Sense Organs and the Activity of Sensation in Aristotle

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ABSTRACT

Amid the ongoing debate over the proper interpretation of Aristotle's theory of sense perception in the *De Anima*, Steven Everson has recently presented a well-documented and ambitious treatment of the issue, arguing in favor of Richard Sorabji's controversial position that sense organs literally take on the qualities of their proper objects. Against the interpretation of M. F. Burnyeat, Everson and others make a compelling case the Aristotelian account of sensation requires some physical process to occur in sense organs. A detailed examination of the interpretation by Everson and Sorabji of Aristotle's theory, however, shows that their reading cannot be the correct one, since it involves many textual and philosophical difficulties. Their interpretation, for instance, would require abandoning Aristotle's requirement that only a transparent substance is suitable matter for an eye. Likewise, their understanding of the Aristotle's doctrine of sensation as the reception of form without matter in *DA* 2.12 cannot be reconciled with other texts of his from *On Generation and Corruption*. An analysis of these texts, as well as *DA* 2.7 and *De Sensu* 6 on the roles of light and the transparent medium in vision, show that, for Aristotle, the physical processes which sense organs undergo are not standard qualitative changes (i.e. alterations), but activities or the actualizations of potencies in the material constituents of living animal bodies.

Recent years have seen an ongoing debate over the correct interpretation of Aristotle's doctrine on the relationship between sense powers and their organs. The dispute concerns the adequacy of claiming that Aristotle has philosophical sympathies with contemporary functionalists, but has involved the close reading of Aristotle's texts on the particulars of his theory of perception. M. F. Burnyeat has criticized Martha Nussbaum and Hilary Putnam for their functionalist reading of Aristotle, but he also faults Richard Sorabji for his reading of Aristotle's explanation of sense perception which Burnyeat claims is a necessary support for the position of Nussbaum and Putnam.[1] These latter scholars counter by accepting the

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[1] M. F. Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible? (A Draft)," in *Essays on Aristotle's De Anima*, Martha C. Nussbaum and Amélie Oksenberg Rorty, eds. (Oxford: Oxford University Press, 1995), 15-26.

particulars of Burnyeat's criticisms of Sorabji,[2] while at the same time denying Burnyeat's contention that perception for Aristotle at most requires necessary physical conditions.[3] They believe instead that the physical processes which sense organs undergo when sense powers become active are not cases of motion in Aristotle's strict sense (*kinēsis*).[4] Nussbaum and Putnam, however, do not offer much textual support from Aristotle for this position, nor do they argue directly against Sorabji. (They do however cite Thomas Aquinas with approval.)[5] Steven Everson more recently has entered this discussion in favor of Sorabji's contention that sense organs literally take on the qualities of their proper objects, offering a well-documented and ambitious treatment of the issue.[6] A detailed examination of the interpretation by Everson and Sorabji of Aristotle's explanation of sense powers and their organs, however, shows that their reading of Aristotle cannot be the correct one, since it involves many textual and philosophical difficulties. Their interpretation, for instance, would require abandoning Aristotle's requirement that only a transparent substance is suitable matter for an eye. Likewise, their understanding of what Aristotle means by receiving form without matter in *DA* 2.12 cannot be reconciled with other texts of his from *On Generation and Corruption*. An analysis of these and other texts from *DA* 2.7 and *De Sensu* 6 shows that, for Aristotle, the physical processes which sense organs undergo are not standard qualitative changes (i.e. alterations), but activities or the actualizations of potencies in the material constituents of living animal bodies.

I. *The Spiritualist-Literalist Debate*

In the course of his criticism of Nussbaum, Putnam and Sorabji, M. F. Burnyeat claims that for Aristotle the processes which sense organs undergo are at most a necessary condition for perceptual awareness. "[T]he physical material of which Aristotelian sense-organs are made does not need to undergo any ordinary physical change to become aware of a colour or a smell."[7] Instead, an animal becomes perceptually aware by its

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[2] Martha C. Nussbaum and Hilary Putnam, "Changing Aristotle's Mind," in *Essays on Aristotle's De Anima*, Martha C. Nussbaum and Amélie Oksenberg Rorty, eds. (Oxford: Oxford University Press, 1995), 36.

[3] Ibid., 37-46.

[4] Ibid., 36-37.

[5] Ibid., 53-55.

[6] Stephen Everson, *Aristotle on Perception* (Oxford, Oxford University Press, 1997).

[7] Burnyeat, 19.

sense powers being immediately affected by sensible qualities. "[F]or Aristotle the 'causal' agent (if such it may be called) of the unordinary change which constitutes perceiving is the colour or the smell itself."[8] Perception *per se* comes about when a sensible object comes into contact with a sense faculty, but such contact is not brought about by the sense organ undergoing any kind of physical change. According to Burnyeat, in Aristotle's theory "[N]o physiological change is needed for the eye or the organ of touch to become aware of the appropriate perceptual objects."[9]

Furthermore, Burnyeat implicates Aquinas in this anti-physiological reading of Aristotle. According to Burnyeat, although Aristotle's several descriptions of sensation seem to refer to ordinary physical processes, they refer instead to the decidedly non-physical activity of perception. "All of these physical seeming descriptions – the organ's becoming like the object, its being affected, acted on, or altered by sensible qualities, its taking on sensible form without the matter – all these are referring to what Aquinas calls a 'spiritual' change, a becoming aware of some sensible quality in the environment."[10] For Burnyeat, "Aquinas gives an excellent account" of what Aristotle means by receiving form without matter, and thus how the activity of sense differs from the changes that non-sentient things undergo in ordinary alterations, i.e. by receiving form with matter, e.g. in being heated. "It follows that receiving the warmth of a warm thing without its matter means becoming warm without really becoming warm; it means registering, noticing or perceiving the warmth without actually becoming

[8] Ibid.

[9] Ibid., 22.

[10] Ibid., 21. Although he gives no specific reference to Aquinas, it seems that Burnyeat has the following text, or one like it, in mind. "Immutation is of two kinds, one natural, the other spiritual. Natural immutation takes place when the form of that which causes the immutation is received, according to its *natural* being, into the thing immuted, as heat is received into the thing heated. But spiritual immutation takes place when the form of what causes the immutation is received, according to a *spiritual* mode of being, into the thing immuted, as the form of color is received into the pupil which does not thereby become colored" (Thomas Aquinas, *Summa Theologica*, I, q. 78, a. 3 in *Basic Writings of St. Thomas Aquinas*, ed. Anton Pegis (New York: Random House, 1945), 739). Est autem duplex immutatio: una naturalis, et alis spiritualis. Naturalis quidem, secundum quod forma immunantis recepitur in immutato, secundum esse naturale, sicut calor in califacto. Spiritualis autem, secundum quod forma immutantis recipitur in immutato secundum esse spirituale; ut forma coloris in pupilla, quae non fit per hoc colorata (*Summa Theologiae*, Ia, 78, 3, ed. Leonine, 63). See also *In II de Anima*, l. 24, n. 553, note 49 below.

