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Aristotle's Theory of Perception

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Declaration

I hereby declare that the present thesis has been composed by me, that the work it contains is my own, and that it has not been submitted for any other degree or professional qualification.

Signature ……

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Abstract

In this work I reconstruct the physical and mental descriptions of perception in Aristotle.

I propose to consider the thesis that αἴσθησις is a μεσότης (DA II 11) as a description of the physiological aspect of perception, meaning that perceiving is a physical act by which the sensory apparatus homeostatically counterbalances, and thence measures, the incoming affection produced by external perceptible objects. The proposal is based on a revision of the semantics of the word *mesotês* in Plato, Aristotle and later Greek mathematicians (mostly Nicomachus of Gerasa). I show how this interpretation fits the text, and how it solves problems that afflict the rival interpretations.

I further develop a 'non-dephysiologizing' spiritualist reading of the additional description of perception as reception of forms without the matter (DA II 12). I show that Aristotle uses the expression 'forms without matter' to describe actually abstracted items in one's mind rather than the way in which the form are received. In opposition to forms-in-matter, such items are causally powerless and metaphysically sterile: an F-without-matter somewhat determines the subject it is in (one's mind content F) without qualifying or identifying it as an F-subject. Thus, we have a second 'mental' description of perception.

Further parts of the thesis are devoted to settle interpretive questions raised by controversial statements about perception found in *De Anima* II 5 and III 2, and to discuss the question of how the mental and physiological descriptions of perception Aristotle offers are related.

My conclusion is that Aristotle's views combines a form of quasi-dualist vitalism about powers (the faculty of perception, and more generally the soul, are not just irreducible to matter, but also primitive and non-supervenient) which is nonetheless compatible with hylomorphism, and a form of epiphenomenalism (and thence the 'bottom-up' determination typical of modern supervenience) with regard to perceptual events (i.e., the activity of perceiving).

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Introduction

The theme of perception is a nexus of fundamental philosophical questions that metaphysics, epistemology and cognitive sciences are still addressing. One may thence be led to expect Aristotle, in his capacities as one of the greatest philosophers of all times, to shed some light on such questions, and look with hope at central texts in *De Anima* and *De Sensu* devoted to the subject. The obscurity and ambiguity of Aristotle's descriptions of perception in those writings, however, are perplexing even for the most confident and capable of his commentators, and their content risks to disappoint the philosophical interest of modern readers.

Despite the number of excellent studies on Aristotle's account of perception, and a lively exegetical debate involving the best scholars in ancient philosophy for the last decades, it is not certain whether and to what extent his views on perception are even comparable with modern ones. To be sure, Aristotle believes that in perceiving we receive information about subjects our sense-organs are interacting with. He would certainly grant that there is some kind of causal interaction going on between your eyes and the black ink printed on the white paper you are looking at, or between our ears and the sound of the solid and smooth keys we touch as we frantically type to meet our deadlines. The presence of physical constraints, and thence the attribution of *some* role to the material properties our sense-organs possess, is a further established fact in Aristotle's theory of perception that no scholar would deny. Beyond this very limited theses, though, there is very little we can take for granted as we attempt to reconstruct Aristotle's views on perception.

It is safe to say that the requirement of physically specialized organs is always coupled in modern views with the belief that the physical structure, composition and state of the organism makes it able to undergo, in its interaction with perceptible stimulations, some *special physical processes* that are co-occurring with, and importantly related to the perceptual experience of those objects. In comparison to this expectation, the role of the assumption concerning organs' specialisation in Aristotle's theory of perception appears puzzling. If one runs through the authoritative exegetical tradition developed by ancient commentators, the 'processes' occurring in Aristotle's sense organs of

perception appear peculiar, and some of their outlandish features suggest that they may not actually be 'physical' by the current understanding of the word.

A first influential step towards the 'de-physiologization' of Aristotle's theory of perception is represented by Alexander of Aphrodisias' own *De Anima*, that theorised a special status in which colours and sounds are present in media and sense organs.[1] In his paraphrasis of Aristotle's *De Anima*, Themistius similarly proposed a distinction between senses based on their different degree of immateriality: while organs of hearing and sight are not affected in an ordinarily material way, the organs and media of taste and touch are.[2] Philoponus added some specifications of his own, arguing that the presence of colours and smells in their respective media is fully 'immaterial', and that this status is aptly described, in Aristotle's words, as a 'reception of forms without the matter'.[3] Such theses were presumably transmitted to Arabic and Latin philosophy by annotation complementing translations of Aristotle's works from the Greek.[4] We then find Averroes theorizing a 'special' status of perceptible forms in media and sense organs, which is somewhat 'in between' the fully material one found in source objects, and the spiritual one characterizing perceiving subjects.[5] Such a doctrine was connected to the notion of '*intentio*' by Avicenna, and later reprised in Latin Scholastic philosophy by Albertus Magnus and Aquinas.[6]

It is nowadays controversial whether the traditional attribution to Aristotle of a de-physiologized account of perception is the result of a distortion or an accurate depiction of his views, and it is accordingly uncertain whether there is any space in his account for genuinely physiological processes.[7] The first question to be answered,

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[1] Sight does not become coloured, and the medium is not changed in the way of an affection (παθητικῶς,) so that neither works as matter for received colours (Alexander of Aphrodisias, *De anima*, p. 62. 1-13 Bruns). Sorabji (1991: 230) further quotes the 'immateriality' of the transmission of sounds in media (*ibid.*, p. 48. 7-21 Bruns).

[2] *In libros Aristotelis De anima paraphrasis* 75. 10-19, 79. 29-37.

[3] *In de anima*, pp. 334. 38-336. 3; 391. 11-29; 392. 3-19; 413. 4; 413. 9-12; 416. 30-34; 432. 32- 433. 11 438. 6-15.

[4] Sorabji, 1991:245-247.

[5] *Epitome of Parva Naturalia,* pp. 29. 15- 30.28; 31. 45-32. 49 Shields-Blumberg (quoted in Sorabji, 1991: 254-255) .

[6] *Avicenna Latinus, Liber de Anima*, vol. I, p. 2, cap. 2, pp. 115.73-116.81; 116.84-7; 118.6-10; (quoted in English translation in Sorabji, 1991:254).

[7] According to Sorabji 1991, on which the brief account sketched above is based, the de-physiologizing tradition did indeed distort Aristotle's views, as the commentators' goal was to offer to the founder of their school a solid and defendable position, rather than to respect the letter of his texts. On the contrary, Burnyeat (1995: 421, note 1) claims that the de-physiologizing accounts they proposed were in fact respondent to Aristotle's original position.

then, is the following: what happens in Aristotle's sense organs as a consequence of the causal interaction between actually perceptible objects and sense organs? The question is important, and not merely for the purpose of tracing back the history of physiology. A reason that contributes to make the question philosophically compelling is that a 'de-physiologized' account of perception would prevent the position of the mind body question in a way that is interesting, or even credible, from the standpoint of modern philosophy.

That Aristotle does in fact propose an incredibly 'de-physiologized' account of perception is the contention of the so-called 'Spiritualist' interpretation. Spiritualists reprise the traditional interpretation to claim that for Aristotle there is no *real* and genuinely *material* process going on in sense-organs. According to this view, perceivers are made of organs and matter primitively endowed with the ability to perceive, and perception consists in the simple, non-further explainable, 'becoming aware' of perceptible aspects. Perception is a change, in this account, only as far as the 'change' we are talking about is the phenomenal 'appearing' of something to a perceiver. In Aristotle's theory, then, no physiological process would be taking place as your eyes run through the sheet you see in front of you (Burnyeat 1992, 1995; Johansen 1998).

Two interpretations rejecting the 'de-physiologized' account of Aristotle's theory or perception have been proposed. A first one, known as 'literalism', contends that Aristotle is committed to the thesis that sense-organs become literally F when perceiving F by causally interacting with an F-object (Sorabji, 1971, 1992, 2001; Everson 1997). A second reconstruction does instead claim that a sense organ undergoes a non-literal assimilation, by which it receives a quantitatively describable 'structural' aspect belonging to the perceived property. On this view, the organ becomes G as it perceives F, and its 'becoming G' has the function of 'codifying' or 'transducing' the quality being perceived (Caston 2004).

It is hard to say which of the three interpretations sketched above is more plausible, for the astonishing divergence between them is not the outcome of capricious dispositions of modern commentators, but rather the result of the unfortunate ambiguity that vexes Aristotle's word on the subject. Some features of his theory often appear to favour one reconstruction over the competing ones, but as soon as some other aspect is taken into account, the initial appearance is suddenly reversed. The explanation Aristotle gives for the existence of a tactile blind spot (in DA II 11), for

instance, appear to make sense only in the frame of a literalist interpretation. This interpretation, however, can only deliver a very unlikely, if not patently absurd explanation of the lack of perception in plants Aristotle proposes in DA II 12, since the latter are literally affected by hot and cold while unable to perceive them. In an attempt to address the difficulties encountered by literalism, one may feel tempted to endorse the idea of a physiology based on non-literal 'codifying' changes, proposed by 'structuralist' interpreters. After all, Aristotle himself repeatedly refers to perception as a 'special' type of affection or alteration. With this regard, the thesis that perception is a 'reception of forms without the matter' has been taken as evidence of a physiology of perception based on 'transductions'. What is lost by embracing this reading, however, is the literalist's ability to make sense of the phenomenon of tactile blind spots. Furthermore, Aristotle's sensoria are made of simple elements (or a simple homogeneous blend of them in the case of touch), and they are thus compositionally identical to bodies that work as mere intermediaries of perceptible qualities. This means that no 'micro-structures' able to perform the required transduction should be conjectured, and that the only effect perceptibles can have on organ through intermediary bodies is the same the latter may produce on a further, materially equivalent intermediary. Shrinking from the difficulties implied by both literalism and structuralism, one may finally give up the hope to find in Aristotle a credible account of perception, and resign to the 'de-physiologizing' tradition of ancient commentators by embracing the sophisticated spiritualist interpretation elaborated by their modern heirs. Such a decision would come at a cost, however. Once again, no acceptable explanation for the phenomenon of tactile blind spots would be available. Furthermore, we would be committed to a view that clashes against Aristotle's thesis concerning the loss of perception by excessively intense stimulation, which requires that perceptibles have some genuinely physical effect on organs during causal interactions that lead to perception (cf. Sisko, 1996).

As long as one is limited to the texts on which the debate between scholars has been conduced so far, no decisive argument is likely going to loom in the foreseeable future, and until this happens it would appear advisable not to commit to any of the three readings currently proposed. Faced with such an impasse, one may even feel tempted to re-consider the idea that Aristotle did not in fact provide anything better than a confused account, already proposed by some commentators before the ongoing

controversy reached the current level of sophistication (cf. Hamlyn, 1959:8-11; Slakey, 1961:480-481).

What I intend to do in this work is more ambitious: I shall contend that Aristotle describes perception as a homeostatic reaction by which sense organs 'counterbalance' (and thus 'measure') the incoming affection of perceptible objects. As I am going to argue, this is the meaning of Aristotle's thesis that 'αἴσθησις is a certain μεσότης' (introduced in DA II 11), which cannot describe – as it is commonly assumed – the state of 'intermediacy' characterizing senses or sense-organs.

In chapter 1, I shall lay the foundations for my proposal by arguing in favour of a revision of the received understanding of the meaning of the Greek word μεσότης, assessing a number of revealing occurrences of the word in Plato, Aristotle and the ancient mathematician Nicomachus of Gerasa. I shall then corroborate (in chapter 2) the attribution of the proposed physiology to Aristotle by tracking textual clues directly or indirectly supporting it. To this end, I shall first of all demonstrate that the rejected standard 'state reading' of the thesis that αἴσθησις is a μεσότης clashes against important difficulties, which are either solved or altogether avoided by the interpretation I offer. This reading will prove to be preferable with regard to the remaining occurrences of μεσότης in conjunction to perception, and perfectly fitting with the idea that perception is a 'special' alteration and affection of a certain kind. Further confirmation of my proposal will be provided by Aristotle's attention to the 'preservative' aspect of perception, which is observable throughout DA II 5-11 and in the comparison between the 'impassivity' of senses and thought in III 4. With this regard, my analysis of DA II 5 (in chapter 5) will show that the admission of the special 'preservative' character of perception, which Aristotle puts forth in analogy with the exercise of knowledge, entails no introduction of 'quasi-physical' changes and affections. My account of the chapter will be rather centred on the assumption that the initial *aporia* about self-perception and self-activation of the sense-organs cannot in fact be solved as easily as commentators commonly believe. In order to give a more complete and fully satisfactory answer to the question, Aristotle distinguishes two possible ways in which the powers of perceiving and knowing can be brought to exercise, thus explaining why sense-organs are in fact able to perceive themselves under certain circumstances, but not as a consequence of ordinary perceiving.

On the grounds of a survey of the occurrences of the clause 'without matter' in Aristotle, I shall then argue that the description of perception as a reception of forms

without the matter refers to its being a 'cognitive' and 'mental' activity, i.e., a 'reception' of metaphysically sterile and causally powerless abstract items (ch. 3). While I believe that Aristotle's formula entails the idea of receiving F without standing to F as matter, and thus without becoming F (a claim diversely endorsed by transductionist and spiritualist interpreters), I shall argue that this is not the most accurate reading of the phrase. Aristotle is committed to something more robust than a denial of literal or genuinely physical changes, and his words suggest that being receptive of perceptible forms without matter is sufficient for being a sense organ. In chapter 3, I shall accordingly address the apparent contradiction between the latter claim and the famous simile of the signet ring sealing a wax block contained in the passage. I shall propose that the comparison Aristotle puts forth is a 'signature simile', rather than as a 'wax simile', as he could have never intended to attribute to wax blocks the power to receive forms without the matter .

A final interpretive question I shall try to settle concerns Aristotle's treatment of the activity of perceiving that we see and hear (ch. 4), which has been hailed by some scholars as introducing a certain type of awareness, supposedly intrinsic to every act of perception. This interpretation has the considerable merit of providing a working explanation of the controversial regress argument Aristotle offers with that regard in DA III 2, but as I shall argue an alternative reading is possible, according to which the argument works without requiring any notion of 'intrinsic' perceptual awareness. In my view, the passage is rather introducing a perceptual power responsible for the cognition of a perceptible F without a causal interaction with an F-subject, which secures the possibility to manipulate and combine first-order perceptual contents.

At the end of the planned investigation, Aristotle's treatment of perception will emerge as a fully credible account satisfyingly attentive to both its 'mental' and 'physical' aspects. On the other hand, an accurate analysis of his views will lead to some disappointing results with regard to the relation he establishes between perceptual powers and sense organs, which appears to suggest be some sort of quasi-dualist vitalism. Under the latter respect, Aristotle's account will indeed sound less than exciting, if not altogether incredible by modern standards.

Chapter 1 - The blind spot phenomenon and the thesis that Αἴσθησις is a Μεσότης (DA II 11)

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.[8] 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 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.

In this chapter 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.

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[8] Despite the important differences among scholars in the interpretation of the implications of the passage, the endorsement of this basic claim is widespread (cf. Hicks, p. 414; Hamlyn 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)

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

1. The interpretive impasse about the blind spot 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, cf. 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, cf. 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, cf. 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.[9]

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

[9] Sorabji 1992:214-215: '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 organ becomes aware of temperature'. Cf. Cohen 1992:66 and Everson 1997:84-85, Scaltsas 1996:34.

underwent because of the coloured source object (e.g., a red tomato).[10] Spiritualists claim that Aristotle has good reasons to account for such 'alterations' by the same theories exposed in GC and Physics.[11] Such quasi-physical alteration requires certain physical conditions.[12] 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.[13] 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 (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 BlindSpot is offered by Johansen (1998:216-217), 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 (Caston 2005:287-288), 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 (cf. again διό, 424a2), based on the assumption that '[t]he organ's material

[10] Burnyeat, 1995:428-431; 2002:74-76. Johansen, 1998:124-147.
[11] Cf. 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).
[12] Burnyeat, 1995:423-426. Johansen 1998:10-20.
[13] Cf. Sisko's (1998:340-341) criticism of Everson's arguments against Spiritualism.

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.[14] 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.[15]

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.[16] Literalism is clearly unable to deal with the ABS problem,

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[14] Cf. 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: 221-228); Lear (1988: 110-16); Silverman (1989:273-280); Price (1996:294-300); Bradshaw (1997: 151-156); Scaltsas (1996:28-29); Miller (1999:191); Polanski (2007:349); Shields (2007:293-298).

[15] The view is supported by Slakey (1961:473-474), Sorabji (1974:71-72; 1992:209-210) Everson (1997:10-11).

[16] Cf. Magee (2000:318), who notes (by indicating as alteration$_1$ the acquisition of a property implying the loss of a preceding contrary one) that '[w]hat is altered$_1$ is in potency to what it will become, but in so altering$_1$, it thereby loses that potency to be altered$_1$. That is, once it is altered$_1$, it cannot then be altered$_1$ again with respect to the same quality. This is the definition of alteration$_1$. If, however, sense organs were to be altered$_1$ in perception, they would then lose their capacity to be altered again'). Cf. 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

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'.[17] 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 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.[18] 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

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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 (cf. note 41 below).

[17] A similar account of BlindSpot is offered by Bradshaw (1997:146-147).

[18] 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 (a problem I shall deal with in the next chapter).

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 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.[19]

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.

2. On the meaning of the word μεσότης

2.1. 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.

[19] 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.

The impression we may get by looking at the earliest occurrences of μεσότης in Greek writings is that the word might be of Platonic and Academic origin. While, according 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 geometric 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.[20]

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)[21]. The mathematical meaning of 'mean' follows, quoting Plato's *Timaeus* 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 (cf. 431a11) are therefore classified as attesting 'medium, communicating between two opposites' and *Meteor*. 382a 19, 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.

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[20] Cf. Tracy (1969:344-346) 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 (cf. Huffman, 2005:179-181). 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* (cf. 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 [cf. Huffman, 2005:170]).

[21] 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 inscription in Eleusis of the age of Augustus. I shall return to both passages later.

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 399b 34).[22] 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

> houses, as we said, both all around in circle and as μεσότητας of both the countryside and the city[23] (my translation).

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'.[24] 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.[25]

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[22] Cf. *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).

[23] 746a6-7: ἔτι δὲ χώρας τε καὶ ἄστεος, ὡς εἴρηκεν, μεσότητάς τε καὶ ἐν κύκλῳ οἰκήσεις πάντῃ.

[24] 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').

[25] First, the legislator must locate the centre of the country and place the city therein (745b 3-4: 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

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 distances 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.[26] Both the uses of μεσότης referring to the whole proportion (ἀναλογία) and to the mean term (τὸ μέσον) only, which I shall indicate by μεσότης$^{\alpha}$ and μεσότης$^{\mu}$ respectively, are clearly observable in Nicomachus' *Introduction to Arithmetic* (I-II AD)[27]. In II 22, 1, Nicomachus introduces ten different types of 'progressions' or 'proportions' (ἀναλογίαι), attributing the knowledge of the first three (the arithmetic,

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advantage and disadvantage due to living at different distances from the city centre (c6-d2: τὸ πρὸς τῇ πόλει μέρος τῷ πρὸς τοῖς ἐσχάτοις εἶς 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).

[26] This usage is clearly reconstructed by Tracy (1969:344-346).

[27] 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 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).

geometric and harmonic) to Pythagoras, Plato and Aristotle. The word employed at the beginning of this section is ἀναλογία, but very soon (line 6) the term μεσότης is used as well, in relation to the fourth, fifth and sixth type of progressions. This suggests that μεσότης$^{\alpha}$ 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 μεσότης$^{\alpha}$ and ἀναλογία are interchangeable, that we consistently find μεσότης$^{\alpha}$ rendered with the same word used for ἀναλογία (i.e. 'proportion') in D'Ooge translation.[28]

The ability of μεσότης to denote a 'progression' is confirmed by Pappus of Alexandria's *Collectio* (III-IV A.D.). Already 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 (cf. III 68, 24-25), specifying that one is such 'in a geometric ἀναλογία' while another 'in the arithmetic μεσότης ' (III 68, 26-28). In III 70 - 72, we have the same clarification 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 (cf. 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 μεσότης$^{\alpha}$ as '*medietas*'[29].

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

[28] Cf. 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.

[29] In III 78-80 the mean term is qualified again as μέση, whereas the μεσότης consists in the three related terms together (cf. 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, cf. the explicit mention of the three terms of the μεσότητες at 80, 8). Cf. also III 82, 6-8; 19-20.

> 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 μεσότης^{α} 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 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[30] (my translation)

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[31]. 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

[30] 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 μετάστασίν

[31] 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 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.

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^{α}).[32] 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 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.

[32] 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'.

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*[33]. On the basis of this combination of shared and unshared properties, this class is said to be a mixture (μῖγμα) of the other two (cf. 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.[34] The recurrence of the logos characterizing the proportion 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'.

[33] 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'.

[34] 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 (cf. II 24, 1 and 23, 4) and any of the other types according to the peculiar relation among their own terms.

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.[35]

[35] 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 (the use of

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 ϕ-ing as well as the result fulfilled by ϕ-ing. An illuminating example in this direction is the English word 'division', which means both the action of dividing and its 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.

2.3. 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, cf. supra). 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, 43d 6). 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

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analogy to argue for the peculiar unity of being in Aristotle's Metaph. IV is exemplar in this sense).

> 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 (251b 19-28), 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[36] (transl. by Graham, modified)

[36] 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.

With regard to such use, LSJ proposes an extension of the spatial meaning of 'central position'.[37] 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 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

[37] 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, 1951:440-441), 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'. Cf. also Plato, *Laws*, IV, 715e7-716a1. On the work ascribed to Ocellus called *De universi natura* as a late Hellenistic forgery, cf. Freeman (1948:81), and Kahn (2001:79).

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'.[38] 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

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

'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) 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*'.[39]

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[40]. 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

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

[40] 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'.

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.

2.4. The revised meaning of μεσότης

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

3. A solution to the interpretive impasse: perception as a μεσότης-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 endorsing 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 change in the sense-organ does not entail, nor suggest, the presence of 'quasi-physical' changes: the logical

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.[41]

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 and medium terms of a mathematical proportion. In the example of perception of heat, the

[41] 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 instantaneous '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 (2000:318-319), 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.

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. Further

support for such an important and bold proposal is certainly needed, and other advantages of it can be demonstrated. It is to this task that I shall turn in the next chapter.

Chapter 2 - The homeostatic physiology of perceptual activities

According to the revised definition of μεσότης I proposed earlier, the Greek word is in itself neutral with regard to whether the denoted 'mediating balance' is a state or activity. In this regard, the manoeuvre by which I embrace an 'activity reading' of the claim that αἴσθησις is a μεσότης at the end of last chapter may appear too hasty, and overly confident. In fact, I myself believe that in comparison to the bold novelty of the proposal, the thinness of the merely logical reasoning by which I preferred it to the traditional 'state' reading is inadequate: after all, how can we be sure that the claimed ability to solve the interpretive impasse on the subject – the clue for this reading so far – is not the result of a misleading reasoning that never crossed Aristotle's mind?

In this section of the work, I shall consolidate the reconstruction of Aristotle's physiology of perception I sketched at the end of last chapter, by offering further textual and logical evidence in its favour. Further confirmation for my reading will be provided by considering a series of difficulties the standard 'state reading' of AisthMesot has to face in DA II 11, which can be solved or altogether avoided by the activity reading I offered. I shall then survey the remaining occurrences of μεσότης in conjunction with perception in Aristotle's corpus, in order to show that all but one has to be understood as referring to the homeostatic physiological activity I described. The only exception is constituted by a passage in *Meteorologica*, which is at any rate perfectly compatible with the reconstruction I elaborate. In the remainder of the chapter, I shall examine several details of Aristotle's theory of perception that become perfectly understandable thanks to the new light my interpretation can shed on them. Among the aspects I shall consider, Aristotle's claim that perception is an alteration of a 'certain kind' will be particularly revealing. Further important confirmations will then come from Aristotle's employment of the μεσότης-like physiology to account for an ample variety of perceptual phenomena, including images, illusions, distortions and feelings of pleasure and pain. Finally, I shall address the question of the role of media in the causal interaction between perceptible source objects and sense-organs,

and show that, in spite of a *prima* facie appearance, the interpretation I propose can indeed supply a satisfying explanation of this feature of Aristotle's theory.

1. Against the standard State reading of AisthMesot in DA II 11: consolidation of my proposal

The support I gave so far for my reading of AisthMesot in DA II 11 is admittedly scant in comparison to the embarrassing boldness needed to discard the reputable traditional reading, which remains valid even accepting my revision of the definition of the word μεσότης. Several more reasons to prefer an activity reading to the traditional 'state' reading exist, however, which are fully independent from the need to provide a solution to the interpretive impasse concerning BlindSpot and the ABS problem. The activity reading of AisthMesot in DA II 11 does in fact avoid several other problems that can be raised against the 'state' reading, including the impossibility to respect the meaning of the word μεσότης in both the traditional or revised understanding of it, and the difficulty of accounting for the explanatory relation Aristotle establishes between AisthMesot and BlindSpot.

In DA II 11 (423b27-424a10), Aristotle builds a complex series of explanatory relations: perception is a certain affection, in which 'the agent makes that one such as itself is in actuality, as <that one> is in potentiality' (424a1-2). Having said this, Aristotle states that on the assumption of AisthMesot we explain BlindSpot. A further explanatory claim is made with regard to perceptual discrimination itself: it is 'because (or by means) of' (διὰ τοῦτο) the fact that αἴσθησις is a μεσότης that one discriminates perceptible aspects, thanks to the ability of the medium term to become both the opposite perceptible qualities, like black and white or hot and cold (424a6-10). AisthMesot, then, explains at the same time why we perceive, and why we are subject to the blind spot phenomenon described above.

The idea that AisthMesot refers to an intermediate blend of tangible properties characterizing the organ of touch fits badly with the double explanatory role Aristotle assigns to the thesis in DA II 11. While there must be some explanatory role AisthMesot is playing here with regard to BlindSpot, the supposed intermediacy of the elemental constitution of the sense-organ of touch cannot be the reason why we are

blind to certain tangible properties.[42] On the assumption that perception is an affection, the mere invocation of the involved requirement about dissimilarity and potentiality (the patient must be potentially F in order to be affected by F), in conjunction with the idea that no body deprived of tangible properties exists, is sufficient to explain the phenomenon. In other words, it is not because of the physical condition of 'intermediacy' of the sense organ that we are blind to the same degree of temperature our own sense organ possesses. Thus, the explanatory function of AisthMesot with regard to BlindSpot is not immediately clear in the frame of the traditional 'state reading'.

An attempt at clarifying the explanatory function of AisthMesot along the lines of a 'state reading' is made by Sorabji (1992:215), who speaks of an inference to the best explanation with regard to the common sense observation that while we are blind to our own temperature, we are sensitive to degrees which are different in two opposite ways (as colder or hotter), rather than in just one way (e.g., just to what is colder). In Sorabji's view, this 'suggests that sense is as it were a sort of mid-point between opposites in perceptibles'. If we accept this suggestion, Aristotle's claim seems to be that the principles concerning the sense-organ's liability to affections by tangible properties are supplemented by a consideration about the 'bi-directionality' relative to couples of extremes defining the range of perceptible objects. If we consider that Aristotle's point must be about the sense-organ (for he is explaining the blind spot phenomenon), the reasoning leading to both AisthMesot and BlindSpot would then be built on the following premisses:

1. perception is affection
2. in order to be affected by some perceptible F, a sense-organs must be actually non-F but potentially F
3. Being a body, the sense organ must be characterized by some F tangible quality (tangible qualities are properties of bodies qua bodies: no body deprived of tangible properties exists)
4. Senses are 'bi-directionally' relative to couples of extremes defining the range of their perceptible objects

The conclusion would be that the sense-organ of touch is an 'intermediate' blend of tangible properties which is blind to what possesses such properties in the same

[42] As Burnyeat (1995:422-423) notes, Aristotle's analysis of the physical constitution of sense-organs does not justify a less literal interpretation of the 'intermediacy' as an allusion to some special 'micro-structure'.

'intermediate' degree. If this reconstruction is right, though, the argument should be valid for touch only, since neither AisthMesot nor BlindSpot should follow without reference to the peculiarities of tangible properties (premises 3). Yet, Aristotle does in fact extend AisthMesot to *all* senses some lines below (424a7-10)

> (…) αἴσθησις is a certain μεσότης of the opposition in the perceptible items, and for this reason it discriminate the perceptible items. The reason is that what is in the middle is able to discern, for it becomes the other relatively to either extreme, and it must be actually neither but potentially both, in the same way as what is to perceive white and black, so with regard to all the other sense-organs. And with regard to the organ of touch, it must be neither hot nor cold (my transl.)

The apparent extension of AisthMesot to all senses is problematic for the 'state reading' reconstruction of Aristotle's argument sketched above. His reasoning goes roughly along the following lines: we have BlindSpot in the case of touch, *on the assumption that* touch, as all the other senses, abides by AisthMesot. If the 'state reading' reconstruction were right, however, one would expect Aristotle to say something like 'in the case of touch we have BlindSpot, and since all sense-organs perceive a bipolarized range of perceptible qualities, we also have a further peculiarity of touch, namely AisthMesot'.

The problem the state reading of AisthMesot incurs in can be expressed by the following dilemma: *either* AisthMesot is not grounded on the peculiar nature of tangible properties (cf. premise 3 above), and thence applicable to all senses *regardless of* BlindSpot, against the explanatory relations Aristotle poses; *or* AisthMesot is founded on the peculiarity of what is tangible and thence limited to touch in the same way as BlindSpot, against Aristotle's extension of AisthMesot to all senses. In other words, on the state reading of AisthMesot one cannot save both the extension of AisthMesot to all senses and the explanatory relations posed in the passage, without attributing to Aristotle an unclear and possibly mistaken argument. The only viable state reading seems to consist in denying that Aristotle is in fact extending AisthMesot to all senses, by assuming, with a rather stretched interpretation, that the final sentences in 424a7-10 focus on the fact that the organ is actually neither of the two extremes in the range of its perceptible objects.

A further difficulty concerning the extension of AisthMesot can be raised, in consideration of the fact that the idea on which the standard 'state reading' is grounded – that is, that the sense-organ is an 'intermediate' blend of perceptible properties it perceives – cannot in fact be applicable to senses other than touch. While

the claim that the sense organ of touch has a mean temperature and consistency appears plausible, it hardly makes sense for Aristotle to extend a similar idea to sight and hearing, whose sense-organs are not for him characterized by an 'intermediate' blend of opposite audible and visible properties. In fact, the organ of hearing is made of air housed inside the ears, that stands still deprived of the 'movements' sounds consist in (DA II 8, 420a 3-11; 419b5-24). Similarly, the organ of sight is the 'jelly' inside the ocular bulb, which is transparent in potentiality (i.e. in a state of darkness) and thus receptive of light (DA II 7, 418b4-13, b27-31; *Sens*. 2, 438a13-24, b7-15 [especially b8-11]). In both cases, the physical condition that makes sense-organs liable to be affected by the relevant perceptible properties is a state of deprivation of such properties, rather than a state of 'intermediacy' between them.

Aristotle's view is more difficult to assess for the organs of smell and taste, but a description of them as 'intermediate' blends of perceptible qualities seems equally unlikely. The sense organ of smell, located inside the nostrils (HA I 15, 494b12; DA II 9, 421b16, GA V 2, 781b7-10), is said to be potentially dry (DA II 9, 422a6-7) and fiery, and potentially like odours it perceives. The latter are themselves described as fiery 'smoke-like evaporations' (*Sens*. 2 439a20-25; more precisely, they are due to the special 'washing' of sapid dry in the moist, cf. *Sens*. 5, 442b27-443b16, cf. DA II 7, 419a32-b1).[43] Aristotle's point may therefore be that the 'fiery' air is what both the medium and the organ are made of, the difference being the presence of the effect of the warmer 'sapid' dry in the medium. Something analogous can be said, with regard to the point I am interested in here, in the case of taste. The latter's objects are importantly connected with the same 'nutritive sapid dry' type of property at the base of smells (DA III 12, 434b21-22, *Sens*. 4, 441b15-442a12). In the case of tastes, however, the moist bodies that 'activate' the perceptibility of source properties do not work as media. In fact, moisture works as an ingredient of the actual taste, and not as its transmitting 'host', since tastes are moist solutions of relevant dry substances (DA II 10, 422a8- 17). Despite this peculiarity nothing rules out that, by analogy with the other senses, the receiving sense organ must be deprived of perceptible properties that have to be received (cf. 422b15-16). The requirement is actually suggested by the

[43] It is worth noting that in DA III 1, 425a5 Aristotle gives reasons for the claim that the organ of smell is either air or water (cf. Johansen, 209-10). There needs to be no contradiction with DA III 1's reasons for concluding that the organ of smell is made of either air or water (*pace* Johansen, 1997:209-10), if 'fire' is understood according to the use of *Meteorologica* (I 3, 340b22, II 2, 354b25; cf. also I 4, 341b19 and 8, 345b33), that is as a wet -liquid or gaseous- flammable combustible.

impairment due to an actual flavouring undergone by the tongue Aristotle recognizes (422b6-10).[44]

As the above survey about the physical constitution of sense-organs shows, AisthMesot should *not* apply to them if the thesis aims at describing the condition of physical intermediacy resulting from a blend of extremes in the relevant range of perceptible qualities. The only way to avoid such a difficulty would be then, once again, to adopt an unnatural reading of the finale of DA II 11, according to which what is extended to all sense organs is not AisthMesot, but rather the requirement of being potentially both the extremes.

No restrictive reading of the end of DA II 11 can avoid a further difficulty concerning the applicability of the standard 'state reading' of AisthMesot to touch itself, though. As Sorabji (1992:222) himself notes, the idea that the sense-organ of touch is an 'intermediate' blend of perceptible properties is in fact problematic. According to Aristotle, the sense-organ of touch is not located in the superficial flesh, but rather resides in the central cardiac area. For this reason, the idea of the sense organ of touch being a 'mean' conflicts with the characterization of the heart as hot and in need of refrigeration in *Parva Naturalia* (cf. *Juv.*, 469b6-20; *Resp*. 474a25-26; 478a11-25).

A final difficulty for the traditional 'state reading' of AisthMesot is conditional upon the acceptance of the revised definition of μεσότης I proposed in last chapter. As I argued, the word denotes a 'mediating balance' of extremes according to a defined logical relation or proportion. The term Aristotle decides to employ, then, does not merely indicate *any* quantity or point laying between two extremes, but rather one precisely fixed abiding by the relevant relation rule or proportion (*logos*). In a μεσότης, the same logos (usually a proportion between quantities) must occur between, on the one hand, the lesser extreme and the mean, and on the other hand the mean and the greater extreme (more on this later). Once we assume that the standard reading commits Aristotle to a 'mid-point' which is exactly defined by a *logos*, the inference to the best explanation suggested by Sorabji disappear. If the phenomena to

[44] This is sufficient to explain why neither an excessively moist tongue nor a dry one can perceive (DA II 10 422a34-b6), for in both cases some condition for the actual exercise of the perceptible incoming affection is missing. A flavour has no power on a dry body that remains dry, since a relevant dry object only becomes flavoured when dissolved in (and mixed with) a moist one (422a17-19); on the other hand, the actual existence of taste is also conditional on the proportional amount of moist matter to be flavoured. The latter should not be excessive: a pinch of salt dissolved in the whole volume of Loch Ness' freshwater would not make it salty (cf. *Sens*. 6, 446a7-10).

be accounted are the bi-directional distribution of the range of perceptible objects and the existence of a blind spot, the commitment to a precise and restrictive 'mean' looks unnecessary and gratuitous. The consequence of a blind spot does in fact follow for *any* tangible F property (e.g., any degree of hot/cold) including those at the extremes of the perceptible range, and not just for 'intermediate' properties. Similarly, any tangible property roughly falling in the middle of the perceptible range would adequately account for the bi-directionality of perception. As far as the rationale for such phenomena is concerned, AisthMesot would be clearly supererogatory.

None of the difficulties the state reading has to face in DA II 11 affects the activity reading I propose. To begin with the latter, it is clear that if the perceptual μεσότης is a physiological activity of homeostatic 'counterbalancing', a precise proportion between the intensity of the incoming affection and the internal one opposing it has to be secured. The precise *logos* entailed by the meaning of μεσότης in light of the revised definition of the word I offered is therefore perfectly sound.

With regard to the difficulties in the application of AisthMesot to touch and the other senses, it is evident that they only raise under the assumption that the thesis is an absolute description of the constitution of the sense-organ, which depicts them as 'intermediate' mixtures of relevant perceptible properties. According to my view, however, Aristotle's point is rather that sense-organs undergo a 'μεσότης-like' homeostatic process. For this reason, the organ of touch must be able to become 'colder and warmer' in so far as it is required to increase its thermal intensity when affected by what is colder, thus discriminating its coldness without actually becoming colder as it preserves its state by a homeostatic adjustment. The non-intermediate physical state of the heart described in *Parva Naturalia* constitutes no real difficulty, then. If the state of the organ is described as a 'mean' with regard to its being the result of such an operation, DA II 11 needs to entail no discrepancy with the theory of a 'hot' heart in need of refrigeration: a hot and moist sense-organ can be described as a 'mediating balance' without being a lukewarm intermediate mixture of cold an hot, if by this one means that such a state results from a homeostatic counter-balance, i.e. by the reciprocal opposition of heating and cooling, or drying and moistening processes. For the same reason, the extension of AisthMesot to the other senses, and even the description of each organ as a 'mean', is not at all problematic once the μεσότης-like homeostatic physiology I propose is accepted.

Aristotle's principal point in introducing AisthMesot in DA II 11 remains that the blind spot of touch must be explained on the assumption that the act of touch is, as the perceiving acts of the other four senses, a μεσότης-like homeostatic counterbalance.[45] Were no homeostatic counterbalance taking place, we would in fact have to admit that as soon as the organ is affected by losing its receptive condition, a new blind spot is acquired (what I called the 'ABS problem', cf. ch. 1), or surrender to the lack of explanation for the commonly recognizable phenomenon of a tactile blind spot.[46]

In my account, it is because of its role as the 'middle' term of the perceptual μεσότης that the condition of the sense organ can be described as a mean. In order to perform such a role the organ must be capable of changing in two opposite directions at the same time, since this is required to adjust its state and prevent the loss of its receptive condition. This is the reason why Aristotle says that the 'medium term' of the perceptual 'mediature' is able to discriminate because 'it becomes the opposite extreme in respect of each of the perceptible items' (424a6-7: γίνεται γὰρ πρὸς ἑκάτερον αὐτῶν θάτερον τῶν ἄκρων), adding that for this reason what is going to perceive two opposite qualities must be none of them in actuality, but both of them in potentiality.[47]In order to perceive white (or hot), the organ is potentially not just white (or hot), but rather *both* black and white (or hot and cold), because the homeostatic process requires it to be subject to symmetric affections of different sign. This explains why the organs of sight and hearing, although deprived of visible and audible properties, and thence unsuitable to be described as an intermediate blend of them, are nonetheless declared to be 'intermediate': once again, they are such since in the homeostatic μεσότης-like process the preserved receptive condition plays the role of the 'mean' term.

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[45] The remark is expressed by ὡς plus absolute genitive (ὡς … τῆς αἰσθήσεως οὔσης). The construction may be understood as expression of an assumption or belief of the speaker (which one can render by a simple participle as 'αἴσθησις being like a certain μεσότης', or by the phrase 'in the belief that' (cf. Smyth 1920: 464, 473).

[46] As Burnyeat (1992: 21 note 3) notes quoting Theophrastus, the idea of a blind spot is a received *endoxon*.

[47] Sorabji (1992:215) rightly insists that the literalist makes here better sense than Structuralist views proposing a physiology of 'codifying' alterations, for the final statement that the organ must be potentially F 'cannot be brushed aside as if it were the merely negative point that the thing must not be actually black or white. It means more to say that it is potentially these' (Caston's caution [2005: 286 with note 88] suggests that he might be ready to accept Sorabji's point with regard to touch in light of BlindSpot). The homeostatic physiology I propose squares with these sentences as effectively as Literalism.

2. Perception as a μεσότης in the discrimination of hard and soft

The reading of AisthMesot I propose does not imply, nor aims at denying, the possibility for the organ of touch to be an 'intermediate' blend of certain tangible properties, even though this not the case with regard to its temperature (the organ in the heart is rather hot, and in need of refrigeration according to *Parva Naturalia*). What Aristotle says in *Meteor*. IV (382a 16-382a21) does in fact entail that the sense-organ of touch has an intermediate consistency, and in the same passage he also speaks of employing the sense of touch as a mediating balance of hard and soft (ὡς μεσότητι χρώμενοι τῇ ἁφῇ). He says that:

> Hard and soft are not determinable relatively to one another, because it is a matter of <one> being <hard and soft> more or less <than the other>. However, since all perceptibles are discriminated with regard to perception, it is clear that we delimitate the hard and the soft in an absolute way with regard to touch, as we employ touch as a mediating balance. So we call that which exceeds it hard and that which falls short of it soft (my transl.)

