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ΑΙΣΘΗΣΙΣ AND ΜΕΣΟΤΗΣ IN ARISTOTLE'S *DE ANIMA* II 11

PROPOSAL FOR A NEW INTERPRETATION

1. INTRODUCTION

In the course of the discussion of touch of DA II 11(424a1-10), Aristotle intertwines the idea that αἴσθησις is a μεσότης and a claim about a 'blind spot' of touch (respectively AisthMesot and BlindSpot from now on). The first thesis is usually read as a statement about the physical 'intermediacy' of the sensory organ (to which the term αἴσθησις is supposed to refer) which is valid for touch, and somewhat extended to the other senses by reference to a physical condition of 'neutrality' that allows their sense-organs to be affected by opposite perceptible qualities in a certain range (such as sweet and bitter, or black and white). According to this view, the fundamental claim in AisthMesot is that the sensory organ of touch is a 'mean' between tangible properties, in so far as it is lukewarm rather than hot or cold, and of 'medium' consistency rather than soft or hard[1]. The connection established between AisthMesot and BlindSpot is unclear, but it is at any rate undisputed that Aristotle does in fact think that given a certain tangible quality F, it is impossible

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[1] Despite the important differences among scholars in the interpretation of the implications of the passage, the endorsement of this basic claim is widespread (see HICKS 1907: 414; HAMLYN 1968: 112; BURNYEAT 1992: 20; SORABJI 1992: 214-215; FREELAND 1992: 231-232; SCALTSAS 1996: 33-34; EVERSON 1997: 81-82; CASTON 2005: 285-286; POLANSKI 2007: 333-336).

to perceive F by a F-sense-organ. In other words, we cannot perceive what is as hot (or cold) as the sense-organ by which we perceive temperature.

Well, I shall raise two problems for the standard reading of AisthMesot, and propose an alternative interpretation that attempts to solve them. The first of the two problems the standard reading of the passage has to face is an apparently irresolvable interpretive dilemma. As widely recognized, BlindSpot does not make sense in Spiritualism, since it implies that liability to be ordinarily affected by a certain perceptible F is required in order to perceive F. As I am going to argue, however, the rationale Aristotle offers for BlindSpot also entails a difficulty for the two alternative physicalist readings (the so called 'Literalist' and 'Structuralist' interpretations), in so far as it implies a problem of 'acquired' blind spots.

The second problem the standard reading has to face is the endorsement of the received understanding of the meaning of the Greek word μεσότης, which as I am going to show is seriously flawed and in need of reconsideration. According to the revised meaning of μεσότης I shall propose, the word indicates a 'mediating balance' between extremes that abides by a precisely defined *logos*. My proposal will thus pave the way for the further exegetical possibility that what is being described as a certain μεσότης is the perceptual activity (the sensation), rather than the state of the sense-organ or sense.

My thesis is that by AisthMesot Aristotle describes perception as a physiological homeostatic process of 'counterbalancing' – and thus measuring – the affection perceptible objects exercise on sense-organs. The introduction of the thesis in connection with the blind-spot phenomenon is not at all casual, and rather hints at an advantage of the physiology Aristotle proposes: postulating a homeostatic process that secures the preservation of the physical con-

dition making sense-organs receptive of certain affections and able to perceive accurately, thus avoiding the 'Acquired Blind Spot problem'.

2. THE INTERPRETIVE IMPASSE ABOUT THE BLINDSPOT PHENOMENON

The way Aristotle introduces BlindSpot shows that he is confident that the phenomenon is in accordance with his theory of perception. He says:

> The differences of the body qua body are tangible (I mean, the differences that define the elements: hot, cold, dry and moist; we have spoken of them earlier, in the lectures on the elements). What is capable of touch is the sense-organ of them (namely that in which the sense called touch primarily resides), the part which is potentially such. For perception is a certain being affected. Accordingly, the agent makes that one such as itself is in actuality, as <that one> is in potentiality. That is why we do not perceive what is equally hot and cold or hard and soft, but only excesses (423b27-424a4, my translation).

The use of the particle διὸ ('that is why') in the last sentence indicates that some rationale for BlindSpot is being provided. Three characteristic theses of Aristotle's natural philosophy and psychology being recalled here are in fact able to do the job. The first is that perception is an affection (DA II 11, 424a 1, cfr. DA II 5); the second is the idea that being liable to an affection by F requires one to be actually different from and potentially similar to F on a specific level, while actually similar on a more generic one (DA II 11, 424a1-2, cfr. GC I 7); the third is the thesis that no body deprived of any actual tangible quality (hot or cold, and moist or dry) can exist (DA II 11, 423b27-29, cfr. GC II 2-3). In application

to perception, the second principle establishes that in order for a causal interaction and an affection to take place on the sense organ, the latter (*qua* patient) must be dissimilar from the perceptible object (the agent) but potentially like it with regard to properties of a certain type, pretty much in the same way as the content of a pot over a fire must have generic thermal properties, and be actually non-hot while potentially hot, in order to be liable to a 'heating' affection. Since, on the basis of the third principle, the sense-organ of touch must be characterized by a certain tangible F property (e.g., a certain degree of hot or cold), it will be impossible for such an F-organ to satisfy the 'liability to affection' requirement with regard to a certain perceptible F-object, and this will *a fortiori* prevent the actual taking place of any affection by F, including the one in which the perception of F consists according to the first principle. It is then clear that for Aristotle the blind spot phenomenon, i.e. the fact that we do not perceive objects that are as hot (or hard, or dry) as our own sense-organs, descends from the fact that an F-sense-organ is not liable to an ordinary affection by an F-perceptible object explains.

BlindSpot has been often invoked by scholars involved in the debate about Aristotle's theory of perception as evidence against the 'Spiritualist' interpretation proposed by authors like Burnyeat and Johansen. According to Spiritualism, Aristotle believes that no ordinary affection and change takes place in sense-organs as we perceive, and the latter view seems fit rather badly with BlindSpot. The reason is that if no literal 'becoming F' were required to perceive F, it would hardly make any sense to claim that the lack of liability to ordinary affection by F, and even further the necessity to be potentially F, prevents the possibility to perceive F[2].

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[2] SORABJI 1992: 214-15: "No barrier would have been presented to our perceiving medium temperatures, if the organ merely had to receive a coded message, for example a vibration, or if we were merely being told that the

The subtlety of modern Spiritualist interpretations may seem to allow for some justification for BlindSpot, though. Spiritualist interpreters do recognize that 'special' quasi-physical alterations and affections take place in sense-organ as we perceive. What is special in such alterations is the fact that their existence and definition essentially depends on their being perceived by some subject. According to the modern Spiritualist view, what takes place in the eye and in the surrounding transparent medium, for instance, is the 'appearing (to a perceiving subject)' of a colour (e.g., red), which is due to the 'non-ordinary' affection those subjects underwent because of the coloured source object (e.g., a red tomato)[3]. Spiritualists claim that Aristotle has good reasons to account for such 'alterations' by the same theories exposed in GC and Physics[4]. Such quasi-physical alteration requires certain physical conditions[5]. It seems accordingly safe to move from this admission to the claim that the lack of the appropriate receptive conditions determines the impossibility to perceive. In the case of touch, then, the necessity to have a tangible F property, and the lack of liability to affection by an F-subject this entails, may appear to be enough to justify the necessary existence of a blind spot[6]. The spiritualist's reasoning may still appear awkward, though. Why should the requirements and restrictions generally valid for ordinary affections be also endorsed in perception, if what is needed in the latter case is only the mere 'appearing

organ becomes aware of temperature". See COHEN 1992: 66 and EVERSON 1997: 84-85, SCALTSAS 1996: 34.

[3] See BURNYEAT 1995: 428-31; 2002: 74-76. JOHANSEN 1998: 124-47.

[4] See BURNYEAT 2002: 58-59. This can also explain the reference to the treatise on the elements in DA II 11, justly posed as a requirement for the interpretation of the passage by SORABJI 1992: 214.