warm."[11] Stephen Everson, in deference to the imputation of Aquinas, calls Burnyeat's interpretation a "spiritualist" reading.[12]

In opposition to Burnyeat's spiritualist interpretation, Everson proposes to defend a "literalist" interpretation. He, like Sorabji, believes that for Aristotle, when an animal perceives, the sense organ undergoes a normal physiological change, as would any inanimate matter of the same sort. So, when one sees, Aristotle would maintain that the eye, i.e. the water in the eye or the eye-jelly, undergoes the same sorts of physical changes that water would undergo if it were not in the eye, and that this is the physiological basis for perception as awareness. Moreover, this physical change is characterized by the organ becoming literally such as the object is, colored in the case of the eye, warm or hard in the case of touch, etc. "According to the literalist interpreter, when a sense organ is activated and perception occurs, the organ is altered so that it literally becomes like its (proper) object: it takes on the property of the sensible which affects it."[13] So, in opposition to the spiritualist interpretation, Everson insists that a change in the sense organ is both necessary and sufficient to bring about actual perception, and that this change is the same sort of physical process which inanimate things undergo when they are altered so as to have the same quality for themselves as what alters them.

II. *The Physical Nature of Perception*

Several scholars argue persuasively that, for Aristotle, perception necessarily has a physical aspect. Everson, for instance, points to what Aristotle has to say about the physical requirements for something to serve as a sense organ. For example, the organ of sight must be made of such material as to be affected by the object of sight (i.e. color). Since the transparent is what is affected by color (418a31-b2; b26-a1), Aristotle says that the eye is composed of water which, like air, has the transparent in it but is more easily confined and condensed than air (*De Sensu* 2, 438a12-14). Everson concludes that the ability of a given sort of matter to be affected by a proper sensible determines the material constitution of each organ in order that it may perceive that sensible.[14] Thus, implicit in this is Aristotle's belief that the proper sensibles do affect the organs of perceivers.

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[11] Burnyeat, 24.
[12] Everson, 10.
[13] Ibid.
[14] Ibid., 80-81.

Likewise, Aristotle's explanation of perceptual blind spots also shows his commitment to the thesis that sense organs undergo physical processes in perception.[15] Aristotle observes that one cannot feel what is as hot or soft as oneself, and explains this by appealing to the fact that the physical qualities of the organ of touch prevent the perception of what is already like itself.[16] Everson concludes that this explanation would not succeed if the sensory apparatus was not affected by the sensible qualities in the object.

Moreover, Aristotle's discussion of the insensitivity resulting from intense perceptibles highlights his commitment to the physicality of perception. Aristotle believes that intense sense objects dazzle a perceiver or destroy the senses of an animal by upsetting the balance (λόγος) in the sense organ.[17] In order for this to happen, however, it is necessary that perceptibles act on the physical organ of the perceiver. Indeed, Aristotle cites the fact that the senses are dazzled by intense objects as a necessary premise in his argument that νοῦς is separate from the body.

> For the sense faculty is not able to sense after an excessive sensible object; e.g., of sound immediately after loud sound, and neither seeing nor smelling is possible just after strong colours and scents; but when the mind thinks the exceedingly knowable, it is not less able to think of slighter things, but even more able; for the faculty of sense is not apart from the body, whereas the mind is separate (429a32-b6).

The fact that νοῦς is not dazzled by its objects when these are intense would show that it does not have an organ only if the dazzling of the senses by their intense objects occurred in their organs.[18] Clearly, then, the fact Aristotle appeals to the deleterious effects of intense perceptibles on sense organs in the demonstration of the mind's separation from the body shows that he believes that perception is a physical process.

John Sisko has shown that, for Aristotle, the phenomena of the senses being dazzled necessarily implies that sensation involves organs undergoing physical processes. According to Sisko, the only ways to resist the conclusion that the objects of sensation, i.e. perceptible qualities themselves, destroy organs by causing a physical process in sense organs, is to claim that the ill effects of such occurrences either are due to a concurrent material cause or occur only in the unusual case of intense

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[15] Ibid., 81.

[16] *DA* 2.11, 423b29-424a7.

[17] *DA* 2.12, 424a29-34.

[18] Cf. Jonathan Lear, *Aristotle: the Desire to Understand* (Cambridge: Cambridge University Press, 1988), 114-115.

perceptibles.[19] Both these options are blocked by other passages on such impediments to perception. In *DA* 3.13, Aristotle claims that intense objects of touch destroy not only this sense, but the whole animal as well.[20] This, however, is not due to a concomitant physical force, which Aristotle credits elsewhere for causing physical effects (e.g. the air that accompanies thunder, and not the sound itself, splits wood (*DA* 2.12, 424b11-12)). Nor is the effect of perceptible objects on material organs operative only among an abnormal class, the intense perceptible. Sisko also sites *De Generatione Animalium* for evidence that even normal perceptibles can dazzle, and so impede a sense organ; normal perceptibles do so when they are stronger than the things that one later perceives.[21] Consequently, all dazzling is explained in terms of the material process which the sense organs undergo due to the influence of relatively or absolutely intense objects.

Aristotle, then, repeatedly insists that organs suffer damaging effects from intense perceptibles, and that the sense qualities themselves, i.e. the proper objects of perception and not a concomitant physical force, damage them. It seems clear, then, that some physical process occurs in the sense organs when an animal perceives. However, those who are strongest in their insistence of this point also insist that the physical processes which the sense organs undergo are what Aristotle calls by the technical term 'alteration' (ἀλλοίωσίς) in *Generation and Corruption* 1.7.[22] The task of determining the kinds of processes that sense organs undergo when sense powers are actualized and an animal becomes aware of a sensible object is, in fact, a more complicated matter in the thought of Aristotle, for there are several passages where Aristotle denies that perception is a case of sense organs being altered in this technical sense.[23] These passages are, in fact, among those to which Burnyeat appeals in support of his spiritualist position. While it seems clear that perception must involve physical organs, it is far from clear that organs are affected by undergoing ordinary alterations. In order, then, to understand the sense in which objects of perception affect sense organs, the relation between sense powers and their organs needs to be better understood. Fortunately, Aristotle offers several illuminating discussions concerning what that relation is.

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[19] John E. Sisko, "Material Alteration and Cognitive Activity in Aristotle's *De Anima*," *Phronesis* 41 (1996): 145-147.

[20] 435b7-12.

[21] Sisko, 146.

[22] Everson, 82-84.

[23] Cf. 417b12-22, 431a4-8, 477b11.