In the immediately preceding passage (382a8-13), hard and soft have been defined by reference to the behaviour of bodies under pressure: hardness is defined as the inclination of a body to yield into itself; vice versa, bodies that do yield into themselves without a reciprocal repositioning of their parts are soft (382a12-13: μαλακὸν δὲ τὸ ὑπεῖκον τῷ μὴ ἀντιπεριίστασθαι). As Aristotle clarifies, according to this definition things can be hard or soft in either an absolute or relative manner. Things are relatively hard or soft by comparison to each other, while they are absolutely such by comparison to touch. With regard to this, he claims that all perceptibles are discriminated by reference to perception, and absolute hardness and softness are accordingly established by reference to the sense of touch, as we make use of it as a 'mediating balance'.

The employment of the sense-organ as a μεσότης does not affect my argument about the physiology of perception Aristotle theorizes. The process by which we perceive is a μεσότης-like homeostasis, in which the condition of the organ plays the role of the medium term (cf. DA II 11, 426a6-10).[48] The only difference between DA II 11 and

[48] As I already recognized in Ch.1, Aristotle describes the persisting condition of the sense organ as the medium term (*τὸ μέσον*) of the perceptual μεσότης as he explains that in the case of perception 'what is in the middle is able to discern, for it becomes the other relatively to either extreme'. The latter phrase does in fact refer to the sense-organ's preserved receptive condition that, in so far as resulting from the encounter of the incoming affection and the homeostatic counterbalancing, is analogous to the medium term of a 'mediature'.

Meteor. IV 2 is merely linguistic: the former states that the organ is the medium term (τὸ μέσον) of the perceptual μεσότης, while the latter makes the same point by calling it a 'mediating balance' (μεσότης). In light of the use of the latter word to denote the 'medium term' in a proportion observed in the works of Greek mathematicians, the statement in *Meteorologica* is all but perplexing.

What *Meteorologica* adds is that in the case of touch the consistency of the organ does also work as the standard for determining the hardness and softness of perceived objects. For this reason, it is right – in fact, tautological – to say that the organ's consistency is intermediate in comparison to what is hard and soft.[49] The thesis about the standard consistency of the organ of touch, however, is in my view independent from the one about its being employed as a 'mediating balance', and none of the two raises any difficulty against my proposal.

It is worth noting that perception of hard and soft can be handled as comfortably as those of hot and cold in the frame of the μεσότης-like homeostatic physiology I am proposing. Peripheral flesh that is directly in contact with external objects works as the medium for both couples of tangible properties: in the same way as heating and cooling affections take place on skin and peripheral 'layers' of flesh as ordinary changes (perception of coldness and heat consists in the homeostatic process, but this is taking place internally), the effect a hard object has on superficial flesh is the same the object would have on a softer inanimate object. Being soft, the patient does in both cases yield into itself without reciprocal repositioning of its parts (cf. *Meteor*. IV 2). If, as Aristotle seems to believe (DA III 12, 433 b-435a10), the media of perception are able to transmit the affection of the perceptible source object by working 'as one', the yielding of superficial flesh will produce the propagation of the original affection, in a way similar to what happens by pushing your face against a pin-art mould.

According to the homeostatic 'μεσότης-like' physiology, internal flesh will then absorb the affection, in order for the 'pressing' affection not to be transmitted to the heart.[50] It

[49] The two claims should not be conflated though: the organ is used as the middle term of a 'perceptual' proportion, and since the word μεσότης ('mediating balance') can refer to both the middle term and the whole proportion, saying that we use the organ as a μεσότης is not problematic. The idea that the consistency of the sense-organ of touch is 'intermediate' is an altogether different, which is a consequence of the fact that we determine hard and soft by perception.

[50] The preservation of its internal condition is fundamental. As MA 7 shows, little changes in the conditions of the heart have macroscopic effects in the whole body. More drastic changes affecting its receptivity would cause the death of the animal cf. DA III 13, 435b4-19. This account fits perfectly with Aristotle's comparison of touch to perceiving by a

is important to keep in mind that no material difference between superficial and internal flesh is postulated, though. As a consequence, the absorption of the outer flesh's affection by the inner one cannot be like that of a wall absorbing a punch. The solution my interpretation can offer is that internal flesh will 'homeostatically' soften up in a way that is symmetrical to the pressure being exercised by external flesh. The process can be imagined as that of a second pin-art mould whose pins are still made of the same metal, while 'dynamically' able to soften up to counterbalance the 'pushing affection' coming from the first adjacent mould, externally affected by a hard object. When superficial flesh working as a medium yields under the pressure of a hard object, then, the 'sensitive' inner flesh reacts by a counterbalancing softening.[51]

3. Perceptual μεσότης and the lack of perception in plants

A further passage in which perception is associated with the notion of μεσότης occurs some lines after the end of DA II 11, where Aristotle accounts for the lack of perception in plants. Here, we read that

> [w]hat perceives is, of course, a spatial magnitude, but we must not admit that either the having of the power to perceive or the sense itself is a magnitude; what they are is a certain form or power in a magnitude. (…). This explains also why plants cannot perceive, in spite of their having a portion of soul in them and being affected by tangible objects themselves. For are warmed up or cooled down, on account of the fact that they have no mediating balance (DA II 12, 424a26-28, a32-b1, Revised Oxford Transaltion [ROT, from now on] modified)

The activity reading of μεσότης retains a clear advantage in the above passage: plants do not have any 'mediating balance' exactly because they are literally affected by heat and cold, while sense-organs oppose a counter-balancing μεσότης like homeostatic reaction to the incoming affection, thus preserving their receptive condition. The use of the word μεσότης understood along the lines of the 'state' reading, on the other hand, clashes against the difficulties we already observed, and it is not capable of explaining the lack of perception in plants. A 'state' reading must invoke the supposedly missing 'intermediacy' in the physical constitution of plants, or to the lack of some special state Aristotle is supposed to describe as a μεσότης, and both the

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shield. A shield is physically affected while it makes the unaffected warrior behind it 'feel' the blow (DA II 11, 423b12-17).

[51] The point at which the counterbalancing takes place is likely to be, in Aristotle's mind, the locus where perception should be deemed to occur. The difficulty Aristotle may have found in committing to a precise localization of this part of the body may be the reason for his uncertain stance with regard to the status of flesh as either of the sense-organ or medium of touch in DA II 11.

hypotheses clash against Aristotle's description of the sense-organs (the only exception being the consistency of the organ of touch). Furthermore, in the frame of spiritualist and structuralist interpretations even the supposed intermediacy of the physical constitution of the organ would hardly explain why plants cannot perceive, since (as clarified in Ch. 1) the lack of perception was equally unable to explain the lack of perception related to the blind spot of touch in DA II 11. On the other hand, the literalist's contention that the lack of intermediacy impedes ordinary heating or cooling is too implausible to be accepted. Plants can be heated or cooled by the sun in the same way as people laying on a beach.[52]

The later occurrence of μεσότης reprising the topic in DA III 13 (435a10-b3) can be shown to support a similar activity reading. Aristotle clarifies that plants lack perception because no subject having a simple body, be it made of earth or any other elements, is suitable to implement the sense of touch, and without it no other sense can be possessed (435a11-20). In this context, he again employs the notion of μεσότης in conjunction with perception, as he says that

> the sensation of touch is like a mediating balance of all the tangibles, and the sense-organ is receptive not only of those difference that belong to earth, but of both hot and cold, and of all the other tangibles (435a20-24, my transl.)

An awkward aspect of Aristotle's explanation constitutes indirect evidence in favour of an activity reading of the passage similar to the one proposed in DA II 11. In consideration of the necessity to be liable to be affected by F in order to perceive F, it would have been expectable for Aristotle to argue that a sense-organ made of earth *cannot* be receptive of the differences of earth, while he is in fact rejecting the possibility of an earthy organ of touch by claiming that the receptivity of the sense of

[52] The problem is envisaged already by Slakey (1961:475-477). Sorabji (1974:74) and Everson (1997:86-89) think that Aristotle is referring to the fact that plants can only be heated or cooled by incorporation of hot or cold matter (an interpretation proposed already by Themistius [p.78 Heinze] and also accepted by Hicks, 419), thus giving Aristotle the chance to deny that plants are in themselves liable to receive the relevant type of literal affection, supposedly characterized by the lack of incorporation of matter. The explanation is rejected as absurd by spiritualists and anti-spiritualists alike (*cf*. Burnyeat, 1992:24, and Cohen, 1992:67; Magee [2000:324-326] also observes its conflict with the rejection of the explanation of alteration through assumption of matter by pores Aristotle elaborates in GC I 8, 326b 21-24). Sorabji (1992:217) replies that Aristotle's endorsement of the hypothesis only requires lack of empirical refutation in his times, and that the spiritualist reading turns what Aristotle proposes as an explanation (cf. 424a 32-33: διὰ τί; 424a1: αἴτιον) into a tautology (Aristotle would be merely saying that plants lacks perception because they become hot but not conscious of hotness).

touch *would be limited to* the differences of earth.[53] The homeostatic counterbalancing physiology may be helpful to provide an explanation of Aristotle's words. Were the sense-organ made of earth, it would be cold (and dry), and it would not be able to become colder in order to perceive hot (or drier to perceive moist). Since such an organ would not be liable to affections coming from by cold (and dry) objects either, the only perceptual activity it might exercise with regard to what is similar to it would be one based on the lack of affection, analogous to that Aristotle admits in the perception of darkness by sight and silence by hearing (cf. DA II 11,422a11-14; III 2, 425b20-22). In this sense, Aristotle can imply that a sense-organ made of earth would at best perceive the differences of earth, and nothing else.

4. The μεσότης-like homeostatic physiology of perceptual activities

Aristotle associates the described homeostatic physiology to other perceptual phenomena as he employs the 'μεσότης' talk to account for the mechanism at the basis of images and feelings of pleasure and pain in DA III 7, a chapter that has been described as a 'folder' of collected scraps because of its apparent lack of argumentative unity.[54]

The second of the two occurrences of μεσότης in DA III 7 is featured in a remark about images as replacements for perceptions that are necessary for thinking (431a17-20). Here, Aristotle says that

> [i]mages belong to the thinking soul as percepts, and when it asserts or denies them as a good or bad thing it avoids or pursues them. That is why the soul never thinks without an image: in the same way as the air has such and such effect on the eye-jelly, that does on something else, and similarly the sense of hearing. The limit is one, however, and there is a single mediating balance, even though its being is manifold (431a15-20, my transl.)

Two points made in the passage require some clarification. The first is the sudden reference to the interaction between media and sense-organs in connection to a further affection the latter does in turn initiate on something else. The second is the claim that 'the limit' is one and that there is one 'mediating balance' whose being is manifold (431a19-20: τὸ δὲ ἔσχατον ἕν, καὶ μία <ἡ> μεσότης, τὸ δ' εἶναι αὐτῇ πλείω). In my view, the two points make sense if the passage is offering a justification of the claim that images are like percepts, which is based on the thesis that the physiological

[53] Sorabji (1992:216) thinks this does either constitute 'some carelessness', or the result of a peculiar way of using 'receptive' to indicate the qualities constituting the organ of touch.

[54] Cf. Burnyeat 2002: 68 with note 100.

process underlying imagination is numerically one and the same with the μεσότης-like homeostatic counterbalance at the basis of perception. In this reading, Aristotle's point in DA III 7 is meant to clarify the description of images as changes generated in the body in correspondence to perception he gave at the end of DA III 3 (428b10-429a2). An image is not a residual of a (literal or codifying) affection impressed on a passive organ through a suitable medium, which is somewhat persisting in the sensory apparatus. The image is rather the result of an affection that the sense-organ produces on some internal organ as soon as it counter-balances the external incoming affection. In the same way as the medium exercises its agency on the sense-organ by affecting it in such-and-such a way, the sense organ triggers a corresponding process on another part of the body. As a confirmation of this reconstruction, we should notice how Aristotle describes the internal process associated with images as analogously proportionate (ἀνάλογον) to its objects (*Mem.*, 452b 9-12). Such a process does 'write' on some part of the body in the same way as scribes write on wax, and the physical qualities of the bodily parts subject to the affection can explain differences and variations in mnemonic abilities (cf. *Mem*. 450a27-b5). We can therefore suppose that an internally directed change co-occurs with the perceptual process (i.e., with the μεσότης-like counterbalancing directed against the incoming affection due to external stimulation), and is numerically one and the same with it: there is a single 'mediating balance', but its being is many.

In III 7, Aristotle is also apparently suggesting that the counterbalancing activity at the origin of perception and images is one and the same for all the different senses. The parallel consideration of sight and hearing suggests that one μεσότης-like mechanism is at work for the images and percepts of various types, corresponding to different senses and sense-organs. Aristotle's mention of a single 'last term' and a single μεσότης that are manifold in their being is evidently reminiscent of the discussion of DA III 2 about the co-operation and unity of senses in cross-modal perceptual activity, which he reprises in the immediate following of DA III 7 (431a20-b1). Aristotle is likely indicating that the principle bringing about the counter-affection is one for all senses and images, and the role attributed to the common sense in *Parva Naturalia* fully confirms this idea.

What has been observed in the passage on images and the perceptual 'mediating balance' is useful for the understanding of the preceding section of DA III 7, where Aristotle talks of the feelings of pleasure and pain as the result of the exercise of the

perceptual μεσότης with regard to what is good or bad (431 a 10-11: ἔστι τὸ ἥδεσθαι καὶ λυπεῖσθαι τὸ ἐνεργεῖν τῇ αἰσθητικῇ μεσότητι πρὸς τὸ ἀγαθὸν ἢ κακόν):

> To perceive then is like bare asserting or thinking; but when the object is pleasant or painful, the soul makes a sort of affirmation or negation, and pursues or avoids the object. To feel pleasure or pain is to act with the sensitive mean towards what is good or bad as such. Both avoidance and appetite when actual are identical with this: the faculty of appetite and avoidance are not different, either from one another or from the faculty of sense-perception; but their being is different. (431a8-431a14 ROT)

Further useful details on the causal chain that leads from 'motivation-involving' perceptual changes to animal motion are found in MA 7, where Aristotle compares it to that at play in the transmission of impulses to puppets and moving toys. Here, he clarifies that

> In an animal the same part has the power of becoming now larger and now smaller, and changing its form, as the parts increase by warmth and again contract by cold and change their quality. This change of quality is caused by imaginations and sensations and by ideas. Sensations are obviously a form of change of quality, and imagination and thinking have the same power as the objects. For in a measure the form conceived be it of hot or cold or pleasant or fearful is like what the actual objects would be, and so we shudder and are frightened merely by thinking. Now all these affections are actually changes of quality, and with those changes some parts of the body enlarge, others grow smaller. And it is not hard to see that a small change occurring at the centre makes great and numerous changes at the circumference, just as by shifting the rudder a hair's breadth you get a wide deviation at the prow. And further, when by reason of heat or cold or some kindred affection a change is set up in the region of the heart, even in an imperceptibly small part of the heart, it produces a vast difference in the body—blushing, let us say, or turning white, and tremblings and shivers and their opposites (MA 7, 701b 10-28, ROT)

The final remark that a barely noticeable change in the heart produces macroscopic changes in the rest of the body is of particular importance. Since such macroscopic phenomena are obviously not taking place every time we perceive, the remark suggests an asymmetry between 'neutral' (purely cognitive) perception and 'motivation-involving' (i.e., emotional and desiderative) perceptual activities, whose objects are desirable or avoidable items.[55] It is therefore the latter kind of perceptual

[55] An asymmetry similar to the one I endorse is recognized in MA, by Burnyeat (2002: 79, note 134: 'Aristotle invokes heating and chilling to explain how perceptions produce animal movement (…), not to explain the initial perceiving'), and denied by Nussbaum-Putnam (1992: 38). In Burnyeat's view (1995: 433 n.38), the asymmetry is recognizable also in DA I 1, 403a16, where Aristotle is supposed to distinguish, among the 'properties' of the soul (πάθη in the sense of συμβεβηκότα, cf. 402b25-403a7), those counting as ἔργα from those that are παθήματα (cf. 403a10 and 403b12). For Burnyeat, perception is included in the former group, while the latter encompasses those that are λόγοι ἔνυλοί (403a25) which involve concomitant bodily processes. According to Burnyeat, then, the

activities that Aristotle must have had in mind in MA 7's, as he described the causal chain leading to locomotion. The restriction seems confirmed in the immediate following of MA (701b 33-35), where he concludes that

> the object we pursue or avoid in the field of action is, as has been explained, the origin of movement, and upon the thought and imagination *of this* there necessarily follows a heating or chilling (ROT, my emphasis)

As a further clarification, Aristotle states that what is distressful is avoidable and what is pleasant is desirable, and all distressful and pleasant things are accompanied by some cooling or heating (701b35-702a2). In his view, evidence coming from passions demonstrates the point:

> Blind courage and panic fears, erotic motions, and the rest of the corporeal affections, pleasant and painful, are all accompanied by heating or chilling, some in a particular member, others in the body general (702a2-5, ROT)

In view of what I observed about the physiology of images, the asymmetry between purely cognitive perception and 'motivational' perception is not problematic. To be sure, the first is in my view characterized by a lack of actual changes that is secured by the homeostatic 'μεσότης-like' physiology, whereas perception of desirable and avoidable object involves slight changes in the cardiac principle of motion. Still, nothing bars the application of the same model proposed for images to the case of motivation-involving perceptual activities. This shows that no inconsistency needs to follow from the latter's entailment of actual, ordinary (non-homeostatic) changes: the very same 'mediating balance' by which we perceive can also produce a change on some other part of the body, thus initiating the chain of changes that will eventually set the whole animal in motion. In this view, the slight changes in the cardiac area at the basis of 'motivational' perceptual activities Aristotle describes in MA are in fact the result of the process he mentions in DA III 7 (431 a 10-11), as he describes pleasure and pain as the exercise of the perceptual μεσότης with regard to what is desirable and good or avoidable and bad.

Aristotle does also admit a pleasure that intrinsically belongs to perceiving. In DA III 2, he explains that on the assumption that αἴσθησις is a *logos* even unblended simple qualities are pleasant to perceive when they are 'brought to the proportion' (426a28-

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asymmetry confirms Aristotle's 'de-physiologyzed' account of perception, and I obviosuly do not agreee with him on that matter. It is worth noting that it is mainly in controversy with the latter point that the asymmetry between the cognitive and the emotional in DA I 1 is rejected by Nussbaum-Putnam (1992:42-43) and Sorabji (2001:56-58).

b8).[56] The argument makes sense if Aristotle is once again having in mind the μεσότης-like homeostatic physiology I reconstructed, described as a calculated adjustment 'measuring' the incoming affection and proportionately reacting in order to preserve the receptive condition of the sensory apparatus. The further point about the pleasure of perceiving certain perceptible objects that are 'brought to proportion', then, may be suggesting that in some cases a perceptible stimulus (or a pattern of stimuli) fits well with the constitution and consequent power of the sense-organ, thus being the occasion for a homeostatic counterbalancing that takes place at ease. In other words, some objects falling in the 'comfort zone' represented by the range of maximal efficiency of the sensory system, are pleasant in so far as they cause an effortless exercise of a natural disposition, which perfectly satisfies Aristotle's definition of pleasure (EN VII 12, 1153a13-15). The hypothesis seems confirmed by what Aristotle says in Sens. 5 with regard to the class of intrinsically pleasant smells (443b27-32). Such objects are noticeably said to be perceived with intrinsic pleasure by man alone. Aristotle stresses that thanks to the proportionately large quantity of moist available in his brain

> their heat and stimulation are *symmetric* to the excess of moisture and coldness in the region (444a33-444b2, my transl. and emphasis)[57]

5. Perception is a reaction and a 'special' preservative affection and alteration

Further important support for the idea of a general homeostatic physiology of perceptual processes comes from a notoriously puzzling passage in *De Insomniis*, where Aristotle talks about red stains caused on mirrors by women during their menstrual periods. The conclusion he is willing to establish is twofold: sense-organs are sensitive to the slightest qualitative differences, and they swiftly *react* to received affections.[58] A plausible reconstruction of the content of this controversial passage can

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[56] About the pleasure for sensations in themselves, cf. also the famous incipit of the *Metaphysics*: 'All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves' (980a21-23, ROT).

[57] σύμμετρος γὰρ αὐτῶν ἡ θερμότης καὶ ἡ κίνησις πρὸς τὴν ὑπερβολὴν τῆς ἐν τῷ τόπῳ ὑγρότητος καὶ ψυχρότητός ἐστιν.

[58] cf. 459b23-24: ταχὺ τὰ αἰσθητήρια καὶ μικρᾶς διαφορᾶς αἰσθάνεται; 459b27: ὥσπερ καὶ ἡ ὄψις πάσχει, οὕτω καὶ ποιεῖ τι; 460a1-2: οὐ μόνον πάσχει ἡ ὄψις ὑπὸ τοῦ ἀέρος, ἀλλὰ καὶ ποιεῖ τι καὶ κινεῖ; 460a23-26: ὅτι μὲν οὖν καὶ ὑπὸ τῶν μικρῶν διαφορῶν γίνεται κίνησις, καὶ ὅτι

be obtained if, as a complement to the homeostatic physiology I propose, we assume that the 'reflecting surfaces' and 'mirrors' mentioned in the passage are not external objects supposedly affected by women from a distance, but rather parts of their own eyes. That parts of the eye are in fact reflective is after all recognized by Aristotle himself (*Sens*. 438a5-13).[59]

In the passage from *Insomn*., Aristotle claims that as an effect of menstruation, something like a an haematic haze (459b30: οἷον νεφέλη αἱματώδης) exhales from the veins around the eye, which produces a colouration of its reflective surface.[60] As it generally happens, a stain is harder to wipe off on a surface that is new, smooth and clean, than on a rough an old one; for this reason the reaction of the eye to the mark left by the menstrual affection has different efficacy in relation to reflective surfaces of different quality (459b31-32: οὐ ῥᾴδιον ἐκμάξαι τὴν τοιαύτην κηλίδα, ἐὰν δὲ παλαιόν, ῥᾷον). In my view, what Aristotle has in mind here is the homeostatic reaction of the perceptual part of the eye which strives to get rid of the menstrual 'stain', thus confirming that even the slightest affections on sense organs trigger their prompt reactions.[61] In this reading, what Aristotle is describing is the interaction between physiological processes going on in some women's eyes, and not a mysterious power to stain mirrors at a distance through the intermediacy of air.

The admission of an 'active' dimension in the physiology of perception does also afford Aristotle the possibility to account for apparent movements in objects perceived under stressful conditions. Discussing the apparent 'spin' of the sun, he explains that this can be accounted by reference to the fact that

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ταχεῖα ἡ αἴσθησις, καὶ ὅτι οὐ μόνον πάσχει, ἀλλὰ καὶ ἀντιποιεῖ τὸ τῶν χρωμάτων αἰσθητήριον, φανερὸν ἐκ τούτων.

[59] That by talking of mirrors Aristotle has in fact eyes in mind has been suggested by Sprague (1985:324). In her view, however, the point seems just an illustration that Aristotle pushed too far to the effect of falling into confusion himself. I believe Aristotle may rather be intentionally describing parts of the eyes as 'reflecting surfaces', and affections taking place on such parts.

[60] Cf. 460a8-11: the menstrual discharges have a certain effect on the air adjacent to the reflective of the eyes, and the air does in turn leave a reddish mark on it (ἡ γὰρ αὐτὴ φύσις σπέρματος καὶ καταμηνίων ὁ δ' ἀὴρ κινεῖται ὑπ' αὐτῶν, καὶ τὸν ἐπὶ τῶν κατόπτρων ἀέρα συνεχῆ ὄντα ποιόν τινα ποιεῖ καὶ τοιοῦτον οἷον αὐτὸς πάσχει· ὁ δὲ τοῦ κατόπτρου τὴν ἐπιφάνειαν).

[61] I am therefore in disagreement with Woolf (1999), who thinks that the passage favours Sorabji's literalist account, even though I share his belief that Aristotle must have in mind some ordinarily physical process going on in the organs, rather than 'phenomenal' changes of the sort theorized by Spiritualists.

> the organ of sight being excessively strained whirls because of its weakness. The same reason probably accounts for the apparent twinkling of the fixed stars and the absence of twinkling in the planets. The planets are near, so that sight comes against them in its full vigour; but against the fixed stars it is quivering because of the distance, striving too much from afar; and its tremor produces an appearance of movement in the star; for it makes no difference whether movement is set up in the organ of sight or in the object of vision. (Cael. II 8, 290a12-24, ROT modified)[62]

If my proposal about a 'homeostatic' counterbalance physiology is correct, Aristotle is entitled to an explanation of the apparent scintillation of fixed stars that does not endorse – as the passage might otherwise suggest – the theory of 'visual rays' coming out of the eye and reaching objects of sight.[63]

In the frame of the homeostatic physiology I reconstructed, it is possible to understand why Aristotle does sometimes feels the need to clarify that perception is

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[62] 290a17-24: ἡ γὰρ ὄψις ἀποτεινομένη μακρὰν ἐλίσσεται διὰ τὴν ἀσθένειαν. Ὅπερ αἴτιον ἴσως καὶ τοῦ στίλβειν φαίνεσθαι τοὺς ἀστέρας τοὺς ἐνδεδεμένους, τοὺς δὲ πλάνητας μὴ στίλβειν· οἱ μὲν γὰρ πλάνητες ἐγγύς εἰσιν, ὥστ᾽ ἐγκρατὴς οὖσα πρὸς αὐτοὺς ἀφικνεῖται ἡ ὄψις· πρὸς δὲ τοὺς μένοντας κραδαίνεται διὰ τὸ μῆκος, ἀποτεινομένη πόρρω λίαν. Ὁ δὲ τρόμος αὐτῆς ποιεῖ τοῦ ἄστρου δοκεῖν εἶναι τὴν κίνησιν· οὐθὲν γὰρ διαφέρει κινεῖν τὴν ὄψιν ἢ τὸ ὁρώμενον. ROT is here misleadingly rendering ὄψις as 'visual ray'. In 290a21 I translate πρὸς αὐτοὺς ἀφικνεῖται as describing sight's 'moving forward' to face planets, to avoid attributing him the Empedoclean he normally rejects (438a25-7; *Mem*. 2, 452b10-11; DA III 12, 435a5-10). This sense can be suggested by the following sentence, where sight 'quivers' πρὸς δὲ τοὺς μένοντας. At any rate, Sorabji (2004:13) helpfully recalls how Aristotle declares in GA (V 1, 780b35) that for his purposes it is irrelevant whether we theorize sight as travelling outwards or as an effect coming from the object being seen.

[63] If my reading is right, the passage in *Cael*. shows that Aristotle uses the verb ἀποτείνω ('stretching out', used also to refer to exertion and straining) in association with sight *both* to report a view he rejects, according to which a ray of sight exits the eye to reach distant object (*Mem*. 452b10; *Sens*. 438a26), *and* in his own explanation of optical phenomena. The same verb is associated with perception in two passages of the collection of *Problemata* traditionally included in Aristotle's corpus. In both these passages, the verb likely indicates the straining of the sense rather than its extension outside the body. *Probl*. III, 20 treats the apparent movement of seen things caused by drunkness, and declares that as far as apparent movement is concerned, it makes no difference if the movement is inside or outside the eye (874a10-12). The effect will then be amplified if sight is 'stretched' since in this way it has less hold on what is seen, and even more so if what is seen is distant, since the inner 'trembling' causes a great apparent one in the distant things being seen (874a14-15: ἧττον κρατεῖ ἀποτεινομένης τῆς ὄψεως, καὶ πλέον τὸ διάστημα ἐπὶ τῷ ἄκρῳ ποιεῖ ἡ ἐγγὺς αὕτη κίνησις; think about shooting photos with an extreme telephoto lens). *Probl*. XXXI, 17 proposes a parallel between the 'crossed fingers' tactile illusion and a visual illusion, based on the fact that a twofold organ is being used to perceive what is external by stretching (ἔξω ἀποτεινομένων αἰσθάνεται). Note that the reference cannot be to something that stretches out of the body, since this is evidently not the case with touch. On the other hand, the employment of the verb in association to sight in the explanation of rainbows and other meteorological phenomena (III 4, 375a33; 6, 377b33) appears to be understandable only in the frame of the theory of sight Aristotle criticizes in De Sensu, according to which visual rays exit the eye and reach objects at a distance.

not an ordinary type of alteration, but rather a very peculiar one. A distinction of this kind between perceptual and ordinary alteration takes place in *Phys*. VII 2:

> Thus we say that a thing is altered by becoming hot or sweet or thick or dry or white; and we make these assertions alike of what is inanimate and of what is animate, and further, where animate things are in question, we make them both of the parts that have no power of sense-perception and of the senses themselves. For in a way even the senses undergo alteration, since actual perception is a motion through the body in the course of which the sense is in a certain way affected. Thus the animate is capable of every kind of alteration of which the inanimate is capable (244b7-14, ROT modified)

That Aristotle is making here a point about something peculiarly characterizing 'perceptual' alterations as opposed to ordinary one is undeniable.[64] Such a distinction is all but surprising in light of the homeostatic counterbalance that in my view characterizes perception.

The peculiarity of the perceptual change as opposed to an ordinary alteration is clearly stated also in *De Anima*. In III 7, Aristotle declares that

> [i]t is evident that what the perceptible is making from the being in potentiality of what is capable of perceiving is its being in actuality, for it is not affected and altered. It is for this reason another kind of change, for change is an activity of what is imperfect, while an activity absolutely speaking is different, i.e. it is of what has been perfected (431 a4-7, mine)

Once again, there is nothing surprising here: the sense-organ is not in fact changed during perception. Far from being a puzzling statement to be explained in the frame of a de-physiologized spiritualist theory, the sentence rather constitutes an indirect confirmation of the homeostatic physiology of perception Aristotle is committed to. Sense-organ are not affected or altered in their receptive conditions, even though perception is a certain affection and a sort of alteration.

The reconstruction of Aristotle's physiology of perception I am proposing can also shed new light on some aspects of DA II 5 emphasized by modern spiritualist interpreters. Aristotle draws a famous parallel between perceptual subjects switching

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[64] The meaning of Aristotle's further remark (244b15-245a2) about the impossibility of failing to notice the alteration is debated. The idea that being perceptually affected and noticing it are two distinct aspects is embraced by Caston (2002:757-759). Johansen (2005:264-265) shows that this is not necessary, and Aristotle may be explaining that one way of being affected peculiar to the animate consists in not escaping notice when affected. In support of Johansen's remark, one can add that even though Aristotle suggests that affection may go unnoticed when not κατὰ τὰς αἰσθήσεις, there are several affections that this description may encompass which would suit his point about being noticed, such as those accompanied by pain or other emotions.

from the possession of the power to perceive to the activity of perceiving, and knowers moving to the exercise of fully possessed bodies of knowledge:

> at birth the living thing is, in respect of sensation, at the stage which corresponds to the possession of knowledge. Actual sensation corresponds to the stage of the exercise of knowledge (τῷ θεωρεῖν) (417b17-19, ROT)

Previously in the same chapter, he stressed that this type of transition requires a distinction in the notion of 'being affected', because of its difference from the one that is a sort of destruction by an opposite:

> what possesses knowledge becomes an actual knower by a transition which is either not an alteration of it at all (being in reality a development into its true self or actuality) or at least an alteration in a quite different sense. (417b5-7, ROT)

As opposed to the 'destructive' type of being affected, this type of transition is more like

> a preservation of what is potential by that which, being in actuality, is also similar in this way as what has a potentiality rather than an actuality' (417b3-6, my transl.)[65]

In order to see how this description can fit perception as well as knowledge under all relevant aspects, including the lack of 'destructive' ordinary change, no 'quasi-physical' change of the type theorized by modern spiritualism is necessary. All we need is the μεσότης-like homeostatic physiology of perception Aristotle introduces in DA II 11.

A careful choice of words similarly suggesting the necessity of preserving the potentiality that makes senses receptive can be also observed in the finale of the same chapter. Having recalled at the beginning of it (DA II 5, 417a17-20) the general conditions for an affection to take place (i.e., the presence of an agent in actuality, and an initial dissimilarity between it and the patient, which allows the latter to become similar to the former after the affection), Aristotle finally (at 418a3-6) introduces a thesis about perceptual affection that is only partially similar to the general one. The final statement about perceptual affections rehearses the idea that what is capable of perceiving is affected when potentially similar to an object that is already perceptible in actuality (418a3-5: τὸ δ' αἰσθητικὸν δυνάμει ἐστὶν οἷον τὸ αἰσθητὸν ἤδη ἐντελεχείᾳ, καθάπερ εἴρηται). However, Aristotle now says that the perceiving subject *is affected while not being the same* as the agent (418a5: πάσχει μὲν οὖν οὐχ ὅμοιον ὄν).

[65] σωτηρία μᾶλλον ὑπὸ τοῦ ἐντελεχείᾳ ὄντος τοῦ δυνάμει ὄντος καὶ ὁμοίου οὕτως ὡς δύναμις ἔχει πρὸς ἐντελέχειαν.

Aristotle's preoccupation with the correct description of perception as a certain type of change that implies no actual change, i.e. as consisting of an incoming affection and a homeostatic change aiming at the preservation of the initial status, does also explain some apparent oddities in his description of the organ of hearing and taste. In DA II 8, he says that the connaturate air in the organ of hearing 'changes' as soon as the external resounding medium changes (DA II 8, 420a4-5: κινουμένου τοῦ ἔξω ὁ εἴσω κινεῖται); on the other hand, he simultaneously argues that such air is receptive in so far as it is unchangeable (ἀκίνητος, a10-12), adding that for this reason it is housed internally and protected from direct affection from the external media by an internal membrane and convoluted channels (a12-16). The description of the sense organ of taste in DA II 10 has a similar tone:

> Since the tasteable is liquid, the organ for its perception cannot be either actually moist or incapable of moisteining. The sense of taste is in a certain way affected by the tasteable *qua* tasteable; it is then necessary that the organ of taste is not moist, but rather moistened while preserving the power to be moistened (422a34-b5, my transl.)[66]

On the ground of the evidence coming from the several passages examined above, it finally becomes possible to appreciate how Aristotle's concern with the preservation of the initial receptive state of sense-organs is signalled by a similarly odd expression in DA II 11. At 424a1-2, we find him saying that in perception the agent makes the patient such as it is in actuality, as the latter is being in potentiality (οἷον αὐτὸ ἐνεργείᾳ τοιοῦτον ἐκεῖνο ποιεῖ, δυνάμει ὄν). The clause about potentiality is usually read as a simple rehearsal of the point about the patient's becoming F thanks to the ability to become F. The homeostatic physiology I propose, however, makes it possible to appreciate a different possible meaning of the sentence, suggested by the odd placement of the clause 'being in potentially' (δυνάμει ὄν). In my view, what the passage is likely suggesting is that the organ keeps being potentially F while it is affected by what is actually F, and the participle ὄν has a temporal function. In other words, Aristotle is saying that

> Accordingly, the agent makes that one such as it actually is while <that one> is being potentially such (424a1-2, my transl.)

The consequential tone of the 'accordingly' (ὥστε) introducing the sentence does in fact invite my reading: Aristotle has just established that the sense-organ of touch

[66] ἐπεὶ δ' ὑγρὸν τὸ γευστόν, ἀνάγκη καὶ τὸ αἰσθητήριον αὐτοῦ μήτε ὑγρὸν εἶναι ἐντελεχείᾳ μήτε ἀδύνατον ὑγραίνεσθαι· πάσχει γάρ τι ἡ γεῦσις ὑπὸ τοῦ γευστοῦ, ᾗ γευστόν. ἀναγκαῖον ἄρα ὑγρανθῆναι τὸ δυνάμενον μὲν ὑγραίνεσθαι σωζόμενον, μὴ ὑγρὸν δέ, τὸ γευστικὸν αἰσθητήριον.

must be potentially the F-tangible it is receptive of, and that perceiving is 'a certain' being affected. The remark that the agent acts on a patient that preserves its potentiality to be affected perfectly squares with the announced peculiarity of perceptual affection, which is going to be explained in the immediately following statement about the μεσότης-like homeostatic physiology. On the assumption that the sense organ must be potentially F to perceive F, perceiving must arguably be an affection of a certain kind (τὸ γὰρ αἰσθάνεσθαι πάσχειν τι ἐστίν): in order for the potentiality and receptivity requirement to be preserved, the agent makes the patient becomes similar to it (ὥστε τὸ ποιοῦν, οἷον αὐτὸ ἐνεργείᾳ, τοιοῦτον ἐκεῖνο ποιεῖ), while the patient keep being in potentiality (δυνάμει ὄν).

6. Ordinary changes in the receptive condition of the sense organ impair perception

In the continuation of the conclusive passage of DA II 5 quoted above (418a5-6), Aristotle adds that what is capable of perceiving does on the other hand become of the same quality as that once it has been affected (418a5-6, πεπονθὸς δ' ὡμοίωται καὶ ἔστιν οἷον ἐκεῖνο). As I show in detail in Chapter 5, the latter phrase is a compressed reference to non-standard cases of perceptual activities, characterized by literal physical alterations that make sense-organs actually perceptible to themselves (what I describe in that chapter as the 'indirect route' to perceptual activation). In relation to such cases, Aristotle speaks of an organ that *has become* similar in a past moment and so *is* the same in quality (ἐκεῖνο) as the object affecting it.

The possibility that *ordinary* changes affect sense-organs in certain circumstances is at the basis of Aristotle's idea that perception is hindered or lost (either temporarily or permanently) after interacting with particularly intense perceptibles. Aristotle typically explains the damage on the ability to perceive by reference to the excess of perceptibles that affected the organ

> the excess of either the sharp or the flat destroys the hearing. (So also in the case of savours excess destroys the sense of taste, and in the case of colours excessive brightness or darkness destroys the sight, and in the case of smell excess of strength whether in the direction of sweetness or bitterness is destructive) (DA III 2, 426a30-b2, ROT)

The doctrine is reprised in III 13 (435b4-19), with the added remark that excessively intense tangibles destroy the animal itself, as expectable in consideration of the thesis

that no perceptual ability and thence no animal exists without the basic sense of touch (animals are for Aristotle defined by the possession of perception).

The point about the negative effect of excessively intense perceptible is interestingly entrenched with a remark about the different degree of impassibility of perception and thought in DA III 4, where Aristotle states that

> Observation of the sense-organs and their employment reveals a distinction between the impassibility of the sensitive faculty and that of the faculty of thought. After strong stimulation of a sense we are less able to exercise it than before, as e.g. in the case of a loud sound we cannot hear easily immediately after, or in the case of a bright colour or a powerful odour we cannot see or smell, but in the case of thought thinking about an object that is highly thinkable renders it more and not less able afterwards to think of objects that are less thinkable: the reason is that while the faculty of sensation is dependent upon the body, thought is separable from it (429a29-429b5, ROT)

In Aristotle's view, the limit to the impassibility of perception is linked to the negative effect of perceptibles of excessive intensity, which is in turn made possible by the fact that the ability to perceive, as opposed to the ability to think, is implemented in a material sense-organ. In a similar way, in DA II 12 he argues that since the sense-organ is a magnitude, it is possible to explain why excessively intense perceptibles destroy it:

> if the movement set up by an object is too strong for the organ, the form which is its sensory power is disturbed; it is precisely as consonance (συμφωνία) and tension (τόνος) are destroyed by too violently twanging the strings of a lyre (424a 30-32, ROT modified)

The idea that the preservation of the receptive power is secured by a homeostatic counter-affection taking place in sense-organs makes Aristotle's attribution of (limited) impassibility to perception easy to understand. In normal circumstances, the sense organ's receptive condition is actually unchanged in spite of the external incoming affection, thanks to the physiological counterbalancing opposed by the sensory apparatus. On the other hand, if the stimulation is too intense in comparison to the intensity of the 'counterbalancing' reaction the sensory apparatus puts forth, the organ will fall short of remaining unaffected: an ordinary change will take place in it, and the loss of its optimal receptive conditions will coincide with an impairment of its perceptual powers. In other words, when the intensity of the incoming stimulation exceeds the intensity of the homeostatic counter-affection (this may well be due to physiological limits of the system: think about touching a blazing fire, or looking straight at the sun), an ordinary, literal change affects the sensitive part of a sense-

organ, thus causing a 'dazzle' that temporarily or permanently impairs the ability to perceive.

