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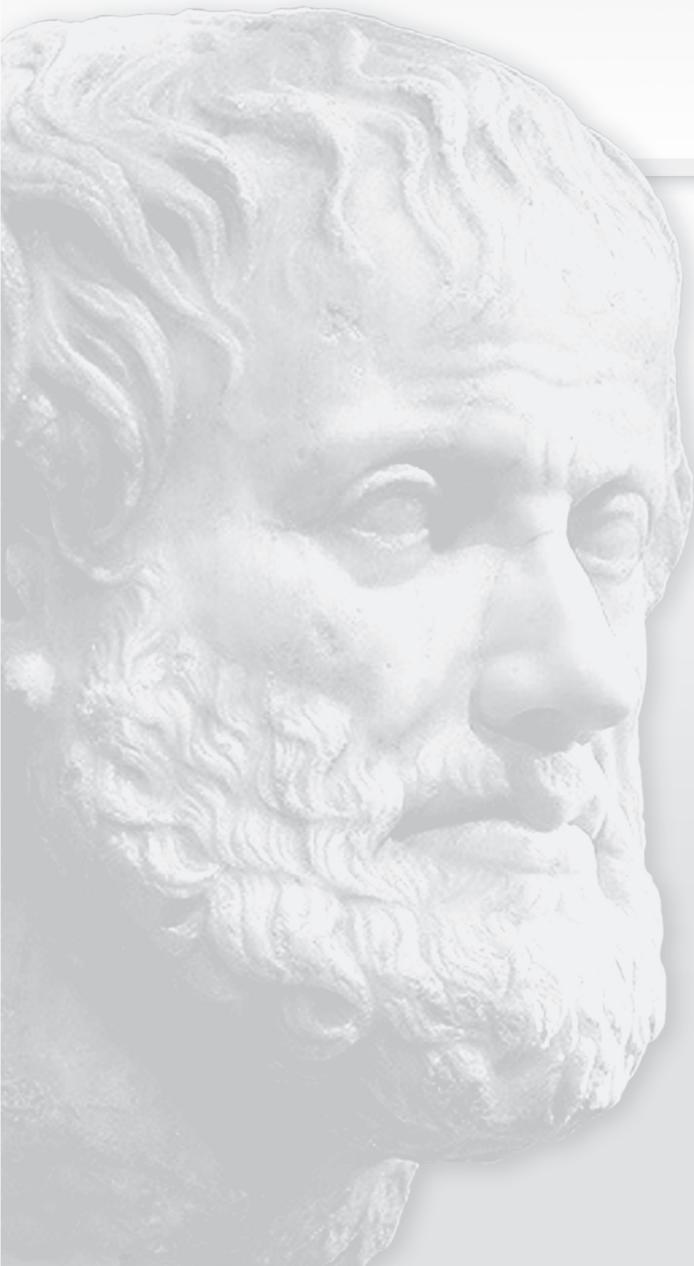
# Proceedings of the World Congress

# Aristotle

## 2400 Years

MAY 23-28, 2016

Edited by  
Demetra Sfendoni-Mentzou



ARISTOTLE UNIVERSITY  
OF THESSALONIKI



INTERDISCIPLINARY CENTRE  
FOR ARISTOTLE STUDIES



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Proceedings of the World Congress “Aristotle 2400 Years”

*Edited by:*

Demetra Sfendoni-Mentzou

ISBN 978-960-243-716-2

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Interdisciplinary Centre for Aristotle Studies, A.U.Th.

*The publication was funded by the*  
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## Figures of Time in Aristotelean Philosophy

WORLD CONGRESS "ARISTOTLE 2400 YEARS" | MAY 23-28, 2016 | ARISTOTLE UNIVERSITY OF THESSALONIKI, ANCIENT STAGEIRA, ANCIENT MIEZA

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Time was perceived by ancient philosophy as a cosmological enigma. The search for truth beyond time determined Greek thought. A true definition, says Aristotle (384-322 BC), expresses “the what-it-is-to-be” (τὸ τί ἦν εἶναι) of a thing, it is an account of the essence, and essence is identity. The principle of non-contradiction was considered by Aristotle as the first principle of the inquiry into Being. As such, it cannot be demonstrated,<sup>1</sup> since this would lead to an infinite regress. Instead, the non-contradiction principle is the first axiom of ontology. But time seems to question this tautology.