[5] See BURNYEAT, 1995: 423-26. JOHANSEN 1998: 10-20.

[6] See SISKO's (1998: 340-41) criticism of Everson's arguments against Spiritualism.

(to the perceiving subject)' of the perceived qualities? Is it not rather the case that the invocation of the general theory of physical affections suggests that some *ordinary* physical interaction between sense-organs and perceptible objects is necessary to perceive?

A peculiar attempt at a spiritualist explanation of Blind-Spot is offered by Johansen (1998: 216-17), who argues that the reason why *the sense faculty* cannot *come to perceive* F by an F-sense-organ is that it is already perceiving it. He assumes that '[e]ven when we are not particularly cold or warm we are generally aware of the temperature of our bodies' and that since the sense is already aware of the temperature it cannot *become* aware of it as the temperature of another object. Johansen's reading is rightly criticized by Caston (2005: 287-88), who notes that in Johansen's view it becomes in fact false that an F-sense-organ cannot perceive F, since such an organ does (must?) instead perceive F. In fact, the neutrality of the sense-organ, and its being non-F, would thus be required only to avoid concurrent perception of the organ itself, and not for the sake of securing the ability of perceiving the full range of qualities. This makes the reading implausible, since Aristotle explicitly excludes sense-organs' self-perception in ordinary cases of perception in DA II 5. The proposal goes against the direct explanation of BlindSpot Aristotle's words imply (see again διό, 424a2), based on the assumption that "[t]he organ's material constitution has direct bearing on the sorts of physiological changes it can undergo and, as a result, what it can perceive" (CASTON, *ibid.*).

That Blind Spot entails the necessity of some ordinarily physical affection on sense-organs accompanying perception is claimed, in controversy with Spiritualism, by the different 'physicalist' reconstructions of Aristotle's theory. According to both Literalist and 'Structuralist' (or 'Transductionist') interpretations, Aristotle invokes an F-organ's

lack of liability to an ordinarily physical affection from an F-object as the reason for the blind spot phenomenon, since such ordinarily physical affections must in fact take place in order to perceive corresponding perceptible objects. In the 'Structuralist' interpretation, Aristotle does indeed theorize ordinarily physical affections that are 'codifying' the relevant information, thanks to the preservation of a quantitatively definable 'Structure' that is relevantly related to a the perceived quality[7]. In this view, then, the F-organ is unable to perceive G, in so far as it cannot 'receive' F, which is the quantitatively definable 'Structure' relevantly related to G (it is by becoming F that the sense-organs perceives G). In Literalism, on the other hand, the necessary 'physiological' process is a literally replicatory affection, and the perceptible property an F-organ is unable to perceive is F itself[8].

There is a problem for both Literalism and Structuralism, however. The same reasons grounding BlindSpot must also entail that as soon as the sense-organs becomes F, the receptive condition with regard to F is lost, and the ability to perceive the corresponding perceptible quality (F, in the case of literalism; G, in the 'structuralist' hypothesis) is as vanished with it. This is what I call the Acquired Blind Spot (ABS, from now on) problem[9]. Literalism is clearly unable

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[7] See CASTON 2005: 299-316. Supporters of reconstructions attributing to Aristotle a non-literalist physiology describable—with varying imprecision—in those terms include ACKRILL 1981: 66-67; MODRAK 1987: 58-60; WARD 1988: 221-28; LEAR 1988: 110-16; SILVERMAN 1989: 273-80; PRICE 1996: 294-300; BRADSHAW 1997: 151-56; SCALTSAS 1996: 28-29; MILLER 1999: 191; POLANSKI 2007: 349; SHIELDS 2007: 293-98.

[8] The view is supported by SLAKEY 1961: 473-74, SORABJI 1974: 71-72; 1992: 209-10 and EVERSON 1997: 10-11.

[9] See MAGEE 2000: 318, who notes (by indicating as alteration the acquisition of a property implying the loss of a preceding contrary one) that "[w]hat is altered is in potency to what it will become, but in so altering, it thereby loses that potency to be altered. That is, once it is altered, it cannot then be altered again with respect to the same quality. This is the definition

to deal with the ABS problem, but Structuralism fares no better, since no actual advantage is gained with this regard if there is a 'transducing' affection that changes the organ's initial receptive condition.

A first way in which Structuralism can try to dodge the ABS problem is by arguing that the blind spot phenomenon Aristotle is referring to is the lack of perception of F *qua* different (e.g., hotter/colder than us), rather than perception of F *simpliciter*. The argument is supposedly grounded by the evident ability to perceive our hands touching each other, while obviously failing to perceive them as 'hot' or 'cold', or 'hard' or 'soft'[10]. Whatever the way Aristotle would account to perceive our own hands (it may well be by a pattern of ephemeral changes in temperature and consistency of superficial flesh and skin, reciprocally induced by each hand on the other), this reconsideration of BlindSpot would offer no solution to the ABS problem. According to Structuralism, as soon as I perceive an ice cube in my hand, the becoming F by which I perceive coldness takes place. Clearly, this change does not affect the way in which I will perceive the ice cube I keep in my hand from that moment onwards. For I keep perceiving the ice cube 'as colder' than me, and I certainly do not perceive it in the same way as I detect my hands touching each other. The latter change in the way I perceive ice, however, should follow in the reconsidered

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of alteration. If, however, sense organs were to be altered in perception, they would then lose their capacity to be altered again". See also FREELAND 1992: 232 ("each body part and organ, of any type of creature, exists as the combination in a certain ratio of various of the four elements [...] It would be impossible for these crucial ratios to be maintained if the body were literally altered when the organism perceived tangible objects"). Tracy (1969: 207) seems to be sensible to the ABS problem as he hypothesizes that the first affection is followed by a second one by which the organ recovers its original receptive condition (see note 34 below).

[10] A similar account of BlindSpot is offered by BRADSHAW 1997: 146-47.

account of BlindSpot mentioned above, if the 'becoming F' is a change in the sense-organ's receptive condition.

It is certainly possible for Structuralism to theorize a 'codifying' change and a 'becoming F' that modifies the physical state of the organ without affecting the condition that is relevant for its receptivity, and it may be thought that this idea offers an alternative way to reply to the ABS problem. Against this view, however, it must be stressed that were this the type of physiology has in mind, no blind spot should follow in the first place. Consider for instance a model drawn on the grounds of Aristotle's own lyre analogy[11]. In the lyre, the 'reception' of the vibration does not preclude the possibility to keep being affected by it. The change underwent by the string becoming F is not such to prevent the ability to play any note, and the receptive condition is accordingly not affected. In the same way, one may think that the organ's becoming F does not prevent the relevant receptive condition characterizing it, and then causes no acquired blind spot with regard to any perceptible quality. Were this the case, however, the reasoning at the basis of BlindSpot would cease to be available with regard to the initial receptive condition as well. If the sense-organ's receptive condition were determined by the possibility to be affected by the 'codifying' affection, then why should the receptive condition prevent the perception of any object in the first place? The actual tension of the strings in the lyre prevents them from actually having a different tension, without having any effect on the 'receivable' vibrations, and the organ should be similar to the lyre also under this

[11]   The lyre analogy is proposed by SCALTSAS 1996: 28-29, who recognizes that the passage on the blind spot supports literalism while generating a contradiction with the idea that perception only happens through interaction with media transmitting perceptible qualities without being literally affected by them.

respect. If the system is avoiding acquired blind spot in virtue of 'transducing' or 'codifying' alterations, then, the initial blind spot should not be there in the first place[12].

The partial conclusion to be drawn, then, is that in all the proposed interpretations of our passage (DA II 11, 423b27-424a4) Aristotle appears to give a blatantly flawed explanation of the blind spot phenomenon, which is either not providing any real explanation at all (in the Spiritualist interpretation no blind Spot should follow), or paying the explanation of the blind spot of touch with the costly introduction, by the same set of theses employed in such explanation, of a mechanism regularly generating acquired blind spots for each and every act of perception.

