>Phys</sup> could contribute more effectively to the reconstruction of the late ancient archetype – if such an archetype existed – of Aristotle's tradition. This brings us back to the question of whether or not this archetype can be reconstructed. Let us use the siglum Π as a reference for both the Corpus Physicum and the *Metaphysics*.

#### 9. Can the Late Ancient Tradition of Aristotle's Corpus Be Reconstructed?

Editors often assume that reconstructing Π (or at least π, see n. 17 here below) is not feasible. I would suggest this may be too pessimistic. If J directly descends from Π, and Π potentially includes the entire Corpus Theoreticum, then Π would be a large fourth-century reference exemplar.<sup>15</sup>

By comparing J and E – and distinguishing between E<sup>Met</sup>'s faithful reproduction and E<sup>Phys</sup>'s editorial interventions – it is possible to assess different levels of reconstructability for Π:

- (a) Texts in both J and E<sup>Met</sup> (i.e. *Metaph.* α 2.994a6-N 2.1089a27)
- (b) Texts in both J and E<sup>Phys</sup> (i.e. *Physics*, *De caelo*, *De generatione et corruptione*, *Meteorologica*)
- (c) A textual section only in J (i.e., the end of *Metaph.* N 2.1089a27-3.1093b29)<sup>16</sup>
- (d) Texts only in E<sup>Met</sup> (i.e. *De memoria*, *De somno et vigilia*, *De divinatione per somnum*, *De motu animalium*)
- (e) Texts only in E<sup>Phys</sup> (e.g., *De anima*, *De sensu*, the initial *Metaphysics* section 980a-994a)
- (f) Texts absent in both J and E, known only from later manuscripts.

On this scale, (a) the *Metaphysics* is the most reconstructable treatise, given the role of J and E, especially E<sup>Met</sup>. It makes sense that the *Metaphysics*

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<sup>15</sup> On the date and shape of the *scriptio continua* exemplar, see Fazzo (2024), p. 83; Ead., in Fazzo-Folli-Ghione (2023-2024) p. 543.

<sup>16</sup> See n. 9 above.

enjoyed a “religiously careful” transmission. In fact, recent debates on the stemma of the *Metaphysics* have confirmed J’s key role. J directly descends from  $\Pi$ ;  $E^{\text{Met}}$  likely copies J and, when needed, refers back to  $\Pi$ .<sup>17</sup> Thus, J remains primary. Likewise, it does so in the (c) final section of the *Metaphysics* as well, 1089a27-1093b, where  $E^{\text{Met}}$  does not help, because it stops at 1089a27. For the reconstruction of (b) the Corpus Physicum, the same logic may apply. If  $\Pi$  encompassed the entire Corpus Theoreticum – that is, the *Metaphysics* and the physical works – then J, as a direct descendant, would be key to reconstructing  $\Pi$  not only for the *Metaphysics*, but also for the *Physics* and other physical treatises: once we identify and filter out “ $\beta$  agenda” readings, we may closely approximate  $\Pi$ ’s text. This principle should also apply in cases where (d)  $E^{\text{Met}}$  remains the earliest witness: in such instances,  $E^{\text{Met}}$  would deserve the highest credit, following Maas’ methodology (see §2 above), unless it can be shown to contain separative errors. In this latter case – as in cases (e) and (f), where neither J nor  $E^{\text{Met}}$  is preserved – the entire manuscript tradition can contribute, including those rare *recentiores* manuscripts that can be demonstrated to be *non deteriores*, following Giorgio Pasquali’s celebrated dictum.

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<sup>17</sup> Fazzo (2022) p. 84, with bibliography. While I have so far adhered to a principle of economy, there is no obstacle to imagining that additional *scriptio continua* codices might have been in use as exemplars between the 9th and 10th centuries. Let us call these, for example,  $\pi^J$  and  $\pi^E$  or even,  $\pi^{\text{EMet}}$  and  $\pi^{\text{EPhys}}$ . This would mean that more reference copies of Aristotle’s works were available. This is not unlikely: 50 parchment exemplars of the Bible were prepared by Eusebius of Caesarea under Emperor Constantinus (Eusebius, *The Life of the Blessed Emperor Constantine*, Book 4, chap. 36). Constantius II, the son of Constantinus, to whom Themistius, *Oratio* IV 60 a-b, addresses his thanks in this regard, may have been following his father’s example (see Fazzo 2024, p. 83 n. 4). This could explain why the exemplar of the Arabic version of the *Metaphysics* was in bad condition (Rashed 2019), whereas the exemplar of  $E^{\text{Met}}$ , which was prepared later, was in good condition. These copies, however, must have been intended to be as identical to one another as possible. This hypothesis is not meant to justify large numbers of discrepancies between copies stemming from two exemplars of the same reference text. Deciding this is perhaps not crucial with regard to the text of the *Metaphysics* in J and  $E^{\text{Met}}$ , which are, in any case, very close. It can, however, be relevant with regard to the physical treatises in J and  $E^{\text{Phys}}$ .

### *Conclusion*

This study suggests that J and E, produced in ninth- and early tenth-century Constantinople, are derived from a late ancient *scriptio continua* archetype (Π), which may have encompassed the entire Corpus Theoreticum. The two main hands of E – E<sup>Met</sup> and E<sup>Phys</sup> – approach the text in markedly different ways. While E<sup>Met</sup>'s faithful copying closely mirrors J, E<sup>Phys</sup>'s editorial approach may reflect a deliberate effort, possibly to make Aristotle's text more accessible, stylistically plain, or easier and faster to transcribe. This cannot be assessed yet and would deserve a dedicated project. Recognizing and accounting for this “β agenda” could provide, either in itself or by contrast – depending on the research outcome – a foundation for a more nuanced understanding of Aristotle's early textual tradition. Such work might help approximate the original fourth-century parchment reference copy, likely identical to Aristotle's archetype.

If so, as we have argued so far, Aristotle's archetype is not merely a “closest common ancestor.” It must have closely reflected the canonical edition of the Aristotelian corpus, as attested in the 3rd century AD, following the work of Alexander of Aphrodisias and his school. Indeed, the version transmitted and commented upon by the school during Roman times effectively erased almost all traces of the texts' earlier circulation.

For all these reasons, despite the constraints, we can now, at the start of this new scholarly millennium, assert that Aristotle's works are indeed more reconstructible than was believed during the 20th century, provided that the readings of the oldest manuscripts are carefully recorded and, where necessary, held in the highest regard.

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