The hypothesis of a homeostatic μεσότης-like physiology of perception perfectly agrees with Aristotle's explanation of the loss of perceptual powers through the analogy of the lyre. As he says, the excess damages and spoils both the activity and the power perception, in the same way as it spoils and damages the consonance (συμφωνία) and the tension (τόνος) of the instrument (note that in III 2 Aristotle also explains the phenomena by appealing to the thesis that perception is a *logos*, in the same way as a 'consonance' and a 'voice' are). In the case of the sense-organ, the activity is a μεσότης. The achievement of an operation of this kind is clearly spoiled if the extremes of the perceptual 'proportion' are not symmetric. This happens when the incoming affection is excessive in comparison to the counter-affection. In such cases, there is no 'fitting' but rather a 'mismatch', in the same way as when one fails to play a chord because of an excessively violent plucking of the strings.[67] For the same reason, a violently clumsy attempt at playing the lyre damages the physical condition enabling it to sound properly, either in a temporary or permanent way: breaking a string is physically possible as well as causing it to go out of tune. In the quoted passage of DA II 12, then, Aristotle offers the analogy of the lyre as an apt illustration of how a similar damage can be produced in the case of senses: excessively intense stimulation causes a literal affection and a change in the organs' receptive conditions, which coincides with a temporary or permanent impairment of the ability to perceive.[68]

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[67] Note that in the case of a mismatch of notes required for a consonance the excess is relative to the notes, rather than to the current state of the subject. In the case of sense, this corresponds to the intensity of the homeostatic counterbalance in relation to the incoming stimulation, as opposed to an absolutely determined 'excessive' intensity of the incoming stimulation in itself. In this way, the model can make room for possible variations due to context, and thus account for the observation that light of similar intensity produces no damage on eyes adapted to direct sun light, while it dazzles those suddenly exposed to it after a long time spent in a dark room. Aristotle's awareness of this phenomena (cf. *GA* V 1, 780a 10-13, e *Ins*. 2, 459b 9-12, quoted in this respect by Sisko 1996: 144-147) suggests that this aspect of the lyre simile is not casual.

[68] Note also that there is another resemblance: the strings are elastic, and they 'bounce' back with an intensity that is symmetrical to the received affection (if the latter is not excessive) while preserving the original enabling condition (the tuning). On the contrary, strokes exceeding the appropriate range of intensity temporary or permanently impair such condition, thus determining a physical alteration of the initial state: having being struck in an improperly violent way, strings do not return to the original condition. In this way, the simile is indeed appropriate to illustrate what happens in the case of sense-organs, both in ordinary cases of perception and in occasion of excessive stimulations which impair perceptual powers.

The excessive stimulation of sense-organs appears similarly involved in Aristotle's explanation of after-images and illusions, placed before the passage on red 'mirrors' in *De Insomniis* 2 (459b 8-23). The explanation moves from the remark that the effect of an agent initiating a change and an alteration can persist when the relevant agency is no longer being exercised. Aristotle extends this possibility to perception, on account of its being an alteration 'of some kind' (459b3-5). In the following lines (459b 4-23), he attributes after-images and certain perceptual illusions to the persistence of affections in the organs, eventually linking the latter phenomena to the impairment of perception by excessively intense perceptibles. The difference between ordinary affections causing illusions and after images and those producing an impairment of the power to perceive seems relative to whether the change extends to the properly sensitive parts of the organs or not. As Aristotle says in the passage quoted above, persistence of the stimulation in sense organs is possible 'both in their deeper and in their more superficial parts'). In the latter case, the ability to perceive is intact and the organ comes to perceive itself as if it were two (cf. *Sens*. 437a27-b10).[69]

Conclusions

The above gives robust reasons to accept my interpretation of DA II 11. In spite of the neutrality of the definition of μεσότης I embraced in the previous chapter, the standard 'state' reading of AisthMesot has to be abandoned in favour of the activity reading I offered, in so far as the latter does not incur in any of the difficulties the former has to face. In my account, the meaning of the word μεσότης is fully respected, and yet its application to all senses is not problematic, even though none of them is in fact an intermediate blend of the extreme perceptible properties it can perceive (the only exception being the consistency of the organ of touch in relation to perceptible hardness and softness).

The survey of all the occasions in which the notion of μεσότης is connected to perceptual activities confirms the advantages on my activity reading. On its grounds, Aristotle can give an explanation of the lack of perception of plants by reflecting on their being passively heated and cooled down. Furthermore, the occurrence of the active μεσότης-like reaction is also at the origin of the physiological changes underlying imagination and 'motivation-involving' feelings of pleasure and pain.

[69] For more details on the type of perception involved in such experiences, see Ch. 4 below, section 6.2.

A constant preoccupation with the preservation of the receptive condition of the sense-organs has been observed in several places of DA, which runs parallel to Aristotle's insistence on the idea that perception is peculiarly different from an ordinary affection an alteration, even though it is some sort of affection and alteration. On the other hand, the distinctions made possible by the homeostatic physiology I propose clarify how, after occasional ordinary changes taking place in sense-organ because of incoming affection of exceeding intensity, the ability to perceive is temporarily or permanently damaged.

Appendix - The homeostatic 'μεσότης-like' physiology and the role of media of perception: why we do not perceive by direct contact

A clarification is needed about an aspect of my interpretation of Aristotle's physiology of perception, which is potentially problematic with regard to the transmission of perceptible stimulations through inanimate external media, and the thesis that perception cannot take place by direct contact between sense-organs and perceptible source-objects (DA II 7, 419a12-21). The homeostatic physiology I propose implicitly assumes that media become no less F that the original F-source objects that have affected them, and that they would thus make the relevant sense-organ F in the same way, if no counter-balancing affection were at play. This requirement cannot be taken for granted. An apparent reason for questioning it is that according to Aristotle direct contact between an F-source object and the corresponding sense-organ (e.g., a red tomato and the organ of sight, or the sounding object and the organ of hearing) cannot produce perception. In his view, perception can take place only when the affection on the sense-organ is performed by suitable media that have been 'changed' by perceptible source objects. As a consequence, there must be some special function peculiar to media that distinguishes the affection they produce on sense-organ from the one the latter would undergo were it immediately in contact with source-objects.

According to an explanatory schema that all commentators seem to accept in spite of the differences in their views, an F-source object affects the medium to the effect of making it 'F' in a certain 'special' way, and this peculiar implementation of F is the function of media Aristotle has in mind as he denies perception by direct contact with source objects. In this schema, the medium does in turn affect the sense-organ likewise, namely by making it 'F' only in a certain way, which is different from the way in which the source object is F.[70] Even literalist interpreters are ready to accept that there are differences in the way in which media and source-object are said to be F. In fact, Aristotle himself recognizes that all transparent bodies deprived of proprietary boundaries, including water and air working as media and sensoria of sight, are deprived of proprietary colours and rather coloured in a 'borrowed' way. In such cases, the colour is an extrinsic propriety due to the affection received by solid bodies,

[70] Spiritualists talk of a 'quasi-physical' or 'phenomenal' affection on media, while Structuralists generally invoke the idea of a 'codification' or transduction'.

whose boundaries and colours are instead intrinsic and proprietary (cf. *Sens*. 3, 439a17-439b14).[71]

Regardless of the peculiarities that the implementation of perceptibles in media may have in comparison with that in source objects, there is an important aspect the two always have in common. The perceptible F in the source object always has the power to affect a suitable medium, and the F-affected suitable medium does have the very same causal power. To be sure, the F-medium does merely 'borrow' the source object's causal agency, since the former is F not in itself and intrinsically, but derivatively and extrinsically. The reason for this difference is that F-source object is F regardless of whether a suitable medium is there, while the medium is F only as far as an F-source object is (or was) there.[72]

The preservation of the causal power is evident if we imagine how we can see the colour of a car passing by the street by looking through a glass of water and a shut double-glaze window. In Aristotle's terms, the car's colour affects the adjacent air, and this generates a series of similar interactions along the chain of intermediate transparent bodies (the two layers of glass in the window, the air, the walls of the glass and the water inside it). The same effect can be observed in the case of sounds, where one may even imagine a possible case in which a violent sound wave strikes a body and makes it emit a sound (think for instance about the effect of a whistling wind on a bell, or to the cracking sound of a tree hit by a thunder). Similarly, in the case of tangible properties like hot or cold, the affection impressed by a source object to a medium gives the latter a similar ability to affect a suitable medium.[73] As far as The F-source-object's power to affect a suitable medium is concerned, then, the F-affected

[71] Sorabji's literalist interpretation does take into account the necessity to distinguish a special way in which colours are received in the eye and in transparent bodies. According to his interpretation of *Sens*. 3 (2001:53-54), the eye-jelly is literally coloured in so far as it has the same formal cause as the coloured source object, even though the material basis is different and the colour is thus 'borrowed' (cf. also his 2004:130-131). As opposed to the eye-jelly, interposed transparent media are instead not literally coloured in Sorabji's view (2001: 54).

[72] In my view, such a difference does not appear to justify the idea that an affected medium is F in a 'phenomenal' or 'codified' way. Even if this were the case, though, the preservation of the power to affect a suitable medium will still be in place, and thence the problem of justifying why the source can affect in the supposedly special way the external medium, but not the sense organ, even though the latter two are materially equivalent (as explained further in the main text).

[73] In DA II 12 (424b3-18) Aristotle refers to the case of sounds and, above all, tangibles to show that the effects of perceptibles are not limited to those leading to perception.

medium is as F as the original object. In this sense, for any perceptible F property, the medium is as F as the original F-source object.

The limited sense in which a medium becomes as F as the F-source object affecting it is sufficient to raise a problem concerning the lack of perception by direct contact. A survey of Aristotle's descriptions of media and sense-organs shows that the material composition of the two is identical for each of the senses. Since the ability to affect suitable media is shared by source objects and affected media alike, the identical material composition of sense-organ should in fact secure source objects with the possibility to exercise their agency on them by direct contact, in the same way and for the same reason why the source object can exercise it on media, and the affected media can in turn do it on sense-organs. In other words, it becomes urgent to provide a justification of why the F-source-object can affect the external medium, but not the sense organ, regardless of whether the medium become F in a different and peculiar way or not.

In the case of sight, a satisfactory justification of the lack of perception by direct contact can be given by taking into account the receptive condition of its sense-organ. In Aristotle's view, the sensitive part of the eye is dark, in so far as it is made of transparent matter deprived of intrinsic boundaries (such as water) in a state of potentiality. In this way, the organ of sight can be affected by what is enlightened (light being for him the state of actuality of transparent bodies deprived of intrinsic boundaries), but not by a similarly dark body. A solid object with its own definite boundary posed on the eye, then, will just prevent the contact with light (indefinite transparent in actuality), thus making vision impossible. To put it more simply, a coloured solid object placed directly on your eyes would simply act as a blindfold: it would prevent vision, rather than producing it.[74]

As far as the other senses are concerned, the homeostatic physiology's assumption that the organ strives not to change is useful to understand why a direct rather than mediated affection by a perceptible source object would not bring about perception. Consider the case of hearing. If a blow able to make air resonate were directly hitting the inner 'sensitive' air in the organ, then two possible outcome could be imagined: (i) the counter-affection prevents the air from resonating, then there is no real sound to be heard, since no sound has been actually produced; alternatively, (ii) the counter-affection resonates, rather than counter-balancing the incoming affection, so that the

[74] Cf. Sisko 1998:342, note 13.

affection being produced is not perception, but rather a becoming perceptible that damages the auditory organ. A reasoning similar to the one sketched for hearing can be easily adapted to the other senses, and this may be the reason why Aristotle appears so confident about the extension of the thesis that we do not perceive by direct contact to all senses.

Chapter 3 - Perception as Reception of Perceptible Forms without Matter

In the first part of DA II 12, Aristotle connects perception to the idea of 'receiving forms without the matter' (RFwM, from now on). The formula is obscure and its interpretation subject to an ongoing debate among scholars. The passage in which the idea occurs goes as follows

> Generally, about all perception, we can say that a sense is what has the power of receiving into itself the sensible forms of things without the matter, in the way in which a piece of wax takes on the impress of a signet-ring without the iron or gold; what produces the impression is a signet of bronze or gold, but not qua bronze or gold: in a similar way the sense is affected by what is coloured or flavoured or sounding not insofar as each is what it is, but insofar as it is of such and such a sort and according to its form. A primary sense-organ is that in which such a power is seated. The sense and its organ are the same in fact, but their essence is not the same. What perceives is, of course, a spatial magnitude, but we must not admit that either the having the power to perceive or the sense itself is a magnitude; what they are is a certain form or power in a magnitude[75]

If we look at current literature, the interpretation of RFwM seems reducible to three options:

(i) RFwM indicates that the patient is selectively affected by F, and not by other properties belonging to the agent because of the agent's matter.[76]

(ii) RFwM means 'receiving F, i.e. becoming F, without receiving any quantity of matter from the F-thing the patient is affected by'.[77]

(iii) RFwM alludes to receiving F without standing to F as matter, i.e., without becoming F.[78]

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[75] Unless specified, all Aristotle's quotations from Barnes' Revised Oxford Translation.

[76] This is the view emerging from translations by Smith, Hicks, Rodier, Hamlyn. Scaltsas (1996:26) endorses a similar position (he speaks of 'selectivity of information'), but proposes that RFwM and the initial simile also constitute a first step towards denying that perception is a physical change ('the criterion of receiving form without matter goes only half-way towards securing non-physical reception of form. (…) [T]he wax example (…) shows that something can receive shape without changing in size or weight, as it would if more matter was added to it. But *it fails to show that perception is not a physical change*. After all, the wax changes form physically').

[77] This is Sorabji's interpretation, supported by Everson. This reading clearly makes the power of RFwM a necessary but not sufficient condition for being a sense organ.

The latter option is subscribed by proponents of very diverse reconstructions of Aristotle's theory of perception, and accordingly cashed out in different fashions . Transductionists like Caston read RFwM as indicating the 'transduction' of F by becoming G (where G is a quantitative structure essential to F, which is reproduced in a material substrate different from the original's) and without becoming F.[79] Modern spiritualists like Burnyeat and Johansen offer a different version of (iii) above, according to which the organ is subject to the 'quasi-alteration' of becoming F 'phenomenally'. In this view, the simile at the beginning of DA II 12 illustrates the 'quasi-changes' supposedly taking place in sense-organ and – as a consequence– in the media of perception.[80] Such affections are not ordinary physical changes, since their description in purely physical terms is impossible (their 'appearing to a subject' must be mentioned), and they do not even satisfy Aristotle's own idea of what change is.[81] The reason why it is only the sense organs' RFwM that counts as perceiving eventually

[78] The idea is found already in Philoponus and embraced by Brentano. For Barnes (1971:109-110) it establishes the negative point that perception is not a purely physiological change.

[79] Caston 2005:299-307.

[80] Having suggested that 'the function of the medium is primarily to separate rather than to join', Burnyeat (1995:427) concludes that 'it is above all the sensible form and the matter of the object perceived that need to be separated. The separation is an aspect of the quasi-alteration I spoke of earlier. If the transparent is coloured in a derivative way, without being really coloured, we can say that the sensible form, the colour, is present in the transparent by itself, without the material base with which it is united in the object perceived' . This appears to be an expansion of Burnyeat's earlier observation that the wax block does not become 'circular' like a circular signet ring, since the predicate 'circular' rather applies to 'the content displayed therein' (1992:22). Along the same lines, Johansen (1998:239) states that 'the medium is only acted on by the form of the sense-object, not also by its matter. It receives only the form of the sense-object just as the wax receives the form of the signet-ring but not the iron of which the ring is made' (cf. also his note 19, ibid.: '[t]he wax block analogy applies, of course, not just to the way in which the sense- object affects the medium of the distance senses but also to the way in which the sense-object affects all the sense-faculties; cf. De an. II. 12 424a17-20.

[81] A lucid presentation and defence of the 'phenomenal' account of affections in media is offered by Johansen (1998: 120-145). He recognises that '[t]he medium takes on the quality of the sense-object only insofar as the quality appears to a perceiver. For example, the transparent becomes coloured only insofar as the colour appears to a viewer through it' (Johansen 1998:135, cf. also pp. 135-136). Johansen rightly recognises such 'phenomenal' changes must nonetheless be real (as opposed to mere 'Cambridge changes'), since *De Sensu* (6, 446b2-10) describes them as alterations with temporal parts that admit of delays. For the idea that DA II 5 makes room for such 'special changes', which fail to satisfy the criteria for ordinary change posed in the *Physics*, cf. Burnyeat 2005.

reduces, in this reconstruction, to the mere 'fact' that sense organs are endowed with perceptual powers.[82]

While I believe, for reasons I am going to expose, that (iii) is indeed the most reasonable among the options listed above, I find myself in disagreement with the versions of this reading currently offered by modern Spiritualists and Transductionists. As I am going to argue, there is an unobserved difficulty in these views – as well as the other ones listed under (ii) and (i) above– have to face. The difficulty is constituted by the thesis – implied by Aristotle's words at 424a24-25, but regularly neglected by commentators – that the power to RFwM is sufficient for being a sense organ ('RFwM-Sufficiency' from now on). This restrictive claim is at odds with the variety or interpretations of RFwM already mentioned, which liberally grant the possibility that RFwM takes place also in inanimate bodies deprived of perceptual abilities.

The liberality of RFwM is obviously not an invention of commentators: admittedly, the possibility that inanimate subjects are indeed capable of RFwM appear plausible in view of the initial illustration Aristotle employs. This illustration may in fact *prima facie* suggest a 'wax simile' stating that a 'matterless' reception of forms is similarly taking place in both senses and wax blocks. If such a wax simile is in fact what Aristotle is proposing here, however, there will be a tension between this initial liberality and the restriction imposed in the following lines by RFwM-Sufficiency. This contradiction is the problem which I shall raise and attempt to solve in this chapter.

As RFwM-Sufficiency is regularly neglected by commentators, I shall first of all stress that this restrictive thesis is in fact implied by what Aristotle says in 424a24-25. Then, I shall accordingly deny that the simile he proposes at the beginning of II 12 entails the attribution to wax blocks of the power of RFwM. The key idea in my interpretation of the passage will be that the illustration Aristotle proposes must be read as a 'signature simile', rather than as a 'wax simile'. In other words, the simile does not hinge on a parallel between the supposedly matterless character of the receptions taking place in wax blocks and sense organs, but rather on the matterless character of the items received by senses and the signet ring's signature received by a wax block. By means of a careful analysis of the occurrences of the clause 'without matter' in Aristotle, I shall

[82] This leads Burnyeat to the famously provoking claim that for Aristotle animal matter is 'pregnant with consciousness' (1992:19). In his view (1995:428) '[t]he sole difference between the effect on the medium and the effect on the eye is the difference adverted to (for the case of smell) in the very last sentence of 2. 12, 424b16–18: at the eye the effect is seeing, in the medium it is not, because the eye has the capacity to see and the air does not'. Cf. Johansen (1998:146-147).

then show that in application to forms the expression indicates metaphysically sterile and causally powerless abstract items (to be explained), and thus aptly describes a similarity between the 'signature' vehicled by the signet ring and the objects received in perceiving.

My reading of DA II 12 will accordingly reprise (iii) above in terms of a fundamentalist variety of spiritualism that departs under important respects from Burnyeat's and Johansen's interpretations. In my reading, the reception of perceptible forms without matter turns out to be a description of the *mental* process by which certain abstract entities are obtained by a cognising subject, which is sufficient to attribute perceptual abilities to the subject it takes place in. The idea that sense are RFwM, then, has nothing to do with 'quasi-physical' or 'phenomenal' affections taking place in sense organ as well as in inanimate bodies, and it does not describe (or deny) 'literal' or 'transductional' physiological changes either.

1. Clarification of the problem: the neglected restriction posed by RFwM_Sufficiency (424a24-25)

The RFwM-Sufficiency thesis is clearly implied by Aristotle's words at 424a24-25 (αἰσθητήριον δὲ πρῶτον ἐν ᾧ ἡ τοιαύτη δύναμις). These are important lines that deserves the best of our attention, as they provide a guide to the interpretation of the wax simile that opens the chapter. In the translation quoted above, Aristotle says:

> A primary sense-organ is that in which such a power is seated

Possible translations like 'that in which such a power resides is primarily a sense organ' are better suited to make the implication of RFwM-Sufficiency evident, but even in the rendering just quoted the sentence is clearly implying that whatever possesses the power just described counts as a sense-organ (or a 'primary' one, depending on how one reads πρῶτον).[83] In other words, the passage is committed to something stronger than the mere remark that sense organs are among the things that possess such a power.[84]

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[83] I must mention that RFwM-Sufficiency is in my view a clear implication of the sentence, but not the point Aristotle is making here. In my view, the passage is rather stressing that even though what works as the 'receptacle' of matterless F is *not* matter (since the latter is a 'to-be-qualified' material subject that would become 'F-qualified' by receiving F), the special receiving 'principle' does still reside in a material sense-organ.

[84] The latter meaning, which would make it theoretically possible to attribute the power at issue to wax blocks receiving the signature of signet rings (for such power would at best be a necessary but not sufficient condition for the possession of perceptual abilities), does not

The strict relation between having the power to RFwM and being a sense organ cannot be bypassed by claiming that the expression 'such a power' refers here to the power of perception, rather than to the power to RFwM. The context strongly suggests that 'such a power' means the power of perception *as just described*, namely as the power of RFwM. If this is denied, we would be required to consider the power to perceive as something altogether different from the power of RFwM discussed so far. This is highly unlikely, though: were Aristotle indeed willing to make a completely new point here, he would surely have used a better expression than the very misleading 'such a power'.

There are accordingly two ways in which one can take the 'power' Aristotle is talking about in the passage:

a) The power at issue is the power to RFwM, which is, absolutely speaking and with no further qualification, sufficient to be a sense organ
b) The power at issue is a *qualified* power to RFwM – a power for 'perceptual RFwM' –which is sufficient to be a sense organ; this leaves open the possibility that the power to RFwM belongs, in some other way, to sealing devices as well.

In order to embrace b), and claim that 'such a power' is referring to the ability for *perceptual* RFwM, one must be able to provide, *already at this point and on the grounds of what has been said so far*, a clear and convincing distinction between the reception of forms without matter which (supposedly) takes place in wax blocks and the one which characteristically belongs to senses.[85] To be sure, each of the proposed reconstructions

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fit the text well. Were this the idea Aristotle wanted to convey, he would rather have employed a phrasing like '*a* thing in which such a power resides is *the* primary sense organ'. This reading goes against Aristotle's words twice. First of all, it requires a determinate article introducing αἰσθητήριον which is nowhere in the text. Despite the wide agreement of translators neglecting this aspect (apart from Smith's translation and its revision by Barnes, all the readings of the passage supply the article: cf. Hicks [1907:105]; Hett [1957:137]; Hamlyn [1968:43], Ward [1988 : 223], Silverman [1989:273], Ross' [1961:264] and Polanski's [2007:349-350] paraphrases), such an addition is strictly speaking wrong. Secondly, the above reading would be neglecting that the organ is said to be 'that in which' – not 'a thing in which'– such a power resides.

A further version of the sentence might be considered, according to which 'that in which such a power *primarily resides* is a sense organ'. This construction may justify the attribution of the power to RFwM in different ways to both sense organs and wax block, as it suggests a distinction between things in which the power reside 'primarily' and 'non-primarily'. Such a reading can therefore be treated as equivalent to the second of the two ways of taking the power Aristotle is talking about which I am going to consider.

[85] A distinction has to be made here depending on whether one reads the πρῶτον in 424a24 adverbially or as a qualification of the sense-organ (cf. the preceding note). In the latter case, what is needed is a distinction between the primary sense-organ's power of RFwM and the power of RFwM which (supposedly) belongs to wax. In the first one, the

is more than capable to provide such a distinction by invoking additional features of perception as opposed to the RFwM supposedly going on in inanimate beings.[86] None of the proposed interpretations, however, seems able to provide the desired distinction *on the grounds of what Aristotle has been saying so far*. This is, however, what the position and wording of the sentence require: it is that in which *such a power* (i.e. the power of RFwM discussed so far) resides that is declared to be a sense organ.

Once the framing of the problem is accepted, it is clear that none of the proposed reading of RFwM can help solving it. In Sorabji's reading, what RFwM means is just being physically affected without receiving bits of matter from the source of the affection. Wax blocks and sense organs (not to mention the media of perception) should be, under this respect, equal. There are no grounds to distinguish their RFwM on the basis of what has just been said, and then no grounds to say that 'that in which *such a power* is seated' is a sense organ. A similar problem will have to be faced if, as Transductionists claim, the idea of RFwM and the wax simile by which it is introduced mean that the form F is not received by becoming literally F, but rather by physically becoming G (where G is a quantitative definable 'structure' importantly related to F's essence). Transductionists themselves concede that RFwM is not sufficient for being a sense organ, as such 'receptions of F without becoming F' can also take place in inanimate bodies, like a wax block.[87] The sentence is problematic for modern Spiritualists as well. If RFwM indicates the 'quasi-physical' reception of perceptual appearances that is taking place in both media of perception and sense organs, the implied principle of RFwM-Sufficiency is contradictory. The problem does not disappear in the more traditional interpretation, according to which the point of the simile is to highlight that the 'receiver' is being selectively affected by perceptible

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distinction to be provided concerns the fact that the power supposedly belongs 'primarily' to senses and not primarily to wax.

[86] Literalist and Transductionist will tell that Aristotle refers to such additional aspects at the end of DA II 12 (and Caston in particular would have much to say about how Aristotle fleshes out this remark by introducing an original notion of consciousness in DA III 2); Spiritualists will claim that the distinction is due to the primitive and not further explainable capacity of perception. A further possibility is proposed by Scaltsas (1996:26-29), who thinks that the initial RFwM is completed by further criteria (not receiving the form in one's matter; having a perceptual principle and mean in which the form is received) Aristotle indicates the following explanation of why plants do no perceive (II 12, 424a32-b3)

[87] Caston (2005:303, 304 and note 116). Caston allows the possibility of receptions of forms without the matter in media (2005: 307, n.121), even though he appears to deny it at least with regard to smells in air (*ibid*: 315).

qualities. In this case too there is no ground to establish a distinction between the wax block's and the senses' receptive powers.[88]

The RFwM-sufficiency principle, then, is clearly entailed by what Aristotle says in 424a24-25, and poses a rigid constraint on how the initial simile should be read that current interpretations are unwilling and unable to address. In view of RFwM-sufficiency, the reading of the initial simile must already secure the difference between wax blocks and sense organs, so that the power just described clearly belongs to the latter only. Accordingly, either the power of RFwM is such that it does not belong to wax blocks at all, or the simile must provide grounds to distinguish a qualified power to RFwM that is sufficient to be a sense-organ.

In the interpretation I am going to offer, I shall reprise the original insight that a form F is received by senses without standing as matter to F (option iii above), and formulate it in terms of a fundamentalist variety of spiritualism that makes the power of RFwM sufficient to be a sense organ. In order to support this reading, I shall provide a survey of the occurrences of the clause 'without (the) matter' showing that Aristotle consistently uses this expression non-adverbially and absolutely (i.e., as indication of lack of any matter whatsoever) to describe metaphysically sterile and causally powerless forms. These are abstractions (aspects actually abstracted in someone's mind) corresponding to forms-in-matter, which are instead factual aspects that qualify and identify external subjects. The problem to be solved, then, will be to understand the simile in II 12 accordingly, and deny to wax blocks (or anything else with the exception of sense organ) the possession of such a power.

2. Examination of the occurrences of 'without (the) matter'

The exact expression 'without *the* matter' (ἄνευ τῆς ὕλης) is rare in Aristotle, as it occurs in the whole *Corpus* just seven times in total (only three times outside *De Anima*). The similar expression 'without matter' is slightly more frequent, with sixteen occurrences (five of which in *De Anima*). I shall assign no relevant difference to the presence of the determinative article that distinguishes the two expressions, and treat them as equivalent by using the formula 'without (the) matter'.

[88] Hicks himself notices (416-417) that the whole of 424a21-24 'merely expands a 18 sq. "receptive of the form without the matter". The difficulty is clearly recognised by Scaltsas (cf. note 1 above).

2.1 Things definitionally 'without matter': mathematical objects and divine beings

In a first group of occurrences, the opposition between what is 'with matter' (or 'in matter') and what is 'without matter' expresses a distinction between essentially different beings and their corresponding formulae.

In Metaphysics Z 10 Aristotle is investigating why for some *definienda* like syllables the formulae include formulae of the parts, while for other *definienda* like circles this is not the case.[89] The solution he proposes (1035a1-b3) is a distinction between (i) *definienda* whose formulae include material parts the *definienda* can be destroyed into – like the snub (whose formula include the flesh the snub can be destroyed into), and a syllable (e.g. 'BA', whose formula includes the letters B and A it can be destroyed into); and (ii) *definienda* whose formulae include no such parts – like concavity and the circle (as opposed to the bronze circle), which feature no reference to segments and other parts they can be destroyed into.

Aristotle says in 1035a28-29 that in *definienda* of the first group (e.g. the snub, or the bronze circle) form and matter are taken together, while in the second we find

> those things which do not involve matter but are *without matter*, and whose formulae are formulae of the form only [90] (my emphasis)

He then adds that either such things are not destroyed at all, or not in the same way as the former (i.e. not destroyed into the parts mentioned in their formula).

Aristotle's regularly mentions mathematical objects, and above all concavity in opposition to snubness, when he deals with such 'things without matter'. In *Metaph*. IV (E) 1 (1026a6), he uses again the example of the snub and the concave as he qualifies as 'bound up with the matter' (συνειλημμένον μετὰ τῆς ὕλης) or *without (perceptible) matter* both the things themselves and their essences (τί ἐστι). Confronting a puzzle questioning the uniqueness of the universe in *Cael*. I 9 (277b 29-278a 6), Aristotle similarly talks of formulae without the matter and formulae in the matter, stating that in the case of shapes and figures (again, mathematical entities) the two are different: [91]

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[89] 1034b24-28: '[t]he formula of the circle does not include that of the segments, but that of the syllable includes that of the letters; yet the circle is divided into segments as the syllable is into letters'. In 1034b32-34 Aristotle explains that the 'parts' he considers here are those in which the substance consists, and not those which measure other things in respect of quantity.

[90] ὅσα δὲ μὴ συνείληπται τῇ ὕλῃ ἀλλὰ ἄνευ ὕλης, ὧν οἱ λόγοι τοῦ εἴδους μόνον.

[91] The puzzle is based on the distinction between a certain F-shape mixed 'with matter' (μεμιγμένη μετὰ τῆς ὕλης) and the F-shape in itself (αὐτή τε καθ᾽ αὑτὴν ἡ μορφὴ). Aristotle's examples show that the distinction is between F-subjects and F: he mentions the bronze and the wooden circle in opposition to the shape of the circle, and the gold and bronze

> It is well said that the shape's formula in the matter and that *without the matter* are different, and let this be true (278a23-24, my translation and emphasis)[92]

Along the same lines, *Physics* II 2 affirms that the objects investigated by natural philosophy are analogous to the snub, in so far as they are 'neither *without matter* nor in terms of matter only' (194a14-15: οὔτ᾽ ἄνευ ὕλης τὰ τοιαῦτα οὔτε κατὰ τὴν ὕλην). The same idea is in Aristotle's mind in DA III 4, as he remarks that flesh is, like the snub, a 'this-in-this' and 'not *without the matter*' (429b14).

That Aristotle's choice of mathematical objects as paradigmatic examples of things 'without matter' is not casual can be seen by reading the end of Metaphysics Z 10 in the light of what he says in Z 11 . In the earlier of the two chapters (1036a16-25), Aristotle establishes a difference between the thing *without matter* and the thing *with the matter* with regard to those cases where F (e.g., 'soul' or 'right angle') stands for a material F-subject ('Socrates' or 'this brazen right angle') which coincides with its essence – e.g. the circle and the right angle.[93] Here, he dialectically enquires whether the same can be said about soul (compare 1036a16-17:'if the soul is the animal or the living thing, or the soul of each individual is the individual itself' and 1036a24:'[i]f, however, the soul is something different and is not identical with the animal). The reply he will eventually give in Z 11 seems to answer such question in the negative:

> an animal is something perceptible, and it is not possible to define it without reference to movement – nor, therefore, without reference to the parts and to their being in a certain state. (…)
>
> Socrates (...) is taken in two ways (for some mean by such a term the soul, and others mean the concrete thing), but if he is simply this particular soul and this

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sphere in opposition to the form of the sphere. The puzzle proceeds by noting that even if there were no F we can conceive or apprehend beyond the only one F-subject existing, the difference between F and this particular F-subject would still be valid, 'the one being form (εἶδος), the other form in matter, i.e. a particular thing (εἶδος ἐν τῇ ὕλῃ καὶ τῶν καθ᾽ ἕκαστον)' (278a 7-10).

[92] He already granted this in 278a2-5: 'when we state the essential nature (τὸ τί ἦν εἶναι) of the sphere or circle we do not include in the formula gold or bronze, because they do not belong to its substance; but if we are speaking of the copper or gold sphere we do include them'. Aristotle stresses that neither this admission, nor the more general distinction between F-subjects and the form F itself (which one has to grant regardless of whether such a form exists or not separately from matter, cf. 278a16-18), is enough to argue against the uniqueness of the universe. The universe is perceptible and a particular, and it is made of all the existing perceptible matter. It is therefore impossible that there is more than one universe, for '[t]he general rule is this: a thing whose substance resides in a substratum of matter can never come into being in the absence of all matter' (278b1-3). This is true for mathematical entities like shapes realised in matter, exemplified by the aquilinity of noses (278a28-32), as well as for any other form in matter, like a man (278a32-b1).

[93] 1036a17-18: 'being a circle is the circle, and being a right angle and the essence of the right angle is the right angle'.

> particular body, the individual is analogous to the universal (1035b28-30, 1037a7-10)

In this context (1036b33-1037a4), Aristotle makes it explicit that what such *definienda* like Socrates are different from is first of all mathematical objects. He clarifies that mathematical objects are not perceptible but still made of divisible parts (like segments and semi-circles) that work as 'intelligible matter', and thence themselves composite particulars. This legitimates a distinction from perceptible ones (like Socrates), based on the fact that the parts of mathematical object's formulae are not parts they can be dissolved into in the way, e.g., a circle is divided into semi-circles.

It is all but casual, then, that in Z 10 Aristotle illustrated the difference between *definienda* 'with matter' and 'without matter' by the example of the right angle in the following way:

> the whole in one sense must be called posterior to the part in one sense, i.e. to the parts included in the formula and to the parts of the individual right angle (for both the one *with the matter* (ἡ μετὰ τῆς ὕλης), i.e. the brazen right angle, and that which is formed by individual lines, are posterior to their parts); while the one *without matter* (ἡ δ' ἄνευ ὕλης) is posterior to the parts included in the formula, but prior to those included in the particular instance (1035a20-23 ROT modified, my emphasis)

In this first group of occurrences, then, the clause 'without matter' means 'definitionally deprived of matter'. What is 'without matter' in this sense are those *definienda* like mathematical objects, whose being and formulae mention no material part in which the things can be dissolved.[94]

In Aristotle's universe, the only other real things beyond mathematical objects that could satisfy the 'definitionally without matter' criterion are eternal divine beings. In fact, in Metaph. XII (Λ) 6 we do find an occurrence of 'without matter' that refers to such subjects. Aristotle argues here that a changeless and therefore eternal *substance* must be 'without matter', and that for this reason such a being is by its own essence an actuality:

[94] The same idea seems at work in PA I 3 (643a24-25), where Aristotle remarks that no part of an animal is (definitionally) *without matter* to support the statement that in the definition of animal kinds the difference is the 'form (εἶδος) *in the matter*'. The point seems to be that if aspects like size and shape are to be included in the difference that defines an animal species, these aspects will have to be considered as essentially instantiated in suitable matter (as in the case of the definition of 'snub' or 'bronze circle'), rather than as purely mathematical entities (as in the definition of 'concavity' or 'circle'). This reading fits perfectly with the following lines (643a27-31) where Aristotle employs geometrical figures as examples.

> There must, then, be such a principle, whose very substance is actuality. Further, then, these substances must be *without matter* (ταύτας δεῖ τὰς οὐσίας εἶναι ἄνευ ὕλης); for they must be eternal, at least if anything else is eternal. Therefore they must be actuality (1071b19-22, my emphasis).

It is worth noting that in this first group of occurrences, Aristotle's use of the clause 'without matter' is absolute and non-adverbial. It is absolute in the sense that the expression refers to matter with no further qualification or specification, rather than being relative to some other thing's specific matter. In doing so, the expression is non-adverbial, as it describes types of things, rather than the fact that some event or affection takes place 'immaterially'.

A further noteworthy aspect is represented by the cautious precision of Metaph. VII (Z) 10, where 'those without matter' is accompanied by the more specific description 'those which do not involve matter (…) whose formulae are formulae of the form only' (1035a28). As the examination of the next group of occurrences will show, leaving a generic expression like 'those without matter' alone would have been potentially misleading in view of the other use of 'without matter' that applies to the forms of perceptible subjects which are not 'without matter' in the same sense.

2.2 Forms 'without matter' as metaphysically sterile and causally powerless

In Metaph. XII 3 (1070a14-17), Aristotle uses the clause 'without matter' in a way that seems irreducible to the meaning of 'definitionally deprived of matter' just outlined. No mathematical objects or eternal beings are involved, and the clause rather applies to things that are in fact not 'definitionally deprived of matter'. In this passage, Aristotle seems concerned with the possibility of calling into question the claim that 'no substance exists beyond the composite' by saying that the form of a F, e.g. *a house*, can in fact exist separately from concrete F-specimens:[95]

> No substance exists beyond the composite: the form of the house, for instance, <does not exist beyond the composite,> *if not as the Art*: and of these things there is no generation or corruption – it is instead in another way that the house

[95] Aristotle appears to choose his words very carefully here. In fact, the claim that 'no substance exists beyond the composite' is not incompatible with the existence of real and independent subjects absolutely separated from matter (like Aristotle's God): the phrasing suggests that the point is about some F that can be instantiated in a composite F-specimen. The possibility of a F that is not instantiated in any composite is therefore theoretically open without requiring the rejection of the claim about inseparability Aristotle formulates here.

> *without matter* (or the health, or each thing which is according to an Art) is and is not).[96](my translation and emphasis)

In the passage, the expression 'the form of the house' (οἰκίας τὸ εἶδος), that refers to what it is said not to exist 'if not as the Art' – and thence 'to be or not to be' without being subject to generation or corruption, clearly corresponds to the following 'the house without matter' (οἰκία τε ἡ ἄνευ ὕλης). That this equivalence can indeed be attributed to Aristotle is confirmed by PA I 1, where we read that the Art consists in a formula (*logos*) of the product 'without the matter' (640a31: Ἡ δὲ τέχνη λόγος τοῦ ἔργου ὁ ἄνευ τῆς ὕλης ἐστίν) .The F which exists 'without matter' as the corresponding Art realizing it in matter is therefore a form and a formula. However, such forms and formulae 'without matter' are not definitionally without matter (as the use of the clause observed earlier prescribes), for the definition of 'house' must include a reference to suitable material parts (Phys II 2, 194a22-27; DA I 1, 403a26-403b19).

In 1070a14-17, Aristotle's point seems to be that the existence and non-existence of a form F apart from F-composites can be *in some way* conceded when F is an artefact, without violating the general claim that such a F cannot exist separately from *any* composite material subject. Aristotle employs here the clause 'without matter' to pinpoint the form F which exists in subjects that possess F 'according to an Art'. In such cases, F exists apart from particular F-subjects in the sense that it belongs to subjects that are not themselves F-subjects: the house exists in the professional builder – a subject that is not a house – as a form without matter.[97] In this sense, such a form may exist or not exist, but it is not subject to generation and corruption since it is not itself a substance.

An implication of this reading of Metaph. XII 3 is that the forms-without-matter Aristotle is talking about are *metaphysically sterile*. As we just saw, an F-without-matter, as opposed to an F-subject, can be said to be or not to be apart from composite F-specimens, even though it cannot exist apart from any composite subject (if F is an artefact, such items 'without matter' exists 'separately' from F-specimens as the

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[96] οὐκ ἔστι παρὰ τὴν συνθετὴν οὐσίαν, οἷον οἰκίας τὸ εἶδος, εἰ μὴ ἡ τέχνη (οὐδ' ἔστι γένεσις καὶ φθορὰ τούτων, ἀλλ' ἄλλον τρόπον εἰσὶ καὶ οὐκ εἰσὶν οἰκία τε ἡ ἄνευ ὕλης καὶ ὑγίεια καὶ πᾶν τὸ κατὰ τέχνην).

[97] Accordingly, the claim stating the inseparability of F (where F is a subject fully realizable in matter) is invalid if taken as a *partially* qualified thesis stating the inseparability of F (in general) from F-composites (any 'house' from particular houses), but it is unambiguously right if taken as an absolute claim stating the inseparability of F from *any* composite (including non-F-composites), or as a *fully* qualified one stating the inseparability of F-*with-matter* from F-composites, and/or the inseparability of F-*without-matter* from composites that possess F according to an Art.

corresponding Art). For this reason (i.e., because a 'form-without-matter' F can exist in a subject which is not an F-subject), F-without-matter is spoiled of the metaphysical 'jobs' of qualifying and identifying a subject, which in Aristotle's philosophy belong to forms (accidental ones qualify subjects, substantial ones identify them).[98] In this sense, the attribution of the qualifying and identifying job will strictly speaking belong to those forms that are in fact 'fused' *with matter* and actually realised *in matter*.

A further occurrence of 'without matter' in GC I 10 can confirm the observed metaphysical sterility. Here, Aristotle says that since tin mixed with bronze changes its colour while adding almost nothing to it in terms of size, it belongs to the latter almost as a property 'without matter' (328b12-13: ὁ γὰρ καττίτερος ὡς πάθος τι ὢν ἄνευ ὕλης τοῦ χαλκοῦ σχεδὸν). Despite a *prima facie* support to the idea of RFwM as becoming F without incorporating bits of matter from the acting F-subject, this passage does in fact make perfect sense if read as stating that bronze receives Q (the quantity of tin qualifying the acting subject) almost as a Q-without-matter since it looks like Q is not qualifying it (the quantity of bronze remains practically the same).