III. *Two Kinds of Alteration*

In *DA* 2.5, Aristotle distinguishes two kinds of alteration and seeks to specify the manner in which each is applicable to perception. He begins by saying that "sensation consists, as has been said, in being moved and acted upon; for it is held to be a sort of change of state" (416b34-35).[24] Next, he wonders why the senses do not perceive themselves since they perceive other things made of the elements and they themselves are so composed (417a1-7) and concludes that perception, in itself, is a certain potency, and so is like the combustible which requires an external agent to make it burn (417a7-10). As a potency, it is present both when being exercised and when it is not (417a10-14). As there are two senses of "potential," so there are two senses of "actual": something which is able to acquire a potency to act is said to become actual in one sense when it acquires this potency, but when it exercises the potency it is actual in a second, higher sense (417a22-b2). This is all by way of preparation for what is the core distinction:

> Even the term 'being acted upon' is not used in a single sense, but sometimes it means a kind of destruction of something by its contrary, and sometimes rather a preservation of that which is potential by something actual which is like it, as potency is related to actuality. For when the one merely possessing knowledge comes to exercise it, he is not being altered (for the development is into his real self or actuality), or else this is a different kind of alteration. (417b2-8).[25]

He then discusses the inadequacy of describing the exercise of knowledge as an alteration or as a teaching, as well the shortcomings of calling the learning process a case of being acted upon (417b8-14). He concludes his distinction by saying that "there are two senses of alteration, one a change to a negative condition, and the other a change to a positive state, that is, a realization of its nature" (417b15-17). Everson labels these two senses of alteration "alteration$_1$" and "alteration$_2$" and explains the basic distinction between them: "When something undergoes alteration$_1$, it loses the property it had before the alteration and acquires a 'contrary' property; in alteration$_2$, it simply exercises a capacity it already possesses."[26] Although

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[24] ἡ δ' ἄισθησις ἐν τῷ κινεῖσθαί τε καὶ πάσχειν συμβαίνει, καθάπερ εἴρηται· δοκεῖ γὰρ ἀλλοίωσίς τις εἶναι.

[25] οὐκ ἔστι δ' ἁπλοῦν οὐδὲ τὸ πάσχειν, ἀλλὰ τὸ μὲν φθορὰ τις ὑπὸ τοῦ ἐναντίου, τὸ δὲ σωτηρία μᾶλλον τοῦ δυνάμει ὄντος ὑπὸ τοῦ ἐντελεχείᾳ ὄντος, καὶ ὁμοίου οὕτως ὡς δύναμις ἔχει πρὸς ἐντελέχειαν· θεωροῦν γὰρ γίγνεται τὸ ἔχον τὴν ἐπιστήμην, ὅπερ ἢ οὐκ ἔστιν ἀλλοιοῦσθαι (εἰς αὐτὸ γὰρ ἡ ἐπίδοσις καὶ εἰς ἐντελέχειαν) ἢ ἕτερον γένος ἀλλοιώσεως.

[26] Everson, 92.

he does not elaborate on the correspondence, Everson does acknowledge that this distinction between two sorts of alteration corresponds to Aristotle's distinction between motion (κίνησις) and activity (ἐνέργεια) in *Metaphysics* 9.6 and *Nicomachean Ethics* 10.4.[27] (95, 255) While alteration$_1$ is clearly a physical process, alteration$_2$, in being distinct, might seem to be non-physical. Aristotle identifies the act of perception with alteration$_2$ for he says, "Again, actual sensation corresponds to the exercise of knowledge . . ." (417b19);[28] as the exercise of knowledge comes about through an alteration$_2$ (417b7-8), so does actual perception. In *Meta*, he also identifies seeing with activity (1048b18-34). Everson, then, grants that *DA* 2.5 *appears* to support the spiritualist contention that the proper activity by which a perceiver is aware of its environment is not a physical process. The question for Everson is whether alteration$_2$ is the only sort of alteration operative in Aristotle's account of perception.

Everson, however, believes *DA* 2.5 in fact supports the literalist interpretation, for he claims that the chapter shows that *both* kinds of alteration are involved in perception.[29] He says *DA* does not rule out alteration$_1$ applying to perception and that 2.5 never says that the change in the perceiver is extraordinary, as Burnyeat contends.[30] However, if the spiritualist is to defend his contention that perception has no physical element, he needs

> to show that the *only* alterations which the sense organs undergo are alterations$_2$. Again the argument of II.5 does not show this – only that they do undergo such alteration. It does not follow from this that no other kind of alteration is involved in perception – and there is nothing at all in II.5 to suggest that when perceptual alteration$_2$ does occur, this does not also require some more basic alteration$_1$ of the relevant sense organ.[31]

Granted that in perception there is an alteration$_2$, Everson believes the chapter does not preclude that an alteration$_1$, i.e. a physical process, also occurs in the sense organ. Indeed, it seems he has good reason to think both kinds of alterations are operative.

Everson claims that the beginning of the chapter supports the belief that there is an alteration$_1$ in perception. At 416b33-4 Aristotle says that "perception occurs in being changed and acted upon." According to Everson,

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[27] Ibid., 95 and 225.

[28] καὶ τὸ κατ' ἐνέργειαν δὲ ὁμοίως λέγεται τῷ θεωρεῖν·

[29] Everson, 93-94.

[30] Ibid., 90.

[31] Ibid., 93-94.

if perception were only an alteration$_2$, Aristotle would have said that perception occurs in being acted upon; if only an alteration$_1$, he would have said in being changed. The fact that he says both indicates that both kinds of alteration are involved. Moreover, Everson believes that this line shows that in fact the being acted upon characteristic of alteration$_2$ exists *in* the change that is characteristic of alteration$_1$.[32] This line alone, however, is inconclusive for it is certainly possible that Aristotle means that both phrases describe a single process. That is, he may not mean to distinguish perception as a motion from perception as a being acted upon. Instead, he could merely be asserting that the one process is both of these things. Everson, then, needs more compelling evidence in order to secure his interpretation.

Everson appeals for support of his contention that perception involves both kinds of alteration occurring in the sense organs by citing *Physics* 7.2. In this chapter, Aristotle is arguing that in all cases of motion, even alterations, mover and moved are in contact, and this principle applies even to the alterations undergone by perceivers.

> Nor again is there anything intermediate between that which undergoes and that which causes alteration: this can be shown by induction; for in every case we find that the respective extremities of that which causes and that which undergoes alteration are together. . . . 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 what is animate. And further, where animate things are in question, we make them both of the parts that have no power of perception and the senses themselves. For in a way the senses also undergo alteration, since actual perception is a change through the body, in the course of which the sense is affected in a certain way. Thus the animate is capable of every kind of alteration of which the inanimate is capable; but the inanimate is not capable of every kind of which the animate is capable, since it is not capable of alteration in respect of the senses (244b1-2,6-15).

Here, Aristotle asserts that in perception there are two sorts of alteration, to one of which both the animate and the inanimate are susceptible, and another of which only the animate, that is the sensate, is capable. "Aristotle here says explicitly that the alterations of becoming white and sweet and hot and so on are ones of which both animate and inanimate substances are capable."[33] Aristotle continues:

> Moreover, the inanimate is unconscious of being affected whereas the animate is conscious of it, though there is nothing to prevent the animate also being

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[32] Ibid., 94-95.
[33] Ibid., 136.

> unconscious of it when the alteration does not concern the senses. Since, then, the alteration of that which undergoes alteration is caused by sensible things, in every case of such alteration it is evident that the extremities of that which causes and that which undergoes alteration are together. For the air is continuous with the one, and also with the body. Again, colour is continuous with the light and the light with the eye – and similarly with hearing and smelling, for the primary agent of change in relation to what is changed is the air. Similarly in the case of taste, the flavour is together with the sense of taste. And it is just the same in the case of things which are inanimate and insensate. Thus, there can be nothing in between what is altered and what alters it (244b15-245a11).

