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## 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 (*ὄρος*) 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 προὔπαρχούσης 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:  $\delta \gamma \alpha \rho \acute{\epsilon} \nu \epsilon \sigma \tau \acute{\omega} \varsigma \nu \ddot{\upsilon} \nu \chi \rho \acute{\omicron} \nu \omicron \varsigma$ ), 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 (*ἀμερῆς*) 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: *ἀπτόμενα 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 γινόμενον τε καὶ φθειρόμενον, κατὰ μέντοι γὰρ τὸ εἶδος τὸ αὐτό.

<sup>76</sup> Indeed, *συνάπτω* appears to mean "to lie next to", which is a less refined 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 in 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: Ἄριθμός ἐστι πλῆθος ὀρισμένον 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 κινᾶτον καὶ ποιεῖ τὰν ἀστρονομίαν· τὸ δὲ διωρισμένον ἢ ἀκίνατόν ἐντι καὶ ποιεῖ τὰν ἀριθμητικὴν ἢ κινᾶτόν τὸ δὲ διωρισμένον ἢ ἀκίνατόν ἐντι καὶ ποιεῖ τὰν ἀριθμητικὴν ἢ κινᾶτόν καὶ ποιεῖ τὰν μουσικᾶν.

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 ἔξω προΐουσης ἀπ' αὐτοῦ καὶ ἐν ταῖς κινήσεσι 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 οἷόν 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 ποικᾶ 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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