The exceptional metaphysical sterility of F-without-matter with regard to the 'identification' or 'qualification' of the subjects it belongs to is hardly surprising, if one considers the role of matter in the composition of particular subjects. In Aristotle's view, matter guarantees the continuity of change and offers a location on the spatiotemporal continuum. Furthermore, matter is endowed with generic, 'to-be-determined', properties such as 'thermicity' and 'hydricity': matter necessarily have some degree of hot and cold, and moist and dry.[99] Since the job of forms 'in' and 'with' matter is to identify or qualify the composite subjects they belong to, it is reasonable to expect that the forms 'without the matter' are not 'instantiated in' and 'fused with' matter in the same 'identifying or qualifying' way. That this expectation about forms-without-the-matter is well grounded can be shown by the following consideration: since forms are not 'fused with' matter, they have no suitable substrate to exert their metaphysical job on. In other words, there is no 'to-be-identified' continuum endowed with spatio-temporal location, and no 'to-be-qualified' generic 'thermicity' and 'hydricity'. In the absence of such a substrate, the forms' qualifying and identifying job cannot be performed.

[98] My understanding of the role of forms and matter in the identification and qualification of subjects depends on the reconstruction of Aristotle's views offered by Scaltsas (1994).
[99] Scaltsas (1994:25-27).

A further peculiarity of F-without-matter concerns causal efficacy: any F-without-matter will be *causally powerless*. The lack of causal efficacy is already expectable because of the observed metaphysical sterility: since F belongs to *a* without making it an F-specimen, the causal power that belongs to F-subjects *qua* F (e.g., the power to generate a human being belonging to individuals in so far as they are human beings; the power to heat a cold object belonging to a hot object qua hot) will not belong to the (non-F) subjects that 'host' F-without-matter.

A further reason for the causal inefficacy of forms-without-matter comes from the fact that matter contributes to subjects their location on the spatio-temporal continuum. This makes matter a necessary (not sufficient) condition for having causal efficacy, since for Aristotle local proximity between suitable subjects (a patient and an agent) is necessary for causal interaction to take place (*Phys.* III 2, 202a5-9).[100] To the extent to which one can deduce lack of spatio-temporal location from being 'without matter', then, causal inefficacy seems to be an expectable feature of forms-without-matter[101]. This perfectly squares with Aristotle's observation that every perceptible *body* possesses the power of acting or being acted upon, or both (*Cael*. 275b5-6).[102]

That forms-without-matter are in fact causally powerless seems to be what Aristotle himself is suggesting in a further occurrence of the clause 'without matter' in GC I 5 (322a28).[103] Here, he states that the form 'without matter' of an artefact, like a pipe, is a power once it is 'in matter'. Judging from the following lines (322a29-322a34), Aristotle is here willing to stress that the forms in the suitable 'feeding material' and in the subject fed with it are interacting causal powers. In growth, the subject's form persists and allocates the added matter with no quantitative modification whatsoever. On the other hand, the same form may also persist and do its job while some

[100] As already observed, forms are responsible for the full determination of those generic properties of matter, either as substantial aspects identifying subjects, or as accessory aspects that qualify them. In this sense, forms are further necessary (not sufficient) conditions for subjects to have causal efficacy.

[101] At the very least, a distinction between 'intrinsic' and 'non-intrinsic' spatio-temporal location must be provided to recognise the different way of being located respectively characterising forms-with-matter and forms-without-matter.

[102] Cf. Scaltsas (1994:27), who therefore mentions 'being a causal agent and/or patient' among the generic essential properties of Aristotle's physical matter.

[103] The critical editions by Mugler (1966) and Rashed (2005) both save the MSS' ἄνευ τῆς ὕλης, whose excision by Joachim (1922:135) as a 'marginal note intended to explain or correct the un-Aristotelian ἄϋλος' (a *hapax* meaning 'immaterial', which Joachim rightly corrects in αὐλός) is accepted in Barnes' ROT ('[t]he form is a kind of power in matter—a duct, as it were').

quantitative modification is impressed on the subject by the surplus of matter.[104] This reading of the contrast between the form-without-matter and the form-in-matter is supported by a similar point Aristotle made some lines earlier (322a17-19, which is separated by the contrast made here only by a series of remarks about the difference between nutrition and growth in 322a20-28):

> Quantity in general does not come-to-be any more than animal which is neither man nor any other of the specific forms of animal—the universal in this case corresponds to the quantity in that. But what does come-to-be in growth is flesh or bone—or a hand or arm and their homoeomeries

Aristotle's earlier point was that the amount of matter transformed and 'incorporated' in a subject is not in fact existing out there as a Q-quantity of abstract generic matter, but always as a certain subject (or part of a subject) possessing a Q-quantity of such-and-such matter. In this context, the specification we already commented – according to which 'this form-without-matter' is a certain power once it is 'in the matter' (τοῦτο δὲ τὸ εἶδος ἄνευ ὕλης, οἷον αὐλός, δύναμίς τις ἐν ὕλῃ ἐστίν), reprises that earlier distinction between generic 'abstractions' (like 'Q-quantity' or 'animal') and concrete subjects or parts or subjects (like a hand or an arm).

Aristotle's use of the clause with regard to forms, then, expresses an idea that is very different from the one observed earlier with regard to things definitionally deprived of matter (like mathematical objects and divine eternal beings). In the passages we just examined, the clause 'without matter' refers to forms that are not definitionally without matter in the way mathematical objects and eternal divine beings are. According to this second use of the clause, a form-without-matter F is instead something existing in composite subjects as an Art, i.e. as a metaphysically sterile and causally powerless item (F does not make the subject it belongs to an F-specimen).

2.3 Forms-without-matter as abstract cognised aspects of reality

In a final group of occurrences, Aristotle associates forms without-matter with cognitive activities. This association is not surprising: we are by now prepared to it as we already saw how *Metaph*. XII (Λ) identifies the forms-without-matter of the work to

[104] An example in the first sense is a pipe doubling in size with no modification of the initial proportion between its length, internal diameter and external diameter. In the second case, which for Aristotle is analogous to a mixture of wine and water becoming more watery, the pipe will instead preserve its identity as a pipe while modifying the mentioned proportion: e.g., keeping the same length and outer diameter, it will reduce its internal diameter. Note a further analogy with the case of wine: both modifications are somewhat 'pejorative', since the more watery wine becomes a 'lesser wine', and the pipe with a lower capacity a 'lesser pipe'.

be accomplished with corresponding Arts, which are for him branches of 'productive' *knowledge* (cf. *Metaph*. VI [E] 2, 1046a36-1046b4). In chapter 9 of the same book of the *Metaphysics*, Aristotle himself confirms this association between productive branches of knowledge and forms-without-matter, and extends it to explicitly include theoretical knowledge as well. Aristotle specifies here the cases in which the thinking subject ('what is thinking') and its object ('what is being thought') are the same. He says that the latter 'identification' takes place when the factual object (τὸ πρᾶγμα) coincides with knowledge (ἐπιστήμη), which happens in productive branches of knowledge when the factual object is the essence and the substance (οὐσία) '*without matter*', and in theoretical branches of knowledge when the object is the formula (λόγος).[105]

The same idea about the coincidence and identity of what is thinking and what is being thought is expressed in DA III 4, where the clause 'without matter' occurs once again. This time, Aristotle's words feature no association with Arts, and the clause is instead used in a claim restricted to 'theoretical branches of knowledge and what is knowable in the same way'. Aristotle establishes here that it is with regard to what is 'without matter' that the mentioned identification (i.e., the identification of what is thinking and what is being thought) takes place, and that thought is a power dealing with the things having matter as '*without matter*'.[106]

The association with cognitive activities returns in DA III 6, where Aristotle examines some features of things 'without matter' by drawing an analogy between thought and perception. When thoughts express the essence of something according to its definition, they are always true and do not count as propositions predicating something of something else, which may instead be false. With regard to this aspect, Aristotle draws an analogy with perception: in a similar way, perceiving white is always true, whilst believing that the white is a man can be false. The conclusion, which makes no explicit distinction between thought and perception, states that this is how it works with those *without matter* (III 6, 430b30: οὕτως ἔχει ὅσα ἄνευ ὕλης).

There is little doubt that these occurrences of 'without matter' in conjunction with intellectual (and in the latter case, perceptual) cognition refer to forms rather than subjects. Aristotle himself tells us that what is in our soul (ψυχή) as we engage in

[105] 1074b38-1075a3: ἢ ἐπ'ἐνίων ἡ ἐπιστήμη τὸ πρᾶγμα, ἐπὶ μὲν τῶν ποιητικῶν ἄνευ ὕλης ἡ οὐσία καὶ τὸ τί ἦν εἶναι, ἐπὶ δὲ τῶν θεωρητικῶν ὁ λόγος τὸ πρᾶγμα καὶ ἡ νόησις.

[106] 430a3-8: ἐπὶ μὲν γὰρ τῶν ἄνευ ὕλης τὸ αὐτό ἐστι τὸ νοοῦν καὶ τὸ νοούμενον· ἡ γὰρ ἐπιστήμη ἡ θεωρητικὴ καὶ τὸ οὕτως ἐπιστητὸν τὸ αὐτό ἐστιν (…) (ἄνευ γὰρ ὕλης δύναμις ὁ νοῦς τῶν τοιούτων).

perceptual and intellectual cognition are forms of subjects rather than subjects, e.g. the form of a stone rather than a stone (DA III 8, 431b25-432a1).[107] Further confirmation in this direction comes from Aristotle's description of perception as RFwM in DA II 12, which also enforces the idea that the remark about 'those things without matter' in III 6 does indeed include both intellectual and perceptual cognition. The same, then, can be said of the other occurrences of the same idea in DA III 2, where Aristotle says that each sensory organ is able of RFwM (425b 23-24), and in III 12 (434a28-30), where he states that subjects that are not able of RFwM cannot have perception[108]. In fact, in light of the consistently 'absolute' and 'non-adverbial' use we observed so far for both subjects and forms, all the latter occurrences of 'without matter' are likely to be understood according to the same pattern. [109]

Together with the observed metaphysical sterility and the lack of causal efficacy, the above association with cognitive activities concurs to suggest that the expression 'form-without-matter' is a metaphysical description of *abstract entities*. To appreciate the plausibility of this proposal, it is sufficient to recapitulate what has emerged from the

[107] He adds (432a1-3) that a sense is the form of what is perceptible (arguably, perceptible forms, since what we know is not the stone, but its form) and intellect the form of forms). Sorabji (1992:213-214) argued that in this last passage Aristotle refrains from describing the processes as 'receptions', and that the reason for this is that Aristotle uses 'reception' formulas to describe the physical alteration in the organs, that only provides the material aspect of perception. This is of course a possible interpretation. However, considering that in DA II 2 (414a4-14) Aristotle says that we have episteme (undoubtedly an intellectual form of knowledge, cf. III 3) by *being receptive* of episteme grant us an equally legitimate chance to reject Sorabji's suggestion.

[108] αἴσθησιν δ' οὐκ ἀναγκαῖον ἐν ἅπασι τοῖς ζῶσιν· οὔτε γὰρ ὅσων τὸ σῶμα ἁπλοῦν ἐνδέχεται αὐτὴν ἔχειν, [οὔτε ἄνευ ταύτης οἷόν τε οὐθὲν εἶναι ζῷον] οὔτε ὅσα μὴ δεκτικὰ τῶν εἰδῶν ἄνευ τῆς ὕλης.

[109] The occurrence of 'without matter' in DA III 8, 432a9-10 is the only possible exception I found to the absolute use of the clause. Aristotle is apparently explaining that it is impossible to contemplate anything without an image, since intelligibles exist in perceptibles. To argue for the latter thesis, Aristotle says that 'imaginative states (φαντάσματα) are like perceptual states (αἰσθήματά), save without matter'. Since *phantasia* is a change triggered by perception and taking place somewhere in the body (cf. the end of DA III 3), one may think that 'without matter' must be employed in a 'relative' rather than 'absolute' way, i.e. as meaning 'without the matter of the perceptual states', rather than 'without any matter'. On the other hand, a possible different interpretation that saves the 'absolute' character of the clause may be provided, if Aristotle's point is rather that as far as intellection goes, perceptual states and imaginative states are the same, save 'without matter', in so far as they are different with regard to their abstract content. A possible difference regarding content may be, for instance, that the imaginative state whose content is 'red tomato' is not necessarily cognized as being present here and now, while the corresponding perceptual state is).

survey of the occurrences of the expression 'without matter' referring to forms (as opposed to thing that are 'definitionally without matter'):

- Forms without matter are metaphysically sterile and causally powerless;
- they exist and non-exist in the same way as Art, thence not as a subject of generation and corruption, and not separately from any material subject, though an F-without-matter can exist separately from F-subjects;
- AN F-without-matter is identical to what is thinking it when it is being thought;
- Both in perception and thought, forms-without-matter are true when grasped in their simplicity, possibly false when combined by (non-essential) predication;
- Senses receive forms-without-matter, and a thing in which such a power resides is a sense organ;

All the above features suggest that forms-without-matter are *abstract cognised aspects in someone's mind*, to be distinguished from concrete aspects in material subjects (the latter are Forms 'in the matter' or 'with the matter'). Such forms-without-matter are causally powerless and metaphysically sterile aspects of the real word, while forms that are 'realised in' and 'fused with' suitable matter are, on the other hand, aspects that determine their subjects' identities, qualifications and causal powers.

3. Application to DA II 12

3.1 The wax simile as illustration of the form's matterless character

The idea that forms-without-matter are metaphysically sterile and causally powerless abstraction provides a promising starting point to achieve a reading of DA II 12 fully compatible with RFwM-Sufficiency: if being able to receive perceptible forms without matter means being in receipt of a perceptible F aspects as an abstraction, it makes sense to require that this is sufficient to be a sense organ. On the other hand, it becomes urgent to understand how the initial illustration involving wax blocks and signet ring can be compatible with such a restrictive reading of RFwM.

The suggestion I shall explore is that the initial illustration of the claim that senses are capable of RFwM should be read as a 'signature simile' rather than as a 'wax simile'. In other words, the point highlighted by the simile is *not* that there is a 'matterless' way of receiving forms which is supposedly common to wax blocks and senses, but rather that the signet ring's 'signature' and the items received by senses are similarly 'matterless'. The signature simile can be properly understood along these lines by reflecting on the

morphological complementarity between the signet ring's and the sealed wax's shapes. While an F-signature is clearly impressed as a 'qualifying' aspect on the F-shaped sealed wax, the same F is metaphysically sterile with regard to the signet ring. For the ring's shape is not the same shape finally impressed on wax: in order to impress on wax a certain signature shape F, the ring's own positive shape G must be non-F, whilst related to F as the engraved 'negative' of a bas-relief. The signet ring's and the (sealed) wax block's shapes must be morphologically complementary, not identical.[110]

As the simile emphasizes, even though the signature is vehicled by the ring's matter and thence 'golden' or 'brazen', the ring's signature is not received 'in so far as it is gold' (that is, not in so far as it is an aspect which, fused in the ring, qualifies it as F-shaped piece of gold), but rather as a form-without-the matter (i.e., as an aspect that does not perform any qualifying or identifying function in the material subject it belongs to). With Aristotle's own words:

> About every sense in general, we must assume that the sense is what is receptive of the perceptible forms without the matter. In a similar way, the wax receives that ring's signature <which is> without iron and bronze: it indeed takes on the signature <which is> bronzy or golden, but not qua <that bronzy or golden signature> is <a piece of> bronze or gold. (424a17-21, my translation)[111]

As expectable, the passage abides by the characteristic 'non-adverbial' and 'absolute' use of the clause 'without matter'. The non-adverbial character of the expression perfectly squares with the forcedly anticipated position of the possessive genitive 'the ring's' (τοῦ δακτυλίου) in 424a19-20 (Aristotle says ὁ κηρὸς τοῦ δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον). Such a phrasing is perfectly appropriate to express the 'adjectival' function of 'without the iron or the gold' in relation to 'the signature': Aristotle wants to point out that the forms received by senses are 'without the matter', and decides to do so by comparing them to that signature without iron or gold that belongs to a signet ring.[112] Furthermore, the fact that Aristotle keeps mentioning different materials (iron and gold first, then gold and bronze) and never

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[110] The morphological complementarity is clearly described by (Polanski 2007, *ad loc.*). Cf. also Ward, who stresses the opposition between the ring's substantial and 'emblematic' forms (the first is the ring's own shape G, the second is the signature, i.e. the ring's F shape that is going to be impressed on wax).

[111] Καθόλου δὲ περὶ πάσης αἰσθήσεως δεῖ λαβεῖν ὅτι ἡ μὲν αἴσθησίς ἐστι τὸ δεκτικὸν τῶν αἰσθητῶν εἰδῶν ἄνευ τῆς ὕλης, οἷον ὁ κηρὸς τοῦ δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον λαμβάνει δὲ τὸ χρυσοῦν ἢ τὸ χαλκοῦν σημεῖον, ἀλλ' οὐχ ᾗ χρυσὸς ἢ χαλκός.

[112] Hicks' (416) propose an alternative explanation, according to which τοῦ δακτυλίου 'is placed thus early and close to ὁ κηρὸς in order to correspond to τῶν αἰσθητῶν εἰδῶν in relation to τὸ δεκτικὸν'.

one alone does instead suggest that what is at issue is being *absolutely* 'matterless': what is received is not just without this particular ring's matter but more generally without any material whatsoever. The idea, then, is that such activities are characterised by the reception of matterless forms, rather than by a matterless way of receiving forms.[113]

In full agreement with RFwM-Sufficiency, the point Aristotle highlights by means of the signature simile (i.e., the matterless character of the received form) does not attribute to either the wax or the ring the power of RFwM. That the simile does not compel one to attribute such power to wax blocks is easy to realise: as soon as the signing interaction takes place, F is impressed on the wax block as a shape-with-the-matter.

Some elaboration is required to understand why the attribution of the power of RFwM to the signet ring has to be rejected as well. In view of the morphological complementarity of wax blocks and signet rings, there seems to be solid grounds to reject the attribution of the signature shape F to the ring. On the other hand, however, there seems to be some good reason to attribute the same shape F to both the ring and the wax, as long as one wants to say that the wax block receives the signature shape from the ring. After all, the ring's shape has been carefully crafted for the purpose of impressing F on wax, and this ability constitutes its essential function as a sealing device. In this view, F must belong to the ring in some way, even though it does not identify nor qualifies it as an F-shaped thing. One might be therefore tempted to solve the problem by adding a qualification: while the wax block possesses F-with-matter, the ring possesses F-without-matter. Along these lines, the ring's possession of the signature F-without-matter will obviously entail that *the ring received it* when its surface had been shaped in such-and-such a way. The conclusion would then be that according to the object reading of the signature simile, the signet ring does in fact have the power of RFwM, against RFwM-Sufficiency.

The above reasoning, which ends up attributing the power of RFwM to the ring, cannot be accepted. First of all, to become fully acceptable, the idea that the signet ring possesses the matterless signature F requires an important qualification. The signature shape F-without-matter does not *actually* exist as an abstract object in the ring. In the

[113] It is only by an indirect route that we can arrive to the adverbially expressed idea that *F* belongs to its subject without qualifying or identifying it as *F*, i.e. by first endorsing the thesis that (while *F*-with-matter perform such metaphysical roles as identifying or qualifying a whole subject) *F*-without-matter belongs to subjects without qualifying or identifying the subject as *F*.

ring, the signature only exists as a *potential* F-without-matter: a 'cognisable' aspect, rather than a *cognised* aspect and an *abstraction*. The signature shape F only exists as *actual* F-without-matter (a 'cognised' aspect, an abstraction) in a cognising subject (e.g., the person recognising the signature by looking at the actually F-shaped wax block). In a way, then, it is correct to state that the signature shape F-without-matter is carried by the signet ring, but only if one supplements the important qualification that the latter is not able to receive the *actually abstracted* matterless form. What the ring could receive, if recast as an F-shaped ring, is instead F-with-matter; and what it has been carrying, after it had been modelled as a G-shaped ring, is a merely *abstractable* F-shape.[114] The ring did not, and cannot, receive any actually abstracted, matterless F.

It would certainly be correct to note that the possession of F-without-matter as an 'abstractable' aspect is common to the ring and the impressed wax block (or any other F-qualified subject whatsoever), but this does not make Aristotle's decision to focus on the ring's signature arbitrary. In fact, there is a good reason why the ring's signature-without-matter is more suitable than the wax block's for Aristotle's purpose. The signet ring shows with immediate evidence that something can carry an F-without-matter without being F-qualified, and thence reveals Aristotle's idea that forms-without-matter (as opposed to forms-in-the-matter) do not qualify or identify the subjects they belong to. It is for the sake of recalling with no ambiguity the metaphysical sterility of matterless forms that Aristotle decides to focus on the abstractable F-shape that belong to a G-shaped subject, despite being likely aware that the F-qualified (sealed) block of wax does also 'carry' F-without-matter in the same way as the signet ring: in fact, any F-subject qualified (or identified) by F-with-matter does also carry – potentially and as a merely *abstractable* aspect– a corresponding F-without-matter. Aristotle's decision to

[114] For the sake of avoiding unnecessary complications, I eschewed a point that can make the difference between abstractable and abstracted F implicit in the simile immediately manifest. The point is that it seems strictly incorrect to say that the wax's shape-with-matter and the ring's complementary negative shape-without-matter are *wholly* identical. If we indicate the whole shape of the wax block as A, and the whole *negative* of the ring's shape as B, it seems more correct to say that the signature shape F is a *part* or section that A and B have in common. The signature F, then, is an abstraction: it is only in our mind that anything like a 'negative-shape-part overlapping with a morphologically complementary positive-shape-part' actually exists with its own, well defined boundaries. Accordingly, as far as the wax block and the signet ring are concerned, F only exists as an 'abstractable' aspect (a potential F-without-matter).

illustrate his point about perception by comparing the matterless forms to the ring's signature is therefore appropriate, and the simile's phrasing fitting.[115]

3.2 Perceptible forms-without-matter in the sense

The section of the passage about the sense that follows the signature simile (424a21-24), is dense and obscure. In order to expose the interpretive problems raised by the passage, it is useful to parse it in the following way:

(1) likewise

(2) each sense[116] is affected by what has colour, or flavour, or sound,

(3) but not *qua* X 'is said to be each of those' (ἕκαστον ἐκείνων λέγεται),

(4) but *qua* X 'is such as that' (τοιονδί)

(5) and according to the *logos* (κατὰ τὸν λόγον).

The lack of an explicit grammatical subject in (3)-(5) contributes to the passage's ambiguity, and in view of the opposition of (2) to (3) and of (3) to (4) it is not immediately clear how inclusive is the 'likewise' in (1) (i.e., which of the clause (2)-(5) are to be included in the similarity).

With regard to the identification of the grammatical subject in (3)-(5), one is forced, for reasons concerning grammatical gender and number, to supply a second 'each' working as either the grammatical subject or predicate in (3), and read the sentence, construed as a dependent accusative and infinitive clause, as 'not in so far as one says that each is each of these'. [117] The referents of 'each' and 'each of these' must be accordingly chosen between those made available by the context, i.e. the source objects or the perceptible qualities. A first reading favours the traditional 'selectivist' interpretation, according to

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[115] It is possible, and in fact likely, that several other aspects of the wax-ring system contribute to make it an attractive example. A first one is that by choosing as example a shape which is the mere negative of a positively instantiated one, he seems indeed to come metaphorically close to the idea of a 'matterless' form as much as one could by using a physical example. For F is instantiated in the signet ring as a sort of (metaphorically speaking) 'empty' shape, in the same way as the foot print left by an animal on mud is an 'empty' and 'matterless' instantiation of the animal's foot's shape (another 'matterless' shape is exemplified in the case of a stone mould to be used in the production of an F-shaped bronze statue). A second attractive aspects of the sealing system is that the same instantiation of the signature in the source secures the formal identity of the content for all the different receivers that may interact with it.

[116] The meaning of the expression ἡ αἴσθησις ἑκάστου is instead uncontroversial: all translators seem to agree that ἑκάστου indicates each type of sensible (Hicks (105) 'sense as relative to each sensible' Ross (264) 'the sense for each sensible quality'; the point seems the same in less literal translation by Hett [137: 'in every case'] and Hamlyn [43: 'in each case']).

[117] Hicks (416).

which (3) talks about whole subjects themselves (the possessors of perceptible qualities), supposedly opposed in (4) to subjects qua qualified by perceptible properties.[118]

Arguments from transductionist commentators convincingly dismissed this reading, lending support to the idea that (3) is denying a literal affection by saying that the sense is not affected in so far as 'each of those perceptible qualities' is itself. In agreement with some transductionists, I believe that what 'not in so far as each is each of these' in fact means is 'not in so far as the received F is the F that belongs to F-qualified material composites'.[119] It is then true that in light of (3) RFwM cannot amount to being subject to a literal physical assimilation, as transductionists insist: sight receives red by being affected by a red tomato, but not in so far as the red received by the sense is said to be the red that qualifies the tomato as red. A suggestion in this direction comes from the parallelism between the 'not *qua* each is said each of those' in (3) and the previous 'not *qua* bronze' in 424a 21. Aristotle said there that the signature shape in a brazen ring is evidently 'matterless', since it is carried by it 'not qua' a signature made of bronze: the signature shape is an F-without-matter in a non-F-shaped subject.

My agreement with transductionist reading comes to an end as long as we move from (3) to (4) and (5), though. To be sure, the opposition between '*qua* τοιονδί' (4) and '*qua* each of those' (3) obviously requires that the sense's being 'such as' the received object does not amount to its being red-qualified like the tomato: were τοιονδί indicating that the sense is qualified in the same way as the source object, (4) would be in contradiction with the point just made in (3).[120] However, the problem of RFwM-Sufficiency, together with the meaning of the clause 'without matter' that emerged in the survey of its occurrences, make it impossible to endorse the further transductionist

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[118] According to Hicks (416-417), the term τοιονδί (commonly opposed to τόδε τι to express the distinction between the categories of substance and quality) serves here as a general term for "coloured, flavoured, sonorous" , and the point made in 424a21-24 is that 'the object acts upon sense not in so far as it is a concrete object, but in so far as it is coloured or flavoured or sonorous'. Similarly, Hamlyn (113) comments that 'when we see a man, the sense of sight is affected by him in so far as he is, say, white, and not because he is a rational, non-feathered biped'.

[119] Ward (220-221), Silverman (289, note 9). A slightly different construction is proposed by Caston (2005:306, n.120).

[120] Nor can (4) mean that the sense-faculty is affected qua 'such as F' in so far as the sense-faculty is itself matterless in the required sense, since this would entail the undesirable idea that the sense faculty, i.e. the perceptive soul, is a causally powerless and metaphysically sterile abstract entity.

idea that the denial of literal affections in (3) is followed by (4) and (5) by a description of physical processes of 'transduction' or 'codification'.[121]

In my view, (4) and (5) describe in positive terms what the 'matterless' F is in comparison to F-with-matter: despite being causally powerless and metaphysically sterile, the received matterless F is 'such as that' (τοιονδί) F belonging to F-qualified material composite subjects, as it is respondent to the essence (κατὰ τὸν λόγον) of F, i.e. to what F in fact is. In other words, forms-without-matter are reality-respondent with regard to corresponding forms-with-matter. The received red is not the type of entity that belongs to the red tomato (the causally efficacious aspect qualifying it as red), but an abstraction that is 'such as that', in the sense of being respondent to a certain aspect of the real world (the aspect of reality that makes the tomato red and capable to interact with the sense organ). This arguably means also that the place belonging to F in the structure of reality is aptly reproduced as well, as we perceive it as co-specific (though still different) from certain other aspects (colours and visible aspects), and as specifically different from other aspects with which it still share the generic feature of being perceptible (e.g., shapes, sounds and smells).

The initial 'likewise' in (1), then, includes all the clauses from (2) to (5), which describe once again what a matterless form is. The sense is being similarly affected by F in F-subjects, not qua each received F is a F in an F-subject (a form-with-matter), but *qua* each received F is a matterless form which is such as the F in an F-subject, i.e. *qua* it is an abstraction which is respondent to the essence of F. [122]

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[121] Ward's somewhat different proposal (220-221, cf. Silverman, 289, n.9), according to which the sense is affected by each subject not as having a determinable quality (e.g., a determinable colour like 'red') but as having a particular non further determinable one (e.g., this particular shade of red), is rightly rejected by Caston (Spirit.. 306, n. 120), who notes that this opposition hardly has any relevance here.

[122] It is important to get the 'likewise' right. Two readings can certainly be excluded. The first one is that by 'likewise' Aristotle means that the sense is 'likewise affected by a matterless form'. The reason why this reading must be excluded is that it implicitly attributes to matterless forms the power to affect inanimate objects like wax blocks and signet rings, which is impossible as far as forms-without-matter are causally powerless. The second reading to be rejected is that 'likewise' indicates that the sense is 'likewise affected as it receives forms in a matterless way'. First of all, according to the object reading of the simile I proposed, there is nothing like a 'matterless way of receiving forms' (the clause 'without matter' rather describes the abstract forms as opposed to forms that qualify or identify composite subjects). Furthermore, if such a 'matterless way of receiving' were in fact to be introduced here, the 'likewise' would end up being highly problematic: since the power to RFwM is going to be declared a sufficient condition to be a sense-organ, it would be absurd to state that there is a 'matterless way of receiving' which is 'likewise' taking place in senses and inanimate subjects like wax blocks and signet rings.

4. Conclusions

At the beginning of DA II 12, Aristotle claims that senses are able to receive *forms-without-matter*. Such forms are metaphysically sterile and causally powerless abstractions that correspond to real aspects of the world. As opposed to forms (realised) *in matter* or (fused) *with matter*, matterless forms do not perform the metaphysical job of qualifying or identifying the subject they belong to. The point is illustrated by the signature simile: senses receive items that are as 'abstract' as the signet ring's signature (which is carried by a bronze subject, but is not a piece of bronze) received by a wax block. The signature simile does not equate the wax block and the sense with regard to the reception of forms without matter. The matterless form F is actually received only in senses, while signet rings (or wax blocks, or any other F-subject quan F-subject) are only able to carry F-without-matter as an 'abstractable' aspect.

This reading of RFwM has a certain degree of agreement with the spiritualist and the transductionist interpretations, in so far as it endorses the idea that when a subject receives F without matter, the affection on the receiver does not amount to becoming an F-qualified or F-identified subject. More specifically, spiritualist interpreters are also right as they insist that the receiver does not become F-qualified because its matter does not work as the suitable ('to-be-qualified') material substrate for the received form, as it happens in physical affections and changes.

Two differences distinguish my reading of DA II 12 from that supported by modern spiritualists, though. First of all, it is in my view wrong to confuse RFwM with the supposedly 'phenomenal' changes taking place in media of perception.[123] RFwM is instead sufficient to be a sense-organ in the most proper way: no wax blocks or media of perception can receive perceptible forms-without-matter. The second distinguishing feature of my reading is its being fundamentally spiritualist without denying the existence of a physiology of perception. In my view, it is wrong to draw from the description of perceiving as RFwM any implication about physiology (on this point I therefore disagree also with transductionists and literalists). Far from being reducible to a negative point about the lack of physical assimilation (or to a description of physical transductions or assimilations), the concept of RFwM must be read in light of the (textually grounded) fact that Aristotle's 'forms-without-matter' are abstractions

[123] In my view, the very same idea of 'phenomenal' changes taking place in the media of perception should also be rejected (cf. above, Appendix to chapter 2).

corresponding to real aspects in the world. By employing this description, then, Aristotle only captures the *mental* dimension of perception: he does not in fact intend to say anything about physiological processes, and thence he is neither excluding nor describing them.[124] If we are looking for a physical description of perception, we have to look elsewhere, namely at the immediately preceding lines at the end of DA II.11, where perception is described as a homeostatic counterbalancing 'mediature' (as explained in chapters 1-2).

By his idea of receiving forms-without-matter, Aristotle captures the difference and opposition between the domain of the physical and the domain of the mental without using any such labels, nor any other modern candidate for the role of mark of the mental like consciousness or intentionality. Thanks to his peculiar hylomorphist metaphysics, Aristotle's description of the mental dimension of perception takes place by the same vocabulary and conceptual tool kit which serves the purpose of describing and analyzing the domain of the physical. This is baffling and puzzling from our point of view, and makes one wonder whether such an account is fact a first step towards a feasible and original account of the mental. At any rate, then, a good surprise indeed.

[124] On this point, I therefore agree with Scaltsas' claim that what Aristotle is concerned with is perception as a mental (not physical, nor reducible to a physical) event, without excluding the possibility of an underlying physiology related to it. Several differences remain, though: I endorse RFwM-Sufficiency and accordingly disagree with both Scaltsas' reading of RFwM as indicating selectivity of the information, and his belief that the initial simile grants to wax blocks the power of RFwM. Quite obviously, in light of what I claimed in chapters 1-2 about perception being a μεσότης, my reading of the reprise of this thesis in the explanation of the why plants do not perceive is also different from Scaltsas'.

Chapter 4 - Perceiving that we see and hear, and the debate about perceptual consciousness in Aristotle

In III 2 Aristotle introduces the activity of 'perceiving that we see', asking what αἴσθησις (sense, or sensation) is responsible for it.

According to the traditional reading, the passage is an investigation about the sense *capacity* responsible for the second-order *reflective awareness* of our own seeing, constituted by two arguments against the hypothesis attributing the activity at issue to a sense different from sight ('different sense hypothesis' from now on): a first one based on the Underlying Colour Inclusion (UCI, for short) requirement posed at 425b13-14; and a second one showing that the 'different sense hypothesis' unacceptably implies an infinite regress (b15-17). Aristotle's final answer has thence been thought to be that sight perceives that we see, and the rest of the passage (425b17-25) accordingly read as a defense of this position against a possible problem concerning the coloration of sight .

Modern commentators reacted to the traditional interpretation, and showed that what one can hope it to deliver is, quite disappointingly, nothing more than two badly conceived arguments for a conclusion that apparently contradicts what Aristotle says in another work (*Somn*. 455a17-20), where it is explicitly denied that that we see that we see by sight), followed by an obscure problem about the coloration of the organ of sight.[125]

Revisions proposed by modern commentators pointing out the problems in the traditional interpretation pointed in two directions. According to a first, Aristotle is not in fact arguing in favour of the 'same sense hypothesis' at all, but neutrally entertaining problematic implications of both the latter and the competing 'different sense' hypothesis (Osborne 1983). In a second interpretation, the 'same sense hypothesis' is instead still considered to be the view finally endorsed by Aristotle, but the interpretation of the argument he offers is importantly modified, to the effect of making the argument cogent and interesting. The latter approach was inaugurated by Kosman (1975), who proposed a fixing of the regress argument through a change of

[125] Cf. Kosman 1975:499-505.

perspective with regard to what 'perceiving that we see' means. In his view, the clause does not indicate self-consciousness or reflective awareness of our own seeing or hearing, but rather the non-reflective consciousness implicitly characterizing seeing (and any other perceiving) *qua* mental. Such recognition was thus connected with the problematic necessity to provide a complete account of what perception is, capable to supplement the reception of forms without matter – which is supposed to be a necessary but not sufficient condition for perception – with a further aspect.[126]

A more radical revision of the passage that revives Kosman's fundamental ideas has thenceforth been proposed by Caston (2002), who rightly remarked that the conservation of the traditional capacity reading cannot even provide a sound 'duplication argument' in 425b13-15 (the passage setting the UCI requirement and the second dilemma).[127] He thence argues that the question Aristotle treats concerns the structure of the perceptual *activity* that secures seeing (and hearing, and other types of perceiving) with its characteristic 'intrinsic consciousness' by means of a higher-order intentional act that, while being a different type of activity in comparison with the first-order act, does not count as a second token separate from it.[128] Against this revisionary attempt, Johansen (2005) has recently renovated the debate by proposing a punctually argued defence of the traditional 'inner sense' reading.

The effect of the recent attention the passage has received is that no shared consensus exists anymore with regard to what Aristotle is saying in the passage. The questions on which scholars disagree are reducible to the following three:

- *what type of awareness is Aristotle describing with the expression 'perceiving (i.e. being perceptually aware) that we see'?*

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[126] Scholars proposing the 'intrinsic perceptual consciousness' interpretation claim that the latter aspect is theorized by Aristotle to demarcate perception from the mere being physically affected by perceptible objects, and thence solve the problem left open, in their view, at the end of DA II 12 (cf. Kosman [1975:507-511] and Caston [2002:755-757]; the connection is rejected by Johansen [2005:256-257]). Aristotle is accordingly supposed to theorize 'intrinsic, non-reflective perceptual consciousness' as a further aspect distinguishing perception form the non-perceptual physical processes of the same type (like a transduction or a literal assimilation) taking place in inanimate bodies (notably, for instance, the media of perception).
Note that in my view such a distinguishing feature would not be needed: Aristotle already provided a 'mental' description of perception by describing it as RFwM in DA II 12, and a non-ambiguous theorization of a type of physical mechanism that is peculiar to perception in DA II 11 (cf. Chapters 1-2 of the present work).

[127] Caston 2002: 764-768. Johansen's defense of the traditional capacity interpretation is immune to the criticism, as he attributes to the passage a neutral stance with regard to the dilemma (cf. Johansen 2005:243-244)

[128] Caston 2002: 768-773.

- *is Aristotle arguing about senses (capacities) or sensations (activities)?*
- *is Aristotle arguing for a certain conclusion, or neutrally considering hypotheses and problems?*

The reading I am going to propose is somewhat rescuing the essence of the traditional interpretation, but to an extent much more limited than Johansen's. In my view, as in Johansen's, Aristotle is indeed investigating what *capacity* is responsible for the second-order perceptual awareness that we are seeing; however, I shall argue that in order to make sense of the regress argument it is necessary to employ the 'activity reading' of αἴσθησις in the hypothesis introducing the argument at 425b15-16. Against Kosman's and Caston's hypothesis, however, I shall claim that the regress does not require to attribute any notion of 'intrinsic' perceptual awareness to Aristotle, and that it remains ultimately uncertain what type of awareness he had in mind. The conclusion Aristotle is aiming at is rather that *an activity different from seeing*, and thence a power *different from sight qua sight* (the power of seeing, i.e. perceiving a visible F by means of causally interacting with an F-subject) is required to explain how we perceive that we see. In the course of his treatment, he does in fact show that – in spite of what a misunderstanding of the UCI requirement may lead one to believe– it is impossible to *see* that is being seen is being seen. In light of the context, and in full agreement with Aristotle's *De Somno*, the capacity by which we perceive that we see cannot be anything but the power of perceiving *per accidens* (perceiving a perceptible F without causally interacting with an F-subject), belonging in the same way to each single sense, and thus 'common' to all of them.

1. The question of neutrality

The beginning of Aristotle's treatment appears unproblematic in both the activity and capacity reading. His claim that some αἴσθησις (a word ambigously capable to refer to either a *sense* or a *sensation*) is responsible for the activity at issue stems from the assumption that we in fact *perceive* that we see and hear: the information is conveyed by perceptual activity[129]. The following initial dilemma, then, seems to require nothing

[129] This need not to be to the exclusion of other cognitive faculties. Aristotle is not saying that this content is accessible by perception only. The possibility that Socrates can think (or image or desire) that he sees and hear is not precluded.

but logic: it is either by *opsis* (vision, or sigth) that we see, or by another αἴσθησις (again, sense or sensation).[130]

The structure of Aristotle's reasoning, however, is unclear. As soon as the UCI requirement is introduced (425b13-14), and the dilemma accordingly updated (b14-15), it becomes difficult to understand – regardless of whether the argument is about senses or sensations –whether Aristotle is already arguing against one of the horns of the dilemma, or merely restating the theoretical options in a neutral way. The difficulty to be faced here is, in other words, that it is not at all clear whether the updated version of the 'different sense hypothesis', according to which there will be 'two (*aesthêseis*) of the same object', is in fact implicitly rejected, or rather neutrally entertained as a theoretical possibility on a par with the other horn.

According to the traditional reading, Aristotle would be arguing against the possibility that a sense different from sight perceives that one sees, by saying that since the 'underlying colour' (τοῦ ὑποκειμένου χρώματος, 425b14) must be included in the activity of the sense perceiving that we see, the hypothesis of a sense different from sight would violate the theory of 'proprietary' (or 'proper', *idia*) perceptible objects proposed in DA II 6. For according to the latter thesis, each of the five senses has exclusive access to a certain class of perceptible objects (e.g. colours are proprietary to sight, sounds to hearing, etc.).[131]

Modern analyses questioning the traditional reading called into question the above reconstruction of the first part of the passage, casting doubts on the efficacy of the argument it sketches. In this direction, Caston (2002: 766) noted that nothing prevents the 'two (*aesthêseis*) of the same object' hypothesis from referring to two senses that are only *numerically* different, and thence to a second sense of sight. In this hypothesis, no contrast with the doctrine of proprietary objects needs to follow and the argument is ineffective. Granted, a model based on the idea of an 'inner eye' seeing

[130] A doubt I shall not try to solve is whether the initial 'we perceive that we see *and* hear' means 'as we see, we perceive that we see; as we hear, we perceive that we hear' or 'as we are seeing and hearing, we perceive that we are both hearing and seeing together' (cf. Ross 1961:274-5 'we are seeing (or hearing)'; Polanski, 2007:381: " His noting that we perceive both that we see and we hear suggests (a) that not only is there such awareness of perceiving but that there is possibly perceiving of all perceiving, and (b) that there may be a unified awareness of all perceiving insofar as we are perceiving our perceiving") . While the difference itself is important, I do not think it is relevant for the point Aristotle is making here.