3. ON THE MEANING OF THE WORD ΜΕΣΟΤΗΣ

3.1. *The need for a revision of the standard lexicography: μεσότης does not mean 'central position'*

In this section, I shall argue that the standard understanding of the word μεσότης is seriously flawed and in need of a revision. The common belief that AisthMesot cannot indicate anything but the idea of a 'mean' state of the αἴσθησις, shared by all commentators and founded on the received lexicography for the word μεσότης, is accordingly mistaken.

The impression we may get by looking at the earliest

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[12] It is worth noting that the ABS problem may be affecting the Burnyeat's and Johansen's spiritualist views as well, in so far as they admit that 'quasi-physical' alterations are affecting sense-organs as we perceive. The difficulties raised for the Structuralism seems to be avoidable only by a fairly *ad hoc* conjecture, according to which being *ordinarily* F prevents being liable to a 'special' non-ordinary affection from F, while being (and becoming) F in a special non-ordinary way does not prevent such liability. The objections to Spiritualism outlined above would still be in place, though.

occurrences of μεσότης in Greek writings is that the word
might be of Platonic and Academic origin. While, accord-
ing to reliable ancient testimonies, the term μεσότης was
the first word denoting a mathematical proportion of *any*
kind (the word ἀναλογία being initially restricted to the ge-
ometric one only), and the subject has been systematically
studied already by 'Pythagoreans' thinkers like Hippasus,
Philolaus and Archytas, there seems to be no solid textual
proof that any of them, nor anyone else before Plato, did
use the actual term μεσότης[13].

It comes as no surprise that occurrences of the word
in Plato and Aristotle abound in LSJ's entry for the word.
The lexicon gives 'central position' as the first meaning of
μεσότης, quoting Plato's *Laws* (746a) and two similar passages
from works transmitted in *Corpus Aristotelicum* (*Mirabilium
auscultationes*, 846a18, and *De Mundo,* 399b34)[14]. The mathe-
matical meaning of 'mean' follows, quoting Plato's *Timaeus*

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[13] See TRACY 1969: 344-46 about the information transmitted by ancient
mathematicians Pappus and Nicomachus and its endorsement by modern
historians of the discipline. Information about pythagoreans' systematization
is contained in the report about Philolaus by Nicomachus (1926, II 62, 2, =
Test. A 24 in [HUFFMAN 1993]) and in a fragment from Archytas preserved
by Porphyry (Fr. 2 in HUFFMAN 2005: 162). Interestingly enough, Archytas
already uses the word ἀναλογία in a broad sense to denote three terms related
by a mathematical formula (and not just in the narrow sense of 'geometrical
proportion', in which the same ratio bind the medium term and each of the
extremes), and the same usage is found later in Aristotle (see HUFFMAN 2005:
179-81). It is therefore not impossible, albeit purely conjectural, to think that
the practice of using the word μεσότης (which, as we shall see, denotes both
the whole ἀναλογία and the medium term alone) originated in the Academy
to speak about 'mathematical' ἀναλογίαι alone, possibly under the influence
of Eudoxus' further investigations on the subject mentioned by Iamblicus
in his Commentary on Nicomachus' *Introduction to Arithmetic* (see 100.19-
101.11 [= Text A in HUFFMAN 2005: 164], a passage probably based on the lost
history of geometry by Aristotle's pupil Eudemus [see HUFFMAN 2005: 170]).

[14] LSJ suggests that the idea of 'central position' is used about time as well.
Passages quoted in this sense are Aristotle's claim that the 'now' is a certain
μεσότης (*Phys.* VIII 251b20, on which we shall return later), and an inscrip-
tion in Eleusis of the age of Augustus. I shall return to both passages later.

32a, 43d and Aristotle *Fragment* 47. The famous Aristotelian characterizations of virtues as μεσότητες are then listed under the heading '*mean, state between two extremes*'. Quotations of Aristotle's usage in relation to αἴσθησις and touch in DA 424a4 (cfr. 431a11) are therefore classified as attesting 'medium, communicating between two opposites' and *Meteor.* 382a19, which is deemed to mean 'standard'. There are finally the grammatical acceptation of middle mode of a verb (between the passive and active ones), and the one denoting a literary style intermediate between poetry and prose.

Doubts about the details of LSJ's entry begins to creep in as soon as we pay closer attention to the first proposed meaning of μεσότης as 'central position'. This proposal does not appear to be founded on solid grounds. Quoted passages from *Mirabilium auscultationes* and *De Mundo* are hardly of any use, as the reading μεσότης is dubious in itself (ἐν μεσότητι in 846a18 is at odds with ἐν μέσῃ τῇ at 399b34)[15]. Furthermore, the only left occurrence of the word μεσότης in Plato, which appears in the fifth book of the *Laws*, provides evidence *against* the definition of the μεσότης as 'central position' proposed by LSJ. The subject of the passage (746a6-7) is the criticism of the unrealistically ideal character of the theorized city. Among the very demanding ordinances citizens would likely not tolerate (including a fixed level of wealth and regulations about the number of children and the size of the family), the Athenian visitor mentions

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[15] See *Mirabilium auscultationes,* 846a17 ff. (Λέγεται τὸν ἀγαλματοποιὸν Φειδίαν κατασκευάζοντα τὴν ἐν ἀκροπόλει Ἀθηνᾶν ἐν μεσότητι ταύτης τῆς ἀσπίδος τὸ ἑαυτοῦ πρόσωπον ἐντυπώσασθαι, καὶ συνδῆσαι τῷ ἀγάλματι διά τινος ἀφανοῦς δημιουργίας, ὥστ' ἐξ ἀνάγκης, εἴ τις βούλοιτο αὐτὸ περιαιρεῖν, τὸ σύμπαν ἄγαλμα λύειν τε καὶ συγχεῖν) and *De Mundo,* 399b33 ff. (Φασὶ δὲ καὶ τὸν ἀγαλματοποιὸν Φειδίαν κατασκευάζοντα τὴν ἐν ἀκροπόλει Ἀθηνᾶν ἐν μέσῃ τῇ ταύτης ἀσπίδι τὸ ἑαυτοῦ πρόσωπον ἐντυπώσασθαι, καὶ συνδῆσαι τῷ [400a1] ἀγάλματι διά τινος ἀφανοῦς δημιουργίας, ὥστε ἐξ ἀνάγκης, εἴ τις βούλοιτο αὐτὸ περιαιρεῖν, τὸ σύμπαν ἄγαλμα λύειν τε καὶ συγχεῖν).

houses, as we said, both all around in circle and as μεσότητας of both the countryside and the city (my translation)[16].

Despite the agreement of modern translators of the *Laws* with the meaning proposed by LSJ, the point made here simply cannot be that the houses must be in a 'central position'[17]. The backward reference clearly points to the creation of the city described earlier (745b3-e6), according to which the portions of land should be allocated to citizens in a coupled way, in order to guarantee to everyone, both in the city and in the countryside, one possession close to the centre and another one close to the borders[18].

In other words, the point is not that houses must be centrally located, but rather that each house must be constituted by two plots that are poles apart, in order to balance advantages and drawbacks implied by their different dis-

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[16] 746a6-7: ἔτι δὲ χώρας τε καὶ ἄστεος, ὡς εἴρηκεν, μεσότητάς τε καὶ ἐν κύκλῳ οἰκήσεις πάντῃ.

[17] As in the translations by Saunders ("What about this description of a city and countryside with houses at the centre and in all directions round about?"), Jowett ("and will endure, further, the situation of the land with the city in the middle and dwellings round about"), and Bury ("and will submit also to the arrangements he has defined for country and city, with the dwellings set in the centre and round the circumference").