Aristotle discusses time in the *Physics*. He begins with the questions about time’s existence which stem from his contemporaries’ conceptions:

First, does it belong to the class of things that exist or to that of things that do not exist? [...] the following considerations would make one suspect that it either does not exist at all, or barely, and in an obscure way. One part of it has been and is not, while the other is going to be and is not yet. Yet time—both infinite time and any time you take—is made up of these. One would naturally suppose that what is made up of things which do not exist could have no share in reality. (IV.10, 218a)<sup>2</sup>

It seems that time belongs more to non-Being than to Being and this elusiveness makes it impossible to identify a part of time that actually exists. We

cannot be sure that the present *is*, since, while we think about it, this present has become past.

Even if we were to assume an indivisible time-unit, a pure Now, given the divisibility of time, this would not be a part of time. A part is a measure of a whole, measured in relation to the whole, but time cannot be perceived in its totality, nor can it have parts, since those determined by a dividing present moment *have existed* or *will exist*.

We can, however, compare finite parts of a whole in relation to the whole, even if we can’t perceive the whole, like in the case of geometrical space, by superimposing or comparing finite spatial intervals, determined by limits. But spatial intervals can be compared because spatial intervals can be placed in succession without seizing to exist. Two points can be co-existent but not consecutive, like limits that differ in their position in space. Aristotle doesn’t refer to space in the Newtonian sense, an absolute abstract space, but to *place* and *spatial magnitudes*.<sup>3</sup> Place is the unmoved limit of the container of a body,<sup>4</sup> whereas spatial magnitude is the movable limit of the containing body. Since place is the unmoved limit, all things in the universe are in place, but the universe itself is not,<sup>5</sup> motivated by an unmoved mover, who is actualized form without potential matter.<sup>6</sup> Spatial magnitudes are infinite in division, but their parts co-exist.

Time, however, is irreversible. A present moment cannot be simultaneous with another pre-

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1. See Aristotle, *Metaphysics*, 1006a5-11. In *The Works of Aristotle*, trans. W. D. Ross, ed. W. D. Ross (Oxford: Clarendon Press, 1930).

2. Trans. R. P. Hardie and R. K. Gaye. Aristotle, *Physics*, in *The Works of Aristotle*, ed. W. D. Ross (Oxford: Clarendon Press, 1930). From now on, for all the quotations from *Physics*, I will be using the translation by Hardie and Gaye.

3. See Sir David Ross, *Aristotle* (1923; reprint, New York: Barnes & Noble Inc., 1964), 87.

4. See *Phys.*, IV.4, 212a20.

5. See *ibid.*, IV.5, 212b20-22.

6. See *Met.*, 1073a.

sent moment, because the “Now” divides the past from the future and for a “Now” to exist, the former must have seized to exist.<sup>7</sup> The co-existence of different presents would mean that there is nothing prior or posterior and all would happen simultaneously. Moreover, whereas all things divisible have more than one limit, the “Now” is a singular limit and yet divides time.

Aristotle addresses the paradoxes that rise from the incapability of enfolding temporality either to Heraclitean Becoming, that would suppose that “Now” is always different, or to Parmenidean Being, that would suppose that “Now” is always the same. He argues that “Now” is both the same and different, as he proceeds to define the nature of time.<sup>8</sup>

Nature, for Aristotle, is a principle of movement and change<sup>9</sup> and the nature of time is defined in relation to movement. However, time is not movement. Time is not the movement of the universe, because, in such a case, if there were more universes than one, then there would be more times than one at the same time.<sup>10</sup> This idea seems absurd to Aristotle, but for us, it resembles the multiple times of General Relativity. For Aristotle, since the past, present and future are contained in time, time itself must be greater than everything that is in time.