[131] Kosman (1975:500). Osborne (1983:402) casts doubt on the interpretation by noting that 'nothing is said about "proper" objects, and in the previous chapter we had just been considering objects perceived by more than one sense'.

the outer eye would be awkward, and what Aristotle himself is going to say in what follows shows that this is far from being his final answer to the question. However, such model is a theoretical possibility at this stage, and this suffices to show that the traditional interpretation is wrong.

To further disprove the traditional reading of the UCI dilemma, I wish to call attention to the fact that even a reference to a different *type* of sense, i.e. a sense different from sight, cannot in fact be excluded. One should note that Aristotle just established (in III 1, 425a30-b4) that the possible five 'particular' senses are accompanied by the ability to perceive proprietary objects of a certain sense 'by accident' through a different sense (and in the case of perceiving a flavour by sight). Such a possibility makes the hypothesis that the latter operation turns out to belong to a kind of sense different from sight valid, in spite of the UCI requirement.

The traditional reading is in fact wrong, then, in invoking the doctrine of proprietary objects to read the UCI dilemma as an implicit argument against the 'different sense' hypothesis. The doctrine of proprietary objects only imposes that each of the five senses has the proprietary power of *per se* perceiving a certain class of objects, and this is compatible with the equally explicit claim that each sense can access, by accidental perception, the other senses' proprietary objects. As a consequence, no argument against the 'different sense hypothesis' can be unquestionably attributed to Aristotle so far, in spite of the required inclusion of the 'underlying colour' belonging to the detected act of seeing. Without further qualification of how the 'underlying colour' has to be perceived (i.e. *per accidens* or *per se*), both the 'second sense of sight' (numerically different sense hypothesis) and 'second sense different from sight' (type-different sense hypothesis) are at this point valid theoretical possibilities.[132]

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[132] I therefore agree with Osborne (1983:401) as she notes that '[b]y this stage in the argument (425 b 15) the original pair of alternatives still remains open', but not when she says that '[i]t seems more likely that he thinks both seem problematic' (ibid., 402; in her view, if we take into account the whole chapter Aristotle's final reply is that the sense by which we perceive that we perceive must in fact be different from sight, cf. ibid., 406-407). Johansen (2005:243-244) reaches a similar conclusion by arguing that the 'different sense' hypothesis is afflicted by the tension it generates with the doctrine of proprietary objects, while the 'same sense' hypothesis by the fact that Aristotle claims in II 5 that we do not perceive our own organs despite of the fact that they contain fire and the other elements (not to mention the 'worry aired in Plato's *Charmides* 165cff, namely, that if knowledge is of something, it ought to be of something other than itself'). The type of neutrality I am going to attribute here to Aristotle is quite different from Johansen's. In my view, Aristotle is not in fact proposing any argument based on the contradiction of the doctrine of proprietary objects. Furthermore, as I am going to argue in Chapter 5 of the present work, I find the problem of self-perceiving *sense organs* in II 5 different from the

2. Capacities or activities?

The suitable interpretations of the first part of DA III 2, including the UCI requirement and the second dilemma (425b13-15), are apparently two: in a first, the 'neutrality reading' is coupled with the 'capacity reading'; in a second, the 'activity reading' is held together with a 'non-neutrality reading'. If what I argued above is correct, once the capacity reading is adopted, it is advisable, if not compulsory, to read the first part of the argument as a neutral exposition of theoretical possibilities. On the other hand, the activity reading of αἴσθησις is better suited to the scope of claiming that Aristotle is in fact providing a first argument against the 'another αἴσθησις' horn. As Caston (2002:770-772) suggests, the point would then be that (regardless of what power is involved) there is no double vision (nor, I would say more generally, any 'double perception'), of the original colour, a fact ultimately grounded on phenomenology. In short:

– *if* Aristotle is dealing with the question 'by what *sense* do we perceive that we see?' (capacity reading), *then* he cannot yet be arguing against either of the horns of the UCI dilemma, which would consist in the alternative between (i) the hypothesis that sight is able to perceive not only visible objects, but also 'that we are seeing them'; and (ii) the hypothesis that we perceive that we see by another sense, which is able to perceive that we are seeing while including the visible objects we are seeing.

– On the other hand, *if* Aristotle is dealing with the question 'by what *sensation* do we perceive that we see?', he would be already implicity endorsing (i) the hypothesis that a single act of vision perceives not only the visible object, but also 'that we are seeing it', while rejecting (ii) the hypothesis that another sensation is taking place, which perceives both 'that we are seeing' and the object being seen (for no double vision occurs).

The question we left aside at the beginning must now be faced: are there independent grounds to decide between the (neutrality involving) 'capacity reading' and the (non-neutral) 'activity reading'? Some (admittedly non-decisive) reasons favouring the first can be obtained by looking at the larger context in which the discussion occurs. As Caston (2002:763) himself admits, in DA III 1-2 Aristotle is generally interested in perceptual powers. He began the discussion with 'physical' argument concluding that

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question of perceiving our *senses* as they receive matterless forms, which is at issue here. Very roughly, this is the same difference that would distinguish first order perception of a part of our body from second-order perception of the qualia-characterized contents of our mind..

the maximum number of peripheral *senses* is five (424b20-425a13), and then discussed the perception of common perceptibles by means of the five *senses* (425a14-29). As already mentioned, he thence considers the power of perceiving one sense's proprietary objects by means of another *sense*, which postulates a power of perceiving by accident belonging to the senses working 'as one' (425a20-b4). At the end of III 2, he will consider the case of discriminating the difference between types of perceptible objects (e.g., that sweet is different from white), and argue again for the unity of the *senses* (426b9-427a14). Generally speaking, then, Aristotle seems interested here in showing that the model of five jointly working senses is capable of explaining the complex perceptual activities we are able to perform, and in fact postulated by them. This suggests that in the part of III 2 under consideration he is considering the phenomenon of 'perceiving that we see' from the same standpoint. In other words, Aristotle is likely asking what is the *sense* responsible for the activity of perceiving that we see and hear, and his agenda is arguably that such an activity can be fully explained by employing the model he is proposing (five different senses, plus a power to perceive 'by accident'). In view of the context, then, it seems more reasonable to support the (neutrality involving) capacity reading.[133]

Further indications in favour of the capacity reading come from considerations about the terminology Aristotle is employing. In fact, as Johansen (2005:242-3) has argued, 'we should take "the capacity of sight" to be the default meaning of *opsis* in the DA'. He notes that none of the occurrence for the sense of *opsis* as 'seeing' quoted in Bekker's Index are from DA, and that passages like DA II 1 412b27- 413a2, III 2 426a12-15 and III 3 428a6-7 (cf. also Metaph. IX 9 1050a24-25) clearly imply the sense of *opsis* referring to the capacity of sight. [134]

The arguments in support of the capacity reading based on context and terminology are admittedly not decisive, though, and its tenability should also take into account its (and the rival activity reading's) ability to make sense of the rest of the passage, including the regress argument and the aporia about coloration of sight. That the capacity reading does in fact fit the bill with the crucial help of the activity reading at

[133] I therefore largely agree with the reconstruction of the context offered by Johansen (2005:235-238).

[134] Johansen also rejects Caston's (2002:768) criticism of the capacity reading of the expression 'it of itself' at 425b15, based on the assumption that a change of referent in such a short phrase is unacceptable (the capacity reading must read the phrase as meaning that the capacity is of its own activity). As he remarks, 'Caston' s point relies on an artificially narrow idea of how to read reflexive expressions such as "seeing oneself"'.

425b16, is what I shall argue for in the following. Before moving on, however, I shall dwell upon the UCI requirement and its grounds, as this will prove necessary to trace back the argumentative path Aristotle is going to follow in the rest of the passage.

3. Making Sense of the UCI Requirement

3.1 The underlying object to be included is the subjectively experienced phenomenal quality

The type of 'neutrality' I coupled with the capacity reading has a positive advantage concerning the UCI requirement. The view I argued for promotes the idea that no argument based on the contradiction of the doctrine of proprietary objects has to be attributed here to Aristotle. In this way, it manages to avoid the implausibility of introducing the UCI requirement that affects the argument theorized by the traditional interpretation: were it in fact impossible that two senses different in kind have the same object, there would be no reason at all to endorse the UCI requirement in the first place.[135] A question remains, however, with regard to what are in fact the grounds for the introduction of the UCI requirement.[136]

Commentators rightly underline that the UCI requirement implies that it is not sufficient to get information about sight being at work, to the effect of discouraging any attempt to *reduce* 'perception that we see' to the proprioceptive feeling that sight is at work. For the latter proprioceptive feeling alone would clearly not need to include the information about what is being perceived (i.e. the underlying colour), against Aristotle's requirement.[137] In other words, once the UCI requirement is embraced 'perceiving that we see' cannot indicate that one is detecting that sight is at work seeing, but rather that what is being seen is being seen. Such remarks cannot be sufficient, though: even if the exclusion of mere proprioceptive feelings were in fact the goal Aristotle wants to achieve by embracing the UCI requirement, it would still be far from clear *why* one is supposed to accept such constraint.[138]

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[135] Cf. Caston (2002:765-6).

[136] The question left commentators like Hicks (1907:435), Hamlyn (1968:121-122) and Kosman (1975:500-501) perplexed.

[137] Caston (2002:771) notes against Osborne (1983) that the UCI requirement excludes the perceiving that we see is simply 'a matter of being informed that we are seeing, rather than merely dreaming; or discerning that we are seeing rather than, say, hearing'.

[138] According to Johansen (2005:243), the reason for the position of the UCI requirement lies in the fact that 'one cannot perceive the perception of that sensible form without also perceiving the sensible form as it is taken on by the sense faculty'. If this is the reason,

A question that is useful asking in the investigation concerning the grounds of the UCI requirement is 'what is the underlying colour Aristotle is talking about'? A need for disambiguation in the description of the relevant sense of 'perceiving that we see' can in fact be raised, which will prove useful in the determination of the nature of such activities and the grounds of the UCI requirement. The mentioned difference between mere 'proprioceptive' perceiving that we see, and the perceiving that we see abiding by the UCI requirement can be schematized in the following way:

- perception-that-we-see* = proprioception that the activity of seeing is taking place (the perceived content is 'Seeing' or 'Sight at work'[139])
- perception-that-we-see = perception that the colour being seen is being seen (the perceived content is '$^{\text{Seen}}$Red').

The ambiguity characterizing the phrasing describing the second, relevant sense of 'perceiving that we see' concerns the expression 'the colour being seen' (the 'underlying colour' Aristotle is talking about). The clause may be referring to either the source object's property (the red tomato we see), or to what the perceiver is subjectively being presented with, as a result of the interaction with the source object's property (depending on the theory of perception one embraces, this could be the sense-data, or *qualia*, or modes of presentation, that result from the interaction with the red tomato).

The above question about the nature of the 'underlying colour' is crucial, in so far as a reasonable justification of the UCI requirement can only be obtained, in my view, by stressing that the only *proper* perception that we see is the *direct perception of particular acts of vision* themselves,[140] accompanied by the visual qualities (*qualia*)

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however, one can still ask why we cannot simply perceive that we see, as opposed to perceiving that we see that particular thing. In note, Johansen explains that 'properly speaking seeing is never just seeing for Aristotle; it is, at least, seeing red or yellow or some colour, since seeing is a matter of some such sensible form being received by the sense faculty'. This explanation raises the further question of why Aristotle does in fact think that seeing is always of some object, but even if the question is left aside and the point accepted, it does not follow from it that one cannot detect that the activity of seeing is taking place without perceiving its object.

[139] The second is to be preferred, since Aristotle tends to distinguish the being at work of sight (which occurs also in darkness) from the actual *seeing*, that consists in the interaction between sight being at work and actually visible objects (cf. later in III 2, 425b17-22).

[140] Caston (2002:766-768) rightly emphasizes that it would be absurd to claim that what is being perceived is the capacity of seeing itself (what he calls 'extreme capacity reading'). As he himself recognizes (ibid.), though, the defender of the capacity reading need not accept that perceiving the capacity amounts to perceiving that a certain subject is able to

characterizing them. According to this proposal, the question about the ambiguity of 'the colour being seen' must be solved invoking the necessity of including the 'subjective' and 'mental' qualities accompanying the detected act of vision (the sense-data, or 'qualia', or modes of presentation), rather than the perceptible object that the detected act of vision is interacting with (the red tomato). Aristotle is thence requiring that we perceive the particular act of vision with the corresponding 'mental' colouration characterizing it at each given time. Perceiving that we see means being aware that what is being seen is being seen, by means of an act of perception that has as its object the particular act of vision, i.e., the subjectively experienced act of vision, that is – so to speak – coloured in 'mental' or 'phenomenal' paint.

3.2 Justification of the proposal

To justify this proposal and the soundness of the version of the UCI requirement I attribute to Aristotle, I shall rely on the intuitive difference between properly *perceiving* that we see and *believing* that we see by means of perceptible indicators along the lines of what I call the 'inferential model'. The 'inferential model' is based on a mechanism of getting information by perceptually conveyed testimony, indirect reports or signals. This is the way in which, for instance, I come to perceive that Socrates sees when I see that all the questionnaires I gave to people knowing Socrates have the 'yes' box ticked under the question asking whether Socrates sees. In both cases, I can say that I come to believe that Socrates sees on the basis of perceptible testimony, and in this sense I may say that I 'perceive' that Socrates sees. In such cases, the verb 'to perceive' is evidently employed in a loose way, i.e. as short for 'to come to believe by perceptible indicators'.

The mechanism of perceptible testimony characterising the 'inferential model' may be applied to the case of one's own perception of seeing. In this case, there is to be sure a notable aspect to be taken into account, namely the fact that both the perceptible indicator and the agency perceiving it belong to the same subject, i.e. myself. This is not what really matters in the inferential model, though. What is essential in the model is rather that the part responsible for seeing, i.e. sight, gives out a perceptible signal that is perceived by what perceives that sight is seeing. An example of this would be a hypothetical case in which an internal sound is produced in my body every time my sight sees, to the effect that I perceive (by hearing the emitted sound) that

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perceive, and rather argue that what is perceived is that the subject is seeing (what he calls the moderate capacity view).

sight is at work.[141] For a less phenomenologically awkward application of the same model, we just have to think of an inner perceptible signal of a different kind, like a proprioceptive feeling due to extraocular muscles spindle stretch. What actually distinguishes the 'inferential model' is exactly the fact that in all such cases what we perceive is strictly speaking a perceptible signal to be interpreted as evidence that we are seeing, to the effect that 'perceving that we see' would mean 'coming to believe that we see, by perceiving a perceptible sign indicating that this is the case'.

If the characterization of the 'inferential model' I offer is accepted, it is arguable that the structure that defines the model may still be in place even when the perceptible sign by which the original perceptual activity is detected is changing in accordance to the content of the inferentially detected perceptual activity, to the effect of allowing one to indirectly interact with the original source object being perceived. It is worth dwelling upon this possible scenarios, since in such cases one might be deceived into thinking that the subject is in fact satisfying 'the underlying colour' requirement. My claim is that in these cases the requirement would not in fact be respected, if not in a merely appartent way, which is not the one Aristotle has in mind as he poses it.

A first interesting variation of the 'inferential model' may be exemplified by the 'blind man & guide dog' case. By following the dog's movements, the guided man is indirectly interacting with visible aspects of the world being seen by (the dog's) sight. Despite the (indirect) interaction with visible objects, the blind man has no 'perception of the (dog's) seeing', if by this we mean 'perception of the (dog's) vision inclusive of the objects being seen by it'. The man is 'perceiving the dog's seeing' only if by 'perceiving' we mean 'coming to believe that the dog sees by means of perceptible indicators'. What is interesting in the 'blind man & guide dog' case is that perceiving that one sees by indirect interaction with the external visible object being seen is not yet sufficient to exclude the 'inferential model'.

A second interesting variation is represented by cases in which one sees that one sees while also seeing the external visible object, without this being sufficient to exclude 'perception of seeing' according to the inferential model. The situation can be illustrated by the 'second row watcher' case, in which a person watching a horror movie perceives that people in the first row are seeing the projection, by means of seeing them cringing in their seat. Again, even though the second row watcher is

[141] Cf. the hypothesis entertained (and rejected) by Kosman (1975:203-504) in his reasoning on the meaning of perceiving that we see and hear.

directly seeing the same visible object (the horror movie on the screen) being seen by the (first row watcher's) act of vision she is detecting, she is not 'perceving the (first row watcher's) act of vision', and she is only perceiving that the other watchers are seeing if what we mean by 'perceiving' is 'coming to believe by means of perceptible indicators'.

The cases that fit the 'inferential model' described above are as far from '*perceiving* that one sees' as '*seeing* a red tomato' is from '*believing* that a perceptible tomato we cannot see is there' on the grounds of someone else's 'perceptibly vehicled testimony': I can *believe* a red tomato is behind a screen because I hear your voice as you tell me so, but this is not what *perceiving* a red tomato is. Similarly, I can *believe* that I see by interpreting a perceptible signal, but this is not what *perceiving* that I see is. The object analogous to the accessible red tomato in the case of properly perceiving that we see is, in my view, the particular act of vision we are engaging in as the perception that we see is taking place.

The 'blind man & guide dog' and 'second row watcher' cases show that interacting or even seeing the external objects are not sufficient to 'perceive' that one sees, if by 'perceive' we mean something more robust that 'coming to believe by perceptible indicators'. This suggest that the only way in which the blind man and the second row watcher might actually *perceive* that the relevant act of *seeing* they are inferentially detecting would be by a second-order perceptual act that is inclusive of the original 'mental' qualities (*qualia*, modes of presentation, sense-data) belonging to the act of vision being detected. Those features can be applied by analogy to a single subject's activity thus gaining the possibility to convert 'perceiving my own seeing' into 'perceiving that I see'. The conclusion is that one cannot be said to properly *perceive* one's own seeing, unless the original *qualia* characterizing the detected act of seeing are accessed by a second order act of perception (where 'properly perceive' means that the substitution of 'perceive' with 'come to believe by means of perceptible indicators' is not allowed). The requirement Aristotle poses, according to which the sense responsible of perceiving that we see must include the 'underlying colour' being seen, is therefore justified.

Caston's remark that the reasons behind the UCI requirement have to do with the precise determination of the type of mental activity at issue is therefore, in my view, a

first agreeable move in the right direction.[142] This very same assumption, however, allows two different reconstructions. According to a first, the UCI requirement serves the purpose of restricting the argument to *a certain type* of 'perceiving that we see'. In a second reconstruction, the point of the UCI requirement is rather to specify a condition that is *generally necessary* in order to have 'perceiving that we see'. In my view, Aristotle's point is the latter, not the former.[143] What Aristotle is implicitly assuming is that in order to *perceive* that we see we must perceive that what is being seen is being seen; the mere 'perception of seeing' would be compatible with coming to believe that we perceive by means of perceptible indicators. In such cases we would in fact be perceiving some indicators, but not 'perceiving that we see' in the relevant sense, i.e. perceiving that what is being seen is being seen.[144]

Despite being proposed aboust colours and sight, the UCI requirement is obviously valid for all senses: what perceives that we are per se perceiving F, must perceive both F and the sense perceiving F. This explains why in the following lines Aristotle is never

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[142] He argues (2002:771) that the UCI requirement is 'gratuitous' unless taken as indication of the sense of 'perceiving that we see' Aristotle is interested in. In his view this sense is 'perceiving that we are undergoing a visual experience with a particular content'. The sense of 'perceiving that we see' at issue would then be 'a perception both of our seeing and of the object seen'.

[143] Caston seems to have in mind the first type of point instead. To be sure, the 'perceiving that we see' Aristotle has in mind must be, in Caston's view, the intrinsic awareness constituting the 'mental mark' of any perceptual activity (2002:755-759, 769, 773-775); and yet, for Caston [t]here are perhaps circumstances, in which it is true to say that 'I perceive that I see' without my having perceived what I am seeing' (771). This concession appears problematic: if Aristotle were arguing about the intrinsic awareness structurally characterising *any* perceptual activity, one would expect him to be unwilling to restrict his argument to *a certain kind* of perceptual activity. In fact, he should rather be wary of unduly exclusion of any perceptual activity whatsoever from his treatment. I suspect that Caston may be thinking that Aristotle is at this stage proposing a first, less general reasoning, to be followed by the second, more general regress argument.

[144] Osborne justifies the UCI requirement by noting (1983:403-404, 406) that colour must be included since what is detected is seeing, a specific type of activation of sight (as Aristotle says, sight can be exercised without the corresponding activity being sight), which on the basis of the second part of III 2 (425b26-426a26) is identical with the actuality of colour and thence 'transparent'. Without the exclusion of the irrelevant loose sense of 'perceiving that we see' (an exclusion that already requires, if I am right, the inclusion of the underlying colour), however, the justification proposed by Osborne is defused, since nothing would otherwise prevent one from perceiving that a specific activation of sight, like seeing, is taking place by a perceptible indicator specifically corresponding to it (for a wholly different line of criticism concerning the 'transparency' of perception, cf. Caston, 2002:782-785). For the same reason, the inclusion of the underlying objects is not required to perceive that the activation at play is seeing rather than, say, tasting. It is therefore implausible that this is what perceiving that we see means, as Osborne (1983: 406-407) proposes.

questioning the Underlying Colour Requirement he is committing to here.[145] In fact, it is plausible that similar considerations, which may be familiar to Aristotle's audience because of the discussion in Plato's *Charmides*, apply also to the detection of non-perceptual types of mental activities: the underlying object must always be included in the higher-order perceptual (or in some cases, intellectual) activity that performs the detection.[146]

4. Making Sense of the regress according to the traditional 'reflective awareness' model

4.1 Is the awareness to be explained first-order 'intrinsic consciousness' or second-order reflective consciousness?

As anticipated, intepreters like Kosman and Caston argued that the activity being investigated in Aristotle's treatment of 'perceiving that we see (and hear, etc.)' is the being aware that intrinsically belongs to every act of perceiving qua mental. The latter 'intrinsic consciousness' reading was motivated by the necessity to solve a difficulty concerning the regress argument at 425b15-17. If intrinsic consciousness is what Aristotle is indicating by 'perceiving (being aware) that we perceive', it is a truism to say that every time we see (or hear, etc.) we experience the awareness (perception) of seeing, since awareness will belong to seeing (and any other perceiving) by logical necessity. In this view, the regress will in fact follow if one postulates that it must be by another sense or act of perceiving that sensations are made conscious. On the contrary, and despite the recent defense by Johansen, the regress argument remains more difficult, if at all cogent, under the traditional assumption that 'perceiving that

[145] The UCI requirement is also valid, in my view, for both the horns of the initial, 'purely logical' dilemma, i.e. whether or not the part or subject seeing is in fact the same as the subject or part perceiving its being seeing. As Caston (735, n. 35) reports, the restriction to the 'another αἴσθησις' horn is instead supported by Alexander (*Quaest*. 3.7,91-2), Themistius (*In De an*. 83.13); Ross (1961: 275 ad loc.), and supplied in translation by Wallace, Rodier, Hamlyn, Tricot, Barbotin.

[146] As Caston (2002:775, note 50) shows, this does not mean that the higher-order, underlying object inclusive activity must be of the same type as the detected first-order one (so that we would have the absurdity of 'desiring to desire' and 'doubting of doubting'). In fact, in the rest of DA III 2 Aristotle will defuse any argument aiming at imposing a similar correspondence between the type of 'underlying' object and the type of detecting faculty, thus gaining the possibility to argue that even though detection of desire must include the desired object, which is a 'proprietary' object of desire (in the same way as red is proprietary to sight *qua* sight), this does not imply that the desirable object must be included by means of being once again subject to the same type of power (desire), since we have a special perceptual power perceiving F 'by accident'.

we see' indicates the reflective awareness of our own perceptual (visual) activity. As Kosman has showed, there is no reason why one should not be happy and stop after the postulation of an αἴσθησις (be it a sensation or a sense capacity) that perceives the first act of vision. The reasoning proposed by the traditional interpretation would require a further αἴσθησις for the perception of perceiving that we see, and so on for each higher order perception; but nothing forces one to go on adding further higher-order *aisthêseis* for the sake of perceiving that we see.[147]

Despite the undeniable merit of being able to make sense of the regress, I find the invocation of a notion of 'intrinsic consciousness' unconvincing. Leaving aside philosophical controversies surrounding the very idea of 'intrinsic consciousness' and its explanation in terms of higher order intentional acts (not to speak of the risk of anachronism), I find such proposal unsupported by the wording Aristotle employs here. The important drawback of the 'intrinsic consciousness' reading is that if the expression 'perceiving *that we see*' suggests anything, this is not the awareness 'intrinsically belonging to' seeing (and thence, in this sense, '*of*' seeing), but rather the second-order perception by which we are aware that seeing is taking place.[148]

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[147] Kosman 2005:280-281. Johansen's attempt to meet Kosman's criticism is unconvincing. In Johansen's view (2005:244-5), a parallel with the third man argument can be drawn, and the regress concerning sense faculties is triggered by the combination of two principles: (i) in order for a faculty to be perceived, a different faculty must be postulated; (ii) every faculty of perception is itself perceptible. In my view, the reconstruction fails to entail the regress, since the explanatory asymmetry characterizing the third man argument is crucially missing in the argument about senses designed by Johansen. The explanatory asymmetry in the argument about Forms consists in the fact that the 'bottom level' represented by the individual subjects is always and only working as the *explanandum*, never as the *explanans*: a Form F may explain why a particular F is F, but certainly not the other way around. On the opposite, in the case of senses there is no such hierarchy, and it is possible to break the regress by theorizing, for instance, that while sight's activity is perceived by X (a sense different from sight, which at this point in the argument may be another one of the five senses), X's activity is in turn perceived by sight. *Pace* Johansen, no infinite proliferation of faculties necessarily follows.

[148] As Osborne (1983:405) rightly remarks. Kosman's reading tries to justify the equivalence by invoking the thesis that the act of the sensible and the act of the sense perceiving it are identical (exposed in III 2, 425b26-426a26), so that 'perceiving red' is –in his view– equal to both 'perceiving red's actuality as it affects sight' and 'perceiving sight's seeing red'. The argument is rightly rejected by Caston, 2002:782-785. Caston's own interpretation may appear to offer a solution, since in his view (2002:752) Aristotle's position 'cuts down the middle' of the dichotomy generated by the current debate 'between those who take consciousness to be an intrinsic feature of mental states and those who think it consists in a higher-order thought or perception' . In this way, Aristotle may be thought to be justified in embracing both the 'perception of perception' talk and the assumption that each perceiving postulates a higher-order perception. For the being conscious that is intrinsic to each perceiving would in this view require such a higher-

Furthermore, against a common assumption shared by proponents of this interpretation, I believe there is in fact no theoretical need for it in Aristotle's account of perception.[149]

If the attribution to Aristotle of the notion of intrinsic (non-reflective) perceptual consciousness is rejected, however, it becomes urgent to provide a convincing alternative explanation of the regress. In what follows, I propose an attempt at such an explanation.

4.2 The Regress Argument without Intrinsic Consciousness

The intepretation of the regress argument I am going to propose will be based on an attempt at re-assessing, in the frame of an overall 'capacity reading', the 'another αἴσθησις' hypothesis introducing it at 425b16-17. As we know, at this point in the text Aristotle has just posed the UCI Requirement, and consequently revised the original dilemma. He now proceeds to argue that under the mentioned hypothesis a regress will follow.

Commentators generally agree that the 'another αἴσθησις' hypothesis in b16-17 is just making explicit that what Aristotle is going to argue against is one of the horns of the dilemma, namely the idea that the αἴσθησις (once again 'the sense' for supporters of the capacity reading, 'the sensation' for proponents of the activity reading) by which we perceive that we see must be different from that by which we see. The Greek ἑτέρα εἴη ἡ τῆς ὄψεως αἴσθησις is accordingly read as 'if the sense/sensation having sight/vision as its object is a different one'.[150] In this view, Aristotle's argument is deemed to aim for the conclusion that not only seeing, but also perceiving that we see, must be attributed *to the same* αἴσθησις (sight, in the capacity reading; vision in the activity reading), since the attribution to a different one generates the regress . As anticipated, along the lines of this reconstruction the only plausible reading seems to be the one attributing to Aristotle a notion of 'intrinsic non-reflective consciousness',

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order perception. The awkwardness of the expression remains, however: Aristotle's starting point is that we have second-order perception (perceiving that we perceive), and not that first-order perception is aware because we have second-order perception. He says 'since we are aware that we perceive…', and reading this as 'since we have awareness as we are seeing…' keeps requiring too much of a stretch.

[149] Cf. note 126 above.

[150] Cf. translations by Hicks ('if the sense perceiving sight were really a distinct sense'), Hett: ('if there is a separate sense perceiving sight'), Hamlyn ('if the sense concerned with sight were indeed different from sight'). The ROT has it as 'if the sense which perceives sight were different from sight'.

since the more natural reading of 'perceiving that we see' as reflective awareness of our own seeing appears unable to make Aristotle's argument sound.

The difficulty involved in reading the expression 'perceiving that we see' in the most natural and simple way – i.e. as indicating (non-intrinsic) 'second-order' awareness – makes it worth exploring a different interpretation of the initial hypothesis, according to which the words εἰ καὶ ἐτέρα εἴη ἡ τῆς ὄψεως αἴσθησις do in fact mean 'if there were another sense/sensation of sight'. In this reading, the genitive 'of sight' (τῆς ὄψεως) is not objective (as in 'the perception of the apple'), but specificatory (as in 'the habit of smoking'): the sense/sensation is 'of sight/vision' *not* in so far as it has sight/vision as its object, but rather as it is an instance of the visual type of sense/sensation. Accordingly, Aristotle's regress argument is *not* deployed against the hypothesis that 'we perceive that we see' by sense/sensation different from sight/vision, but rather against the hypothesis that we do it by a further visual act, i.e. a second act of seeing.

Outlandish as it may seem, the hypothesis of 'another sensation of sight' (which will eventually prove wrong) can at this stage appear justified by the supposition that since the original *qualia* to be included are *visual*, i.e. proprietary to sight *qua* sight, the perceptual activity including them can only be a second act of *vision*. Once the hypothesis is posed, the regress does indeed follow, regardless of whether one assumes the 'one sense of itself' or the 'two senses of the same object' model. Under the assumption that we in fact 'perceive that we see' by *seeing* that what we are seeing is being seen, the preceding dilemma will impose the choice between the two following horns:

– *Horn 1: 'two senses having the same object & another* αἴσθησις *of sight'*

a second instantiation of sight (Sight2) perceives that what the first sight is seeing is being seen, by means of a second act of vision (Vision2) that is due to the causal interaction between itself and the first simple sight (Sight1) engaging in the first act of vision (Vision1). A representation of the model can be obtained imagining a perfectly transparent sensor that sees 'red', and a second sensor behind it perceiving the first sensor (if the first sensor is affected by a red tomato, the second sensor is affected by the tomato-affected first sensor). Note that on this model, the phenomenal qualities of the first act of vision are preserved.

– *Horn 2: 'one sense of itself & another* αἴσθησις *of sight'*

one and the same power (Sight) perceives, by means of a second act of vision (Vision2), that what it is itself seeing (by means of a first act of vision, i.e. Vision1)

is being seen. A representation of the model can be obtained imagining a reflective sensor that, thanks to a system of mirrors, is affected at the same time by a red tomato (Vision1) and by its own being affected by it (Vision2, due to a double reflection)

What is implying a regress is, in both the hypotheses above, the fact that the hypothesized second act of vision would be identical to the first whose perception is supposed to postulate it. The gist of the regress argument is that if the postulated second act is *simply* an act of vision preserving the content and phenomenal qualities of the first one, such further act of vision cannot be anything but a simple reproduction of the first (like a second photograph printed from the same impressed film). As a consequence, if one hypothesizes that in order to perceive that we see the first (visual qualia inclusive) act of vision is simply perceived by a second act of vision, an infinite regress will follow.[151] Being a copy of the first act of vision, the second, simple act of vision has nothing more to contribute in comparison to the original one; and if, in order to explain how we perceive that we see, the previous act of vision needed to be seen by a further one, the same will apply to the second, and so on *ad infinitum*. In my view, then, no postulation of a controversial notion of 'intrinsic non-reflective perceptual awareness' is needed to make sense of the regress argument, and the reason why Aristotle draws the consequence of a regress from the assumption of 'another act of vision' is quite simple and straightforward.

This reconstruction makes sense of Aristotle's regress argument without having to attribute to him the idea that there is a physically or logically necessary co-occurrence of 'seeing' and 'perceiving that we see'.[152] This leaves untouched the further,

[151] More precisely, the 'one power of itself' horn will generate a regress of tokens, the 'two powers of the same object' horn a regress of both tokens and powers.

[152] That there always is that co-occurrence is claimed by Caston (2002:757-759, 774-775), on the grounds of a certain reading of several passages (*Phys*. VII 2, 244b12-245a2; *Sens*. 2, 437a26-29; cf. *Mem*. 2, 452b26-8 and *Sens*. 7, 448a26-30; *EN* IX 9, 1170a29-b1; *Metaph*. XII 0, 1074b33-36). As Johansen (2005:263-269) shows, however, a different reading of those passages is possible, according to which the co-occurrence is not necessary. It is worth noting, in particular, that – as Johansen (2005:266, n.64) remarks – in Sens. 437a26-29 Aristotle's argument makes perfect sense if the Greek μὴ ἔστι λανθάνειν <μὴ> αἰσθανόμενον καὶ ὁρῶντα ὁρώμενόν τι , is rendered as 'it is not possible to be unaware of what is seen when one is seeing', thus neutralising Caston's point (which is based on the reading 'it is not possible to be unaware of perceiving and seeing something seen'). Johansen further remarks that even if Aristotle stated that second order 'perceiving that we see F' and first order 'seeing F' are always co-occurring, such co-occurrence may still be due to physical (causal) rather than logical necessity. In this way, second-order

independent question whether the co-occurrence of 'seeing Red' and 'perceiving ^{seen}Red' (which is in my view possible, but not necessary for the entailment of the regress in DA III 2) amounts to a single token or to two separate ones.[153]

Once the explanation of perceiving that we see by a *simple* second act of seeing is proved to be untenable, it becomes clear that what is needed is a different type of perceptual activity and a corresponding power that – having still to abide by the UCI requirement – includes *also* (as opposed to *just*) the information and phenomenal qualities belonging to the first, *simple* of act of seeing. This type of activity is the only alternative to the regress. As Aristotle says:

> either there will be a regress or a *certain* one will be of itself (425b16, my translation and emphasis)

In my view, the 'certain' (τις) here must be emphasized as an indication that the power at play here cannot be *simple* sight (i.e., sight *qua* capable of seeing), since the activity that is required cannot be limited to a *simple* act of seeing.[154] In order to avoid the regress, it is necessary that the operation of perceiving that we see is not theorised as a simple act of vision that is merely replicating the original one and its phenomenal qualities. On the contrary, it is crucial that there is 'something special' that makes the required perceptual activity different from mere seeing. An additional element of information must in fact be provided by the activity at issue, to the effect that its content can be described as '^{seen}Red' rather than simply as 'Red'.

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perception cannot be said to be 'part of the nature or essence of first-order perception' (*ibid*.:268).

[153] Caston (2002:777-778) argues that Aristotle's passage reveals the logical inseparability between two components in each and every token of perception. In Caston's account, in each token of perception a sense is directly perceiving something else and, at the same time, indirectly perceiving itself. Against a common assumption in contemporary thought, however, the unity of the token requires that the individuation of mental acts cannot be exhausted by content (Caston 2002:781-782). Otherwise, the obvious difference in the type of content between seeing and perceiving that we see (respectively having 'Red' and '^{seen}Red' as their content) would imply the impossibility for them to form a single token. Johansen (2005:259-260) does on the opposite insist on the difference in content and truth condition between the two activities to reject the idea that they form a single token, objecting that Caston 'provides no justification of his rebuttal' (ibid., p.260, note 50).

[154] This means that the 'one sense of itself' in b15 (αὐτὴ αὑτῆς, opposed to δύο τοῦ αὐτοῦ) is not referring to the exactly the same hypothesis as the 'some *certain* sense of itself', offered as an alternative to the regress in b16 (αὐτή τις … αὑτῆς, opposed to εἰς ἄπειρον).

5. Making Sense of the aporia about colouration of sight

The necessity to avoid the regress requires that perception that we see is assigned to a capacity that is not limited to the reproduction of the detected perceptual activity's 'underlying object'. There are several ways in which one can meet this condition, but at this stage it is unclear whether in doing so one must worry about saving the assumption – implicitly grounding the postulation of 'another act of sight' at 425b15-16 – that the inclusion of the visual (phenomenal) qualities of the detected act of seeing requires one to attribute to the 'special' self-detecting power the capacity to *see*. If this is the case, the only way to avoid the regress would be by theorizing a specially 'enhanced' ability to see, thence abiding by one of the following two options: *either* (i) we perceive that we see as sight, specially (and perhaps *ad hoc*) endowed with self-detecting abilities, perceive '^{seen}Red' by a single act of 'enhanced' vision ('same sense' horn, hypothesizing an act of 'super' vision rather than a simple 'seeing'); *or* (ii) perceiving that we see takes place by another, self-detecting sense, which will have to be endowed with the ability to *see* the colour underlying the detected act of vision same sense hypothesis (different sense horn, hypothesizing a second act of 'super' vision after the first 'simple' or 'standard' act of seeing).[155]

It is exactly the concern about the theoretical possibility of *seeing* that we see, still open for someone willing to theorize an enhanced power of sight and act of vision, that motivates Aristotle to consider the problem concerning the colouration of what sees. He says:

> There is a problem: for if perceiving by sight is seeing, and one sees a color or what has it, then if a certain sense *sees* what is seeing, what is seeing must be coloured in the first place (425b17-20, ROT modified, my emphasis)

According to the view Aristotle is evaluating, the 'special' sense invoked to elude the regress is *seeing* the detected act of vision. In this model, perception of seeing must work by the same mechanism of causal interaction with visible objects belonging to normal vision (in the 'enhanced sight' model, this must happen while providing an additional piece of information). The mechanism at issue, which equally characterizes all cases of *per se* perceiving, requires that in order to perceive F a special sense must

[155] When Aristotle observes that, for the sake of simplicity and economy, the best explanation would attribute this power to 'the first' sense (ὥστ' ἐπὶ τῆς πρώτης τοῦτο ποιητέον, 425b17), he is therefore meaning the 'first' in the series: the first of postulated senses, if another sense is needed, or (the by now 'enhanced') sight itself, if no other sense is needed.

be causally interacting with an F-subject: we perceive red by causal interaction with a red subject, e.g. a red tomato.[156]

Aristotle proceeds by critically remarking that the mechanism at work in seeing is not adequate to account for all instances of perceptual activity, even if we limit ourselves to sight:

> Well, to be sure 'to perceive by sight' has more than one meaning; for even when we are not seeing, it is by sight that we discriminate darkness from light, though not in the same way as we distinguish one colour from another (425b20-22, ROT modified)[157]

Aristotle is here stressing that there are cases in which perception of a certain content cannot be due to the mechanism of 'perceiving F by causal interaction with F-subjects', which is at work in seeing (and hearing, etc.). In experiences like perceiving darkness or silence, there obviously are no causally powerful F-subjects corresponding to the F content being perceived. As we perceive darkness, our sight is not causally interacting with anything visible, and rather perceiving a certain content because of the lack of it. The fact that Aristotle says that as we perceive darkness by sight we are *not seeing* is, therefore, a confirmation that his point consists in calling attention to the presence of a different type of perceptual activity, which arguably postulates a different type of perceptual power.

Having secured on independent grounds the existence of the activity of perceiving F without interacting with an F-subject, Aristotle can now directly attack the assumption that grounded the regress-implying hypothesis of 'another sensation of sight', namely the idea that since the underlying colour must be perceived as we perceive that we see, then we can only perceive that we see by seeing the supposedly visible colour included in the detected act of vision. He observes that

> in addition, it is *in a certain way* that what sees is coloured; for in each case the sense-organ is receptive of the perceptible item without the matter (425b22-24, my translation)

The above remark concerning the colour that 'tinges' the capacity of sight that is at work in seeing enforces the necessity of a special type of perceptual power, different

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[156] More precisely, for Aristotle one must interact with an *actually perceptible* F-subject. This requires, for instance, that an indeterminate and actually transparent body (such as air or water in presence of fire) affected by the visible source object 'mediates' the interaction between the latter and the sense organ of sight. This further complication will be ignored here, as it does not affect any aspect of my reconstruction.