[18] First, the legislator must locate the centre of the country and place the city therein (745b3-4: πρῶτον μὲν τὴν πόλιν ἱδρῦσθαι δεῖ τῆς χώρας ὅτι μάλιστα ἐν μέσῳ), reserving the central area for the acropolis. Then the whole territory (including the city and the countryside) must be equally divided according to its productivity, in twelve slices containing a total of five thousands and forty holdings. The holdings must be divided in two, and the halves distributed to the effect of fairly distribute in the population both the advantage and disadvantage due to living at different distances from the city centre (c6-d2: τὸ πρὸς τῇ πόλει μέρος τῷ πρὸς τοῖς ἐσχάτοις εἷς κλῆρος δεύτερον ἀπὸ πόλεως τῷ ἀπ' ἐσχάτων δευτέρῳ, καὶ τἆλλα οὕτως πάντα). The same division must be repeated, for the same reason, for the city "and each man should be allotted two houses, one near the centre of the state, one near the boundary" (e2-5: τέμνειν δ' αὖ καὶ τὰ δώδεκα τῆς πόλεως τμήματα τὸν αὐτὸν τρόπον ὅνπερ καὶ τὴν ἄλλην χώραν διένεμον· καὶ δύο νέμεσθαι ἕκαστον οἰκήσεις, τήν τε ἐγγὺς τοῦ μέσου καὶ τὴν τῶν ἐσχάτων).

tances from the city centre. In this sense, houses must be fair and proportionate 'mediating balances' determined by a calculus and a reasoning.

2.2. Μεσότης as 'mediating balance' in Plato and late mathematicians

Further criticism of the entry for μεσότης in LSJ can be raised for the second meaning of mathematical 'mean'. Regrettably, the lexicon fails to report a very interesting feature of the mathematical use of the word which is illuminating for understanding its meaning. This is the possibility for μεσότης to refer to the whole of a three-term mathematical ἀναλογία, as well as to its 'medium' term only. In other words, it is possible to call μεσότης *both* a proportion like 2:4::4:8, and its 'intermediate' term 4[19].

Both the uses of μεσότης referring to the whole proportion (ἀναλογία) and to the mean term (τὸ μέσον) only, which I shall indicate by μεσότηςₐ and μεσότηςₘ respectively, are clearly observable in Nicomachus' *Introduction to Arithmetic* (I-II AD)[20]. In II 22, 1, Nicomachus introduces ten differ-

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[19] This usage is clearly reconstructed by TRACY 1969: 344-46.
[20] In I 8, 10 there are two occurrences of the term μεσότης which clearly indicate the 'intermediate term' of a proportion (l. 9: a single μεσότης or two μεσότητες between the extreme terms of a series can be found; l. 19: in certain series – those obtained by progressive division in two, where the number of members of the series is even - the extremes necessarily have two μεσότητες, not one). In I 8, 11 (3) the converse point is made: in some other series (those obtained by progressive division in two, where the number of members of the series is odd) the μεσότης in necessarily one. Here we again have μεσότης as 'mean term'. The same meaning is found in I 9, 6 (l. 6), where the idea of reciprocal substitution of corresponding terms belonging to opposite 'sides' in relation to the μεσότης (16 and 4 or 32 and 2 in the series 2, 4, 8,16, 32) is presented (ἐπ᾽ ἐκείνων μὲν ἡ ἀντιπερίστασις τῶν μερῶν ἀπ᾽ἀκροτήτων εἰς μεσότητα ἢ μεσότητας: 'the reciprocal arrangement of parts from extremes to mean term or terms' according to D'Ooge's translation). The same usage of the term is found in the illustration of the arithmetical properties of the

ent types of 'progressions' or 'proportions' (ἀναλογίαι),
attributing the knowledge of the first three geometric and
harmonic) to Pythagoras, Plato and Aristotle. The word
employed at the beginning of this section is ἀναλογία, but
very soon (l. 6) the term μεσότης is used as well, in relation
to the fourth, fifth and sixth type of progressions. This sug-
gests that μεσότηςα and ἀναλογία are interchangeable, and
the idea finds further support in II 22, 3 (ll. 12-13), where the
adjective 'geometric' (used in the beginning for ἀναλογία)
is attributed to μεσότης. Nicomachus' following treatment
is so rich of passages where μεσότηςα and ἀναλογία are in-
terchangeable, that we consistently find μεσότηςα rendered
with the same word used for ἀναλογία (i.e. 'proportion') in
D'Ooge translation[21].

The ability of μεσότης to denote a 'progression' is con-
firmed by Pappus of Alexandria's *Collectio* (III-IV A.D.). Al-
ready in III 68-70, Pappus exposes the idea that geometric
arithmetic and harmonic μεσότητες can be shown to exist
and understood by examining them in a semicircle. Here he
calls the line representing the mean term between other two
a μέση (cfr. III 68, 24-25), specifying that one is such 'in a ge-
ometric ἀναλογία' while another 'in the arithmetic μεσότης'
(III 68, 26-28). In III 70-72, we have the same clarification

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μεσότης in relation to the extremes in different kinds of numbers (I 10, 10,
l. 8). This usage of μεσότης is still present in the second book, together with
the one denoting the whole of a mathematical proportion. Occurrences of
the term as 'mean' are at II 24, 6 (l. 4); 24, 9 (ll. 5 and 9); 27, 2 (l. 2); 27, 4 (l. 2);
29, 2 (l. 11); 29, 3 (l. 9).

[21]   See II 23, 1 (ll. 1 and 10); II 23, 5 (l. 2) and 27, 5 (l.8), about arithmetic
μεσότης. II 23, 2 (ll. 2 and 6), about conjoining and disjoining μεσότητες.
II 24, 3 (l. 1); 24, 4 (l. 4); 25, 2 (l.6); 26,2 (l.5) and 27, 5 (l.8), about geometric
μεσότης. II 25, 1 (l.1); 5 (l.1); 26, 1 (l.14) and 27, 7 (l.16), about harmonic μεσότης,
compared in II 23, 6 (ll.14, 17 and 19) to the geometric and the arithmetic
ones. II 28, 4 (l. 2) for the fifth and sixth μεσότητες, II 28, 6 (l. 2) for the first
six μεσότητες; II 28, 8 (l. 1) for the eighth μεσότης, and finally II 29, 1 (l. 3) for
the last and 'most perfect' μεσότης.

we found in Nicomachus about geometric μεσότης as the only proper ἀναλογία, and the idea that the general term for 'progression' should only be μεσότης. The number and types of μεσότητες distinguished by Pappus are the same as Nicomachus', with the first three (arithmetic, geometric, harmonic) representing the most 'ancient' ones (cfr. III 80, 24-25; 84,1 - 86, 18). This use of the word is widely confirmed in the rest of the treatise, and justifies Hultsch's addition of the formula '*sive progressio*' after his Latin rendering of μεσότηςα as '*medietas*'[22].

Reflecting upon the double use of μεσότης Tracy (*cit.*) observes that

> as practically synonymous with ἀναλογία, μεσότης can only signify a "proportion" (i.e. a three-term progression) and not a "mean"; and when it has this sense of a three-term progression or "proportion", μεσότης is distinguished from "the mean" as the whole from the part. […] For μεσότης may signify in mathematics the whole relationship of two extremes joined by a mean, i.e. a "proportion". And applied analogously to physical realities, μεσότης will obviously suggest a disposition in which extremes of any kind are balanced in a mean, i.e. a state of equilibrium among opposing factors.

Although valuable in several respects, Tracy's reconstruction seems too hasty in assuming an unqualified equivalence between μεσότηςα and ἀναλογία, and it appears more careful to distinguish two alternative ways in which it is possible to account for the double use of μεσότης: either there are two

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[22] In III 78-80 the mean term is qualified again as μέση, whereas the μεσότης consists in the three related terms together (see III 78, 5-6, 12-13, 14-15). The same goes for the talk about the minimum terms of a μεσότης (III 90, 6 and 23), implying that the terms are three in total (minimum, maximum and middle one, see the explicit mention of the three terms of the μεσότητες at 80, 8). See also III 82, 6-8; 19-20.

different meanings of the word μεσότης, one equivalent to ἀναλογία, and the other equivalent to τὸ μέσον; or there is one single sense of μεσότης that gives the word the ability to share the referent, in different circumstances, with either ἀναλογία or τὸ μέσον.