Aristotle also disagrees with the identification of time with Being, which is based on the argument that all beings are in time. There are things, Aristotle argues, that are not in time. Time is defined in relation to motion and motion is the actualization of what is potentially as such.<sup>11</sup> The prime mover that is form without magnitude, unmoved and actual, is not in time. Necessary truths not subjected to change, are not in time. Perhaps the rational part of the soul, the mind, whose subjects, necessary truths, are timeless, is not in time, but this remains obscure. We may assume that abstract numbers and essential predicates are not in time.

Non-beings can be divided accordingly. Those who are in time *potentially have* existed or may ex-

ist. Those who are not in time could never exist. Non-beings that are not in time are the opposites of necessary truths.<sup>12</sup>

Finally, time is not movement or change, because there are many different movements but one time and change can be faster or slower, while time cannot. Time is what defines fast and slow, but time doesn't exist without change. Time is dependent on movement but is not identical to movement.

Aristotle connects time with movement and movement with magnitude. Spatial magnitude is the primary continuum, potentially infinite. Movement is also continuous, both as a principle of nature and by correlation to magnitude. Time is the third continuum, associated with a specific kind of movement, the movement between before and after. Aristotle argues that we apprehend time when we perceive movement by designating a “before” and an “after”<sup>13</sup> and inserts a subjective element in his definition of temporality, which correlates time to the soul.

The change from prior to posterior refers to all three continua in the same hierarchy, primarily to magnitude, then motion, then time. It is an essentially spatial movement and temporality appears as an attribute of spatiality. Time is not, however, a fourth spatial dimension, as in relativity physics, itself subject to alteration. Instead, time is an aspect of this specific motion grounded in magnitude, which manifests as change regarding before and after; “[For] time is just this—number of motion in respect of ‘before’ and ‘after’” (*Phys.* IV.11, 219b-220a24-25).

Time is the enumerable attribute of motion between “before” and “after,” and this implies that someone performs the enumeration. It also highlights the twofold nature of “Now.” When we perceive “Now” as indivisible and singular present, it has no time, because it contains no movement. When we perceive it as a limit that designates “before” and “after,” “Now” binds time by division and unification. “Now” joins and divides temporal intervals, past and future, but is not a part of time, like a point is not part of a line.

A continuum may be measured by indivisibles, but cannot be composed of indivisibles. There is

7. See *Phys.*, IV.10, 218a.

8. See *ibid.*

9. See *ibid.*, III.1, 200b12.

10. See *ibid.*, IV.10, 218b.

11. See Ross, *op. cit.*, 81.

12. See *Phys.*, IV.12, 222a.

13. See *ibid.*, IV.11, 219a25-26.

always a line between two points and a time between two "Now," otherwise there could be no limits for spatial or temporal measurement.

The mind that counts makes the distinction, but unlike a point, "Now" cannot be counted twice and only moves forward. It is both the same and different, the same as the counting number regarding time, different as the countable motion regarding change. It is the same as having the same *substratum*, but has different *predications*. Its existence is obscure, as an indivisible singular limit of time, but not a part of time. The existence of "Now" as a temporal limit is dependent on the mind that counts. That means that time is dependent on the soul, and Aristotle acknowledges this:

Whether if soul did not exist time would exist or not, is a question that may fairly be asked; for if there cannot be someone to count there cannot be anything that can be counted, so evidently there cannot be number; for number is either what has been, or what can be, counted. (*Phys.*, IV.14, 223a24-27)

But time's dependency on the soul does not suggest a subjective dimension of time or a subjective temporality. Time is an attribute of movement, and movement is not dependent on the soul. Like different "Now" share an identical substratum, but different attributes, movement and magnitude persist as the substrata of time, even if temporal enumeration is dependent on the subjective soul. The connection of time with movement and magnitude is the reason there is one common time for all subjective souls and an objective measure for temporal counting. This measure is change and the movement between "before" and "after," primarily spatial, belongs to change.