[157] As Osborne (1983:402, note 7) notes, the word τοίνυν introducing the remark at 425b20 (rendered as 'well, to be sure' in the above translation) does not indicate a conclusion, but rather a rejoinder.

from the one involved in seeing.[158] Aristotle is willing to admit here that the reception of forms without matter coincides with some sort of colouration of what sees. However, as established in the analysis of DA II 12 (424a17-28), forms without matter are *causally powerless* abstract items, and the described operation of perceiving '[Seen]Red' cannot accordingly amount to *seeing*, nor take place by causal interaction with something that is *visibly* red, i.e. as red as a tomato, or even as the transparent medium affected by it.[159]

The reference to the reception of matterless forms confirms the interpretation of the UCI requirement offered early, in so far as the special colouration Aristotle is hinting at here seems to coincide with what we would describe today as the phenomenal quality of vision (the subjectively experienced *qualia*).[160] Aristotle is here stressing

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[158] As Johansen (2005:245-248) notes, it is unlikely that τὸ ὁρῶν ('what sees') indicates here the activity of seeing, as Caston's reading requires. In terms of meaning, it makes sense to say that sight has colour as it is seeing, but not that the act of seeing itself has colour, as Johansen's comparison with a fence being painted shows (2005:246: 'the fence becomes colored in the act or activity of being painted, but it is not the act of being painted that has the color'). Further, the use of the neuter participle with definite article instead of the infinite with definite article is unusual in classical Greek literature (Johansen, 247 notes that 'Caston quotes no examples from Aristotle and I am aware of none') and 'even in the unlikely eventuality that Aristotle was using the idiom, it would still be unsuited to supporting an activity reading rather than a capacity reading', since 'it would still retain, according to Denniston, a reference to the part or the whole of the person in its activity of seeing, that is to say the faculty or the person seeing' (Johansen, 2005:247-248).

[159] I am therefore in disagreement with Kosman (1975:512). Assuming that perceiving that we see indicates the (non-reflective) intrinsic consciousness belonging to first-order perceiving, he explains that since 'awareness is by sight, it will be seeing, and since what we see is colored, its object will be colored. (...) then (...) that which sees at the eyeball or retina (...) will have to be colored. Aristotle (...) offers two possible responses. (1) (...) not all perception by sight is seeing. (...) (2) (...) that which sees is in a sense colored, since the sense organ takes on the sensible form without the matter'. Similarly Osborne (1983:402) comments that here Aristotle 'questions whether there is any difficulty in supposing that it is a case of seeing, and hence of seeing colour, in that it has been argued that that which is seeing is, in a way, coloured and hence could itself be seen'. In the same direction, Johansen (2005:251) notes that '[w]hat is required is a notion of being colored that would allow a) for the sense organ itself to be perceptible by being so colored and b) for the color to remain in the sense organ after the departure of the external sense object', arguing that both the literalist and spiritualist readings are up to the task. In his view (2005:267) the colouration 'suggests that there is color available for second-order vision whenever we are engaged in first-order vision. So whenever I see a colored object before me, that color will itself be impressed on my sense-organ and therefore my sense organ can itself be seen, as colored'.

[160] I therefore largely agree with Caston's (2002:788-791) observations about the phenomenal quality of experience we can attribute to Aristotle on the ground of the passage. Being perceived, but not seen, the 'coloured' act of vision must be perceptible in a different way than a visible object (thence, unlike a sense-datum theorist, Aristotle is not theorizing that 'our experience contains objects that possess perceptible qualities quite

that sight engaged in seeing Red is not *visible* as a red tomato. In fact, the 'Red' item received by sight through causal interaction with the tomato's visible Red is not an equally causally powerful replica of the latter. The sense of sight, our 'mind' as it were, is 'coloured' only *in a certain way*. We would say 'epiphenomenally' and 'subjectively'; Aristotle says 'in so far as what it is received are forms without the matter'.

Since perceiving that 'Red' is being seen *without* causally interacting with a red subject is not only possible, but in fact necessary, the activity of 'perceiving that we see', understood in light of the UCI requirement, postulates a type of power that access an F-content without causally interacting with an F-subject. The inclusion of the causally powerless *qualia* characterizing the detected act of seeing, then, requires that seeing and sight are different in kind from the perceptual activity and power responsible for perceiving that we see. More precisely, both the activities ad powers involved in cognizing 'Red' and '^{seen}Red' are *perceptual*, in so far as in both cases we have a reception of perceptible forms without the matter; but in one case F is received by causal interaction with an F-subject, while in the other F is received without causally interacting with an F-subject. One is therefore compelled to reject, rather than to endorse, the assumption on which the antecedent of the regress was based (i.e. that we perceive that we see by a further act of seeing). Any argument insisting that sight and second-order seeing are necessary to perceive that we see, on the assumption that the visual *qualia* characterizing the detected act of vision can only be perceived by seeing, would therefore be seriously mistaken.

The remark about perceiving darkness by sight, together with the invocation of the thesis that items received by senses are matterless (and thence causally powerless) forms, effectively rejects all the versions of idea that perceiving that we see consists in *seeing* that we see, including its (so far) surviving regress-avoiding versions, based on the postulation of an 'enhanced' act of vision. Not only a *simple* vision has to be excluded (the cost would be a regress), then, but also *any* kind of vision of the first, original-qualia-inclusive act of vision. Aristotle's final *aporia* about the colouration of what sees shows that the required activity cannot consist in a 'seeing plus', so to

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literally'). Caston appropriately notes (2002:791) that 'Aristotle can thus agree with the intentionalist that nothing other than perceptible objects need literally have the perceptible qualities in question. But he can also agree with the proponent of qualia that the phenomenal character of our experiences outruns their representational content. His view thus cuts down the middle of another alleged dichotomy'.

speak, but must rather be due to a type of perception that cannot at all be a 'seeing' of any sort.

6. The power and mechanism by which we perceive that we see and hear

6.1 The power of perceiving per accidens *belonging to all senses, rather than sight* qua *sight, is responsible for perceiving that we see.*

Once the reasoning of DA III 2 is understood as arguing for the impossibility of *seeing* that we see, the power to perceive *by accidens* Aristotle discussed in DA III 1 (and already mentioned in DA II 6) appears as the most suitable candidate for the the role of perceiving that we see. Aristotle describes as 'accidental perception'

> the perception of Cleon's son, where we perceive him not as Cleon's son but as white, and the white thing happens to be Cleon's son (425a25-27, ROT)

and it is arguable that the latter operation is performed by the same mechanism I proposed for 'perceiving that we see': the perceived content F ('Cleon's son') is accessed without causal interaction with the F aspect of an F-subject, since what we are causally interacting with is another aspect (i.e., whiteness).

Some lines below in (III 1, 425a30-425b3), Aristotle mentions the fact that sight can perceive *per accidens* a taste (and in general that 'the senses perceive each other's special objects accidentally'), leading one to believe, for instance, that the yellow thing we see, being bile, is bitter. The mechanism Aristotle is hinting at is the same by which we perceive the bitterness of an unripe banana by seeing its green colour. In such cases, a content F (in our example, 'bitter') is once again accessed without any causal interaction with the F of an F-subject (the bitterness of the green thing we see).

Generally speaking, then, Aristotle seems to have in mind the following distinction:

- perceiving F *per se* = F is perceived by means and because of direct causal interaction with some F-subject
- perceiving F *per accidens* = F is perceived, but not by means and because of direct causal interaction with some F-subject's F[161]

[161] The classification is valid regardless of a possible distinction between contents that are accidentally perceived on a particular occasion and with regard to a certain sense, and contents that are instead always perceived *per accidens*. In the first group we would have those objects that are not accidentally perceptible absolutely speaking, since they can also be perceived *per se* in other occasions by some other sense. Examples would include the bitter flavour perceived by sight, or the master perceived by his dog, as the latter hears the sound of the keys in the door as its master is opening it. In the second group we would

In consideration of the fact that – as we know from the aporia about colouration of sight– when we perceive '^{seen}Red' we are entertaining a content F that is not in fact perceived by causal interaction with an F-subject, the perceptual power responsible for the perception that we see, then, is the ability to perceive *per accidens* introduced earlier to explain how a sense can perceive another sense's proprietary object or aspects like 'being Cleon's son'.

The power of perceiving *per accidens* is crucially important in the economy of Aristotle's theory of perception as a whole. Aristotle's argument (exposed in DA III 2, 426b8-427a14) that on the one hand, a single thing cannot moved at the same time by contrary movements, while on the other it must be a single thing that says whether 'F and G' forms a unity or not (there would be no such judgment if two separate subjects perceive 'F' [alone] and 'G' [alone] respectively), does in fact appear manageable only if one abandons the scheme of *per se* perception (which would require perceiving F and G simultaneously and by a single sensor by an impossible simultaneous causal interaction between them), to embrace the one characterizing perception *per accidens*. Therefore, it is arguable that it is thanks to this power that we access the cross-modal activity necessary to perceive external perceptible objects in their complexity, i.e. as single wholes endowed with properties that are hearable, tangible, visible, etc.

It must be noted, however, that while cross-modal perception requires perception *per accidens* as a precondition the converse does not hold. When Aristotle insists that perception *per accidens* only takes place as the senses work 'as one', what he is talking about is the capacity each sense has to (accidentally) perceive another sense's proprietary objects (DA III 1, 425a30-425b3).[162] And there seems to be no reason to think that any similar 'unification' of cross-modal contents is necessary to perceive that we see or hear.[163]

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instead find those objects that cannot be perceived in any case by the mechanism of *per se* perception, like the relation 'being son of' or more generally 'being relative of'.

[162] It is far from clear what type of physical or metaphysical unity between the senses Aristotle is having in mind here, and how it is achieved. I shall not even try to sketch an interpretation of this difficult aspect of his theory here.

[163] I therefore agree with Johansen (2005:260) as he observes that perceiving that we see and hear 'will generally qualify as a form of accidental perception', but the reasons he gives distinguish his view from mine. In his view, the perception is accidental because it involves 'attributing this color to one' s own sense of sight', or locating it in one's own sense faculty (on account of the fact that accidental perception is involved in saying where the coloured thing is, cf. II 6, 418a16). Perceiving that we see is then analogous, for Johansen, to discriminating sweet from white (which postulates a unification that cannot

While sight itself, as opposed to the five senses' cooperative unity, is endowed with the power to perceive that we see, it would be mistaken to state that such power belongs to 'sight qua sight'. The reason can be appreciated by reflecting on the difference between the latter and the activity of perceiving 'common' perceptible aspects. In perceiving a 'common' perceptible aspect like the shape of a tomato, two senses (e.g., sight and touch) perceive *the same content by two different powers*, each exclusively belonging to each of the two different senses.[164] On the contrary, in the case of perceiving '[seen]Red' by sight and '[heard]Middle C' by hearing, the two senses perceive *two different contents by the same power* (i.e., the power to perceive *per accidens*), which belong to both of them in the same way. Each sense has the very same, generic power to (accidentally) perceive its own activity, and it would therefore be wrong to say that we perceive that we see by sight *qua* sight.

The denial that we *see* that we see found in Aristotle's *De Somno* is hardly surprising in view of the interpretation of DA III 2 I offered. Aristotle says that

> every sense has something special and also something common; special, as, e.g., seeing is to the sense of sight, hearing to the auditory sense, and so on with the other senses severally; while all are accompanied by a common power, in virtue whereof a person perceives that he sees or hears (for by sight one certainly does not *see* that he sees; and still discriminate it); also, it is not by taste, or sight, or both together that one can discern that sweet things are different from white things, but by a part common to all the organs of sense; for there is one sensory function, and the controlling sensory organ is one, though differing as a faculty of perception in relation to each genus, e.g., sound or colour) (Somn. 455a13-22, ROT modified, my emphasis)[165]

The first claim shows the existence of the power of perceiving that we see or hear, belonging to each and every sense, but different from the power that is specifically

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be carried out by sight and taste themselves, although clearly requiring both), since it requires the unification of 'that we see' and 'Red' (ibid., 270-273).

[164] The case of perceiving common perceptible aspects does not require a unified embracement of contents simultaneously accessed by multiple sensory parts. As Aristotle says, perception of common perceptibles is a case of *per se* perception that follows from perceiving changes in proprietary objects (DA III 1, 425a14-20, 27-29, b5-6). As a consequence, a single sensory part in rapid movement is arguably enough to scan the entire perceptual field it has access to, and register a pattern of different proprietary objects (image a single retinal cell scanning the visual field, thus perceiving limits and shapes of differently coloured areas by registering the changes in the colours composing the scene).

[165] It is worth giving the Greek for lines 455a17-20, where I modified the Revised Oxford Translation: οὐ γὰρ δὴ τῇ γε ὄψει ὁρᾷ ὅτι ὁρᾷ, καὶ κρίνει δὴ καὶ δύναται κρίνειν ὅτι ἕτερα τὰ γλυκέα τῶν λευκῶν οὔτε γεύσει οὔτε ὄψει οὔτε ἀμφοῖν, ἀλλά τινι κοινῷ μορίῳ τῶν αἰσθητηρίων ἁπάντων.

exclusive to each and thence 'common' to all.[166] The further remark about cross-modal perception involved in discerning white things from sweet things does instead reveal that all the senses are in fact modalities of a unitary system.[167]

6.2 Lack of causal interaction with perceived F does not entail de-physiologized spiritualism

It is important to note the interpretation I offer does not imply that we perceive that we see without *any* causal interaction whatsoever, and thence by some sort of 'magic' which would abide by the de-physiologized account proposed by modern Spiritualists. In fact, the interpretation I propose only excludes that we perceive that we see by means of the same mechanism which characterizes all kinds of *per se* perception (including both proprietary objects like sounds and colours and common objects like shapes), i.e. by means of a causal interaction between the sense organ perceiving F and the causally powerful F of an F-subject actually affecting it. It is intuitively clear that the lack of this particular type of causal mechanism does not entail the lack of any causal mechanism and underlying physical process. As we 'accidentally' perceive unripe bananas as bitter by seeing their green colour (or the knife as hard and sharp by observing the visual qualities of its material and shape), we are perceiving some F but no causally powerful F in an F-subject is affecting our sense organs; but nothing

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[166] I thence agree with Caston's a distinction of powers and activities involved in perceiving that we see. As he says (2002:779) 'it no more follows that we perceive that we see by sight than it follows that we see that we see. Aristotle always asserts that we perceive that we see, never that we see that we see. In so far as this sort of awareness is common to all perception, Aristotle is right to ascribe it to the perceptual capacity as a whole in *On Sleep and Waking* (2, 455a15-22)—it is not something vision possesses in so far as it is specifically the activity of sight. The perceptual system sees in virtue of its visual part. But it perceives that it sees in virtue of the nature of perception more generally (cf. *On Perception and Perceptibles* 7, 449a10-11,a18-22)'. Having in mind the ἐν παρέργῳ awareness of *Metaph*. XII 9, 1075a36 (a secondary and indirect awareness, for Caston), he also notes (2002:787) that '[t]he awareness that accompanies all perception is not the primary function of a second sense, according to Aristotle, but a secondary function of the primary ones'.

[167] I therefore slightly depart from Johansen's (2005:270-273) explanation of the compatibility between DA and Somn., which seems rather based on the assumption (which I deny, cf. note 163 above) that '^{seen}Red' requires a unification of contents similar to that involved in discriminating 'White' from 'Sweet'. In Johansen's view, both operations equally require common sense, which he describes not a sixth sense but as the unity of the five senses (cf. *ibid*., p. 272: 'he is not excluding that sight is involved in perceiving that we see; he is just saying that insofar as sight is involved it is not involved as a special sense, but rather by virtue of its integration with the other senses').

implies or suggests that there are no causal interaction and physical processes going on in our perceptual apparatus.

There is little doubt that Aristotle's intuitions concerning the presence of physical processes underlying accidental perception are compatible with ours, but different cases should be distinguished, depending on whether the perception of F without causal interaction with F-subjects involves other cognitive powers, such as memory.

The involvement of past experience and memory secures the existence of physiological processes in virtue of the Aristotle's employment of images (φαντασίαι) in the explanation of such cognitive activities, since images are themselves 'movements' resulting from the exercise of perceptual powers, resembling sensations and remaining in the sensory apparatus (DA III 3,428b27-429a8, cf. III 7, 431a15-19).

Some circumstances in which accidental perception appears to involve no other faculty (like memory of past experience) requires a different mechanism, but they will equally be far from being 'de-physiologized'. Aristotle's preoccupation with the physiological aspects of phenomena that do not require neither the presence of an actual perceptible object nor images replacing them is evident in *De Insomniis* 2, where he considers after-images and perceptual illusions following the fixation of an intensely bright object. The explanation he offers is based on the assumption that internal affections can persist in sense organs after the departure of the external perceptible objects (459a24-b7). The mention of the impairing effect of excessively intense stimulation at the end of the passage (459 b20-23) suggests the persisting affections are those due to the agency of external perceptibles (as opposed to the counter-balancing ones reacting to them). Due to the perseverance of alterations, the sudden passage to a new stimulation is not accompanied by an equally quick ceasing of the old stimulation, especially when the persistence of the past stimulation is favoured by its being more powerful than the present one:

> when we shift the scene of our perceptive activity, the previous affection remains; for instance, when we have turned our gaze from sunlight into darkness. For the result of this is that one sees nothing, owing to the motion excited by the light still subsisting in our eyes. Also, when we have looked for a long while at one colour, e.g. at white or green, that to which we next transfer our gaze appears to be of the same colour. Again if, after having looked at the sun or some other brilliant object, we close the eyes, then, if we watch carefully, it appears in a right line with the direction of vision (whatever this may be), at first its own colour; then it changes to crimson, next to purple, until it becomes black and disappears. And also when persons turn away from looking at objects in motion, e.g. rivers, and especially those which flow very rapidly, things really at rest are then seen as moving (459b 8-20, ROT modified)

A different type of perceptual experience can be distinguished, which is wholly independent from external objects. In *Sens*. 2 (437a27-b10), Aristotle recognizes that in special circumstances even the physical features of the body are sufficient to produce an internal affection that makes the sense-organ perceptible to itself. This further corroborates the general point that an internal perceptible affection can exist in the absence of an actual external source-object corresponding to it, thus securing the possibility to perceive 'by accident' (i.e., to perceive F without interacting with a perceptible F-object), without entailing a magic 'de-physiologized' type of perception.

Finally, what goes on in an organism capable of hearing that is awake in a perfectly silent room would likely be, for Aristotle, analogous to what goes on in an electrical recording system that is turned on and running. In such cases, he would likely concede that the mere 'preservation' of the receptive condition characterizing the system in the state of being 'awake and ready' already implies some physiological process. After all, according to the theory he exposes in *De Somno*, the contrary state of sleep and the subsequent awakening are caused by internal physical interactions that accompany nutrition and digestion. Conversely, the mere maintenance of the waking state of sense organs must equally require certain physical dispositions and interactions in the body, even in the absence of external stimulation characterizing the experience of silence or darkness.

The perception of F with no causal interaction with F-subjects does not need to invoke 'magic', nor is it a reason to re-introduce the modern de-physiologized versions of Spiritualism. In the interpretation I offered, it is the active dimension of perception on the physical level, namely the internal processes of homeostatic counterbalancing, that secure the possibility to perceive F. It is thanks to such processes that it is possible to perceive darkness by sight. Furthermore, as Aristotle states at the end of the aporia about the colouration of sight that concludes the passage on perceiving that we perceive in III 2

> That is why sensings and imaginings (αἰσθήσεις καὶ φαντασίαι) are there in the sense-organs even when sensible objects are gone (425b24-25, my transl.)

The point is again to invoke commonly experienced phenomena showing that perception of F is possible even in the absence of stimulation by an actually

perceptible F in an F-subject, as the perception of ^{seen}Red requires.[168] In fact, the power to perceive *per accidens*, which is necessary to postulate to account for our perceiving that we see (and hear, etc.), is also what makes it possible for us to experience after-images, illusions and hallucination, as well as mental images.[169]

Conclusions

Aristotle's investigation about the sense by which 'we perceive that we see' reasonably abides by the general requirement that *qualia* characterizing the first order act of perception must be included by the second order one, since this secures that we are in fact *perceiving* that we see (rather than coming to believe that we see by means of perceived indicators). The necessary inclusion of *qualia* peculiar to the first order perception, however, does not entail that the second order perception must be of the same type, so that, for instance, we would see that we see. First of all, if perception that red is being seen required a further simple act of seeing, the latter would be a mere replica of the first, and equally postulate a further act of seeing, and so on *ad infinitum*. Furthermore, the activity of perceiving that red is being seen cannot abide by the same mechanism by which sight sees visible objects, nor stem from the power of seeing that characterizes sight qua sight. *Seeing* that red is being

[168] In my view, then, Aristotle is providing a robust argument rather that the merely tentative answers that Caston suggests (he comments [2002:790] that '[t]he claim that we have certain perceptual capacities that are not of perceptible qualities like azure is a welcome broadening of his account. But it is hardly enough to do the job'; further, he offers no substantial clarification about the argumentative role of the remarks about forms without the matter and persisting sensations and images, that he considers 'no more than gesture at an answer' [ibid.]). I therefore disagree with Osborne's reading as well, in so far as she believes (1983:402) that '[t]he paragraph as a whole surely remains inconclusive', and that 'Aristotle observes that it is because the sense-organ receives the form without the matter that there are perceptions and *phantasiai* in the sense-organs when the sense-objects are no longer present', thus posing a 'footnote' that 'seems to have little relevance to the matter in hand except that it raises the question of our awareness of our seeing when what we see is only a *phantasia* in the organ'.

[169] In the following section of DA III 2 (425b26- 424a26), Aristotle clarifies that every time a perceptible item interacts with a subject able to perceive it, their actualities are numerically one but still distinct with regard to their being. At 425a1-6, he seems to suggest that such a distinction leaves room for the possibility that the actuality of a sense can occur in the absence of a corresponding actuality of a perceptible object actually affecting it. He says:

> If it is true that the movement, i.e. the acting, and the being acted upon, is to be found in that which is acted upon, both the sound and the hearing so far as it is actual must be found in that which has the faculty of hearing; for it is in the passive factor that the actuality of the active or motive factor is realized; *that is why it is not necessary that what causes movement moves* (διὸ οὐκ ἀνάγκη τὸ κινοῦν κινεῖσθαι). (ROT, modified, my emphasis).

seen is in fact impossible, since the act of seeing being detected, and the visual qualities characterizing them are not at all *visible*. Sight engaging in the activity of seeing a colour can be said to be 'coloured' only in so far as it has received an abstract content characterized by a mental 'epiphenomenal' quality.

What Aristotle seems to have in mind as he speaks of 'perceiving that we see' is some sort of second-order perception of one's perceptual activity that may or may not take place in a perceiving subject. The higher-order activity of 'perceiving that we see or hear' may still be supplying the lower-order one with 'consciousness', but it may be difficult to locate the type of consciousness Aristotle has in mind on the theoretial map drawn by contemporary distinctions on the subject. Nothing of what Aristotle says, not even the regress argument in DA III 2, inequivocably states or requires logical inseparability between 'seeing' and 'perceiving that we see'; and if the two are in fact logically separable, the 'consciousness' at issue will not be something intrinsically belonging to every act of perception *qua* perception.[170] Furthermore, Aristotle's argument presupposes that the (second-order) perception of seeing finds (first-order) seeing already 'poised' (i.e., available and ready to be accessed) and endowed with a phenomenal 'colouration', and both aspects seem secured by the fact that seeing is a reception of matterless forms. As a consequence, if 'perceiving that we see' does in fact confer some type of 'consciousness' to first-order seeing, the latter will be neither 'phenomenal consciousness', nor 'access consciousness', respectively characterizing the 'colouration' and the 'being poised' I just recalled. The only sense in which the higher order 'perception of seeing' might be said to make the first order seeing 'conscious', then, is similar to that applying to a novice driver's 'attended' vision of the unknown road he is travelling on, which thanks to the attention being paid is distinct from the 'seeing' characterizing an absent-minded expert driver coming home by a route she has been acquainted with for decades. It seems the interpretive choice about Aristotle's 'perceiving that we see' remains open between the latter (i.e., the second-order perception making first order attended perception 'conscious') and the hypothesis that perceiving that we see only indicates reflective self-consciousness

[170] I am therefore sympathetic with Johansen's remark (2005:274) that Aristotle is not 'offering either in DA III.2 or in *De Somno* 2 a general account of perceptual consciousness, if that is meant to explain also what makes first-order perception consciousness of objects in the world', but I disagree with his statement that Aristotle gives 'an account of what, thanks to Ned Block, has become known as "access consciousness," that is, the mechanism by which the contents of our mental state are available, or "poised," for rational control, verbal report, and reasoning' (ibid., 273-274).

(perceiving one's own activity). To my understanding, nothing Aristotle says seem to justify a preference between the two.

The reason why the activity of 'perceiving that we see (or hear, etc.)' attracted Aristotle's activity seems rather to lay in its revealing that a perceptual power different from that involved in *per se* perception must be postulated. Since any perceptual content F supplied by *per se* perceiving is a causally powerless abstract item in the perceiver's mind, the further perceptual activity that has it as its object cannot be based on the causal interaction with an F-subject. A perceptual power enabling us to perceive F without causally interacting with an F-subject must be postulated. In agreement with *De Somno*, the context of De Anima III 1-2 indicates that each of the senses possesses not only a *per se* power of perceiving proprietary and common perceptible items, but also the power to perceive *per accidens*. Such power belongs to each of the five senses in the same way, and it is therefore right to say that 'we perceive that we see' by such a common power, rather than by sight *qua* sight (for we do not in fact *see* that we see).

Aristotle's reflection on the power responsible for 'perceiving that we see' has therefore the crucial importance of attesting the necessary introduction of the common power to perceive *per accidens*, which allows each sense to perform further perceptual operations on the contents provided by *per se* perception. Several operations cannot in fact be carried out by the mechanism of *per se* perceiving. Perceiving darkness and perceptually experiencing absent objects are an example, and resolution of the problems posed by the 'grouping' and 'ungrouping' discriminations of perceptible objects, which are clearly crucial to account for the richness and complexity of perceptual experience, are likely to involve the same mechanism.

Chapter 5 - DA II 5: Self-Perceiving Sense-Organs and the Transitions to the Exercise of Perception

In DA II 5, Aristotle begins the exposition of his own views about perception. He starts with the assumption that perception is an affection and a change, which recalls a thesis from earlier thinkers read in the light of his own natural philosophy. After presenting a problem concerning sense-organs' self-activation and self-perception, he proceeds by promises a refinement of the analysis about potentiality and actuality with regard to perception. The treatment is conducted by examining the case of knowledge first, and then by applying the results of this examination to perception. In the course of his analysis, Aristotle establishes several fine-grained distinctions about changes and activities, and the chapter is often quoted in its capacity as a repository of distinctions about the subject.

According to a classic reconstruction proposed by Ackrill (1965 [1997]: 161-162), DA II 5 distinguishes 'first-order' and 'second-order' abilities (the latter being abilities to acquire the former), respectively exemplified in their actualization by learning and thinking (or perceiving). In this view, Aristotle's point is that the acquisition of a first-order ability amounts to a change, since the subject's nature is developed by a process of acquisition that 'is a journey towards an end or a goal'. The actuality of a first-order ability would instead be the simple exercise of the subject's nature. In other words, Aristotle would here be stressing that getting an ability is a κίνησις, while using it is not κίνησις, but an ἐνέργεια, without establishing whether the activity exercised is itself an ἐνέργεια or a κίνησις.[171] In fact, one of the examples adopted in the chapter is that of a builder who begins building, and in this case the activity itself is clearly a κίνησις, even though the transition the builder undergoes as he exercises his skill is not a κίνησις.

It is uncertain, however, if what DA II 5 ends up endorsing is in fact a peculiar version of the distinction between κίνησις and ἐνέργεια. As Barnes (1979:38) pointed out, the

[171] This is not to say that such a scheme is not problematic when compared to the notion of κίνησις and ἐνέργεια elaborated elsewhere. In fact, the point of Ackrill's analysis is to emphasize the peculiarity of DA II 5's approach.

chapter seems rather aiming at the introduction of a notion of 'special' alteration, whose meaning remains obscure. In the same vein, Burnyeat (1992:19) noted that as a consequence of DA II 5 perception is not an ordinary change of the type described in the natural works. By attending to the details of the chapter through a long and astonishingly sophisticated analysis (Burnyeat 2002), he finds in it a distinction of two types of changes that prepares the grounds for the 'spiritualist' theory of perception he attributes to Aristotle in II 7-12. In Burnyeat's view, Aristotle would discard in this chapter the notion of unqualified ἐνέργεια, to work out a distinction between ordinary (i.e. 'destructive' and featuring an opposition among *termini*) alteration and 'non-ordinary' (preservative and developmental) alteration.

In the general division between 'spiritualist' and 'literalist' interpretation, however, the distinctions set forth in DA II 5 have never proved to be decisive.[172] In reaction to Burnyeat's reconstruction, an alternative and equally thorough analysis of the chapter has been elaborated by Heinaman (2005), according to which no 'non-ordinary' alteration is being introduced here by Aristotle. In Heinaman's view, the chapter is rather offering a series of distinctions about two kinds of transitions to the actuality of knowledge, followed by a different (and overlapping) one differentiating positive and negative affections.

In this chapter, I propose my view concerning the debated issue of what De Anima II 5 is really meant to establish, and how. I shall argue that the initial *aporia* about self-perception and self-activation of the sense-organs cannot dismissed as easily as it is normally believed, and that what unifies the chapter as an organized series of distinctions is in fact the necessity to fully solve such *aporia*. In my view, the gist of the chapter is that there are two possible ways in which the power of perceiving can be activated, and thus two ways in which perception is exercised. In a first normal and 'direct' activation, sense-organs do not become perceptible and thence cannot perceive themselves. However, a second type of activation is possible by an 'indirect route', which entails an actual affection and alteration making sense-organs

[172] According to Everson (1997:89-96) the 'special alteration' distinguished in II 5 applies only to the shift from first to second actualities, and this is not decisive to prove whether or not there are further literal affection (what is decisive is for him only the very last statement in 418a5-6); on the other side, the 'spiritualist' Johansen (1998:269-271) speaks of a distinction between 'quasi-alteration' and 'alteration', but recognizes that the first takes place on the agent's side in all ordinary changes. According to Johansen, a 'quasi-alteration' does in fact take place on both the patient's and the agent's side, but he does not argue for this on the grounds of DA II 5, but by a specific analysis of the physical condition of perception.

perceptible to themselves. The existence of this two possible 'routes' to the exercise of perception explains why sense-organs do not normally perceive themselves, while leaving open the possibility that this can actually happen in particular circumstances.

1. The *Aporia* about Self-Activation and Self-Perception of the Senses

Aristotle begins the chapter with a very general statement that includes perception among affections and changes, justified by its being theorized as an alteration (a change in the category of quality, for Aristotle).[173] He thence recalls the thesis held by some thinkers according to which affections take place only between similar things ('like is affected only by like'), and his own critical reception of it. In fact, for Aristotle himself affections take place between things that are actually similar on a generic level; however, a difference in actuality and a capacity of being similar are also required on the specific level (GC I 7, 323b29-324a9).

Aristotle notes (417a2-3) that the idea of perception as change in quality and an affection entails a problem: if perceiving is an affection, and thus a 'becoming like' from the past 'being actually unlike and potentially like', sense-organs should become actually perceptible.[174] If this is right, then why do we not perceive them every time we perceive? This is only part of the problem, though. Aristotle immediately adds a second one (417a3-5), asking why sense-organs do not start the perceptual process by themselves. The supposed rationale for the latter problem lays in the fact that sense-organs have their own perceptible aspects because of their physical constitution: as Aristotle says, they contain elements (fire, earth, etc.) that are – in

[173] He says that perception συμβαίνει ἐν being affected (πάσχειν) and changed (κινεῖσθαι), echoing a thesis already presented DA I 5, 410a 25-26 (τὸ δ' αἰσθάνεσθαι πάσχειν τι καὶ κινεῖσθαι τιθέασιν), which (together with II 4, 415b24) is the target of the first backward reference (καθάπερ εἴρηται, 416b34, cf. Hicks [1907:350], Ross [1961:235], and Burnyeat [2002:33]). Burnyeat (2002: 35-40) stresses that it is only by assuming Aristotle's own ideas (as presented in treatises like GC I 4 and Physics III 1, [esp. 200b 32-201a 3] and V 1-2 and Cat. 14) that perception, as theorized by earlier thinkers, cannot be other than an affection and a qualitative change, i.e. an alteration. Aristotle does indeed associates the reported belief that we perceive like by like with the idea of perception as a qualitative change (I 2, 404b 17-18; 405b 15; I 5, 409b 26-8), perhaps because the involved 'likeness' tends to mean for Aristotle 'sameness in quality' (Cat. 8, 11a 15-19; cf. Met. V 9, 1018a 15-18; 15, 1021a 11-12).

[174] Since we are told that the αἰσθήσεις contain elements, the meaning we have to choose among the possible ones is clearly 'sensory organs'. Cf. Hicks (1907:351, quoting PA IV 10, 686a8, Sens.3 440a19) and Ross (1961:235, adding *Insomn*. 459b8), who reports that this interpretation is embraced by Themistius (1899:54.23) and Philoponus (1867:291.3), and that Simplicius, who rejects it, attributes it to Alexander (it in fact appears in his *Quaest*., 82.35-36).

themselves or in their properties– what perception is about.[175] This second problem envisions an even more challenging situation, in which sense-organs are also able to trigger perceptual processes in a fully autonomous way, thus being able to perceive themselves *by themselves*, as a sort of diminished physical incarnation of the divine first mover.

Aristotle has an easy time solving the second part of the *aporia*:

> To be sure, it is clear that what is capable to perceive is not in actuality, but only in potentiality. This is the reason why it does not perceive in the same way as what is ignitable does not ignite itself by itself without what is able to ignite; for it would ignite itself, and would not need what is in actuality fire (417a6-9)

Invocation of the potentiality of the sense is sufficient to solve the latter part of the *aporia*, in so far as it explains why we do not perceive in the absence of external stimulation. The being in potentiality of the capacity implies that an agent in actuality is needed to trigger the activity of perception, and this is certainly part of what Aristotle has in mind in the comparison between the ignition of what is combustible and the act of perception.

The explanatory efficacy of the remark about the potentiality of what perceives, however, is limited to the problem of self-activation. In fact, the remark is impotent against a version of the self-perception problem divorced by the endorsement of self-activation, as in the hypothesis that we do perceive our sense organs when they are affected by external, actually perceptible objects. As Aristotle himself suggests, the potentiality of the sense can only explain why an organ is not perceiving 'in the same way as what is ignitable does not ignite itself by itself without what is able to ignite'. As a consequence, the initial condition triggering the process must certainly be in place. However, one can still argue that once the activation has taken place sense-organs should be able to perceive themselves, pretty much in the same way as a fire keeps burning what is ignitable by itself after having been fired up. In my view, then, it

[175] Aristotle is here leaving open the question whether what perception is about are the elements themselves, or just their (essential – or non-essential) attributes. I see no reason why the neutrality he shows here should perplex us, but commentators try to accommodate it with the following chapter's (DA II 6) discussion, where Aristotle speaks of qualities without mentioning elements. Some scholars think the alternative posed here is between perception elements' *essential* (καθ'αὐτά) and accidental properties (cf. Hicks, 351, who quotes Philoponus [295, 3-8], Simplicius [118, 23] and Sophonias [63,33-35]); others (Burnyeat, 2002:40) take both the disjuncts as an expression of earlier thinkers' doctrines he is criticizing. At any rate, in my view Aristotle immediately solves this part of the problem and focus on the harder one posed in the first part. This makes the question of the compatibility with II 6 less than pressing.

would be wrong to claim that these lines are sufficient to *wholly* solve the *aporia* about the perception of the sense-organs, and Aristotle's illustration of the fire burning its combustible shows he is fully aware of this.

That there is no reason why Aristotle should discard *a priori* the possibility that sense-organs are affecting and perceiving themselves is clear in light of his own ideas about self-change and self-motion, expounded in Physics VIII. [176] All is needed for self-change is a distinction between what changes (or moves, or affects) and what is changes (or moved, or affected) internal to the self-changer.[177] The distinction does not necessarily have to be restricted to physical parts: in DA III 10 (433b13-21) Aristotle distinguishes the desired object and the desiring power as moving, and the physical organs involved in the transmission of motion as moved. Concerning a sensory organ like the eye, however, he can actually deal with self-change by invoking a physical partition, as he distinguishes at least three physical parts of the eye: the κόρη (the pupil or the jelly posterior chamber of the eye), 'the white' (our sclera) and 'the dark' (our iris). Among these, only the κόρη is properly capable to perceive[178].

Aristotle's does in fact acknowledge that in at least some cases sense-organs perceive themselves. He noticeably describes a similar experience in *Sens.*, 437a 22 ff. , where he admits that in certain circumstances an eye sees itself. He states that this happens when we are in darkness (*Sens.*, 437a 24-26) and is due to the smoothness of the black

[176] In Burnyeat's view (2002: 39 n.31; cf. the approving remark by Caston 2005:287, note 90), it is a corollary of GC I 7 that 'an organic unity cannot be affected by itself (*Met*. IX 1, 1046a 28; cf. *Ph*. VIII 4, 255a 12-15)', and this entails a difficulty about the sense-organs in the 'like by like' thesis: if like were affected by like, sense organs would be self-activating and continually perceive themselves without any need for external stimulation. The parallel Burnyeat makes between the general difficulty of GC I 7 and the specific one of DA II 5, however, seems to underestimate some important differences. To be sure, in GC I 7 (323b 18-29), Aristotle points out that if like were affected by like, then every thing would continually affect itself, and therefore nothing would be indestructible and unchangeable. The absurd consequence in GC, however, is only that there would be *nothing* that is unchangeable since *all the things* would *always* be changing themselves. This is quite different from the arguably tenable implication that a particular 'changeable' thing, be it the sense or the sensory organ, would sometimes be able to change itself by itself, provided that the appropriate relation among its parts occurs, and in accordance to Aristotle's views about self-motion in *Phys*. VIII.

[177] Cf. *Phys*. VIII 4, 254b 14-33 and 5, 258a22-27. As a consequence, elements, that are homogeneous and continuous, cannot be self-movers (*Phys*. VIII 4, 255a 5-10). For a classic treatment of the tensions between the claim that animal are self-movers (cf. DA III 9-11) and the denial that they are, absolutely speaking, self-movers (cf. *Phys*. VIII 2, 253a11-21; 6, 259b1-16) see Furley (1978).

[178] Cf. *HA*, 491b 21 ff. ; *PA*, 653b 25; *Sens.*, 438b 15 ff. On the identification of the κόρη with the internal eye-jelly cf. Sorabji (1992:209-210) and Lloyd (1978: 218, 220-221).

and the middle part of the eye.[179] This property allows things to shine in darkness (*Sens.*, 437a 31-b 1), and when the shining takes place while the eye is moving quickly, the eye becomes 'as two' (*Sens.*, 437b 1-3), to the effect that a difference between what sees and what is seen becomes apparent (*Sens.*, 437b 3-4). Against the claim that this experience supports the idea of a fiery composition of the eye, Aristotle eventually stresses that this phenomenon is analogous to looking at our eyes reflected in a mirroring surface (*Sens.*, 437b 9-10).

The limitation of sense-organs' self-perception to exceptional circumstances appears problematic, however, for at this stage in DA one may in fact argue that sense-organs *should always* become actually perceptible, and thence perceive themselves, after the interaction with actually perceptible objects by which they *normally* perceive. The 'generic' similarity and 'specific' dissimilarity necessary for causal interaction are in place not only in the case of sense organs and perceptible objects, but also inside the sense organs themselves. Sense-organs are, in Aristotle's view, made of the same material as the external media corresponding to them, and accordingly they *should* in fact undergo affections that make them perceptible as a result of their interaction with them. Take the case of sight for instance: both the external media and sense organs are made of indeterminate transparent bodies like air of water, which in presence of fire is suitable to be affected by colours to the effect of becoming visible. In the interaction between the medium and the organ, then, it is reasonable (but in fact wrong, in light of the counterbalancing physiology I reconstructed in chapters 1-2 of the present work) to expect that the organ becomes as visible as the external media. The problem may then be raised for Aristotle himself: why do we not perceive our own eyes, if they are made of the same elements as the external media that are actually visible, and affected by them in a way that is suitable to make themselves perceptible?[180]

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[179] Aristotle says 'the black and the middle (μέσον)'. Lloyd (1978:231, note 13) notices that since by 'middle' Aristotle usually describes the κόρη, and by 'the black' the iris, the καί cannot be explanatory. While I certainly agree with Lloyd about Aristotle's technical use of the clause, I believe it is still possible that 'the middle' is here used as an (admittedly confusing) non-technical description of the iris as what is in the middle between the white and the κόρη.