A passage in Nicomachus' *Introduction* (II 21, 1, ll.1-9) indicates that there is in fact no equivalence between ἀναλογία and μεσότης_α, while also suggesting that the latter of the two options above is correct. Here, Nicomachus writes that

> in the division of the musical canon, once one has stretched a single string or set forth a flute of a single length and fixed the ends, after (i) the μεσότης is imparted to the flute by holes and to the string by a bridge, (ii) one might produce in one and another way the mentioned arithmetic, geometric, and harmonic μεσότητες – (iii) they would be called appropriately and abiding by etymology in this way, as they are differently brought about by change and shift of the μέσον (my translation)[23].

I distinguished three steps in the passage: (i) the μεσότης is imparted to the flute by holes and to the string by a bridge; (ii) one can therefore produce different sounds or set of sounds to be considered as 'musical' μεσότητες; (iii) the μεσότητες are produced by a shift in the 'mean term' (τὸ μέσον). In (iii) μεσότης clearly occurs in its μεσότης_μ function, and alludes to a 'mean' point on the instrument (where the hole is drilled or the bridge fixed): by shifting this μέσον the musical μεσότητες played by the instrument change[24].

[23] Ὥσπερ δὲ ἐν τῇ τοῦ μουσικοῦ κανόνος κατατομῇ χορδῆς μιᾶς τεταμένης ἢ αὐλοῦ μήκους ἑνὸς ἐκκειμένου τῶν ἄκρων ἀμετακινήτων ὑπαρχόντων, μεταλαμβανούσης δὲ τῆς μεσότητος ἐν μὲν τῷ αὐλῷ (5) διὰ τρυπημάτων, ἐν δὲ τῇ χορδῇ δι' ὑπαγωγέως, ἄλλον ἐξ ἄλλου τρόπον ἀποτελεῖσθαι δύνανται αἱ προλεχθεῖσαι μεσότητες, ἀριθμητική τε καὶ γεωμετρικὴ καὶ ἁρμονική, ἵνα εἰκότως καὶ ἐτυμώτατα καλοῖντο διὰ τὴν τοῦ μέσου ὅρου μετάστασιν.

[24] In (iii) τὸ μέσον can hardly be anything else. A reference to the movable bridge working as a μέσον is unlikely, as it does not cover the case of the

The μεσότης in (i) can be referring to this μέσον set on the instrument by holes or by a movable bridge, as well as to the proportion between lengths of the pipe or the string that the μέσον establishes. In (ii) we have to face a similar persistent ambiguity. Here, μεσότης must certainly refer to sounds a player can produce by the instrument, but it is unclear whether Nicomachus is alluding either to a single 'mean proportional' sound (a musical μεσότης$_μ$), i.e. a chord obtained by playing two 'extreme' notes together, or to a progressive set of three sounds (a musical μεσότης)[25]. Despite its ambiguity, (ii) turns out to be enlightening for the reconstruction of the meaning of μεσότης, since the sentence requires both that μεσότης$_μ$ is not perfectly equivalent to τὸ μέσον, and that μεσότης$_α$ is not equivalent to ἀναλογία. Accordingly, even if μεσότης denoted here the mean term, it cannot be doing so in virtue of a supposed semantic equivalence with τὸ μέσον, as this would entail the absurdly tautological claim that 'different mean terms are produced by a shift in the mean term'. On the other hand, μεσότης may certainly be denoting a whole progression, but not in virtue of a supposed semantic equivalence with ἀναλογία, for this would spoil the kinship with τὸ μέσον and the idea that calling such sounds μεσότητες is appropriate and 'abiding by etymology.

Several other passages in Nicomachus' *Introduction* are of equal interest to establish the meaning of μεσότης. Nicomachus takes for granted more than once that the word somewhat conveys the meaning of 'being common to the

flute. The expression does not refer to the mean term of the set of sounds either, since the shift of the μέσον is rather invoked here as the reason why such sounds change.

[25]   Either a scale of three single notes, or a series made of two single notes considered as extremes and the chord made by the two together, considered as the 'balancing mean'.

extremes as a mixture of them', thus giving additional motivation to revise the common understanding of the meaning of the word. In proposing a classification of numbers I 8 (3, ll. 3-5), Nicomachus uses μεσότης as an example of something which is neither one or another 'extreme', but nonetheless 'common to both':

> The even-times even and the even-times odd are opposite to one another, like extremes, and the odd-times even is common to them both like a mean term (μεσότης).

The same idea returns in the course of the treatment of the third 'middle' kind of number (I 10, 1), where Nicomachus says that the 'odd-times even' is 'common' to the previously mentioned kinds of number (the 'even-times even' and the 'even-times odd'), as if it were the single μεσότης between those kinds considered as extremes (κοινὸς ὢν ἀμφοτέρων τῶν εἰρημένων ὡσανεὶ δύο ἀκροτήτων μία τις ὢν αὐτὸς μεσότης). In both these passages, Nicomachus seems to consider as self-evident that all μεσότητες have the property of being 'common', as he even takes the notion connected with the term as capable of clarifying and illustrate his views about the classification of numbers.

The clarification Nicomachus gives in I 10, 1 puts some restriction to the interpretation of the idea of μεσότης as 'common to the extremes'. He explains that the kind of number at issue (the 'odd-times even') is 'common' because it shares with the one the property by which it differs from the other, and *vice versa*[26]. On the basis of this combination

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[26]   The properties in question are clearly stated in I 10, 10: the even-times odd has the peculiarity "that the mean term is always half the sum of the extremes, if there should be one mean, and the sum of the means equals the sum of the extremes if two'; the even-times even has the peculiarity that 'the product of the extremes is equal to the square of the mean, should there be one mean term, or their product, should there be two".

of shared and unshared properties, this class is said to be a mixture (μῖγμα) of the other two (cfr. I 10, 6, line 3 and I 10, 10, line 10). The point about being 'common', then, seems to be a stretched (rhetorical, not mathematical) analogy between an arithmetic μεσότης (like the one consisting of 3, 8, 13) and a couple of properties resulting from other two couples in a physical mixture. Despite a *prima facie* appearance, then, the middle term's 'being common to the extremes' cannot be explained by the presence of the same relationship *towards the same thing*, as for instance in the case of two extremes (1,16) that are said to have the middle (4) in common because they both have the property of producing a certain ratio (1/4) in relation to that one number (4). This relationship would make the middle term 'common' in the same way as the mother of two brothers, which is a further example of the 'same relationship (being son of) to the same thing (the same mother)'. Trying to make sense of the 'being common to the extremes' Nicomachus has in mind, we can rather imagine that in the same way as *'dry & hot'* bodies result from 'dry & cold' and 'moist & hot' ones, an arithmetic μεσότης (middle term) is 'bigger than the minor & smaller than the major' as it results from a term which is 'bigger than the minor & bigger than the mean' and another one which is 'smaller than the mean & smaller than the major'. A similar point is made about ἀναλογία in II 22, 2, where Nicomachus describes it as a σύγκρισιν that accommodates and bind together its components[27]. The recurrence of the *logos* characterizing the proportion

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[27] τῶν ὅρων σύγκρισιν οἰκειούσης ἀλλήλοις καὶ συνδεούσης. The point is explicitly made about arithmetical proportion, but it is plausible to assume that the function a mathematical ἀναλογία performs according to quantity (κατὰ τὸ ποσὸν) is the same a geometric one does according to a ratio (see II 24, 1 and 23, 4) and any of the other types according to the peculiar relation among their own terms.

is apparently supposed to account for the 'mixing' of the extremes, which in turn explains why the resulting mean term can be seen as a 'mixture'.

While the notion of 'mixture' Nicomachus associates with the word μεσότης may not be crystal clear, it is at least evident that the standard translation of μεσότης as 'mean' or 'mid-point' is not illuminating with regard to the meaning of 'being common to the extremes' the word appears to suggest to his ears, even in those occurrences of the term that do in fact refer to the 'medium' term of a mathematical progression. In fact, the rendering as 'mean' does not even remotely suggest anything like a mixture 'crossing' some properties belonging to the extremes.