Everson then concludes on the basis of *Phys*. 7.2 that perception involves alteration$_1$ which also applies to non-perceptual changes.

> Both percipient and non-percipient patients will undergo a change which can be described in the same way. Both will be altered 'by becoming hot or sweet or thick or dry or white.' In both perceptual and non-perceptual alteration the patient is assimilated to the agent and takes on its property. In both cases, this will be a case of alteration$_1$.[34]

Everson seems to grant that what Aristotle says in the passage from *Phys*. 7.2 may not be the only or final account that he will give on the relation between sense powers and their organs. "This chapter of the *Physics* is an interesting one, and unduly neglected in discussions of Aristotle's theory of perception, since it shows quite clearly that he was, at one point in his career, committed to the literalist account of perceptual change."[35] By the time he came to write the *DA*, however, Aristotle seems to have changed his mind on the point that is central to *Phys*. 7.2, namely the need for agent and patient to be in contact for the one to affect and the other to be affected. In *Phys*., he claims that the object is in contact with the medium and the medium with the eye, and the whole process is a straightforward one. On this account, one would expect that if the object were in direct contact with the eye, the alteration$_1$ which he describes there would occur even more easily. However, in *DA*, Aristotle notes the fact that one cannot see in this case, i.e. by placing an object directly on the eye, as evidence first that perception requires a medium in all cases, and second that, because of this, perception is not an alteration$_1$.[36] This divergence between the *DA* account and the *Phys*. will be examined again later.

Having argued that Aristotle's account of perception affirms that both kinds of alterations occur, Everson elaborates the relation between them.

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[34] Ibid., 137.
[35] Ibid., 134.
[36] Cf. 419a12-15; 419a25-33; 423b7-8; 423b18-27.

Although the two sorts of alteration are not each reducible to the other, and certainly not identifiable with each other, according to Everson's interpretation, the material change (alteration$_1$) nevertheless determines the psychological activity (alteration$_2$). He claims that this is necessarily implied in *Phys*. 7.3, where Aristotle discusses why processes other than those caused by perceptible qualities are not alterations.

> And moreover, it would seem absurd to speak in such manner, to say, e.g. that a man or a house or anything else whatsoever that has come to be has undergone an alteration. But it is perhaps necessary for each of these to come to be when something else is altered, e.g. when the matter is thickened or thinned or heated or cooled, the things which come to be are not altered and their coming into being is not alteration (246a4-9).

When a man or a house comes to be, the man or house is not altered since it only has just come to exist; its coming to be, however, may have been necessitated by matter undergoing alteration$_1$. Similarly, bodily *hexeis*, such as health and fitness, are not alterations, nor is their acquisition and loss, but "it is perhaps necessary that they come to be and are destroyed when certain other things undergo alteration, just as in the case of substantial and geometrical forms . . ." (246b14-15).

> The formula Aristotle uses for the genesis of substances, bodily *hexeis*, and virtues and vices is that when the relevant alteration (or alterations) occurs, then the higher-level change *must* occur. . . . If this is right, then Aristotle commits himself here to the determination of changes at the formal level by alterations at the material level. . . .[37]

Thus, alterations in the matter determine and necessitate the coming to be (which is not an alteration) of things having a new form – substantial, geometrical or dispositional. To the extent that material changes determine formal changes, this interpretation claims that alterations$_2$ supervene on alterations$_1$; the psychological process supervenes on the material change.

IV. *Objections to Everson*

Despite Everson's appeal to *Phys* 7, and his assertions to the contrary, *DA* 2.5 does indeed, on the most natural reading, rule out actual sense perception being or even involving alteration$_1$, Describing the difference between the two kinds of alteration (i.e. between alteration properly so-called and that sort of alteration which should have its own name), Aristotle says that

[37] Everson, 271.

when someone learns and passes from potential knowledge to actual knowledge under the influence of someone who has actual knowledge, this process

> either ought not to be described as 'being acted upon,' as has been said, or else there are two senses of alteration, one a change to a negative condition (alteration$_1$), and the other a change to a positive state, that is, a realization of its nature (alteration$_2$). In sentient creatures (τοῦ δ' αἰσθητικοῦ) the first change (alteration$_1$) is caused by the male parent, and at birth the subject has sensation in the sense in which we spoke of the mere possession of knowledge. Actual perception corresponds to exercise of knowledge (417b12-22).[38]

Here, Aristotle is delineating the extent to which both kinds of alteration pertain to sensation. Alteration$_1$ applies to the process of changing from a potential$_1$ sensor to a actual$_1$/potential$_2$ sensor, and it is accomplished under the agency of the animal's sire. Alteration$_2$ applies to the processes of changing from a potential$_2$ sensor to an actual$_2$ sensor. There is no indication that an alteration$_1$ applies to a process in the sense organ while alteration$_2$ applies to the sense power. To believe that Aristotle, after this explication of how the two kinds of alteration function for perceivers, meant to leave the possibility open that alteration$_1$ is still operative in perception on a material level would seem to imply extreme carelessness in Aristotle's explanation. Moreover, this passage seems clear in its indication that perception is *only* an alteration$_2$. When Aristotle says that "actual perception corresponds to the exercise of knowledge" (417b22), he has just equated the exercise of knowledge with alteration$_2$ (417b5). Since the point of the chapter is, as Everson admits, to contrast the two senses of alteration, Aristotle's assertion that actual perception is an alteration$_2$ clearly implies that it is not, nor is there any reason to think that it 'involves,' an alteration$_1$. That this is the correct way to read *DA* 2.5 is also confirmed in *DA* 3.7:

> And clearly the sensible object makes the sense-faculty (αἰσθητικοῦ) actually operative from being only potential; it is not acted upon, nor does it undergo change of state (οὐ γὰρ πάσχει οὐδ' ἀλλοιοῦται); and so, if it is motion, it is motion of a distinct kind; for motion, as we saw, is an activity of the imperfect, but activity in the absolute sense, that is activity of the perfected, is different (431a4-8).[39]

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[38] ἤτοι οὐδὲ πάσχειν φατέον, ὥσπερ εἴρηται, ἢ δύο τρόπους εἶναι ἀλλοιώσεως, τήν τε ἐπὶ τὰς στερητικὰς διαθέσεις μεταβολὴν καὶ τὴν ἐπὶ τὰς ἕξεις καὶ τὴν φύσιν. τοῦ δ' αἰσθητικοῦ ἡ μὲν πρώτη μεταβολὴ γίνεται ὑπὸ τοῦ γεννῶντος, ὅταν δὲ γεννηθῇ, ἔχει ἤδη ὥσπερ ἐπιστήμην καὶ τὸ αἰσθάνεσθαι. τὸ κατ' ἐνέργειαν δὲ ὁμοίως λέγεται τῷ θεωρεῖν·

[39] φαίνεται δὲ τὸ μὲν αἰσθητὸν ἐκ δυνάμει ὄντον τοῦ αἰσθητικοῦ ἐνεργείᾳ ποιοῦν·

As will become clear, however, it would be a mistake to assume, with the spiritualists, that because perception is only an alteration$_2$, it is therefore in no sense a physical process which the organs of sense undergo. Indeed, Aristotle believes that there are some manifestly physical, as opposed to mental, processes which are not motions, i.e. alterations$_1$, but are instead activities, i.e. alterations$_2$.