[180] There is an evident discrepancy between 'transparent' perception of external objects (as opposed to the perception of our own organs) we commonly experience, and the 'becoming perceptible' of sense-organs one can arguably expect (in consideration of their composition and the interaction between them and actually perceptible objects and media), and it is only in virtue of this discrepancy that sense-organ's self-perception becomes problematic. In other words, the claim that sense-organs perceive themselves

The persistence of the *aporia* about self-perceiving sense-organs appears confirmed by the following passage (417a9-14), which (according to one of the possible readings of the uncertain Greek text) reads

> But since we speak of 'perceiving' in two ways - for we say that the one potentially seeing and hearing 'sees' or 'hears', both if it is by chance sleeping, and if he is already exercising the activity – then one should speak in two ways also of the 'sense' – the one as <seeing and hearing> in potentiality, the other as <seeing and hearing> in actuality – and in the same way also of the 'perceptible' – the one being in potentiality and the one in actuality[181]

The point seems to be that in correspondence to actual perceiving and potential or 'dormant' perceiving we should not only speak of the actuality and potentiality of the sense, but also of the actuality and potentiality of the perceptible. This suggests that a distinction between the actual and potential perceptibility of sense-organs becomes possible, thus allowing one to argue that sense-organs are potentially (but not yet actually) perceptible to themselves in the absence of incoming stimulation by external objects, while actually perceptible to themselves after their interaction with (and being affected by) external objects.

My conclusion is that there are logical and textual grounds to believe that Aristotle must be taking the *aporia* more seriously than it is commonly observed.[182] Otherwise, he would be committing the ridiculous inaccuracy of raising a difficulty he himself leaves unsolved. The appeal to the potential state of the capacity to perceive is only

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only becomes absurd if we take into account our common experience about what senses and sensory organs can and cannot do. What has to be explained, then, is the reason why, as we all know, sense-organs are not normally perceiving themselves as they perceive.

[181] The reading αἰσθητόν was proposed by Torstrik on the basis of Alexander (*Quaest*. 83,6, cf. Hicks' apparatus, 70-71 and p. 352 *ad loc*.), and accepted by Ross (235), who notes that τὸ αἰσθάνεσθαι (attested also by Themistius, Simplicius and Philoponus) is clearly wrong. In fact, the MSS's reading (ὁμοίως δὲ καὶ τὸ αἰσθάνεσθαι, τό τε δυνάμει ὂν καὶ τὸ ἐνεργείᾳ) is clearly redundant, and thence considered suspicious by Trendelenburg and bracketed by Biehl and Rodier (cf. Hicks, who keeps the MSS reading, but qualifies the clause as a 'strange piece of carelessness').

[182] The passage is treated as Aristotle's proposed solution to the whole *aporia* by Hicks (1907: 350-351), Ross (1961: 233), Johansen (1998: 71) and Hamlyn (1968: 99-100), who complains about its obscurity. Everson (1997: 90) seems to think that the *aporia* does not deserve much more than a passing mention ('after a brief discussion of the problem of why we do not perceive the senses themselves'). Burnyeat (2002: 39-40) sees the whole *aporia* as a criticism of thinkers who endorsed the theory that we perceive like by like (he notes that the theory that we perceive like by like is associated with the claim that soul is composed by elements in I 2, 404b 8ff. and I 5, 409b 23ff., esp.410b 22). In my view, the criticism (which would be superfluous, in view of the earlier one offered in I 5, 410a 23-26, quoted by Burnyeat himself) leaves untouched the first part of the problem, that must still be valid even if the outcome of the interaction between sense-organs and perceptible objects were – as Burnyeat proposes – a 'quasi-alteration'.

sufficient to solve the second part of the difficulty, but it certainly not enough with regard to the more general question of why sense-organs do not perceive themselves.

2. Knowledge-related transitions: a model for the refined doctrine of potentiality and actuality

With a resolutely consequential fresh start (aptly announced by πρῶτον μὲν οὖν at 417a14) Aristotle declares his intention to ignore in the forthcoming reflection his own distinction between imperfect ἐνέργεια (i.e. κίνησις) and unqualified ἐνέργεια.[183] The claim that even (καὶ, read as concessive) κινήσεις are ἐνέργειαι, familiar for readers of Phys. III 1-3, invokes the right to make this preliminary simplification.[184] While we do not yet know whether we are going to meet κινήσεις or unqualified ἐνέργειαι or both, then, we can safely assume that we will deal with such events regardless of their distinction.[185]

> First of all, then, let us speak as being changed, being affected and actual exercising[186] are the same thing: for change is a kind of activity, albeit imperfect, as it as been said in other <writings> (417a14-17)

The first thing Aristotle does after assuming this point of view is recalling the relevant doctrines about the ἐνέργεια of the patient. He reminds us of the necessity of an agent that is already in actuality, and of the way the agent and the patient are on one hand similar and on the other dissimilar (417a17-20). He then proceeds by declaring the necessity of further distinctions about potentiality and actuality (417a21-22). As he explains (γάρ, a 22), we are currently speaking (λέγομεν) about them ἁπλῶς, i.e. 'in a simple, undifferentiated way'.[187] The point Aristotle makes here, read bearing in mind

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[183] If we were to assume, along the lines of the standard interpretation, that Aristotle already solved the *aporia*, he would initiate here the treatment of a new topic in a pretty abrupt and perplexing way. Hicks (1907: 352) reads the passage, together with the following 417a17-20, as a 'preliminary note on action and passivity', but it is still unclear what is in his view the relevance of such a note. Burnyeat (2002: 41, n.34) believes that 'the argument takes a new turn', whose goal is to provide refined notion of alteration, radically different from the ordinary physical one.

[184] As scholars normally notes commenting on the first cross-reference (καθάπερ ἐν ἑτέροις εἴρηται, a17), Aristotle defines κίνησις as the ἐνέργεια of the potentiality *qua* potentiality in *Phys*. III (1, 201a27-29), where he also deals with the idea of κίνησις as an imperfect ἐνέργεια (2, 201b 26-202a 3, cf. DA III 7, 431a6-7).

[185] To this end, it is not necessary to think that the notion of perfect ἐνέργεια is here absorbed and nullified by the notion of κίνησις. On this aspect, I therefore agree with by Heinaman's (2007 : 184, n. 69) critical remarks against Burnyeat (2002:47).

[186] Burnyeat (2002:46, n.48) wisely recommends to avoid 'activity' as a translation for ἐνεργεῖν, since perception is passive (it is a case of πάσχειν), quoting Met. IX 8, 1050a 22-3.

[187] On the interpretation of the expression 'we are speaking ἁπλῶς', cf. the useful remarks in Hicks (1907: 354) and Burnyeat (2002:47- 48).

the still pending *aporia* about sense organs, already suggests the direction of his enquiry in DA II 5: the being in potentiality related to sense-organs and their being perceptible is a notion in need of further specifications.

Aristotle now explains (cf. the introductory γάρ at 417a22) the declared necessity to abandon the initial 'simple way of speaking' by examining different stages of potentiality and actuality in the case of knowledge (417a 22-28). He begins by demarcating two ways in which we attribute the qualification 'knower' (ἐπιστῆμόν). In a first way, we say that a certain person is a 'knower' because 'human being' (ὁ ἄνθρωπος, a 23-24) belongs to the class of subjects that are such *qua* 'endowed with knowledge' (the καί in a24 being explanatory). In a different way, we say that a person is 'already' (ἤδη, a 25) a knower *qua* possessing a certain expertise, for instance the ability to read and write (τὴν γραμματικήν). The distinction is then rehearsed in terms of two respective modes (τρόποι, cf. a26) of 'being capable' (δυνατός): a first due to the genus the subject belongs to and 'the matter' (ὅτι τὸ γένος τοιοῦτον καὶ ἡ ὕλη);[188] and a second due to the fact that the person can 'contemplate' whenever she wishes, if not impeded. The theme of contemplating returns immediately in the final description of a third case, in which a subject is 'already' (another ἤδη, a27) engaged in contemplation (θεωρῶν, a 28). The latter is for Aristotle the principal and most proper sense (κυρίως, a28) in which one can be a 'knower'.

Up to this point, then, Aristotle offers a distinction between two potentialities related to knowledge and its actual exercise, i.e. contemplating.[189] In the following analysis, I

[188] As Burnyeat (2002: 49, n.59) points out, the adoption of γένος for a specifically differentiated species makes it impossible to invoke the analogy between matter and genus we find in the *Metaphysics* (V 28,1024a 36-b 9; VII 12, 1038a 6-8; X 8, 1058a 1, 23-4). He therefore suggests either to read the word ὕλη as a synonym of 'potentiality', or to consider one of the hypotheses elaborated by ancient commentators like Philoponus and Themisitius, usefully reported by Hicks (355). Themistius 55, 21 H. (1899: 101, 14 Sp.) thinks that the reference to ὕλη is due to the fact that the nature of man is receptive of knowledge (some support for this reading may come from II 2, 414a9-11); Philoponus (1897: 299,27) seems instead to believe that 'because of the genus, that is the matter' must mean 'because of the ὑποκείμενον'. Simplicius (1882: 121, 17) explains that since the natural human disposition to knowledge needs to be perfected by learning, the genus (that is human nature) is such as (τοιοῦτον) matter. Along the same lines, Hicks thinks that ὕλη probably sums up 'the latent capabilities of the individual', and is therefore not indicating something really different from to γένος.

[189] Commentators usually draw comparisons between this passage and analogue ones in *Phys*. VIII 4, 255a30b2 (where two potentialities related to knowledge and perception are distinguished, and subsequently applied to the natural motions of the elements) and DA II 1, 412a 20 ff, in which Aristotle only speaks of one knowledge-related potentiality. As Burnyeat (2002: 48-49) notes, Phys. VIII 4 is the only other place in which the 'tripartite

shall adopt the abbreviation k_0 and k_1 to refer to the senses of 'knower' defined by to the two τρόποι of 'being capable of knowledge' distinguished here, while by k_2 I shall indicate the one actually exercising knowledge.

The identification of the actuality that k_0's and k_1's potentialities are related to is crucial to determine what Aristotle is after in DA II 5. Despite some differences in their readings, commentators generally agree that what Aristotle is interested in is the fact that k_1 is at the same time 'in potentiality' with regard to k_2, and 'in actuality' with regard to k_0, while k_0 has a knowledge-related potentiality *qua* capable of reaching the state of k_1.[190] It is not obvious, however, that this (undoubtedly true) fact is what Aristotle is really interested in here. In fact, in the contrast between k_0 and k_1 no explicit mention is made to the actuality they are relative to. Aristotle does not in fact say that k_1's actuality is what k_0's potentiality is related to: the clause 'capable of becoming a knower in k_1's sense' is nowhere in the text. What we have is rather an explanation of why we think of them as 'capable'. Thus, k_1 is 'capable' because she can exercise at her will a *hexis* she fully possess, while k_0 is such because of a natural 'innate' disposition *qua* member of the human kind. As I am going to explain, there should be little doubt that k_0's 'capability' is no more relative to k_1 than it is to k_2. In other words, the expressly mentioned 'capable of contemplating' (δυνατὸς θεωρεῖν) can be predicated of k_0 as legitimately as the capability to reach k_1.[191]

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scheme' (in his terminology) is found (with the exception of a brief allusion, in Sens. 4, 441b21-23). The distinction of three stages is instead remarkably absent from both the metaphysical lexicon of *Metaph*. V and the distinction between ἐνέργεια and κίνησις in Metaph. IX 6, 1048b 18-36.

[190] Hicks (1907: 354) claims that II 5's (as opposed to II 1's) distinction introduces k_1, thus stressing that knowledge is a *hexis*, i.e., in his view, an 'act if contrasted with potence, but potence if contrasted with act', and accordingly speaks of 'three stages being really four'. A similar reading is proposed by Ross (1961: 223-24). On the opposite, Hamlyn (1968: 101, 82) refers to DA II 1 (416a6 ff.) as the place where the notion of knowledge as *hexis* is elaborated, while arguing that DA II 5 adds k_0 in order to differentiate it as a 'mere potentiality' whose actuality is a κίνησις, in opposition to k1 (whose actuality is the exercise of the *hexis*). Some of Burnyeat's (2002:50-51) assumptions are in line with Hamlyn's. He also believes that k_1 and k_2 were already distinguished in II 1, and that what is added in II 5 is k_0, which he considers an example of the ordinary potentiality related to κίνησις. On the other hand, Burnyeat peculiarly argues that the aspect defining k_1 is not its being both an actuality and a potentiality, but rather the fact that while resulting from a 'ordinary' change (the one from k_0), it gives raise to a non-ordinary change (the one to k_2).

[191] Despite his own interpretation, and despite stressing Aristotle's reluctance to speak about actualities in the passage, Burnyeat himself recognizes (2002: 50) that 'both types of potentiality contrast with the actuality of someone exercising their knowledge of letters'.

The attribution of the capacity of exercising a certain branch of knowledge (k_2) to a human being that does not yet possess that branch of knowledge (that is, to k_0 as opposed to k_1) is all but perplexing in Aristotle's terms, and reasonably so. According to him, a subject progresses towards the stable acquisition of a *hexis* by repeated (assisted or unassisted) exercise of it. As a consequence, the capacity for a human being of exercising knowledge (k_2) without being an actually accomplished knower – i.e., exercising knowledge *qua* k_0 rather than *qua* k_1 – must be logically presupposed. Aristotle addresses the issue twice in Metaph. Θ 8 (1050a12-21, 1050b10-15), and while he considers possible perplexities about the ability of exercising knowledge without possessing it, he clearly does not deny that learning students can exercise knowledge, and rather admits that they have 'something' of the knowledge they are practicing. Bearing this in mind, I propose the following schematization of Aristotle's view:

$k_0 =_{def}$ subject capable of reaching k_1 = subject capable* of k_2;

$k_1 =_{def}$ subject capable** of k_2

The words by which Aristotle introduces the distinguishing features of k_1 and k_0 in 417a26, then, seem carefully chosen: 'each of them is capable in a mode that is not identical' (ἑκάτερος δὲ τούτων οὐ τὸν αὐτὸν τρόπον δυνατός ἐστιν). This is unquestionably different from saying that 'they are in potentiality in relation to two different actualities'. In spite of the apparent obviousness of the standard reading, then, the point Aristotle is making is *not* that k_0 is capable of becoming k_1, but rather that k_0 is able to exercise knowledge (becoming k_2) in a way that is different from k_1's. There is accordingly one actuality both the potentialities are relative to (namely the actual exercise of knowledge Aristotle calls 'contemplating', θεωρεῖν) and two different ways of being capable of it.

This point is particularly important once we put it in the context of the chapter as a whole. Aristotle just declared his intention to achieve some further distinctions about potentiality and actuality. The reason behind his proposal was the impossibility to solve the *aporia* of self-perceiving sense-organs by a 'simple way' of speaking about potentiality and actuality. It is therefore reasonable to expect that the distinction of two potentialities (k_0's and k_1's) that lead, in two different ways, to the exercise of the same actuality (k_2's θεωρεῖν), is going to be crucial in Aristotle's full-blown answer to the *aporia* about self-perceiving sense-organs.

2.1 Two transitions towards contemplation.

In 417a28-b2, Aristotle recognizes that 'both' the previously mentioned knowers (k_0 and k_1) are such 'in potentiality', and then claims that

(i) one is based on

(a) 'having been altered through learning' (διὰ μαθήσεως ἀλλοιωθεὶς) and

(b) 'having shifted from an opposite disposition' (ἐξ ἐναντίας μεταβαλὼν ἕξεως),

(ii) the other is characterized by the shift from 'having, but not exercising' (ὁ δ' ἐκ τοῦ ἔχειν, μὴ ἐνεργεῖν δέ) to 'exercising' (εἰς τὸ ἐνεργεῖν) the specific knowledge at issue (e.g., τὴν γραμματικήν).

In my view, what Aristotle means as he says that k_0 and k_1 are 'in potentiality' a knower is that both of them are such with regard to k_2. This is strongly suggested by the context, since he just stressed that k_2, exemplified by the actual exercise of 'knowing this A', is in fact the primary sense in which one is said to be a 'knower' (417a28-29: ὁ δ' ἤδη θεωρῶν, ἐντελεχείᾳ ὢν καὶ κυρίως, ἐπιστάμενος τόδε τὸ Α).[192] The point enlightened by the following descriptions, then, is that while k_0 is potentially k_2 only (a) 'having moved many times from an opposite state (*hexis*)' and (b) 'having been altered through learning', k_1 can go straight to k_2 in a different way, i.e. by shifting from the actual possession of the relevant *hexis* to its exercise.

It is worth noting that the common assumption I rejected, according to which the transition the passage compares are $k_0 \rightarrow k_1$ and $k_1 \rightarrow k_2$ (rather than, as I argued, $k_0 \rightarrow k_2$ and $k_1 \rightarrow k_2$), faces the difficulty of explaining why k_0 –previously described as 'knower' because of the innate potentiality due the mere belonging to human kind–

[192] Commentators usually read κυρίως supplying the predicate 'knower', so that Aristotle distinguishes here a third situation in which the term is employed (cf. translations by Smith, Hicks, Hett). This seems indeed implied by the fact that the subject is 'knowing this A': since the person at issue is knowing, then is a knower; and since he is in actuality (ἐντελεχείᾳ ὢν), he is a knower in the principal sense. This last inference is due to the fact that actuality is 'definitionally and teleologically prior to the correlative potentiality', as Burnyeat (2002: 50, n.60) suggests quoting DA II 4 (415a 17-20) and *Metaph*. IX 8 (1049b 10-17; 1050a 7-12).
Ross (1961: 233) and Hamlyn (1968: 23) prefer to read κυρίως together with ἐπιστάμενος τόδε τὸ Α, so that the meaning would be that the subject at issue 'is actually and in the proper sense understanding this letter A'. In this reading, however, κυρίως would be referring to an aspect that has not appeared so far, since each of the first two subjects was described either as 'capable' or as a 'knower', not as 'knowing'. Moreover, no other case of 'knowing' is distinguished in the chapter, and the supposed remark about being κυρίως 'knowing' would therefore be otiose and out of context.

would be said to be *potentially k_1* after having been altered (ἀλλοιωθείς, in a30) by learning. This implication of the standard reading is absurd, since any human being *qua* human being is k_1 in potentiality from the very beginning, i.e., 'innately' and without 'having been altered' by learning. Different solutions to the difficulty has been proposed, but all of them seem to require some stretched interpretation – if not indeed an alteration – of the original text.[193] In my reading, the past participle ἀλλοιωθείς does instead make perfect sense without any exegetical intrusion, and the passage can be translated as follows:

> However, it is the one already contemplating that, being in actuality, is also a 'knower' in the principal sense, knowing this particular A; both the first two are in fact a 'knower' in potentiality, then. However, one <is potentially a knower in the principal sense> after he has been altered through learning, and having shifted several times from an opposite state; the other, <having shifted> to the exercise from the possession of the letters without exercise, <is potentially a knower in the principal sense> in a different mode.

As it is clear, the implicit clause in the passage is the one declared at the beginning: both k_0 and k_1 are a 'knower' in potentiality in relation to k_2, which is the principal sense of the term. The only other clause one need to supplement is a 'change' verb connecting the stages the latter transition ($k_1 \rightarrow k_2$) begins from (ἐκ τοῦ ἔχειν τὴν γραμματικήν, μὴ ἐνεργεῖν δέ) and ends in (εἰς τὸ ἐνεργεῖν).[194]

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[193] As Burnyeat (2002: 83-87) reports, commentators deal with the difficulty by supplying, in the translation if not in the text, a reference to being or becoming a knower *in actuality*. In this way, the passage is supposed to claim that a k_0 is a knower *in actuality* after becoming k_1, thanks to the alteration undergone by learning, while k_1 is a knower in actuality after becoming k_2, which only requires activation of expertise and knowledge that are already fully possessed (cf. Alexander [*Quaest.* III 3, 83.27-30], Philoponus [1897: 300.8-30], and all modern translators; Torstrik and Ross, with some differences, added it to the Greek). Burnyeat himself proposes a less intruding reading in response to this difficulty, rightly complaining that the commonly supplemented 'is a knower in actuality' is nowhere in the text. In his view, the passage moves from the remark that k_0 and k_1 are potentially a knower, to the distinction of k_0 as 'potentially' (thus supplying just 'is in potentiality' for ὁ μὲν in a 31) one who has been altered through learning and has repeatedly changed from an opposite state (i.e., k_0 is potentially k_1), and k_1 as 'potentially someone who has changed' (thus supplying 'in potentiality μεταβαλὼν' for ὁ δ' in a 32) in another way, viz. from having knowledge of letters without exercising it to the actual exercise. While certainly more persuasive than the traditional insertion of a reference to 'becoming k_1', Burnyeat's proposal still suffers from the assumption that the transition from k_o to k_1 must be relevant here, and is forced to artificially separate κατὰ δύναμιν from ἐπιστήμον to provide an adequate suppletive clause.

[194] On this point, I agree with Hicks and Burnyeat that the participle μεταβαλών ('having shifted' or 'having moved') must be borrowed from the preceding description. I also agree with Burnyeat (2002: 53, n.68) that the MSS reading τὴν αἴσθησιν ἢ τὴν γραμματικήν at the end of the passage is implausible. The mention of αἴσθησιν (possibly a gloss inspired by 417b18-19) together with γραμματικήν would imply that perception is a case of

An aspect that needs to be clarified is the relation between the two processes mentioned in the first description under (a) and (b), i.e., the shift from the opposite *hexis*, and the 'being altered by learning'. Commentators believe that the two are in fact referring to the same thing (in their view, the transition from k_0 to k_1) so that the καί connecting the two clauses is explanatory.[195] If I am right in believing that Aristotle is explaining how k_0 and k_1 are potentially k_2, rather than how k_0 moves to k_1, the supposed equivalence between the 'shift from the opposite *hexis*' and the 'being altered by learning' is implausible. First of all, in my view the subject 'altered by learning' (k_0) has not yet reached the 'opposite *hexis*' (k_1), and has rather altered his initial full ignorance of letters by becoming, so to speak, a 'taught ignorant' (to be distinguished by a full possessor of γραμματική: imagine the difference between a learning kid and an mature school master). We can accordingly speak of the passage from 'intact' ignorance (k_0) to 'altered' ignorance (k_0*), but it would be awkward to claim that the two *hexeis* constituting the *termini* of the transition are 'opposed' to each other. Furthermore, the equivalence between 'having been altered' and 'having shifted from a contrary state' is ruled out by the specification that the shift happened more than once (πολλάκις). The alteration from k_0 to k_0* by which a 'pure' ignorant changes into a 'taught' one is not something that need to happen more than once. It is *vice versa* likely to assume that in order for such 'alteration' of the state of ignorance to have occurred, the shift to k_2 – e.g., a repeated activity of recognizing letters – has been performed more than once. At any rate, there certainly are preliminary changes 'from the opposite *hexis*' that human beings must go through since their birth in order to reach the state of 'taught' ignorance, such as becoming a competent speaker of a language, acquiring experience, performing induction and memorizing sets of beliefs (*A.Po*. I 1, 71a1-b8, II 19, 99b15-100b5; *Phys*. I 1, 184a10-b14; *Metaph* I 1, 980a27-981b10; 9, 992b24-993a2). For this reason, I believe that the 'having been altered' clause is referring to the fact that k_0's initial ignorance underwent an alteration as k_0 became a 'taught' (or even 'self-taught') ignorant (k_0*), whilst the repeated shift from

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ἐπιστήμη, that is absurd (on this point, cf. Hicks' commentary, despite his choice to keep the MSS reading). The usual emendation is ἀριθμητικὴν (found in Themistius' paraphrase [1899: 55.28] and accepted by Torstrik and Ross). Burnyeat reports also Theiler's ἀρίθμησιν, and suggest as an alternative the deletion of τὴν αἴσθησιν ἢ. Considering that so far Aristotle mentioned only γραμματική and 'knowing this A', I prefer this last option. At any rate, the choice of one or the other emendations is irrelevant for the general understanding of the passage.

[195] Cf. Burnyeat (2002:53).

the contrary *hexis* refers to the fullest way of being a knower (k_2), that in k_0's case is reached from the contrary state of ('altered' or, originally, intact) ignorance.[196]

What we have, then, is the remark about two ways of exercising the same activity (k_2): one mediated by an alteration and thus 'indirect', in which k_0 becomes potentially k_2 passing through k_0*; and one that is 'direct' or 'immediate' in so far as the subject (k_1) simply 'switches on' and exercises and already possessed *hexis*. The two transitions to k_2 can therefore be schematized in the following way:

Indirect : k_0 – (alteration)→ k_0* –(shift from opp. *hexis*)→ k_2

Direct: k_1 — (shift from same *hexis*)→ k_2

The idea that the shift from the same *hexis* (as in $k_1 \rightarrow k_2$) is not an alteration is not in itself unacceptable and in fact right in light of what Aristotle is going to say. It is doubtful, however, that the rationale for the distinction of the two transitions is the presence or lack of an opposition between their initial and final *termini*, supposedly grounding a differentiation between 'ordinary' and 'non-ordinary' changes.[197] At any rate, this is not what Aristotle seems to be interested in here, and if there is a

[196] This interpretation suggests to look back again at the preceding (417a27) explanation of k_0's ability by appealing to his γένος and ὕλη. If we read καὶ ὕλη in the light of the 'having been altered', it is indeed possible to assume that Aristotle was hinting at bodily modifications due to previous training. The mention of matter should therefore be interpreted as a further reason adding up to being a member of the human kind, different from it and hinting at the bodily matter composing the subject. Hicks (1907: 355) has the merit of considering the possibility to read καὶ ὕλη in this way, even though he does it only to note that this is very improbable (cf. also Ross, 1961: 233, 236).

[197] Heinaman convincingly argues that the transition $k_1 \Diamond k_2$ can be equally described as a passage from contraries (ignorant3◊knower3) and as an activation of a potentiality (k_2 in potentiality ◊ k_2 in actuality). Accordingly, he claims that (*pace* Burnyeat) it is wrong to assume that a distinction of $k_0 \Diamond k_1$ from $k_1 \Diamond k_2$ can be based on the fact that the first transition, as opposed to the latter, features and opposition between initial and final *termini*. He recalls (2007: 151-153) various distinctions about stages and meanings of 'ignorance' and 'knowledge', pointing out that each type of 'knowledge' has a correspondent contrary in a specific type of 'ignorance' (ibid.:151-156; he quotes Top. 114b 9-11, 147a 17-18 and Metaph. 1052a2-4 [where even a state of 'ignorance' opposed to k_0 is admitted], and EE 1225a 37-b16 and EN VII 3, 1147b6 [where he identifies a sense of 'ignorance' defined in opposition to k_2]). Heinaman thinks that the transitions (in his view, $k_0 \Diamond k_1$ and $k_1 \Diamond k_2$) are distinct in so far as the *termini* of the second do not fall in none of the categories in which changes take place (i.e. substance, quality, quantity and place), but rather to the category of 'suffering' and 'being changed' (πάσχειν, κινεῖσθαι). The latter explanation, however, unconvincingly abandons a clear textual indication (that is, that in $k_1 \Diamond k_2$ there is *no* transition from a contrary *hexis*) to promote an improbable idea of 'transition between opposites belonging to the category of pathos'.

somewhat 'special' transition he is willing to introduce and emphasize in the passage, this is in fact the first, 'indirect' one ($k_0 \rightarrow k_0^* \rightarrow k_2$), which is opposed to the one reaching contemplation by the 'normal' and 'direct' route ($k_1 \rightarrow k_2$).

The distinction between 'direct' and 'indirect' transitions to the same exercised activity is certainly subtle, and offers more than an occasion to draw apparently paradoxical consequences.[198] On the other hand, the difference between a master and a beginner with regard to their epistemic abilities is too evident to go unnoticed, even if they both exercise an activity that is part of the relevant branch of knowledge, like 'recognizing that this sign is an A'.[199] Knowledge is for this reason a useful case-study for demonstrating that there may be *two* different modes of being able to exercise one and the same activity. Without questioning the idea that an actuality is definitionally prior to the relative potentiality, Aristotle thus gains the theoretical possibility of distinguishing two different ways of being in potentiality starting from the same actuality.

The clarity by which such a distinction is displayed in the case of knowledge may help us to understand why Aristotle, having in mind the pending *aporia* about self-perceiving sense-organs, starts speaking about knowledge. *Pace* Burnyeat, we are not in front of a 'strained' and 'artificial' application of the language of alteration and affection to knowledge, that is meant to introduce us to the realm of a 'special' types of alteration.[200] The rationale behind Aristotle's strategy is rather that knowledge is a perfect introductory example for the claim that two second actualities, apparently indistinguishable, may be reached in different ways and require different

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[198] Cf. again *Metaph*. Θ 8, 1050b10-15.

[199] This is not to say that the distinction of the two potentialities of reaching k_2 is useful as a discriminatory test to evaluate if a particular individual 'knows' or is a mere 'taught' ignorant. In fact, in order to spot the difference between two subjects, we would need some detailed information about the causal history by which the potentialities are gained, and perhaps put their knowledge to the test by dialectic examination.

[200] Burnyeat (2002:58-59) admits that the language of alteration and affection can fit the case of knowledge only in a strained and artificial way. In his view, Aristotle may have chosen knowledge as the model for the opposition between extraordinary and ordinary alteration 'in deference to its Platonic ancestry', while struggling not to give the impression that a transition from possession to exercise of a hexis 'is incompatible with dependence on a particular external cause'. Such dependence is in turn necessary to elaborate a model that secures that perception is 'covered by the pattern of explanation expounded in *De Generatione et Corruptione* I 7 and *Physics* III 1-3' Having made Aristotle suffer this discomfort, Burnyeat sets him free to recognise in 417b 8-9 that the transition from k_1 to k_2 is not in fact an alteration. In his view, since perception has an external causal agent, while knowledge is something we can do at will (417b 19-26), $k_1 \lozenge k_2$ is not a passive change, 'hence not a change at all as change is understood in Physics III 1-3'.

potentialities. This seems a pretty good start towards the enrichment of the notion of potentiality, and exactly what Aristotle needs at this point to get rid of the *aporia* on self-perceiving organs.

2.2 Preservative affections and the $k_1 \rightarrow k_2$ transition

Aristotle proceeds by introducing a distinction between two kinds of 'being affected' (πάσχειν) in 417b 2-5. A first one is a certain 'destruction' operated by a contrary (φθορά τις ὑπὸ τοῦ ἐναντίου); another is rather a 'preservation' (σωτηρία) of what is in potentiality.

The following section (417b6-16) appears to state that $k_1 \rightarrow k_2$ is a clear example of 'preserving' affection. The point seems to be that since k_1 is a knower *qua* possessing knowledge, the transition from k_1 to k_2 entailed by 'becoming a contemplating subject' (θεωροῦν γίνεται) is 'a progression towards the same and an actuality' (417b8: ἐπίδοσις καὶ εἰς ἐντελέχειαν).[201] As the introductive γάρ (b6) suggests, this statement is meant to be a clarification of the previous distinction between two types of affections, and this seems to make sense if Aristotle does in fact think of $k_1 \rightarrow k_2$ as belonging to the 'preserving' rather than the 'destroying' type. In the same vein, Aristotle says in the following that 'this is the reason why' (διό) the wise is not 'altered' when he exercises wisdom, and the builder is not altered when he builds. The reason is the same as the one making $k_1 \rightarrow k_2$ a preservative affection: since both the subjects start from the possession of the relevant disposition (respectively, wisdom and the craft of house-building), and so end up in the same state (they still possess, respectively, wisdom and the craft of house-building), they are certainly undergoing a *pathos*, but they are not suffering an alteration or a destruction of any sort.[202]

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[201] Heinaman (2007: 177, n.59) claims that the expression θεωροῦν γίνεται is strictly speaking at odds with Aristotle's general thesis that there is no coming-to-be or κίνησις of an ἐνέργεια (cf. EN X 4, 1174b12-14), and thence (against Burnyeat's assumption of a parallel between the passage and 417a31-b2) considers θεωροῦν (as opposed to θεωροῦν γίνεται) as the sole referent of ὅπερ (417 b5-7). In this way, Aristotle would be referring to the activity of contemplating, and not to the transition to such activity. The hypothesis seems not necessary, since (as we know from 417a14-16, and as Heinaman himself suggests) Aristotle is not considering here the difference between κίνησις and ἐνέργεια to which the thesis of EN X 4 is committed. Further, since Aristotle has not yet established that $k_1 \Diamond k_2$ is not a destructive alteration, it is excusable to talk of such transition as 'becoming a contemplating subject', even though this is strictly speaking improper.

[202] The examples Aristotle chooses are probably not casual. In both cases, someone could exploit the ambiguity of πάθειν to claim that the house builder is affected by a house, that is paradoxical in consideration of the fact that it is rather the case that the house is 'affected' (built) by the builder. Aristotle expressly denied that the builder is affected by

It is important to note that, despite a *prima facie* appearance promoted by the association of $k_1 \rightarrow k_2$ with affections of the 'preserving' type, it is not obvious that $k_0(\rightarrow k_0^*) \rightarrow k_2$ must in turn be associated with affections of the 'destroying' type. If the destructive character concerns the loss of the initial state (as Burnyeat proposes), then $k_0(\rightarrow k_0^*) \rightarrow k_2$ may be said 'destructive' (the subject become 'taught' from being 'absolutely' ignorant, and then even a 'knower' in the fullest sense) as well as 'preservative' (the subject is still 'ignorant' even though he is 'taught', and still a 'taught ignorant' while contemplating).[203] If, on the other hand, the 'destroying' character of the affection depends on the positive or negative effect on the subject's nature (as Heinaman believes), calling $k_0(\rightarrow k_0^*) \rightarrow k_2$ a 'destroying' affection is unambiguously wrong, since the progressive approximation of the state of knower is certainly beneficial to the subject in Aristotle's mind.[204] In fact, the distinction of preservative and destructive affections does not need to be exhaustive, and Aristotle is more interested in contrasting the possible transitions to the exercise of knowledge – and thence, for the sake of clarifying that distinction, in the examination of the processes being involved – than in offering a complete classification of all types of affections.

What appears to be important for Aristotle's purpose is to show that the description proposed for preservative affections ('a progression towards the same and an actuality') fits the 'direct' transition to contemplation ($k1 \rightarrow k2$), but not the indirect one ($k_0[\rightarrow k_0^*] \rightarrow k_2$). In this way, it becomes clear that the two do in fact constitute different and alternative ways of reaching the same exercised activity. Aristotle is only

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what is being built in II 4, (416a34-b3), offering a parallel with what the relation between food and what is nourished in nourishing. Here, Aristotle remarks that what happens – presumably, the only effect of wood on the builder – is that the builder switches from inactivity to activity (ὁ δὲ τέκτων μεταβάλλει μόνον εἰς ἐνέργειαν ἐξ ἀργίας).

[203] In Burnyeat's view (2002: 53-57), the destruction or preservation concerns a certain quality in itself: in this way, an affection that realizes a certain potentiality without destroying it (like contemplating, considered as an affection of the potentiality to contemplate) is 'preservative', while an affection entailing the destruction of the starting point (the original potentiality of being in the final stage) is 'destructive'. He therefore associates the two transitions distinguished in the previous passages (in his view, $k_o \Diamond k_1$ and $k_1 \Diamond k_2$) with the 'destructive' and 'preservative' types of affection distinguished here.

[204] Arguing against Burnyeat's interpretation, Heinaman (2007:171-173) argues that affections are 'preservative' and 'destructive' in relation to the nature of the affected subject (the affections due to health or virtue preserves and develops our nature; the one due to blindness, ignorance, sickness are instead some sort of destruction). It is worth noting that the disagreement between Heinaman and Burnyeat involves a disagreement on the question whether Aristotle's distinction between κίνησις and ἐνέργεια is based on the destruction of the initial state, due to the acquisition of a final one that is contrary to it.

after a secure confirmation of the difference between 'direct' and 'indirect' transitions, regardless of how one exactly classifies the transitions and the changes they involve. This stance is confirmed by Aristotle's lack of interest with regard to deciding whether the preserving character of $k_1 \rightarrow k_2$ entails not being an alteration at all, or rather being an alteration of a different type: he is not looking for an exhaustive and definitive classification of events and processes.[205]

2.3 $k_0 \rightarrow k_0$ is a alteration that is 'able to deprive', to be distinguished from the perfective alteration $k_0 \rightarrow k_1$*

Aristotle concludes the section on knowledge with some considerations about teaching (417b6-16): first he approves the fact that the derived name for what leads to thinking is not 'teaching' (διδασκαλία); then, he states that *either* students being taught are not affected at all by their teachers, *or* there will have to be two kinds of alteration. The section is obscure, and several aspects need to be clarified.

The initial endorsement granted to the fact that 'what leads' (τὸ ἄγον) to the exercise of an epistemic activity is not given the name of 'teaching' appears quite bizarre. Aristotle says:

> Accordingly, it is certainly a good thing that what, in a way related to who is thinking and understanding, leads <him> from being in potentiality to actuality, has a derived name different from 'teaching' (417b9-12)

It is *prima facie* incredible that anyone could ever call the cause for the transition to actual thinking (k_2) 'teaching', and this makes Aristotle's praise for not doing it suspiciously awkward. For this reason, some editors changed the text transmitted by manuscripts, and made Aristotle say that what is appropriately not called after 'education' is rather the very same transition to the exercise (τὸ ἄγειν).[206] In fact,

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[205] While recognizing that the following case of the builder makes it clear that Aristotle would certainly go for the first disjunct (that is compatible with the idea of *Metaph.* Θ 6 that knowledge is the paradigmatic case of ἐνέργεια as opposed to κίνησις), Burnyeat (56-59) explains that the possibility that k1◊k2 is 'another kind of alteration' is left open because of Aristotle's intention to extend the distinction to perception. This is in turn due, in Burnyeat's view, to his wish to preserve the objectivity of perceptual content and the collocation of perception in the domain of natural philosophy (cf. note 200 above).

[206] Cf. Ross, who follows Torstrik in turning τὸ ἄγον into τὸ ἄγειν. Burnyeat (2002: 59, n.83) points out that in both the traditional and modified versions of the text the verb ἄγειν equally alludes to 'a causal agent distinct from τὸ νοοῦν καὶ φρονοῦν and parallel to the causal agent in the contrasting description', namely the teacher Aristotle is going to mention at 417b13. However, despite a declared preference for the 'tortuous' text of the MSS, and despite suggesting that 'what induces' could be a sensible or intelligible object (he cites Torstrik's 'geometrical figure', 417a29's 'A', Philoponus' τὸ ἐπιστητὸν καὶ τὸ

statements like 'we are taught because of teaching' or 'we know because of knowledge' appear to be perfectly fine for Aristotle. In DA II 2 (414a4-12), he proposed a general scheme for all livings beings' activities, according to which these last are affections due to the presence of dispositional states (*hexeis*) that, thanks to the soul, living beings are naturally capable to 'receive'. In particular, Aristotle states that the expression 'that by which we know' can indicate both the 'knowledge' we receive and the soul's passive ability to 'receive' it. If this is taken into account, it is evident that it would not be outlandish for him to entertain the hypothesis that 'teaching' is what leads a teaching-assisted ignorant to the exercise of knowledge ($k_0 \rightarrow k_0^* \rightarrow k_2$). Appreciation of the practice of not invoking teaching (but, presumably, 'knowledge', or 'understanding', or the objects being thought) as the subject-related causal factor leading to k_2 is therefore neither bizarre nor superfluous[207]. In the frame of the interpretation I am offering, a good reason for Aristotle's approval may be that this practice is describing the transition to k_2 in an appropriately neutral way, that is regardless of whether k_2 is reached starting from the actual possession of the *hexis* (k_1) or from a state of 'taught' or 'intact' ignorance (k_0^* or k_0).

In the following sentence (417b12-16), Aristotle seems willing to clarify the approval granted to the practice of not giving 'teaching' as the name for what leads a subject to actual (i.e., k_2's exercised) epistemic activity. He says:

> However, we must say either that being learning and acquiring knowledge from being in potentiality is not affected by a person that is able to teach and is being in actuality; or that there are two modes of alteration: the shift to the conditions (διαθέσεις) that are able to deprivate, and the shift to the dispositional states (ἕξεις) and the nature.

The text is extremely compressed here, but the salient points seem clear enough. Aristotle is investigating how we should speak (φατέον, b14) of a 'taught' subject ('one who learns and acquires knowledge', μανθάνον καὶ λαμβάνον ἐπιστήμην), in the

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αἰσθητὸν), he is happy with having Aristotle dully saying that 'teaching' is not the right word to describe them.