To take stock, it is possible to invoke late mathematicians' texts to highlight the following desiderata for a more appropriate rendering of μεσότης:

– employment of a single word able to refer to the whole of a three-term progression or proportion, as well as to its 'medium' term alone;
– preservation of the etymological link between μεσότης and τὸ μέσον (the mean or medium term);
– adoption of a term able to suggest the idea of a mixture of the extremes that 'crosses' their opposite features.

All the above requirements seems aptly satisfied by paraphrasing μεσότης as 'mediating balance'. To begin with the first requirement, it is possible to note that the proposed meaning of 'mediating balance' does in fact capture an aspect that any mathematical ἀναλογία considered as a whole has in common with its middle or medium term. To find the medium term between 3 and 27, it is necessary to achieve a 'mediating balance', where the latter expression may equally refer to the organized whole in which the progression '3, 9, 27' consists, or to its medium term 9, or again to the operation by which the whole and the medium are

produced. To think of the performed operation and the resulting progression as a 'mediating balance' of the given 'extremes' terms appears as natural as saying that the found medium term is itself a 'mediating balance' of the extremes (9 is a *medium thing* which performs the mediating balance of 3 and 27). The proposed periphrasis and the notion it expresses are enough to justify the multiple referents of μεσότης in Mathematics[28].

The periphrasis as 'mediating balance' seems to satisfy all the other desiderata listed above as well. Calling the whole 2:4::4:8 or its medium term 4 as a (geometrical type of) 'mediating balance' suggests that some sort of 'mixture of the extremes' and 'a compound which settles and binds together the terms' has been achieved. By the same periphrasis, the etymology centred on the kinship with the 'medium' (τὸ μέσον or μέση) is also neatly respected. Similarly, it finally becomes understandable how a class of numbers showing a mixture of the properties of other two classes of numbers can be said to be a 'mediating balance' (rather than a 'mean') as well as a mixture of them.

It is then clear that μεσότης works like English nouns ending in -tion or -ture, i.e. as an 'achievement' word denoting the actual F-ing as well as the result fulfilled by F-ing. An illuminating example in this direction is the English word 'division', which means both the action of dividing and its

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[28] That the ability to achieve a reasoned 'mediating balance' between two numbers or magnitudes might have been what ancient mathematicians had in mind when employing the term μεσότης is hardly surprising. The typical problem a mathematician working on 'means' had to face is in fact to find a middle term entertaining the same relation to given 'extremes' numbers or magnitudes. The fascination with the challenge must have been equally strong for philosophers: solving problems of that kind means discovering a conceptual unity between terms that are *prima facie* irreconcilably different analogy to argue for the peculiar unity of being in Aristotle's *Metaph.* IV is exemplar in this sense).

result (either a part or the state brought about by the operation). If an admittedly ugly neologism could be coined to render the Greek μεσότης, one might then call the operation of finding a term such that 3:x::x:12 a 'mediature', and thus employ the same word to describe the discovered 'medium' term 6 as well as the organized whole (3, 6, 12), pretty much in the same way as one can say both that 6 is a division which fits 24 four times, and that 24/4=6 is a division.

3.3. *Μεσότης in Plato and Aristotle*

As already noted, the proposed meaning of 'mediating balance' perfectly fits with the occurrence of μεσότης in Plato's *Laws* (V, 746a6-7,). The same can be said of the remaining four occurrences of the word in his dialogues, uttered by the Pythagorean character Timaeus in the homonymous dialogue (*Tim.* 32a8, b3, 36a 3, 43d6). In all these cases, the word also has a clear mathematical connotation that perfectly fits with the examination conducted so far. In a first passage, μεσότης can indifferently be referring to the activity of the demiurge, or to the mean term of a geometric proportion:

> For whenever of three numbers which are either solids or squares the middle term (τὸ μέσον) between any two of them is such that what the first term is to it, it is to the last, and, conversely, what the last term is to the middle (τὸ μέσον), it is to the first, then, since the middle term (τὸ μέσον) turns out to be both first and last, and likewise both the last and the first turn out to be middle terms (μέσα), they will all of necessity turn out to have the same relationship to each other, and, given this, will all be unified. So if the body of the universe were to have come to be as a two dimensional plane, a single *mediating balance* (μεσότης) would have sufficed to bind together its conjoining terms with itself. As it was, however, the universe was to be a solid, and solids are never joined together by just one,

but always by *two mediating balances* (μεσότητας). Hence the god set water and air between fire and earth, and made them as proportionate to one another as was possible, so that what fire is to air, air is to water, and what air is to water, water is to earth (31c4-32a7, trans. Zeyl, slightly modified).

A second passage seems to favour the reference to the mean term of a proportion:

After this he went on to fill the double and triple intervals by cutting off still more portions from the mixture and placing these between them, in such a way that in each interval there were two *mediating balances* (μεσότητας), one exceeding the first extreme by the same fraction of the extremes by which it was exceeded by the second, and the other exceeding the first extreme by a number equal to that by which it was exceeded by the second (35c2-36a5, trans. Zeyl, slightly modified).

In a last one, μεσότης appears instead to be indicating the bond or connection (συνδέσεις, connected to μεσότητας in 43d6 by an apparently epexegetical καὶ) established between the terms of a proportion:

And they further shook the orbit of the Different right through, with the result that they twisted every which way the three intervals of the double and the three of the triple, as well as the *mediating balances* and connections (μεσότητας καὶ συνδέσεις) of the ratios of 3/2, 4/3 and 9/8 (43d3-7, trans. Zeyl slightly modified).

The flexibility secured by the proposed understanding of μεσότης as a 'mediating balance' proves more useful with regard to the several uses of the term in Aristotle. A first one concerns Aristotle's theory of time, and more specifically his definition of the 'now' or 'instant'. In *Phys*. VIII (251b19-28), Aristotle offers an argument for the eternity of

time (and motion) based on the assumption that the 'now' (τὸ νῦν), without which he thinks we cannot conceive time, is a mediature of some kind (μεσότης τις). In the relevant part of the argument (b19-23), he states that

> if, then, it is impossible for time both to be and to be thought of apart from the now, and if the now is a *mediating balance* of some kind and, having simultaneously a beginning and an end, it is both a beginning of the time <which> followed <it> and an end of that <which> preceded <it>, then time must always exist[29] (transl. by Graham, modified).

With regard to such use, LSJ proposes an extension of the spatial meaning of 'central position'[30]. In fact, if the only point raised here were that the now lies in between the future and the past, the claim would be offering no argument at all to support the conclusion that 'time must always exist'. The revised meaning is on the other hand helpful once again, for it allows one to appreciate that under the assumption that the 'now' is some sort of 'mediating balance' of what comes after and what came before, picking any instant in time

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[29] εἰ οὖν ἀδύνατόν ἐστιν καὶ εἶναι καὶ νοῆσαι χρόνον ἄνευ τοῦ νῦν, τὸ δὲ νῦν ἐστι μεσότης τις, καὶ ἀρχὴν καὶ τελευτὴν ἔχον ἅμα, ἀρχὴν μὲν τοῦ ἐσομένου χρόνου, τελευτὴν δὲ τοῦ παρελθόντος, ἀνάγκη ἀεὶ εἶναι χρόνον.