There are even more compelling reasons against believing that Aristotle could accept that perceptual activity supervenes on physical alteration. For the potency which the subject of an alteration$_1$ has at the beginning of the alteration$_1$ is completely actualized by the end, and at the end it is no longer in a state of potency with respect to the same sort of alteration$_1$. What 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.[40] Such a view of the physical process occurring in sense organs creates insuperable problems when it is connected to perception as an activity.[41]

On the literalist model, the eye, for instance, is made literally red in one instant, and in just one part of its eye-jelly. That part, in that instant, then loses the potency to be affected by red until the affection that is there fades. However, one would expect that, in the next instant, even before the red affection fades, it could be affected by a blue object, turning the formerly red bit of eye-jelly blue. This should hold true because the eye-jelly, even though affected by the red object, is still matter for a living,

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οὐ γὰρ πάσχει οὐδ' ἀλλοιοῦται. διὸ ἄλλο εἶδος τοῦτο κινήσεως· ἡ γὰρ κίνησις τοῦ ἀτελοῦς ἐνέργεια, ἡ δ' ἁπλῶς ἐνέργεια ἑτέρα, ἡ τετελεσμένου.

[40] Cf. James T. H. Martin, "Sense and Intentionality: Aristotle and Aquinas" in *Aquinas on Mind and Intellect: New Essays* (Oakdale, NY: Dowling College Press, 1996), 177.

[41] Indeed, this seems to be Aristotle's point in *Meta* 10.6: an activity continues even after it is completely actualized, whereas a motion ceases upon the completion of its actualization. Cf. J. L. Ackrill, "Aristotle's Distinction between *Energeia* and *Kinēsis*" in *Essays on Plato and Aristotle* (Oxford: Clarendon Press, 1997) and Sarah Waterlow, *Nature Change and Agency in Aristotle's Physics* (Oxford: Clarendon Press, 1982), 183-186. Aristotle's opposition between motion and activity precludes actual perception being a motion. What I hope to show is that the requirements for perception as an activity extend to the processes occurring in sense organs. This fact, then, blocks Everson's contention that there is a κίνησις (alteration$_1$) in the eye, and an ἐνέργεια (alteration$_2$) in the faculty of vision supervening on it.

functioning eye; it, thus, should still have the capacity for sight. If it were true that red-ly affected eye-jelly bits can become blue, then one has abandoned Aristotle's principle that the eye-jelly be transparent in order to be affected by colors (*De Sensu* 2, 438a12-14). Clearly, then, this alternative is unacceptable.

However, if one denies that the red eye-jelly bit can become blue, on the other hand, and instead claims that the redness of the bit of eye-jelly must fade first, one still encounters problems. Such an account seems contrary to Aristotle's (and Everson's) commitment to the idea that perceptual awareness is a continuous activity. For, while looking at the same red wall, one does not ever cease to perceive it. If seeing occurs by the eye-jelly being altered and taking on the color of the object seen, however, one would not see the red wall for as long as it took the previous affection in the eye-jelly to fade. Perhaps, one could claim that eye-jelly affections fade rather quickly. In this case, while it is true that until the previous affection fades there would be no perceiving, perception would occur intermittently, producing a sort of strobing effect which might go undetected. However, insofar as perception at least involves an activity, it is continuous, and our ability to engage in it is constant, even while we are already engaged in it. Thus, the formal cause of perception could not be a single activity if it has to supervene on the strobing of alterations in the organs, since it is at least necessary that what supervenes be simultaneous with what it supervenes on. Supervenience, then, cannot accommodate both standard alterations and activities in an Aristotelian explanation of perception.

The potency which characterizes a sense power in being potentially like its object, then, is a condition of perception that exists throughout the perceptual process. Thus, even while perceiving, the sense organ does not lose its capacity to perceive, and so it does not cease being able to become like its object. Aristotle seems to have had this in mind when he introduces the distinction between alteration properly-so-called and activity by saying that the activity of perception is a preserving (417b3). Furthermore, Aristotle is able to present a consistent account of perception because he believes that the effect of light and color at least, and presumably by extension the effects of the objects of the other senses, are also activities which the physical organ engages in.

V. *Receiving Form without Matter*

DA 2.12 seems to support the view that Aristotle's theory of perception is not a case of ordinary alteration.[42] In this chapter, Aristotle gives a general summary of his views on sensation and entertains some problems associated with it. It is here that he claims that all perception is a reception of form without matter, and employs the analogy of a gold signet ring impressing a block of wax, both of which seem to pose problems for the literalist interpreters.

> We must understand as true generally of every sense that sense is that which is receptive of sensible forms without matter, just as the wax receives the impression of the signet-ring without the iron or the gold, and receives the impression of the gold or bronze, but not as gold or bronze; so in every case sense is affected by that which has color, or flavor, or sound, but by it, not *qua* having a particular identity, but *qua* being such, and in virtue of its form (*DA* 2.12, 424a17-24).

Here, Aristotle says that the sense receives form without matter, as the wax receives the impression without the iron or gold, but does not do so as gold or bronze. A few lines later, he elaborates somewhat on the meaning of "form without matter" when he considers how the passivity of the senses differs from the way in which insensate things are affected by the same sorts of objects.

> It is also clear why plants do not feel, though they have one part of the soul, and are affected to some extent by objects touched, for they show both cold and heat; the reason is that they have no mean, i.e. no first principle such as to receive the form of sensible objects, but are affected with the matter (424a33-b3).

Plants apparently do not receive form without matter; instead they are affected with the matter since they have no "mean" or "principle" for the reception of form. To receive form without matter, then, requires being of the right physical constitution, described here as a "mean," which is the principle for such a reception. Although plants are affected by the objects of touch, e.g. heat and cold, they are affected with matter, and this explains why they do not sense. Finally, Aristotle distinguishes the effect that sensible qualities have on inanimate things from their effects on perceivers. He considers whether a sensible quality, such as smell, affects anything besides a perceiver of smells, and answers that "it is impossible

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[42] For a discussion of this chapter which reaches similar conclusions by different means, see T. K. Johansen, *Aristotle on the Sense-Organs* (Cambridge: Cambridge University Press, 1998), 274-280.

for anything which cannot smell to be affected by smell; and the same argument applies to the other senses" (424b7-8). However, he seems to change his mind, for he says that some things are affected by sensible qualities (424b12-17). He then asks "What, then, is smelling apart from being affected in some way? Probably the act of smelling is also an act of perception, whereas the air, being only temporarily affected, merely becomes perceptible" (424b17-20).[43] Both the air becoming smelly and an animal smelling it are cases of things being affected by smells, but when the animal is affected, it perceives; when the air is affected there is no perception.