[207] The clause κατὰ τὸ νοοῦν καὶ φρονοῦν suggests that the pertinent causal factor must be related to the subject that thinks and understands (I therefore agree with Hicks [1907: 357] that the κατὰ must be interpreted as 'in relation to'). In other words, it indicates that we are considering factors such as affections (that is, the effect due to some agent leaving aside the agent that produced it), states, or dispositions of a subject that make a causal contribution to the transition. The focus on the subject is in line with the earlier limitation of the enquiry to actualizations that take place in the changed and affected patient (417a15-16). The restriction allows Aristotle to leave aside cognized objects , which would otherwise have been suitable candidates for the role of 'what leads' to the exercise of the relevant epistemic activity.

light of what he just said (cf. τὸ μὲν at b9 and τὸ δέ here in b12).[208] He poses a dilemma: since it is right not to say that 'teaching' is what leads a subject to k_2, then in the case of a 'taught' ignorant (k_0*) moving to k_2 while still remaining ignorant, either we shall deny that the teacher had any effect on the taught subject, or admit a distinction between two types of alteration.[209] While some justification for the first disjunct can be offered in consideration of the fact that the subject remains ignorant, it would be absurd to deny that the change from 'absolute' to 'taught' ignorance is at least in part an effect of teaching. It would indeed be paradoxical for Aristotle to state that no effect on students is made by a person able to teach and actually teaching, when this presumably describes what he himself was actually doing by giving this very same lecture. Furthermore, he already admitted the effect of teaching in 417b30: k_0 is able to shift to k_2 'having been altered by learning'.[210]

The second disjunct, and the distinction of two types of alteration stemming from it, is therefore grounded on the obvious admission that teaching has an effect on people being taught, even when it is not effectively reaching the full transformation of ignorance into the possession of knowledge (i.e., when the effect being reached is k_0* rather than k_1). This reconstruction perfectly squares with the final classification of alterations, according to which taught subjects can be altered *either* to the effect of

[208] The exact qualification of the taught subject's with regard to potentiality is not at all clear, for the clause ἐκ δυνάμει ὄντος seems ungrammatical. Torstrik suspected a scribe's repetition from b10, and bracketed the clause. On the opposite, Ross (1961: 237) saves it as being repeated 'naturally enough', and interprets it (*ibid.,* 234) as absolute: the subject is the student that, 'from being in potentiality', learns and acquires knowledge. The parallelism is accepted also by Burnyeat (2002: 61, n.86), who refers the clause to an implicit term like 'knower', so that the sense is that the student 'learns and acquires knowledge from being a knower in potentiality'. He adds that the phrase's oddity is indeed due to 'Aristotle's determination to treat the two potentialities and the two transitions as parallel'.

[209] Both Burnyeat (2002:63-65) and Heinaman (2007:166,n.41) assume that when Aristotle says that the taught student is not affected by the teacher he means 'not affected in a destructive way'. The assumption is in my view wrong, however. For it is far from obvious that 'being not affected' could be reformulated as 'being altered in a certain way', either presupposing or leaving aside the previous distinction between 'destructive' and 'preservative' affections: if we presuppose it, then 'being not affected' means that not even the latter affection is taking place; if we leave it aside, then it becomes impossible to claim that Aristotle means 'not affected in a destructive way'.

[210] Heinaman (2007: 169-173) notes that since Aristotle adopts learning as both an example of the 'developmental' shift (here) and as a genuine case of alteration (in 417a30), Burnyeat's opposition between ordinary (supposedly destructive) changes and non-ordinary (preservative or developmental) changes is unconvincing. Burnyeat (2002 : 61-62, n.87) does in fact recognize the difficulty, and argues that Aristotle is in fact adding a new claim here (he accordingly approves the omission of ὥσπερ εἴρηται in b14 by nearly all ancient commentators and several MSS and modern editors).

becoming k_1, thanks to the achievement of a dispositional state that complements the subject's nature (τὴν ἐπὶ τὰς ἕξεις καὶ τὴν φύσιν); *or* to the effect of undergoing a 'shift' towards conditions that have the ability to spoil them of their ignorance (τήν τε ἐπὶ τὰς στερητικὰς διαθέσεις μεταβολὴν), thus becoming k_0*.[211] It is important to note that the latter transition is defined by the *tendency* or *ability* to deprive (cf. the suffix –ικόν, that typically indicates 'being able to' or 'inclining towards') subjects of their initial condition, rather than by an actual deprivation of it. Thus, a taught ignorant has been subject to a transition 'towards a condition that is able to deprive', because the alteration by which he becomes a 'taught' ignorant (k_0*) tends to deprive him of the state of ignorance without actually having deprived him yet. Aristotle's employment of two different technical words to describe the states the two alterations lead to (*diathesis* and *hexis*) is also relevant, for he normally opposes the two by saying that a *diathesis* is a transient and unstable condition (properly speaking, an arrangement among parts), while a *hexis* is a stably achieved dispositional state (once a *hexis* is achieved, some significant event and explanation is required for its loss).[212]

What Aristotle is trying to achieve by distinguishing the alteration towards a 'privative' transient state and the one towards a 'perfective' *hexis* is the neutralization of a threatening linguistic ambiguity, which could undermine the earlier definition of $k_0 \rightarrow (k_0^* \rightarrow) k_2$ as a transition to the exercise of knowledge 'that passes through an alteration due to learning' (417a31). Aristotle must be aware that $k_1 \rightarrow k_2$ also implies (as a past pre-condition) an 'alteration due to learning', and can thus be described by the phrase originally used to capture the transition he wants to contrast with it, namely $k_0 \rightarrow (k_0^* \rightarrow) k_2$. A safe description for the latter transition, then, need to qualify

[211] Against Burnyeat (2002: 61-63), Heinaman convincingly argues (2007:156-160) that the point of the distinction is not the presence or lack of a logical 'negation' between the *termini* of the alteration (*ibid*.:169-170), and that in any case this would not be sufficient to ground a distinction between ordinary and non-ordinary changes. I only partially agree with Heinaman's own proposal, though, for he believes that the distinction is alluding to the fact that the final conditions are positive or negative for the subject, qua respectively perfective or deprivative of a full natural completion (like sickness, blindness and so on). In my view, Heinaman is right on the positive type of affection (which is indeed defined by its complementing the subject's nature), but not on the negative one, which is defined by the tendency to deprive subjects of their initial condition, rather than by an actual worsening of it. In fact, a taught ignorant is presumably better than a full ignorant with regard to knowledge (though this may in fact be less obvious than it seems, cf. Plato, *Sophist* 230a-d)– and yet subject to a transition to a condition (k_0*) that tends to deprive him of the initial state of ignorance.

[212] As Burnyeat (2002:62, n.89) notices, the idea of temporary vs. stable disposition is included in the opposition between διαθέσεις and ἕξεις, cf. *Cat*. 8, 8b26-9a13.

the entailed 'educational alteration' (i.e., $k_0 \rightarrow k_0^*$) as being *privative*, to avoid any confusion with the transition to k_2, that rather entails a *perfective* educational alteration (i.e., $k_0 \rightarrow k_1$).

More generally, the result Aristotle is pursuing at the end of his discussion of knowledge in DA II 5 is the discovery of a distinction between two ways of being able to exercise one and the same activity:

- an optimal 'direct' one, consisting in a transition from the relevant dispositional state (*hexis*) to its exercise, i.e. a preservative affection, enabled by previous 'alterations' that ended in the stable obtainment of the relevant *hexis* which complements the initial state and the subject's nature;
- a sub-optimal 'indirect' one, consisting in a transition from a power that falls short of the relevant dispositional state, enabled by previous alterations that ended in a condition that is able to 'deprive' the subject of the initial state (rather than complementing it and the subject's nature).

As the examination of the next sections of DA II 5 will show, Aristotle is not interested here in the topic of learning and knowledge in themselves, but rather in using them as a model for the above distinction, whose application to the case of perception provides the means for a complete solution of the question about self-perceiving sense organs.

3. Solving the *Aporia*: perception in light of the refined doctrine of potentiality and actuality

3.1 The comparison between knowledge and perception.

In 417b 16- 19, Aristotle finally begins a series of comparisons between knowledge and perception. The first remark, according to which the 'shift' by which the power to perceive is acquired is due to the parent (and actually takes place before birth, cf. GA II 3), carries on from the previous section the interest in the causal factors behind the potentiality.[213]

Aristotle adds that a newborn 'already possesses perception in the same way as knowledge' (417b18). The knowledge he is referring to must be k_1's, since we clearly

[213] It is unlikely that by 'the first shift' (πρώτη μεταβολή) Aristotle wants to refer to the first type of 'shift' just distinguished (the one leading to a 'privative' state), since the acquisition of the power to perceive is rather a 'developmental' transition complementing the subject's nature. Hicks recalls the interpretation of the commentators, that rightly distinguish this first transition as the one from pure potentiality to the possession (*hexis*) of the capacity (he cites Alex. *Quaest*, III 3, 84, 33)]

do not need to acquire the power to perceive by learning. The emphasis must then be put on the 'already' (ἤδη, echoing the one employed in the description of k_2 at 417a25), which indicates that no further development of the capacity is needed (cf. 417a27-28).[214] Aristotle is thus warning us that, in adapting to perception what has been established by using knowledge as a model, we should bear in mind that no difference exists between the perceptual power belonging to a human being *qua* human being (the analogous of k_0), and the *hexis* fully possessed by an expert knower (k_1). If we call p_0 the natural specific power analogue to k_0, and p_1 the possession of the power to perceive by analogy with k_1, we shall have to take $p_0 = p_1$. As a consequence, all perceivers reach the actual exercise of perception (call it p_2) by moving from the same, already full-fledged perceptual power (p_1=p_0).

It is worth noting that the position of only one (natural and specific) perceptual power (p_1=p_0) does not prevent the possibility to reach the same second activity (p_2) in different ways. For instance, in order to go from my desk to the library, I need to activate my natural ability to intentionally reach a place by moving my limbs in a controlled way. Two different activations of the same ability are clearly possible, as I could reach the library either walking on my feet or on my hands (granting for the sake of argument that I am actually capable of doing it). Aristotle himself considers a similar example in a textually defective and obscure section of EE (1246a26-35), as he investigates whether virtues can have a correct and an incorrect use. Notably, the cases he takes into account in the investigation include knowledge and perception: one is the possibility to use knowledge (k_2) in a wrong way, as it happens when we spell a word incorrectly, either *on purpose* or *by ignorance* (thence moving from k_1 or k_0 respectively); the other is the possibility to use the eye to misperceive *because of a distorting affection*. The latter example already suggests the possibility to move to the exercise of perception (p_2) by a route that, analogously to that followed by an ignorant sub-optimally achieving k_2, is characterized by going through an alteration of the initial state (p_1*, analogous to k_0*). In my view, then, Aristotle is hinting to nothing less than this analogously twofold way of reaching the exercised activity (k_2 and p_2), when he states, in the passage of DA II 5 under examination (417b16-19), that we similarly

[214] According to Hicks (1907: 354) in a25 ἤδη means 'without requiring that any further condition should be fulfilled' (he cites *Pol*. 1275b 18). He recalls (*ibid.*: 357) that perception is a δύναμις συγγενής (*Metaph*. 1047b 31 ff.) that is neither due to habit nor to instruction 'whereas artistic skill and moral virtue are only acquired by practice'. Citing also *Sens*. 4, 441b 22: οὐ γὰρ κατὰ τὸ μανθάνειν ἀλλὰ κατὰ τὸ θεωρεῖν ἐστι τὸ αἰσθάνεσθαι .

speak of perceiving in actuality and contemplating (τὸ κατ' ἐνέργειαν δὲ ὁμοίως λέγεται τῷ θεωρεῖν).

Aristotle continues his comparison between knowledge and perception by stressing their difference with regard to the possibility of self-activation (417b 19- 28), thus recovering the original investigation about the problem of self-perceiving sense-organs. While it is true that a subject endowed with the natural power to perceive is analogous to the one in full possession of an epistemic *hexis* (k_1), one must also bear in mind that the activation of the power to perceive requires the presence of actually perceptible objects.[215] The passage from the possession to the exercise of knowledge ($k_1 \rightarrow k_2$) can be performed at the subject's will, since knowledge is about universals that are somewhat in the soul.[216] On the contrary, since perception is about external particular objects, their presence is required in order for the sense-organs to be activated and brought to exercise ($p_1 \rightarrow p_2$). This requirement was already introduced in 417a6-9, when Aristotle remarked that what is able to perceive is in potentiality and needs to be activated in a way similar to the ignition of a fire, thus explaining why sense-organs cannot activate themselves by themselves, and why external object are needed to activate perceptual powers. And as already noted, the remark only accounts for the fact that sense-organs do not perceive themselves by themselves, while still leaving unexplained why they are not perceiving themselves once they are activated and affected by external, actually perceptible objects.

3.2 The two ways of activating the power to Perceive and the Potential Perceptibility of Sense Organs

Aristotle is finally in a position to argue that the first part of the *aporia* about self-perceiving sense-organs, which faces the difficulty of explaining why sense-organs do not perceive themselves once they are activated and affected by perceptible objects, can only be solved after one poses a distinction between two types of perceptual 'activation' and 'affection', in analogy with the one examined in relation to knowledge.

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[215] Cf. Hicks (1907: 359), who quotes *A.Po.* 87b 29. He even translates (*ibid*.: 75) 'for the presence of the sensible object is necessary'.

[216] It is worth noting that on the basis of Aristotle's position concerning the existence of absolute self-movers (cf. *Phys* VIII 4, 255b3-4, 13-31), the mere presence of suitably 'active' objects of knowledge would not determine the capacity to know at will, but rather the impossibility not to be always knowing. What determines the capacity to know at will, then, must be a certain way of being present and available to the knower that characterizes the universals that are the objects of knowledge. On the subject, cf. Shields (1994:130-133) and Wedin (1994:85-88, 114-116) .

Aristotle suggests this by finally applying to perception the idea of two different ways (optimal and direct vs. sub-optimal and indirect) in which a subject can reach the exercise the same power. The application takes place by a further comparison, which this time entail the activities of perceiving and commanding (στρατηγεῖν):

> being in potentiality is said not to be simple; on the contrary, in the same way as 'capable of commanding' are on the one hand the boy, on the other the one who is of the proper age, so it is the case for what is capable of perceiving (417b30-418a1)

The way Aristotle employs the case of commanding may strike us as surprising, for he decides to hint at a mere difference of age between a boy and a person of the proper age, rather than to rehearse the difference between the 'taught' ignorant's and the expert's way to exercise knowledge (which would have been possible as a proper τέχνη related to military leadership [i.e. στρατηγική, cf. EN 1094a9, 13] does in fact exists). In fact, the focus on age does in fact seem to indicate that, in both the cases of commanding and perceiving, two subjects already having the *same* full-fledged *hexis* (i.e., a k_1-type dispositional state) are distinguished because of the presence, in one of them, of a further enabling condition. Aristotle's employment of the example, then, suggests an important aspect we should pay attention to in the application of the doctrine of the two transitions from the case of knowledge to that of perception.

What Aristotle indicates in drawing a parallel between commanding and perceiving is that the salient aspect distinguishing the two activations of the fully possessed potentialities is an 'alteration' of the original power, analogous to the one detected earlier in the 'indirect' transition to contemplation of 'taught' ignorants. In the case of being capable to command employed by Aristotle, the enabling alteration is represented by getting older. That this is in fact what happens in the case of commanding can be clarified by adopting the example of a father and a son. Alexander, already able to command in the sense of possessing the relevant *hexis* (k_1), lacks only the proper age that will make him 'able to command' in the most proper sense, i.e. as an officially invested general. The way Alexander is potentially commanding is then different from that characterizing his father Philip, who is instead able to command as an officially invested general thanks to the ability to command he has in common with Alexander, plus the older age that differentiates him from his son. Philip's potentiality towards the activity of commanding is therefore analogue to the possession of the relevant *hexis* plus a certain alteration of it due to age (call it k_1*). In a similar way, in the case of perception the starting point is a fully possessed dispositional state

(p_1=p_0). It is therefore with regard to the latter, fully possessed perceptual power that we shall have to distinguish the two ways of exercising perception, the 'direct' one ($p_1 \rightarrow p_2$), and the one that, after a certain alteration, passes through an enabling condition that is able to deprive the subject of the initial state ($p_1 \rightarrow p_1^* \rightarrow p_2$).

The distinction of an 'indirect' and 'direct' way of exercising the power of perception, characterizing subjects that are respectively in possession of 'altered' and 'non-altered' perceptual powers, sheds new light on the conclusion of the passage. Here, Aristotle says that

> Since the difference among them is unnamed, but concerning them we discerned that they are different and how they are different, 'being affected' and 'being altered' must be used as the principal names. But what is capable of perceiving is in potentiality similar to that perceptible object <which is> already in actuality; accordingly, it is affected when it is not similar to <it>, but once has been affected it has become similar and it is of the same quality of that. (418a1-6)

Concerning 'being affected by a perceptible' we are stuck with a lack of proper names for the different two ways in which this is possible. Aristotle accepts this linguistic limit as inevitable, noticing that we nonetheless distinguished how and why they are different. As we have finally established, the distinction consists in the fact that in the 'indirect' way of exercising perception, the subject passes through an enabling 'privative' alteration.

The point about becoming similar by being affected may appear a pedant rehearsal of the point already made in 417a 20, but it is not, in fact, a mere repetition. The slight differences between the earlier and present formulations must not be overlooked. What Aristotle said earlier (in 417a20), was that, generally speaking, something is affected when is dissimilar and similar after being affected. In that case, he was enunciating a general condition for being liable to an affection, and a consequence of having been actually affected; but nothing yet implied that an actual assimilative affection does in fact take place in perceiving. On the contrary, ordinary assimilative affections of this sort have to be excluded, if sense-organs are not perceiving themselves every time we perceive.[217] In the present passage, Aristotle states again that what is capable of perceiving is potentially like the actually perceptible object. However, he now says something that acquires a wholly new meaning in the light of the two ways in which perception can be exercised: as said earlier, what is capable of

[217] This implies that during standard cases of perception sense organs are *not* literally affected, in agreement with the reconstruction I offered in chapters 1-2 of the present work.

perceiving is affected when dissimilar from the perceptible object (418a3-5: τὸ δ' αἰσθητικὸν δυνάμει ἐστὶν οἷον τὸ αἰσθητὸν ἤδη ἐντελεχείᾳ, καθάπερ εἴρηται); therefore, *it is affected while not being the same, but it becomes of the same quality as that once it has been affected* (418a5-6: πάσχει μὲν οὖν οὐχ ὅμοιον ὄν, πεπονθὸς δ' ὡμοίωται καὶ ἔστιν οἷον ἐκεῖνο). This is a very compressed way to state that in 'direct' standard activation of the ability to perceive (i.e., $p_1 \rightarrow p_2$), senses do not become similar to the perceived object to the effect of becoming themselves actually perceptible, whereas in some special cases sense-organs may in fact undergo a physical alteration that makes them actually perceptible to themselves, according to the 'indirect' perceptual activation described above ($p_1 \rightarrow p_1^* \rightarrow p_2$). In the latter case, Aristotle speaks of an organ that *has become* similar in a past moment and so *is* the same in quality (ἐκεῖνο) as the object affecting it, and thence actually perceptible. This formulation is clearly describing the literal alteration taking place in non-standard 'indirect' activation of the power to perceive, which is what makes sense-organs able to perceive themselves (the literal affection is what leads to the state I described as p_1^*). This shows that sensory organs can indeed become actually perceptible, and thus perceive themselves, without this having to happen in each and every case of 'normal' perceiving.

We can therefore try to escape the pessimistic reading shared by Ross (*ad loc.*) and Burnyeat (2002:51-52) about the initial announcement that 'there will be certainly some occasion in the future to make some further clarification about these things'. The reference to a further clarification is certainly disappointing if, with Burnyeat, we expect this to mean that there will be some more detailed discussion about the distinction between ordinary and non-ordinary alterations. If I am right in interpreting the passage in the way I explained, Aristotle is rather thinking of the occasions in which he will consider non-standard perceptual experiences due to some affections on sensory organs that make them perceptible to themselves. The passage from *De Sensu* quoted earlier (437a22-b10) is a paradigmatic example, as it describes a peculiar a non-ordinary experience in which the eye sees itself because of a certain affection that makes it perceptible to itself. This is similar to what happens in the experience of after-images and other illusory perceptual phenomena Aristotle discusses in *Insomn*. 2 (459b1-11). In such cases, there is an actual affection on sense-organs due to an imprecise counter-balancing of the incoming affection (the intensity of the sense-organ's homeostatic counter-affection either exceeds the incoming

affection or falls short of it), and as a consequence the organs undergo an actual affection that makes them perceptible to themselves (cf. chapters 1, 2 and 4 of the present work for further discussion of the passage). In this way, the transition to the exercise of perception takes place by the 'indirect' and 'sub-optimal' route we are by now familiar with, since the original power (p1) is affected and altered, and thus reaches a temporary condition that tends to the deprivation of the original power (p1*).

Conclusions

In the reconstruction of DA II 5 I offered, the chapter is unified as a coherent whole by the necessity to solve the initial *aporia* about self-perception and self-activation of the sense organs. Aristotle explains very easily why self-activation is impossible, on the grounds of the potential state of what is able to perceive and the necessity of external, actually perceptible objects. The question left unanswered is why, once sense-organs are affected and thence become 'like' such objects, self-perception does not take place. This should in fact be expectable, since they are made of the same elements as external perceptible objects, and they should become themselves perceptible like them after the affection they undergo.

As far as there is only one possible way in which the potentiality of the perceptual faculty is actualized, the sense-organs are affected and the exercise of perception reached, it would always be possible to point out that sense-organs should perceive external and internal perceptible objects (i.e. themselves *qua* perceptible) in the same way. In order to show why this is not in fact the case, Aristotle needs a more refined account of potentialities and actualities related to perception. It is exactly this refined account that DA II 5 is meant to provide.

Aristotle uses knowledge as a case-study to show that there may be two different ways to exercise one and same activity. The activity of 'knowing this A' is one and the same, but there is an obvious difference between reaching the activity from being a possessor of grammar, and shifting to it from being a 'taught' ignorant. In the latter case, the transition is possible thanks to an alteration that is able to deprive the subject of the initial state (while not yet ending in the replacement of ignorance by knowledge). In the other case, there is no alteration at all, and the previous affections that one may invoke are different from the 'privative' one, for they rather led to the obtainment of a stable *hexis* that complements the subject's nature.

Aristotle finally applies the thesis of two transitions to the exercise of the same activity to the case of perception. Concerning perception, the state of full possession of the potentiality is the starting point for both the 'direct' optimal exercise and the 'indirect' sub-optimal one. The latter type of transition takes place because of an affection that tends towards destruction of the initial state, while enabling an ephemeral disposition that makes sense-organs perceptible to themselves. There is an inevitable ambivalence in the terminology of 'being affected' here, but the difference is clear: to have a normally direct exercise of perception, a sense-organ must be dissimilar from the object to be perceived in order to be liable to be affected by it; in the case of an 'indirect' exercise of perception, the same condition rules, but the sense-organ must also be actually affected to the effect of becoming qualitatively identical to the object, and thus actually perceptible like it. It is therefore true that at the end of II 5 Aristotle unambiguously describes a literal alteration undergone by a sensory organ. However, such a literal assimilation characterizes the non-standard episodes or perception Aristotle is interested in here.

Aristotle's final answer to the *aporia* of self-perceiving sense-organs is that we do not normally perceive our own sense-organs, since they are not affected to the effect of becoming actually perceptible. However, in special circumstances sense-organs can in fact be affected to the effect of becoming perceptible to themselves. In such cases, they will accordingly perceive themselves, thus reaching the exercise of the power of perception by an non-ordinarily 'indirect' route, in analogy to what happens to a 'taught' ignorant reaching the exercise of knowledge.

Chapter 6 - Aristotle's Theory of Perception: Some Conclusions

In her study on Aristotle's perceptual realism, Sarah Broadie (1993:145) wrote that 'in the absence of conclusive textual evidence', the question whether Aristotle's account of perception includes 'physiological events in the role of mediators between perception itself and the external world (…) may remain unsolved'. The revised understanding of the meaning of μεσότης I offered supplies, I believe, something very close to a much desirable widening of the texts at our disposal. As I argued, the thesis (introduced in DA II 11 and recalled in DA II 12, III 7 and in Meteor. IV 2) describes *the act of perceiving* as a homeostatic 'mediating balance' of the incoming affection caused by an actually perceptible object on sense-organs. On the other hand, the alternative reading that makes it a description of the physical constitution of sense-organs turned out to be implausible: none of them is an 'intermediate' blend of the extreme opposites in the range of its perceptibles (with the exception of only one aspect of the organ of touch, its consistency).

The rediscovery of the homeostatic physiology of perception enlightened several aspects of Aristotle's theory. The thesis squares well with the idea (presented in *De Insomniis*) that sense organs *react* to the slightest affection they are subject to, and his cautious description of perception as an affection and alteration 'of a certain kind' are now perfectly sound. Similarly, it is clear how Aristotle can state that senses are impassive like thought, but in more limited way, and why he says that the exercise of perception is a 'preservative' type of affection, similar to the one that takes place when a knower 'activates' its knowledge in contemplation. For the same reason, the motivation behind his constant preoccupation with the maintenance of the sense-organs' original potentiality – the one which makes them liable to the stimulation caused by relevant perceptibles – can now be fully appreciated. Finally, it is evidently the homeostatic physiological process that dictates that sense organs which perceive F must be simultaneously able become both F and its opposite.

The reconstruction I proposed has the curious consequence of mediating between some of the claims at the basis of Tranductionism and Spiritualism. Spiritualists turn

out to be right with regard to the assertion that sense organs are not in fact affected by an actual, ordinary change. However, such denial does not entail, nor suggest, the presence of 'quasi-physical' changes, nor a 'de-physiologized' account of perception. On the contrary, the reason why sense-organs are not actually changed as we perceive is that, thanks to a homeostatic physiological reaction, they counterbalance the incoming affection, and thus keep their receptive condition unaffected. For the same reason, my reading also entails a certain degree of agreement with transductionist interpreters. In order for the homeostatic counterbalancing to be effective, the intensity of the incoming affection must be commensurate to that of the perceptual reaction. As a consequence, the homeostatic process there will be a quantitative structure the incoming affection and the internal counter-affection have in common, and the latter will thus be describable as a particular type of 'transduction'. Against transductionist interpreters, however, I do believe that the thesis that senses receive forms-without-matter is *not* portraying the physiological aspect of perceiving, but rather complementing it with the description of an aspect we would not hesitate to declare 'mental'. To a certain extent, my view coincides with the traditional interpretation reprised by modern spiritualists: the form is received 'cognitively' and not 'materially', i.e. as an abstract aspect in the receiver's 'mind', rather than as an aspect that qualifies the receiving subject as a whole.

On the other hand, an important feature of my reading is irreconcilable with all the interpretations offered by modern scholars. As I argued, the ability to receive matterless forms is *sufficient* to be a sense-organ in the most proper way, and the signature simile, which only illustrates the 'waterlessness' of the received F, does *not* equate a wax block to a sense with regard to their receptive powers. Aristotle's point is just that items received by senses are as 'abstract' as the signet ring's signature (which is carried by a bronze subject, but is not a piece of bronze) received by a wax block. For this reason, it would be wrong to think that the 'special' affections of perceptibles on media are receptions of forms without matter (regardless of whether one construes them as 'phenomenal' and 'quasi-physical' alterations, or 'codifications', or 'borrowings' of properties with no intake of bodily parts from the agent).

The widely accepted opinion that Aristotle faces the problem of distinguishing the affection caused by perceptibles on media and sense organs at the end of DA II 12 is mistaken. As the lack of a reply in the immediate continuation of the work suggests, the question he is asking is purely rhetorical. According to my reading, by the time we

reach the end of DA II 12 Aristotle with not one, but *two* ways to distinguish the effects that a perceptible F has on sense-organs and on inanimate objects, which respectively amounts to perceiving F and becoming perceptible as F. The first difference is physical: perceiving is a 'special' alteration and affection in which the initial condition is preserved by a μεσότης-like homeostatic process. The second invokes the mental aspect of perceiving: the activity of perception is a reception of abstract cognized aspects (causally powerless and metaphysically sterile matterless forms). Invocation of the activity of 'perceiving that we see and hear', then, is not required to distinguish the effect of perceptible forms on animate and inanimate subjects. In fact, such an attempt would be altogether mistaken, for Aristotle's treatment of such activity in DA III 2 is not alluding to a notion of 'awareness' intrinsic to each and any act of perceiving. As I argued in ch. 4, the passage is rather attesting the necessary introduction of the common power to perceive *per accidens*, which enables each sense to perform further operations on first-order perceptual contents supplied by *per se* perception (such as colours, shapes, sounds, flavours and so on). Such operations, which includes the grouping and discrimination of simultaneously and cross-modally experienced perceptibles, are crucial to account for the richness and complexity of perceptual experience Aristotle generously grant to animals.

As a result of my reconstruction, it is possible to combine the different aspects covered by Aristotle's treatment in a complete definition, encompassing the four types of explanation characterizing his natural philosophy he distinguishes in the second book of his *Physics*. Perception is a homeostatic μεσότης-like process taking place in suitable sense-organs, triggered by an affection that actually perceptible objects exercise on them through a medium; qualia-inclusive 'abstract' items (i.e., causally powerless and metaphysically sterile matterless forms) are thus received, and the activity is functional to the preservation and well-being of animals (cf. DA III 12, 434a30-b9). In Aristotle's account, the source object's perceptible F-with-the-matter is the 'efficient' cause of perception, whilst the 'final' one is the subject's own preservation and well-being. It seems thus plausible to identify the formal cause in the matterless, qualia-possessing received form, and associate the μεσότης-like process taking place in the sensory apparatus with the material one.

Thanks to my investigation, it is finally possible to assess the relationship between the reconstructed formal and material aspects of perception, and the position we should accordingly assign to Aristotle with regard to the mind body problem. To this end, it is

crucial to distinguish the question of the relationship between the formal and material descriptions of *the event of perceiving* (i.e., the perceptual activity and affection), from that concerning *the power to perceive* and the embodying sense-apparatus.

With regard to the question about events, Aristotle states in DA I 1 (403a16-b25) that investigation about an affection like anger must include both the 'formal' and 'material' aspects, i.e. its being a 'desire for retaliation' as well as a 'boiling of the blood around the heart'. What Aristotle says at 403a16-25 suggests that a relation of determination connect the material aspect to the formal one, in so far as it is possible to feel a certain passion like fear or anger because of the occurrence of the corresponding physiological process.[218]

> It seems that all the affections of soul involve a body—passion, gentleness, fear, pity, courage, joy, loving, and hating; in all these there is a concurrent affection of the body. In support of this we may point to the fact that, while sometimes on the occasion of violent and striking occurrences there is no excitement or fear felt, on others faint and feeble stimulations produce these emotions, viz. when the body is already in a state of tension resembling its condition when we are angry. Here is a still clearer case: in the absence of any external cause of terror we find ourselves experiencing the feelings of a man in terror. From all this it is obvious that the affections of soul are enmattered accounts (403a16-25, ROT).

In the frame of the interpretation I propose, nothing suggests that perception is an exception to this general approach, and its being taken as the most evident type of activity 'common to body and soul' (Sens. 1, 436b2-436b9) rather appears as evidence for its inclusion in this explanatory scheme.[219] If this is right, the passage satisfies a first condition to claim the supervenience of the formal aspect of perceiving on the material one, in so far as it establishes a relation of determination grounding the former on the latter.

My interpretation of Aristotle's notion of receiving forms without the matter, which constitutes the 'formal' aspect of perceptual events, can be helpful with regard to a further condition for supervenience, namely the existence of a distinction of the involved aspects as belonging to two different *types*. That the formal aspect of perceiving belongs to a type that is different from the 'material' one is evident, if we consider that the received matterless forms are in my view causally powerless,

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[218] As Caston (1997: 332-334) has argued, the passage shows that the bodily aspect of events like anger is sufficient for the determination of the affection as a whole, inclusive of is formal aspect. It must be noted that different interpretations of the passage have been offered, according to which it actually denies supervenience (Heinaman, 1990:101; Burnyeat, 1992:23). Against this reading, cf. again Caston (1997:333, n.54).

[219] Cf. chapter 2 above, p. 47, note 55.

whereas the 'enmattered' ones involved in the physiological reaction are causally efficacious, in so far as they counterbalance the incoming affection.[220] Since, as I argued, what such reception receives are actual abstractions endowed with a phenomenal quality, we are also justified in considering the type under which the 'formal' aspect of perception falls as 'mental'.[221] On the other hand, my reconstruction is evidently incompatible with the attribution of 'downward' causal powers to the 'mental' aspect of the perceptual event (i.e., the mental activity of perceiving). In other words, as far as perceptual activities (as opposed to perceptual powers) are concerned, the formal aspect is a powerless epiphenomenal event, rather than an emergent efficacious one.[222] Any causal efficacy ascribed to the *activity* of perception as a whole (such as the motions of limbs in the organism), then, is strictly speaking due to its physiological aspect, and it is only in virtue of the latter that the 'formal' or 'mental' one can be *coincidentally* described as efficacious.[223]

As I anticipated, I believe that the question about the relationship between formal and material aspects of powers has to be kept distinguished from the one concerning events. A first difference between the two is evident, for in the case of the hylomorphic link of soul and body (established in DA II 1-2) the 'formal' aspect (i.e. the soul) is *not* a powerless epiphenomenon. On the contrary, Aristotle attributes irreducible causal

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[220] A different view is proposed by Charles (2009:10-17), according to which the two aspects are 'determinants' in the definition of a single event belonging to *one*, inextricably and non-decomposably psycho-physical type. For a criticism of Charles' interpretation, cf. Caston (2009:30-47).

[221] My view is accordingly convergent with observations made on this regard by Irwin and Sorabji. In Irwin's view, in the case of perception a 'mental' subset of soul-related formal aspects can be distinguished, which include a reference to the notion of 'appearing' to a subject (1991:78-81). Sorabji (1992:208) suggests that formal aspects in Aristotle's treatment of perception are those that define its content in relation to other capacities on the *same* domain (he quotes as possible examples 'belief, reason, appearance, memory, experience, and concept formation'), rather than in relation to aspects of a different level 'such as physiological states, or behaviour, or the performance of functions'. In this sense, formal aspects of perception are in his view corresponding to those we would describe as 'intentional'.

[222] I use 'emergent', 'supervenient' and 'epiphenomenal' in the sense specified by Caston (1997:310-319), who attributes to Aristotle the claim that perception is supervenient and emergent on matter. Emergentist readings of Aristotle's theory have been advocated also by Scaltsas (1996:28-29) and Heinaman (1990: 90-91).

[223] Note that this does not exclude that the 'formal' aspect *determines* the content of other 'mental' faculties: for instance, the reception of matterless F contributes to the determination of the (second-order) perception that F is being perceived, or that F and G constitute an unity. It is easy, but perhaps mistaken, to consider the contribution to the 'top-top' determination of mental content as a *causal effect* of matterless form, but such causal talk is strictly speaking precluded by their causal impotency.

powers to living beings in virtue of their souls. This is evident, for instance, as he invokes the soul to explain why organisms like plants resist to the disaggregation due to the opposite kinetic tendencies belonging to elements composing them (DA II 4, 416a6-9, cf. Caston 1997:329).

Arguably, a second feature distinguishing the hylomorphic connection between soul and body from the one between formal and material aspects of the perceptual event is the lack of evidence for the institution of a relation of supervenience. Sense-organs are on Aristotle's account made of simple elements, and they display no complexity or microstructure (cf. Burnyeat 1995 and Johansen 1998). Yet, they have the power to counterbalance incoming affections by a μεσότης-like homeostatic reaction, and the power to receive matterless form thanks to a principle that resides in them (cf. DA II 12, 424a24-b3). These powers have a remarkable degree of independence from matter and cannot be determined by it, since inanimate bodies made of the same materials exposed to the same stimulation (the causal agency of actually perceptible subjects) can at most become perceptible, and they surely cannot perceive. If, as Burnyeat injuncts, we aim at respecting the spirit of Aristotle's text, rather than at providing a philosophy of mind inspired by it, we should take this as an indication *against* the supervenience of the power to perceive (and of soul in general) on the body.

The independence of soul from the body need not be absolute, nor does it preclude a certain co-variance between them. Some kind of reciprocal dependency connects the two, in so far as Aristotle recognizes precise constraints for the implementation of a certain form: not any chance matter can be combined with any chance form to constitute a hylomorphic unity (cf. DA I 3, 407b20-25). For the same reason, form and matter are somewhat co-variant, at least to the extent to which a suitable material substrate is a necessary instrumental condition for the realizability of *x* forms, which is in turn necessary for the material substrate to actually constitute a certain specimen of *x.* According to this view, a hypothetical replica of Socrates, identical in all respects to the original with regard to elemental composition (proportion and arrangement of chemical elements), does not need to possess the same powers, and thus cannot engage in the same activities, as the original Socrates. Yet, variation in the physical constitution of the original Socrates does affect his psychic powers, in so far as it can spoil (or provide) the necessary instrumental conditions for the exercise of soul's powers.

If the reconstruction of the relation between soul and body is correct, what the latter determines is whether an already possessed vital power is actually ready to be exercised or not. For instance, the lack of eyes in the body of an embryo makes the exercise of the power of sight impossible. The formation of suitable organs does not correspond to the acquisition of the power to see, though, in the same way as their decaying in old age does not determine the deterioration of the power itself (408b20-29). The suitability of the body determines the attenuation or elimination of impediments for the readiness of an already possessed power with regard to the corresponding exercised activity, and not the possession of the power itself.[224]

The 'downward' causal powers of the soul Aristotle recognizes, then, do not emerge from the material level, but are rather primitive properties of an immaterial agent governing and 'using' suitable matter at its disposal.[225] This view is incompatible with supervenience, and suggests Aristote's commitment to a form of non-emergent vitalism that must avoid substance dualism, if coherence with his hylomorphic account of the soul has to be saved. With regard to the relationship between perceptual (and more generally vital) powers and the material constitution implementing them, as opposed to what we observed with regard to formal and material aspects of perceptual activities, Aristotle's position is therefore best understood as a form of quasi-dualist vitalism compatible with hylomorphism.[226]

What I aimed at establishing is that Aristotle theory of perception takes into account both its mental and physiological aspects. He embraces a non-emergentist and quasi-dualist form of vitalism with regard to the principle endowing suitable bodies with

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[224] Cf. This would then account for the suitability requirement of DA I 3, as well for the other passage quoted by Caston (1997: 334-337) to attribute to Aristotle the supervenience of soul on matter (Phys. VII 3, 246a4-8; GA II 1, 735a6-7; LBV 3, 465a27-31, Juv. 4, 469b6-20; 6, 470a19-20; 23, 478b31-32).

[225] A similar view is proposed by Miller (1999:203-213). Labeled as 'epigenetic' by his author, the view is assimilated to some form of vitalism by Caston (1999:221-223). Miller's use of the thesis that perception is a discrimination as a proof for this interpretation is unconvincing, and rightly criticised by Caston (ibid., 224). Furthermore, Miller does not distinguish, as I do, between the question of bottom up (matter to form) determination in the case of events. The evidence he proposes is rather directed at showing the 'epigenesis' of the *activity* of perceiving (cf. Miller 1999:208), which does not fit with the supervenient epiphenomenalism I attribute to Aristotle on the same issue .

[226] Caston (1999:225-226) appears to believe that a form of vitalism denying supervenience would entail substance dualism and be incompatible with hylomorphism. That some type of psychological dualism may be compatible with Aristotle's hylomorphism is recognized by Irwin (1991:71-73). Different sorts of non-Cartesian dualism have been attributed to Aristotle's psychology by Robinson (1978:117-120), Shields (1988) and Granger (1990:46-49).

perceptual powers, while being an epiphenomenalist as far the material (physical) and formal (mental) aspects of the act of perceiving are concerned.

By exploiting his hylemorphic metaphysics, Aristotle remarkably depicts the experiential and cognitive aspect of perception, and thus captures the specificity of the mental, without introducing notions like consciousness and intentionality, which are common currency among modern philosophers of mind. Whether this led him to elegantly avoid unsuitably confusing concepts, or to confusedly gesture at a distinction that is better approached by modern criteria, remains a question worth of accurate reflection.[227]

On the other hand, as far as physiology is concerned Aristotle's position turns out to be less than exciting. To be sure, no one would expect to learn something on the subject by reading his works, but it may still be disappointing to realize that what he saw as he looked at sense-organs was just simple, elemental bodies: the cold watery eye jelly, the airy auditive sensors, a warm 'homeomerous' fleshy mixture having intermediate consistency. This he owes, with all probability, to the empirical evidence at his disposal, filtered through the bias of the science of his time (cf. Sens. 2, 437a19-26 and 438b16-439a5). And yet, we should not overlook nor underestimate his firm commitment to an intuition we modern share with him, according to which some special physical process must be taking place in our bodies in order for perception to take place. If we try to image how frustratingly impotent the ancient four-element chemistry could have appeared to his eyes, and how desperately simple the matter of vital organs must have looked in comparison to phenomena that have not yet stopped to amaze us after more than two thousand years, we may found Aristotle's postulation of a vitalistic immaterial agent not altogether unreasonable.

The vitalist position I attribute to Aristotle accommodates the challenging conservatism of modern spiritualist interpreters, at least with regard to the primitiveness of soul powers. On the other hand, Aristotle's account of the activity of perceiving is not the 'de-physiologized' one they depict, and under *this* respect his theory is as credible as contemporary epiphenomenalism. What has to be rejected as incredible, then, is not Aristotle's philosophy of mind, but rather the impotent chemistry leading him to rebut the supervenience of vital and cognitive powers on matter. In the end, we may rest assured that the elements of Aristotle's thought that actually need to be 'junked' have already been disposed of, long time ago.

[227] An opinionated discussion is offered by Wilkes 1992.

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