[30] LSJ also quotes an inscription in Eleusis from the age of Augustus, which appears to refer to the eternity of the Universe by saying that it has no beginning, end or μεσότης (ἀρχὴν μεσότητα τέλος οὐκ ἔχων, DITTENBERGER 1883: III, 1125.9-11). The reference to a middle time suggested by LSJ seems unnecessary. The inscription seems rather (polemically?) reminiscent of a Pythagorean dictum attributed to Ocellus (fr. 8 in DIELS-KRANZ 1951: 440-41), according to which there exists a 'first triad' consisting in beginning, end and μεσότης (ἡ τριὰς πρώτη συνέστησεν ἀρχήν, μεσότητα καὶ τελευτήν). A similar claim is reported by Aristotle in *De Caelo,* 268a10-13 [268a10]: "as the Pythagoreans say, the world and all that is in it is determined by the number three, since beginning and middle (μέσον) and end give the number of an 'all', and the number they give is the triad". See also PLATO, *Laws*, IV, 715e7-716a1. On the work ascribed to Ocellus called *De universi natura* as a late Hellenistic forgery, see FREEMAN 1948: 81, and KAHN 2001: 79.

will logically imply a future and a past time. The rationale seems to be that the 'now', being a μεσότης, does necessarily depend on the two extremes starting from which it is determined, pretty much in the same way as 6 can be described as a μεσότης only in virtue of the extremes it entertains a certain relation with (e.g., 3 and 12). The only way in which one can identify a time-limit (a 'now') is by considering it in a time-span, because the time-limit is a 'mediature' or mediating balance of the extreme limits of the time-span containing it. Quite obviously, the extremes in question, being time-limits themselves (and thus both a 'now'), should in turn be identified in the same way, and so on *ad infinitum.* This justifies Aristotle's argument for the eternity of time from the assumed impossibility for time to exist and be thought apart from the 'now', combined with the thesis that the 'now' is a mediating balance of preceding and following time-limits. In this view, the 'now' is not an independently existing thing which happens to be located between two others, but rather an entity that cannot exist or be thought apart from what precedes and what follows it. Otherwise, it would be like speaking of a mediature which has no extremes, of a 'mediating balance' between no things, of an average of no terms.

Further connotations of the word highlighted in Nicomachus that can be recognised in Aristotle include the idea that a μεσότης is a mixture moderating opposed co-specific qualities. This idea seems to square well with Aristotle's employment of the term in connection with his treatment of physical mixtures in GC II 7. Here, Aristotle states that the way in which mixed bodies result from elements is different from the one characterizing the transmutation of the elements into each other (334b23-29).

> And properly speaking <it is> the elements <that> mutate in this way, whereas flesh and bones and similar things <come

to be> out of these when, becoming the hot cold and the cold hot, they have been brought to the middle term (τὸ μέσον). For in such cases there is none of the two, and yet the middle term is many and not indivisible. Similarly, <it is> according to a *mediating balance* (κατὰ μεσότητα) <that> the dry and the moist and the things of this kind produce flesh and bones and the other things (my transl.).

The idea seems to be that elements are characterized by couples of basic opposite (dry/moist and cold/hot), and their way of resulting from one another postulates the full substitution of one property: to get fire ('dry & hot') from earth ('dry & cold'), 'cold' must be wholly substituted by (as opposed to 'harmonized with' and 'moderated by') 'hot'. Mixtures deriving from the elements do instead result in the way proper of a 'mediating balance', i.e. as a 'moderate' thing which relates by a single peculiar proportion to each of the two extremes.

A further final confirmation of the proposed semantics of μεσότης comes from Aristotle's *Nicomachean Ethics*, where the word is repeatedly employed in connection with the description of virtues of character according to the much discussed and controversial doctrine of the mean. In this context, it is widely assumed that the word expresses the idea that such virtues are states of 'in-betweenness' or 'intermediacy' between two opposite bad states or 'vices'. This practice is in agreement with LSJ's definition, which in connection with Aristotle's theory of virtues suggest the meaning of 'mean state between two extremes'.

Against an unqualified endorsement of the received reading of μεσότης in the doctrine of the mean, there is at least one passage in Aristotle's *Nicomachean Ethics* where the meaning of μεσότης as 'mean state' appears questionable. In 1106b27-28, we find him offering a very puzzling conclusion summing up an argument based on the idea that virtue of

character 'hits the mean' with regard to actions and emotions. According to the proposed meaning of μεσότης, what Aristotle is supposed to say here is that 'virtue is therefore a mean state, as it is able to hit the mean'[31].The logic behind this statement is clearly flawed, as the claim that virtue is a mean state receives no support or explanation from the thesis that virtue is able to determine the 'mean' result (τὸ μέσον). Even if we suppose that the centre of the bull's eye is aptly described as 'mean', why should this imply the 'intermediacy' of the archer's ability to hit the target? The latter statement is all Aristotle can get from the argument he just presented, though, and as long as the argument is expected to support the claim that virtue of character is a 'mean state' it must be flagged as a *non sequitur*.

The proposed revision of the semantics of μεσότης can fix the problem of the apparent a *non sequitur* in the introductive argument for the doctrine of the mean. Aristotle's reasoning becomes sound if we substitute 'mean state' with 'mediating balance' or 'mediature', and read the conclusion existentially and with regard to the operation of finding the mean, rather than as a definition identifying virtue of character with a mean state. In other words, the conclusion Aristotle has in mind here is only that "there is therefore a certain mediating balance, since virtue is able to hit the mean". Read this way, the sentence appears unproblematic: since virtue of character is capable to 'hit the mean' and consistently produce mean results involving a skilful and reasoned balance that keeps bad extremes at bay, there is an activity of 'mediature' or 'mean balancing' which belongs to it. That the conclusion Aristotle is after is in fact, at this stage, the 'existential' statement above (rather than a stronger claim already *identifying* virtue with a mean state)

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[31] μεσότης τις ἄρα ἐστὶν ἡ ἀρετή, στοχαστική γε οὖσα τοῦ μέσου.

is confirmed by the final words in the preparatory argument (1106b28-34). Here, he says that "it is *also* for this reason that while the excess and the deficiency belong to badness, the 'mediature' *belongs to excellence*"[32].

The flexibility granted by the proposed reconstruction of the meaning of μεσότης turns out to be appropriate and advantageous also in the immediately following 'definitional passage'. Here, Aristotle displays some reluctance to *identify* virtue of character with a μεσότης, and prefers to say that it is a state that 'depends upon' a μεσότης[33]. Were μεσότης be already referring to a 'mean state', nothing would have precluded a simple identity between it and the virtuous *hexis*. Aristotle's weaker and more cautious expression does instead show full awareness of what he has grounds to claim so far, namely that virtue of character is defined by the mean results it produces, and thence from a characteristic activity of 'mediature'.

We can therefore reasonably conclude that the flexibility of the word μεσότης, conferred by its being an achievement word denoting whatever (state, activity or concrete thing) performs a 'mediating balance', is fully confirmed and in fact required by Aristotle's use of the word in his argument for the doctrine of the mean.

3.4. *The revised meaning of μεσότης*

Some of the occurrences of μεσότης found in Plato, Aristotle and Nicomachus are irremediably puzzling if we limit our-

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[32] καὶ διὰ ταῦτ' οὖν τῆς μὲν κακίας ἡ ὑπερβολὴ καὶ ἡ ἔλλειψις, τῆς δ' ἀρετῆς ἡ μεσότης.

[33] 1106b36-1107a2: Ἔστιν ἄρα ἡ ἀρετὴ ἕξις προαιρετική, ἐν μεσότητι οὖσα τῇ πρὸς ἡμᾶς, ὡρισμένη λόγῳ καὶ ᾧ ἂν ὁ φρόνιμος ὁρίσειεν. Irwin and Crisp render the relevant words as "a state [...] consisting in a mean"; Rowe as "a disposition [...] depending on intermediacy".

selves to the received understanding of the word offered by the LSJ lexicon. As observed, a different and more flexible meaning of the word proves necessary to make sense of the employment of the word in those authors, thus grounding the claim that μεσότης is an achievement word conveying the meaning of 'mediating balance'. My proposal yields particularly interesting results with regard to Aristotle, as it allows a less problematic reconstruction of his arguments for the eternity of time and for the doctrine of virtue as a Mean. The most important outcome for our purposes, however, is going to be the discovery of novel exegetical possibilities concerning his claim that perception is a μεσότης.