The proper interpretation of the idea of the reception of form without matter has been a major point of contention between literalists and spiritualists. Literalists claim that the point of the analogy with the wax block and signet-ring in *DA* 2.12 is that the gold, i.e. the matter of what makes the impression, is what is left behind. All that is received is the impression, but this impression is a literal and physical impression in the wax. Likewise, the sense organ receives the sensible form of its object, i.e. it comes to have literally in itself that sensible form.

> But there is good reason to interpret the reception of form without matter physiologically. It means that, for instance, the organ of sight . . . takes on the colour of the object seen, without taking on any material particles from the object, such as Empedocles and Democritus had postulated.[44]

Sorabji, then, points to the fact that at the end of *DA* 2.12 (424b17-20), when Aristotle says that smelling is also a perceiving, he is saying that perceiving is also a material alteration which the organ, like the air, undergoes.[45] Because inanimate things undergo the same alterations that perceivers do, the process undergone by perceivers, the receiving form without matter, is a physical alteration, which means that the organ of the perceiver becomes literally the same as its object. Thus, when plants are said to become hot or cold by being affected with the matter, they do so by receiving small particles or vapors of the agent that is making them hot; ". . . plants become warm by letting warm air or other warm matter into their systems, instead of leaving the matter behind."[46]

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[43] τί οὖν ἐστι τὸ ὀσμᾶσθαι παρὰ τὸ πάσχειν τι; ἢ τὸ μὲν ὀσμᾶσθαι καὶ αἰσθάνεσθαι, ὁ δ' ἀὴρ παθὼν ταχέως ἀισθητὸς γίνεται.

[44] Richard Sorabji, "Body and Soul in Aristotle," in *Aristotle: De Anima in Focus*, ed. Michael Durrant (New York: Routledge, Inc., 1993), 172.

[45] Richard Sorabji, "Intentionality and Physiological Processes: Aristotle's Theory of Sense Perception," in *Essays on Aristotle's De Anima*, ed. Martha C. Nussbaum and Amélie Oksenberg Rorty (Oxford: Oxford University Press, 1995), 217-220.

[46] Ibid., 217.

Aquinas, insofar as he is said to side with the spiritualists, predictably has a different account of what Aristotle means by the reception of form without matter. In his *Commentary on the De Anima*, he entertains the objection that receiving form without matter does not seem to be unique to sensation since in non-perceptual cases of a thing being affected, the patient also receives the form of the agent without its matter.[47] Aquinas explains that although in an ordinary case of being passively affected a thing does receive the form without the agent's matter, the patient still receives form with matter, i.e. within its own matter, since the recipient's matter "becomes, in a way, the same as the material agent, inasmuch as it acquires a material disposition like that which was in the agent."[48] He argues, then, that the reception of form without matter is in contrast to the patient taking on the quality in the same sense, i.e. in a material sense, as the agent.

> Sometimes, however, the recipient receives the form into a mode of existence other than that which the form has in the agent; when, that is, the recipient's material disposition to receive form does not resemble the material disposition in the agent. In these cases the form is taken into the recipient "without matter," the recipient being assimilated to the agent in respect of form and not in respect of matter. And it is thus that a sense receives form without matter, the form having, in the sense, a different mode of being from that which it has in the object sensed. In the latter it has a material mode of being, but in the sense, a cognitional and spiritual mode.[49]

When the form is in the patient in a way other than as that form is in the agent's material disposition, then the patient is assimilated in a way that is not standardly material. The fact that this second way differs from the first, i.e. material, mode, is what warrants calling it "without matter." In this second mode, however, it is still the recipient's material disposition

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[47] Thomas Aquinas, *In Aristotelis Librum De Anima Commentarium*, ed A. Pirotta, ([Taurini]: Marietti, 1952), 138.

[48] Ibid., n. 552. Licet enim illa et eadem materia numero quae est agentis, non fiat patientis, fit tamen quodammodo eadem, inquantum similem dispositionem materialem ad formam acquirit ei quae erat in agente.

[49] Ibid., n. 553. Quandoque vero forma recipitur in patiente secundum alium modum essendi, quam sit in agente; quia dispositio materialis patientis ad recipiendum, non est similis dispositioni materiali, quae est in agente. Et ideo forma recipitur in patiente sine materia, inquantum patiens assimilatur agenti secundum formam, et non secundum materiam. Et per hinc modum, sensus recipit formam sine materia, quia alterius modi esse habet forma in sensu, et in re sensibili. Nam in re sensibili habet esse naturale, in sensu autem habet esse intentionale et spirituale.

which does not resemble the agent's; thus, the fact that he calls the manner in which form is in the sense a "spiritual" mode should not distract from the fact that even Aquinas believes that this takes place in the organ: "the organ of sense is that in which a power of this sort resides, namely a capacity to receive forms without matter."[50] In contrast to Burnyeat's spiritualist interpretation, the reception of form without matter is a physical process for Aquinas to the extent that it takes place in the physical organ. He believes, then, that the second mode of receptivity, i.e. coming to have the quality but not according to the agent's disposition, is what Aristotle means to convey by the wax block example.

The force of the wax block example, for Aquinas, is that the shape of the signet-ring comes to be in the wax, but not in the same respect as it is in the signet-ring. Finding significant the fact that Aristotle says that the seal is received both without the gold and not as gold, Aquinas comments, "hence wax, he says, takes a sign, i.e. a shape or image, of what is gold or bronze, but not precisely as gold or bronze. For the wax takes a likeness of the gold seal in respect of the image, but not according to the disposition of gold."[51] It seems that, for Aquinas, the fact that the image received is a negative or reverse of the seal, (and so the wax has the image but not as the gold has it) is analogous to what is distinctive of sensation. That is, the fact that the image is in the wax in a different way than it is in the ring illustrates the fact that the sensible form is in the organ in a way different than it is in the object. For, the wax does not have the image to the extent that it can cause another impression, and so it is not a seal-like image; it lacks "the seal's intrinsic disposition to be a gold seal." Analogously, sense organs do not take on the forms of their sensible objects to the extent that they can again be perceived; the sense

> is not affected by a colored stone precisely as stone, or sweet honey precisely as honey, because in the sense there is no such disposition to the form as there is in these substances; but it is affected by them precisely as colored, or tasty, or as having this or that 'informing principle' or form.[52]

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[50] Ibid., n. 555. Et ideo ad hoc excludendum, assignat ei organum: et dicit quod primum sensitivum, idest primum organum sensus est in quo est potentia huiusmodi, quae scilicet est susceptiva specierum sine materia.

[51] Ibid., n. 554. Et ideo subiungit, quod cera accipit signum idest imagem sive figuram auream aut aeneam, sed non inquantum est aurum aut eas. Assimilatur enim cera aureo sigillo quantum ad imagem, sed non quantum ad dispositionem auri.