Time is not an abstract number, but the number of what is counted in change regarding before and after. Number, magnitude and time are potentially infinite, but in a different manner. Number is infinite in addition, since Aristotle doesn't know about negative numbers, magnitude is infinite in division and time is infinite both in division and in addition, although each finite temporal interval must disappear for another to exist. But for Aristotle infinity is potential and cannot be actualized. Aristotle understands that infinite series can converge to a finite sum. Potentially infinite continua can converge to a

finite universe. Despite Scholastic interpretations, the prime mover is beyond infinity, as the unmoved, singular actuality without magnitude.<sup>14</sup>

So, enumeration has a minimum, space has a maximum, but time has neither. Time is not a number in every sense, it is not a mathematical number in arithmetic succession, but a number in the sense of what is counted.

Time is the counting of continuous movement in a continuous magnitude by the soul, but what kind of movement do we count by time? Aristotle claims that everything is measured by something homogenous and primary, so change is measured by the primary motion, which is circular locomotion.<sup>15</sup> He thus explains the common Greek belief of circular temporality, which he partially shares. The dominant concept of circular time pervades ancient philosophy, even when a sense of linear history emerges that refers to human time, which, however, remains restricted in the circular motion of cosmic temporality. Linear history is used descriptively in Aristotle's political theory, in the manner of regime succession, to provide alternative paradigms for comparison. Aristotle includes a history of philosophy in his *Metaphysics*, but never implies any metaphysical historicity.

The primacy of circular locomotion is consistent with Aristotle's definition of movement as the actualization of the potential. It is incompatible with Newtonian physics, which considers time and space as separate absolute mediums and regards motion in terms of acceleration and inertia. Circular movement, according to Newton's "First Law" would require constant external force, like gravity, to continually change its primary linear direction. Einstein's Relativity refuted absolute time and unified time and space.

Potentiality and actuality are categories of formation and manifest through movement. As such they are related to time. Actualization is motivated by ἐντελέχεια, the natural tendency of things that exist in time to actualize their potential on a teleological progress. Form precedes actualization, not chronologically but ontologically, since form is the τέλος that motivates. So, potentiality and actuality are ontological, but not historical attributes. Aris-

14. See *ibid.*, VIII.10.

15. See *ibid.*, IV.14, 223b20-24.

totelean teleology is measured by time, but does not manifest through history, unlike deterministic or Hegelian dialectics.

Time is also a category of being, in Aristotle's *Topics* and *Categories*. As a category and a number, it is a predicate of existence but exists in an obscure manner, neither as an entity nor as a substance. Time is dependent on the soul, which in *De anima* is defined as the final cause of every living body,<sup>16</sup> the form that precedes it. Aristotle distinguishes the irrational soul from the mind, the rational part of the soul. The irrational soul is twofold, the vegetative, that all lifeforms have, and the appetitive, that all animals have.<sup>17</sup> Those have the potentialities of sensation and mobility. But the human mind, the rational, partakes of necessary truths through contemplation, which is a bridge to the eternal. The mind's objects, mathematics and intelligibles are timeless, so it should be timeless.<sup>18</sup> This distinction is not a division, and Aristotle points out that these are *potentialities* (δυνάμεις) of the same essence with different attributes, since the soul is the essence and the ἐντελέχεια of the body.<sup>19</sup>

Which part of the soul measures time? Certainly, the counting of time presupposes the sensation of change so that the irrational soul can perceive temporal change. On the other hand, time is a number that is counted, and only the mind can perceive numbers and relations of numeral succession of things that don't exist. But the mind, in order to be rational, must be timeless, since the objects of reason are timeless.

Aristotle claims that delusion lies in thoughts of combined falsity and truth, whereas the contemplation of undivided objects contains no falsity.<sup>20</sup> Time can be divided by the soul, through the perception of the present moment as a limit, but also remains undivided as a continuous attribute of magnitude and motion. Again, there is a substratum that unifies time and place<sup>21</sup> which is not dependent on the

soul. The undivided appears as twofold, potential and actual, since the only actual undivided, the prime mover, that has no opposite, is not in time. Because of this, potential knowledge is not prior in time in general.<sup>22</sup> The mind thinks of the undivided in an undivided time, Aristotle argues.<sup>23</sup>

But time is also infinite in division, as we saw, and the indivisible moment of "Now" contains no time. So, this perception of undivided time cannot be the perception of a pure present, neither a conception of a timeless object. Perception is determined by the sensations of the intellect, which are presentations produced by imagination: "Hence the soul never thinks without an image" (*De anima* III.7, 431a16).<sup>24</sup>

Aristotle defines imagination as the movement of representations affected by actual sense-perception.<sup>25</sup> Imagination mediates sensation and thought, while images resemble sense-perceptions, but are conceptual forms without matter.