4. A SOLUTION TO THE INTERPRETIVE IMPASSE: PERCEPTION AS A ΜΕΣΟΤΗΣ-LIKE HOMEOSTATIC PROCESS

The revision of the meaning of μεσότης proposed above opens new interpretative possibilities in DA II 11 by making the referent of the claim that αἴσθησις is a 'mediating balance' less obvious than it appeared. In DA II 11, 424a2-5 Aristotle points out that αἴσθησις is like a sort of μεσότης immediately after having rehearsed that perceiving is a certain being affected. As it is typical with 'achievement words', the term μεσότης can denote both concrete and abstract things that are obtaining the relevant achievement, including things and their states as well as activities. If we accept the meaning of 'mediating balance' for μεσότης, then, Aristotle may be describing *either* the condition of what perceives by using αἴσθησις in its meaning of 'sense' or 'sense-organ', *or* the activity of perceiving, thence employing αἴσθησις to mean 'sensation'. A further interpretive possibility is thus gained, according to which perceiving is being theorized as a mediating balance *activity*, with a use

of the word μεσότης similar to the one observed in the introductory argument for the doctrine of the mean in EN II. In other words, μεσότης may be indicating what the organ *does*, rather than what it is.

The 'activity reading' AisthMesot has to be preferred as providing a solution to the interpretive impasse described above. Despite the revised meaning of μεσότης, no progress would be made with regard to the entrenched problems concerning the initial and acquired blind spots BlindSpot and the ABS problem if one reads AisthMesot as a description of the state of the sense-organ as a 'mediating balance' of the opposite properties constituting it. On the other hand, the activity reading of αἴσθησις, coupled with the improved understanding of μεσότης as 'mediating balance', affords a new interpretation of AisthMesot that sheds new light not only on Aristotle's explanation of the blind spot, but also on the vexed question of physiological aspects in his theory of perception.

The described interpretive impasse that current debate leads to can be captured in terms of the following, apparently irresolvable dilemma: *either* the sense-organ's receptive condition must be non-F in order to be *liable to be ordinarily affected* by F, since such an affection is necessary in order to perceive the correspondent perceptible property (G or F); *or* the sense-organ's receptive condition is not determined by its being *liable to be ordinarily affected* by any F, since no ordinary affection is necessary in order to perceive the correspondent perceptible property. If the first horn is embraced, then BlindSpot makes sense, but the ABS problem follows by necessity. On the other hand, by endorsing the second horn one avoids the ABS problem while simultaneously losing the grounds for the blind spot phenomenon.

In fact, it would be mistaken to think that the ABS problem does necessarily follow for *every* reconstruction endors-

ing the first horn of the interpretive dilemma above. What is required to provide secure grounds to BlindSpot is just the liability to ordinary affection, but *not the actual taking place of an ordinary change*. As Burnyeat (1992: 20) notes,

> it is one thing to say that it takes a strong hard hand to appreciate the delicate softness of the hand it is holding, quite another to suggest that the strong hard hand softens as it holds the other, or that a hand which touches the pavement literally becomes itself as hard as concrete

I also believe that Spiritualists turn out to be right in stressing that for Aristotle no literal heating or hardening of the sense-organ is taking place as we sense hardness or heat, and more generally that in his view no ordinary change in the organ's receptive condition is accompanying perception. In my view, however, Aristotle's reason to embrace this idea is that the ABS problem would otherwise follow, and not his commitment to a theory of 'quasi-physical' alterations.

To be sure, the denial of the actual taking place of an ordinary possibility of a physiology of perception based on a homeostatic mechanism secures a chance to reconcile the presence of physical processes taking place in sense-organs during perception with the lack of change in the sense organ's receptive condition. This logically possible hypothesis would also make sense of the blind spot phenomenon described by Aristotle. While liable to be affected by F, a sense-organ may instantaneously react to the incoming affection caused by an F-subject, adjusting its state in order to counter-balance the affection to the effect of preserving its initial state and receptive condition[34].

[34] Among the commentators I am aware of, Tracy (1969) is the one who comes closer to attributing to Aristotle a homeostatic physiology of perception. What he has in mind, however, is different from the instanta-

The reconstruction of the meaning of μεσότης as 'mediating balance' does in my view show that a homeostatic physiology of perception is more than a mere logical possibility, and rather constitutes the meaning of Aristotle's claim that αἴσθησις is a μεσότης. A homeostatic process can indeed be said to be 'like a sort of mediating balance', since it features three magnitudes related by a precise relation, in a way that resembles the terms of a mathematical μεσότης. In the hypothesis of a homeostatic physiology, the sense organ performs, thanks to its perceptual power, a measured adjustment in the intensity of some relevant physical property in the sensory apparatus, which aims at the preservation of the physiological condition of receptivity. As the organ of touch is affected by a warmer object, for instance, a symmetrical measured diminishing of its warmth takes place. Three magnitudes can be identified, which are related in a way that is similar to the one linking together the extreme

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neous 'counterbalancing' process I am entertaining here. In his view, what takes place in sense organs is a literal affection, which is then followed by a recovering of the sense organ's receptive condition. He says (1969: 207) that "if the objective quality is strong enough, the qualitative change which it sets up in the medium evokes a corresponding change in the sense organ, i.e. the organ responds in the direction of that quality in proportion to its intensity. In doing so, the organ becomes like the objective quality, thus taking on the form of the object without its matter". By reference to the perceptual μεσότης of 424a5-7, Tracy adds (*ibid.*) that '[b]ecause the sense is in form a μεσότης, a single equilibrium which responds in one direction or another according to the quality presented and then returns to its original "middle state" when the stimulating cause is removed, the sense organ is capable of "judging" between one quality and another'. It is therefore in this sense that Tracy talks of Aristotle's μεσότης as a dynamic state, which is able to react proportionately to external stimuli (1969: 221-22). A similar hypothesis is dialectally entertained by Magee (2000: 318-19), as he examines the theoretical possibility of a literalist account in which the 'fading' of the literal affection allows the recover of the initial receptive condition. Magee does in fact reject the hypothesis, arguing that such a 'strobic' effect cannot secure the continuity of perceptual awareness if the latter supervenes on the hypothesized literalist physiology.

and medium terms of a mathematical proportion. In the example of perception of heat, the magnitudes constituting the extremes of the perceptual 'μεσότης' are (i) the intensity of warmth the organ would have if it passively suffered the agency of the external agent (were there no counter-affection opposing it) and (ii) the one it would end up possessing were the proportionate adjustment (the decrease of temperature) taking place in the absence of external stimulation. The medium term of the 'mediature' (τὸ μέσον) is thence nothing but the receptive condition of the organ, which is possessed before the stimulation and eventually preserved after it, thanks to the peculiar activity of the sense organ. It is in this sense that Aristotle's μεσότης-like perception, being 'like a sort of mediating balance of the contrariety in the perceptible qualities', is in fact a proportioned 'homeostatic' counterbalancing of an incoming affection being caused by a perceptible object.

Having in mind a μεσότης-like homeostatic physiology of perception, Aristotle can boast the availability of an explanation for the blind spot phenomenon, one that can be confidently held without worrying about generating the problem of acquired blind spots. The receptive condition must be such to allow the liability to an affection from F in order for F to be perceived, in accordance to Aristotle's general theory of similarity and dissimilarity in affections. The μεσότης-like homeostatic physiology is thus entitled to the same explanation of BlindSpot available to literalism: the blind spot is a result of the actual similarity between the organ and the perceptible object. We do not perceive what has our own temperature because no affection—and thence no counter-affection or proportioned active resistance—is possible. In opposition to literalism, however, the μεσότης-like homeostatic physiology also avoids the ABS problem: thanks to the homeostatic counter-affection, the

sense organ that is going to perceive F will not become F while perceiving it. The organ will keep being able to perceive F without acquiring any new blind-spot, and it will also keep perceiving it as long as F is exercising its causal power on it by counterbalancing the incoming affection this actualized power's agency is striving to produce.

In my view, the claim that αἴσθησις is like a certain μεσότης may be Aristotle's description of the physiological aspect of perception. If I am right, such description has been left dormant and neglected for centuries. Its re-discovery can supply a much needed widening of the textual basis on which the controversy between Literalists, Spiritualists and Structuralists has been recently grounded, together with some fresh hope to advance our understanding of what happens, in Aristotle's mind, as I perceive the white screen in front of me and the hard and smooth keys I am typing on.

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