[52] Ibid. Et similiter sensus patitur a sensibili habente colorem aut humorem, idest saporem aut sonum, 'sed non inquantum unumquodque illorum dicitur,' idest non patitur a lapide colorato inquantum lapis, neques a melle dulci inquantum mel: quia in sensu

Since literalists offer no explanation at all of Aristotle's words "without the gold and not as gold," it seems that Aquinas' reading accounts for more of the text, and reflects Aristotle's intention. Plants, Aquinas concludes, "are affected with matter, i.e. according to a material change."[53]

Everson, nevertheless, defends Sorabji and the literalist interpretation by pointing to what Aristotle says about the physical constitution of plants. According to Everson, plants in Aristotle's theory are not made hot and cold by taking on the forms of these qualities, but by admitting hot or cold matter. This is what Aristotle means when he says that plants are affected with the matter. Everson, to support this radical contention, cites *DA* 3.13, where Aristotle says that "touch is a kind of mean between all tangible qualities, and its organ is receptive not only of all the different qualities of earth, but also of hot and cold, and all other tangible qualities" (435a22-24). Plants, however, because they are made of earth, do not have a mean for the tangible qualities that belong to the elements other than earth, and this fact explains their insensitivity. As Aristotle says: "And for this reason plants have no sensation, because they are composed of earth" (435b1-3). Everson argues that Aristotle's reasoning rests on the claim that earth can itself have no qualities other than the cold and dry; these are essential to being earth: ". . . an element cannot lose its distinctive qualities without ceasing to be that element. . . .",[54] and cites *GC* 2.3 to support this contention. If earth, or something made of earth, appears warm or moist, it is because it has taken into itself some other matter with these qualities.

> The force of the claim that plants are affected with the matter is not, then, that plants are affected by both the form and the matter of whatever heats them up: they are not affected by the form at all since their own matter is incapable of taking on the property of, say, heat . . . . strictly, the plant itself is not affected at all.[55]

Thus, according to Everson, plants do not undergo alteration at all and do not take on the form of the agent in their own matter. Instead, they take on some of the matter of the agent which has the sensible form in question.

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non fit similis dispositio ad formam quae est in subiectis illis, sed patitur ab eis inquantum huiusmodi, vel inquantum coloratum, vel saporosum, vel secundum rationem, idest secundum formam.

[53] Ibid., n. 557. Sed accidit ei pati cum materia, scilicet secundum materialem transmutationem.

[54] Everson, 88.

[55] Ibid., 88-9.

Unfortunately, this view of how plants take on various sensible qualities is at variance with other texts of Aristotle, texts quite central to Everson's overall argument. First, in *Phys*. 7.2, which Everson cites to show that the alterations involved in perception are suffered also by insensate things, implies that plants do undergo alteration even in respect of tangible qualities.

> 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 what is animate. And further, where animate things are in question, we make them both of the parts that have no power of perception and the senses themselves (244b6-10).

Thus, in this passage which Everson makes use of in his general argument, plants, i.e. animate things without perception, are altered and become, among other things, hot and dry. It appears, then, that the fact that plants are made of earth does not in fact prevent their being literally heated and cooled. Since Aristotle says here that plants become hot by being altered, he cannot think that this happens by their taking on the matter of what heats or cools them.

Moreover, Aristotle explicitly rejects those theories which explain the apparent changes in quality of things by postulating a process and mechanism by which matter enters into the things that are so affected. In *GC*, 1.8, Aristotle considers the view of those philosophers who believe that an agent "enters through certain pores, and so the patient suffers action" (324b26),[56] and while these thinkers postulated this theory to account for sense perception, Aristotle presents the theory as being quite general and evaluates it in general terms that have nothing to do with the problems peculiar to sense perception. Furthermore, he specifically mentions Empedocles (324b33) and Leucippus and Democritus (325a1) as proponents of this theory. He is extremely critical of these views, however, in spite of the suggestion by Sorabji that Aristotle would have advocated such a theory.

> If an agent produces no effect by touching the patient, neither will it produce any effect by passing through its pores. On the other hand, if it acts by contact, then – even without pores – some things will 'suffer action' and others will 'act', provided they are by nature adapted for reciprocal action and passion (326b22-24).

So even though his predecessors held to the view that things change their sensible characteristics by taking on the matter of an agent of this change, Aristotle explicitly rejects it in *GC* 1.8. While it is true that Aristotle

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[56] τοῖς μὲν οὖν δοκεῖ πάσχειν ἕκαστον διά τινων πόρων εἰσιόντος τοῦ ποιοῦντος ἐσχάτου καὶ κυριωτάτου . . .

believed that the explanations of perception offered by Empedocles and Democritus which made use of pores to be inadequate, his criticism of pore theories in *GC* oppose such theories as an explanation of all action and passion, not just of perception. It is extremely unlikely that he would have changed his position in the *DA* when it comes to explaining the heating and cooling of plants.

Another part of *GC*, 2.3, shows that Aristotle does not believe that the material constitution of plants prevents them from being altered in respect of tangible qualities. Ironically, after appealing to this chapter to show that anything composed purely of earth cannot itself be made hot or cold since earth is essentially cold and dry, Everson uses it as his basis for concluding that the fact that plants are composed of earth must mean that they are heated and cooled by receiving hot or cold matter. He is right, of course, that the elements do have these qualities essentially. "For Fire is hot and dry, whereas Air is hot and moist (Air being a sort of aqueous vapour); and Water is cold and moist, while Earth is cold and dry" (330b4-5). A few lines later, however, Aristotle warns that, although he takes over the four traditional elements into his system, one should not believe that these 'simple bodies' are to be found in nature in a pure form. "In fact, however, fire and air, and each of the bodies we have mentioned, are not simple, but blended. The 'simple' bodies are indeed similar in nature to them, but not identical with them" (330b20). Thus, the simple body of earth, i.e. the element, is not the earth of our common experience, but similar to it. The earth of common experience, and *a fortiori* things of experience made of earth, are in fact not simple, but blended. There is, then, no theoretical obstacle to ordinary earth undergoing alteration and receiving the form of heat, say, from an agent, though this would be received into the earth's matter. So while Aristotle does say that plants are made of earth, it is safe to assume that he means that they, like other things of ordinary experience which are called earth, are blended with other elements. Thus, the claim that they do not feel because they are made of earth and are affected with matter, means that they are made too much of earth to be a mean, and so cannot be affected in the non-material way that is characteristic of sense organs.

Therefore, just on the basis of *DA* 2.12, when the organ receives form without matter, it receives the same form as its object, but not as that form is in the object. Aristotle is explicit that sense is like the wax which receives an impression both without gold and not as gold. The literalists offer no interpretation for this qualification. In fact, the qualification seems to invalidate their interpretation since on their interpretation both the wax

and the sense organ literally receive the form of what affects them. Just as the wax has the shape just as the gold has it, so the sense organ has the sensible quality just as the object has it, i.e. literally. Aquinas, on the contrary, explains Aristotle's qualification as indicating that the organ does not receive the form in a material way, i.e. not as an alteration. Furthermore, there is no warrant for believing that Aristotle accepted that a plant's being affected with matter means taking on some material vapour from the apparent agent. There are at least three places where he either implicitly or explicitly rejects this. The alternative interpretation, that of Aquinas, accommodates the view that a sense organ does not receive the matter of the object (which the literalists claim is Aristotle's sole point), since in no kind of alteration does the agent receive the matter of the agent, much less does a sense organ receive the matter of its object.