But imagination is different from assertion or denial; for truth and falsity involve a combination of thoughts. But what distinguishes the first thoughts from images? Surely neither these nor any other thoughts will be images, but they will not exist without images. (III.8, 432a9)

Imagination participates in intellectual conception, but is not contemplation. We would assume that while imagination creates combined objects and divided images of time, only pure intellect can perceive undivided time. But even the first thoughts, intellectual first principles, are mediated by images and cannot exist without imagination. However, imagination is temporal, while first-principles should be timeless.

In his brief treatise *De memoria et reminiscencia*, Aristotle reaffirms that without imagination intellectual activity is impossible<sup>26</sup> and admits that we cannot apply the intellect on a-temporal ob-

16. See Aristotle, *De Anima*, trans. D. W. Hamlyn (Oxford: Oxford University Press, 2002), 414a.

17. See Aristotle, *The Nicomachean Ethics*, trans. W. D. Ross, ed. L. Brown (Oxford: Oxford University Press, 2009), 1102b.

18. See *De an.*, 413b.

19. See *ibid.*, 412a19-21.

20. See *ibid.*, 430a26-30.

21. See *ibid.*, 430b16.

22. See *ibid.*, 431a1.

23. See *ibid.*, 430b14.

24. Trans. D. W. Hamlyn. Aristotle, *De Anima* (Oxford: Oxford University Press, 2002). From now on, for all the quotations from *De anima*, I will be using the translation by Hamlyn.

25. See *ibid.*, 429a2-3.

26. See Aristotle, *De memoria et reminiscencia*, 450a1. In *The Basic Works of Aristotle*, ed. R. McKeon (New York: Random House, 1941).

jects without a connection with time.<sup>27</sup> Aristotle relates memory to the past, sense-perception to the present, and expectation to the future.<sup>28</sup> This three-fold distinction later reappears as the main schema in St. Augustine's theory of subjective time, and as the temporal articulation of consciousness in the phenomenology of Husserl. Memory was upgraded to the ontological opposite of matter in the Bergsonian theory of duration.

However, Aristotle considers memory a faculty of the soul. Memory is neither perception nor conception, but a reaction, affection or a passion determined by the lapse of time.<sup>29</sup> We perceive time in its correlation to magnitude and movement, so we perceive time as an affection of the primary faculty of sense-perception. Perception of the continua, time, motion, magnitude, is based on the primary *sensus-communis* and is necessarily mediated by imagination.<sup>30</sup> Memory is the function by which we perceive time, and it is the state of an imaginative presentation in relation to time.<sup>31</sup>

Memory implies imagination even in the case of intellectual objects. Consequently, the perception of the present and the memory of the past belong not to the intellect but to the sensitive soul. Memory is not a function of the intellect, since all animals possess memory. It participates in the function of the mind *incidentally*, but in sense-perception *essentially*. Given that all animals perceive temporality, only the mind can perceive non-temporal objects, but again, not without a connection to time.

Memory belongs to the functions of the soul that include imagination and the objects of memory are essentially sensitive objects capable of being presented. Intellectual objects become objects of memory *incidentally*, but *necessarily* involve imagination.<sup>32</sup> Even if temporal memory is incidental for intellectual objects, these, in order to be conceived by the mind, are infused with time through imaginary representation. This seems to imply that every object of thought is, in modality, within time and would undermine Aristotle's insistence that objects

of true knowledge are a-temporal. It also obscures the participation of the rational mind to the eternity of necessary truths. Without an image of the continuous, we cannot comprehend the indivisible, which is an intellectual delimitation of the continuous, and similarly, without an image of time we cannot comprehend eternity.

Does the assumption that we cannot think without a correlation to time mean that every concept, sensitive or intellectual, is a temporal object of imagination?

Aristotle does not discuss this problem, even though he mentions it.<sup>33</sup> Cornelius Castoriadis argued that Aristotle was on the verge of acknowledging the creative and formative power of *prime imagination*,<sup>34</sup> but that would also involve accepting the identification of Time with Being, which Aristotle denied.

Aristotle is the major philosopher of the cosmological-objective approach to the question of time. This remained the main approach of science, even when modern science disproved several aspects of Aristotelean physics. Aristotle insisted that time has no beginning, because the universe has no beginning. The Standard Model of modern cosmology presumes an anomaly as the beginning of time and the universe, called the Big Bang. However, there is still controversy. Recently, an alternative model<sup>35</sup> applied the concept of *quantum potential* to the equations of General Relativity to suggest an ever-existing universe and an ever-existing time. This indicates that the cosmological discourse has not finished and that the standard revision of Aristotelean natural philosophy is not final. As Aristotle knew, the concept of a beginning of time brings up the paradox of when was before time.

St. Augustine (354-430 AD) was the first major philosopher to work under the axiom of a linear time with a beginning and an end and he tried to answer that paradox in his *Confessions*.<sup>36</sup> He ad-

27. See *De mem.*, 450a7-10.

28. See *ibid.*, 449b10-16.

29. See *ibid.*, 449b24-25.

30. See *ibid.*, 450a10-15.

31. See *ibid.*, 451a15-18.

32. See *ibid.*, 450a20-25.

33. See *ibid.*, 450a8-10.

34. See Cornelius Castoriadis, "La double découverte de l'imagination par Aristotle," in *Proceedings of the World Congress on Aristotle*, vol. 4 (Athens: Publication of the Ministry of Culture and Sciences, 1983), 210-14.

35. See Ahmed Faraq Ali & Saurya Das, "Cosmology from Quantum Potential," *Physics Letters B* 741 (2015): 276-279.

36. See St. Augustine, *Confessions*, book XI, trans. E. B. Pusey (Chicago: Henry Regnery Co., 1948).

dresses Aristotle, without mentioning the name.<sup>37</sup> Augustine argues that time is not movement, because movements of different durations exist, but Aristotle had already proved that time is not movement but a measurement of movement.

However, Augustine perceives time as completely dependent on the soul, and speaks of a three-fold present, the present of the past as memory, the present of the present as perception and the present of the future as expectation. The schema that was presented by Aristotle as a cognitive faculty of the soul is upgraded to an absolute ontological status by Augustine, while time becomes subjective and temporality passive.<sup>38</sup> By enveloping the totality of time within the subjectivity of the soul, Augustine generates more aporias, since the soul is not capable of producing either the stability, nor the continuity, nor the universality of time. The path that Augustine opens leads to Cartesian subjectivism and the foundation of existence on the thinking Ego. Of course, Augustine did resolve to the Holy Scriptures. There he found affirmation that time has a beginning and that the soul is passion. He con-

sidered the Passion of Christ as an unrepeatable historical event that proved the linear and finite image of temporality.

Augustine also constructed a metaphysical history in *The City of God*, the linear Christian schema of past, present and future. Holy History is articulated as the Memory of the Fall, the perception of the Passion, the expectation of the Apocalypse. Augustinian theology turned philosophy towards the contemplation of time as a subjective phenomenon.

The division between the cosmological and the phenomenological approaches to time echoes the division between science and philosophy. However, Aristotle's theory of time, given all its implications and aporias, seems to precede and transcend this division, since both the subjective and the objective dimensions are implicitly included in his definition of temporality.

Today, the question of the nature of time re-emerges as both a scientific enigma and a philosophical mystery. Aristotle's timelessness defines our perception of the present, our reflection of the past and our contemplation of the future.

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37. "I heard once from a learned man, that the motions of the sun, moon and the stars constituted time, and I assented not" (Book XI, xxiii, 29). Trans. E. B. Pusey, *ibid*.

38. See *ibid.*, xxviii.