Opposition to the literalist interpretation of the theory of the reception of form without matter should not be seen as capitulation to the spiritualists, however. Unlike Burnyeat, Aquinas holds that the reception of form without matter nevertheless takes place *in material organs*. Aristotle also explicitly applies the theory to sense organs, and so the theory must be meant to identify a physical process, but one that is not an alteration in the normal sense.[57] In *DA* 3.2 (425b22-24), Aristotle claims that it is the *sense organ* of sight which is receptive of form without matter. Given that the theory of reception of form without matter is not alteration, this implies that what goes on in the organ is the same as what goes on in the power. "Sensation would seem to be a single alteration of the ensouled body which is a living functioning sense organ."[58] Thus, neither spiritualists nor literalists seem to capture Aristotle's intention that perception is a physical process which is nevertheless not an ordinary, i.e. standardly material, alteration. Aristotle believes that perception is an activity which is realized in sense organs.

VI. *The Medium of Sensation*

Aristotle's explanation of the relationship between light and the perception of color which occurs by means of it indicates that he thinks the effect of color on both the medium of sight and the organ is not an alteration, but an activity. Color is not seen without light, "for, as we saw, it is the

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[57] Cf. Johansen, 289-291.

[58] Kurt Pritzl, "On Sense and Sense Organ in Aristotle," *Proceedings of the American Catholic Philosophical Association*, (1985): 261.

essence of colour to produce movement in the actually transparent; and the actuality of the transparent is light" (419a9-12). Thus, the physical nature which is common to the "everlasting upper firmament," air and water or whatever can be transparent, is made actually transparent by the activity of light (418b7-9). This physical nature when so actualized and made to be actually transparent receives the further actuality, i.e. a "movement," from color. Although he sometimes calls the actuality of light a "movement" (κίνησις), Aristotle clearly does not consider light itself, nor the color in the medium actualized by light, to be a literal movement, i.e. an alteration. Rather, the actuality of light and of color occurs all at once and so could not be an alteration which travels through the transparent medium since the latter processes affect their subjects by stages.

> Empedocles, and anyone else who has argued on similar lines is wrong in saying that light travels, spreading at a certain time between the earth and its envelope, without our noticing it; this is contrary both to the clear evidence of reason, and to the appearances; it would be possible for it to escape our observation in a small intervening space, but that it does so all the way between east and west is too large a claim (418b21-27).

This line of reasoning is repeated in *De Sensu*, where Aristotle is explicit in his denial that light is a motion. There, he seems willing to grant that the media for the senses other than sight may involve motions which traverse the intervening space in a period of time. However, he explicitly denies that the medium of sight is made transparent in stages and that the colors of objects reach a mid-point between the object and the perceiver before reaching the perceiver. "With light there is a different account; for light is due to the existence of something, but is not a movement" (446b27-28). Here, Aristotle believes that for other senses the medium is not affected simultaneously, "except in the case of light, for the reason given, and of vision too for the same reason; for light causes vision" (447a11). Both light and vision are not the sorts of processes which progress through space for the same reason, namely, that neither is a motion. Consequently, if color under the suitable conditions, i.e. in a medium that is made actually transparent by light, brings about actual vision, it is also not a motion, but is in the medium in the same sense as light is. Therefore, since color is in the eye in the same sense as it is in the medium (for this is the reason that the eye must be made of a transparent substance), the coloration of the eye, the organ, is an activity (alteration$_2$), not a normal alteration (alteration$_1$).

Because one sees not only colors, but also sources of illumination such as the sun and fire, these luminous objects of sight give further evidence

that vision does not come about from the eye undergoing an alteration. For, light is an activity, and as such, it not only actualizes the transparent, but it is also visible. "Now fire is visible in both darkness and light, and this is necessarily so; for it is because of the fire that the transparent becomes transparent" (419a23-25). If the activity of fire, for example, allows other things to be seen, Aristotle reasons that when it itself is seen, this will likewise be due to its nature as an activity. Aristotle clearly denies that the transparent medium, and so *a fortiori*, the transparent in the eye, undergoes an alteration as a result of light; light is the actuality of the actually transparent. Thus, when light itself is an object of vision, it will not be seen through the organ undergoing an alteration since nothing in the nature of light is either the source or subject of an alteration. Rather, the vision of fire, say, occurs when the eye of the perceiving animal engages in or receives the activity of the light of the fire.

Aristotle's insistence on the need for a medium for sensation in *DA*, then, implies that he has changed his position on the mechanics of perception since *Phys*. 7. The fact that in *DA* he insists on a medium for all senses, and rejects simple contact, is enough of a warrant to reject *Phys*. 7 as his ultimate position on the sort of alteration which he believes sensation to be. Since *Phys*. 7.3 was Everson's primary evidence for Aristotle's adherence to supervenience (since in this chapter Aristotle says both that there are two kinds of alterations and that the physical determines the mental), we can reject Everson's claim that Aristotle endorsed supervenience.

VII. *Conclusion*

From the foregoing, it should be clear that for Aristotle perception is not an ordinary physical process. Given what he says about the material constraints and operational failures to which the senses are subject, one cannot deny that perception occurs because sense organs are affected. Thus, perception is indisputably a physical process. However, it seems that this physical process in the organ is not an ordinary alteration. On the most natural reading of *DA* 2.5, Aristotle denies that perception either is or involves this ordinary sense of alteration, and any evidence offered to support a contrary conclusion is either inconclusive or makes Aristotle inconsistent. Moreover, the literalist interpretation, which asserts that perceptual awareness is a formal aspect and an activity which supervenes on material alterations which sense organs undergo, becomes incoherent when joined to core Aristotelian doctrines. Aristotle's requirement that the

matter of the eye, for instance, be transparent in order to be affected by color cannot be reconciled with the claim that this matter becomes literally colored when seeing occurs. Likewise, claims that activities supervene on organs suffering ordinary alterations are equally irreconcilable with the nature of activities, i.e. that activities are continuous and the ability to engage in them undiminished by already being so engaged. In addition to these interpretive and philosophical failures, the literal interpretation of *DA* 2.12 championed by Everson and Sorabji is contradicted by other central texts of Aristotle. In order to account for more of the text, it seems best to interpret Aristotle's assertion that senses receive form without matter to mean that perception is a non-ordinary sort of physical process. Thus, the sense organs are the subject of their own physical activities which Aristotle understands to be opposed to ordinary physical alterations. That this activity constitutes perception is confirmed by Aristotle's insistence that all the senses require a medium to unite them with their respective proper objects, as well as by his analysis of the activity involved in the fact that seeing is brought about by light. For all these reasons, it follows that Aristotle thought that perception is a special kind of physical process in which is realized the activity of perceiving.[59]

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[59] I wish to thank the editors of *Phronesis* for many helpful comments and suggestions.