

Offprint from
OXFORD STUDIES
IN ANCIENT
PHILOSOPHY

EDITOR: BRAD INWOOD

VOLUME XLIII

WINTER 2012

OXFORD
UNIVERSITY PRESS

2012

ARISTOTLE ON ODOUR AND SMELL

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THE sense of smell occupies a peculiar, intermediate position within Aristotle's theory of perception. In *De anima* smell is treated as the third of the three distance senses: like sight and hearing, it involves perceiving an object at a distance through an external medium. However, in *De sensu* Aristotle treats odour, the proper object of smell, as intimately related to flavour, the proper object of taste. Taste, for Aristotle, is a species of touch,¹ requiring contact between the body of the perceiver and the object perceived. Smell, therefore, combines features of both distance and contact senses: its mode of operation is like that of sight and hearing, while its proper object is closely related to that of a form of touch.² Largely for this reason, Aristotle's discussion of the sense of smell has the potential to tell us a great deal about his theory of sense-perception more generally. First, it provides invaluable information about his views on perceptual mediation and the operation of the distance senses. Next, it promises to help us understand his distinction between distance and contact senses, and his views on the ontological status of the proper objects of perception. Finally, it provides a crucial test case for views on the role of ordinary, material changes in perception, an issue that has received much attention in the recent literature on Aristotle's psychology.

In this paper I examine Aristotle's claims about odour and smell, especially in *De anima* 2. 9 and *De sensu* 5, to see what light they shed on his theory of perception more generally. In the first half of the paper my goals are predominantly negative. In particular, I argue that neither of the two most highly influential recent ways of understanding Aristotle's theory of perception as a whole can adequately account for what he says about the sense of smell. These two views

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I would like to thank Hendrik Lorenz and Thomas Johansen for their helpful comments on earlier versions of this paper.

¹ This claim is most explicit at *DA* 2. 10, 422^a8.

² Aristotle emphasizes the special, intermediate position of smell between the contact and distance senses at *De sensu* 5, 445^a4-14.

are commonly known as ‘literalism’ and ‘spiritualism’.³ Roughly, literalists⁴ maintain that in perception, for Aristotle, the perceiver’s sense-organ takes on, in a literal way,⁵ the very same sensible qua-

³ The literalism/spiritualism debate has been the focus of much recent literature on Aristotle’s psychology. In addition to the works listed immediately below (nn. 4 and 6), prominent discussions of Aristotle on perception in which this debate plays a central role include J. Lear, *Aristotle: The Desire to Understand* [*Desire to Understand*] (Cambridge, 1988), 101–16; M. Nussbaum and H. Putnam, ‘Changing Aristotle’s Mind’, in M. Nussbaum and A. O. Rorty (eds.), *Essays on Aristotle’s De anima* [*Essays*] (Oxford, 1992; repr. 1995), 27–56; S. M. Cohen, ‘Hylomorphism and Functionalism’, in Nussbaum and Rorty (eds.), *Essays*, 57–74; D. Bradshaw, ‘Aristotle on Perception: The Dual-Logos Theory’ [‘Dual-Logos Theory’], *Apeiron*, 30 (1997), 143–61; J. Sisko, ‘Alteration and Quasi-Alteration’ [‘Quasi-Alteration’], *Oxford Studies in Ancient Philosophy*, 16 (1998), 331–52; F. D. Miller, Jr., ‘Aristotle’s Philosophy of Perception’, *Proceedings of the Boston Area Colloquium in Ancient Philosophy*, 15 (1999), 177–213; V. Caston, ‘The Spirit and the Letter: Aristotle on Perception’ [‘Spirit and Letter’], in R. Salles (ed.), *Metaphysics, Soul, and Ethics in Ancient Thought: Themes from the Work of Richard Sorabji* (Oxford, 2007), 245–320; and H. Lorenz, ‘The Assimilation of Sense to Sense-Object in Aristotle’ [‘Assimilation’], *Oxford Studies in Ancient Philosophy*, 33 (2007), 179–220. For further references see Caston, ‘Spirit and Letter’, nn. 3, 4, 5, and 7. Several of these authors (notably Lear, Bradshaw, Caston, and Lorenz) have advocated alternatives to both literalism and spiritualism, as have e.g. D. Modrak, *Aristotle: The Power of Perception* [*Power of Perception*] (Chicago, 1987), J. K. Ward, ‘Perception and Logos in *De anima* II. 12’ [‘Perception and Logos’], *Ancient Philosophy*, 8 (1988), 217–33; A. Silverman ‘Colour and Colour-Perception in Aristotle’s *De anima*’ [‘Colour’], *Ancient Philosophy*, 9 (1989), 271–92; and R. Polansky, *Aristotle’s De anima* (Cambridge, 2007). The present article represents an attempt to advance the development of such a ‘third way’ view.

⁴ Prominent advocates for literalism include R. Sorabji, ‘Body and Soul in Aristotle’ [‘Body and Soul’], *Philosophy*, 49 (1974), 63–89; ‘Intentionality and Physiological Processes: Aristotle’s Theory of Sense-Perception’ [‘Theory’], in Nussbaum and Rorty (eds.), *Essays*, 195–226; ‘Aristotle on Sensory Processes and Intentionality: A Reply to Myles Burnyeat’ [‘Reply’], in D. Perler (ed.), *Ancient and Medieval Theories of Intentionality* [*Intentionality*] (Leiden, Boston, and Cologne, 2001), 49–61; and (at book length) S. Everson, *Aristotle on Perception* (Oxford, 1997).

⁵ Stated somewhat more carefully, literalism is the view that in perception the perceiver’s sense-organ becomes F in just the same sense of the term as that in which the object is F, where F denotes some sensible quality. A literalist could still claim that the organ is F in a different way from the way the object is F. Indeed, Richard Sorabji, arguably literalism’s most well-known and influential proponent, has explicitly argued that in vision the eye jelly takes on colour in a different way from the way in which the object seen is coloured (to illustrate what he has in mind, Sorabji compares the coloration of the Aristotelian eye jelly (κόρη) with the coloration of the sea (Sorabji, ‘Theory’, 52–3)). By contrast, Everson, like others who maintain the literalist’s account of perceptual assimilation (e.g. T. Slakey, ‘Aristotle on Sense Perception’, *Philosophical Review*, 70 (1961), 470–84), holds that organ and object are (e.g.) red not only in the same sense of the term, but also straightforwardly in the same way. I am grateful to Caston, ‘Spirit and Letter’, for his clear discussion of this distinction between different literalist views, and, in general, for his helpful survey of the space of possible literalist and spiritualist positions.

lity the sense-object possesses: for example, the eye jelly becomes red when one sees a red object. By contrast, spiritualists⁶ maintain that for Aristotle nothing happens when a perceiver encounters a sense-object under suitable conditions,⁷ save that the perceiver becomes perceptually aware of that object—no ordinary, ‘material’ changes or processes are involved in perception as such.⁸ I begin by arguing, against spiritualism, that Aristotle clearly commits himself to the occurrence of ordinary, material changes in both the sense-organ and the medium of smell, changes that cannot plausibly be dismissed as merely accidental to perception proper. Yet, as I then note, this conclusion should provide little comfort to the literalist, since the changes in question are not the ones literalism would lead us to expect. If literalism were correct, we should expect the organ of smell to become odorous: bitter- or sweet-smelling, for example. However, Aristotle makes it clear that on his view the organ and medium of smell become *dry* when they are acted on by an odorous object, a kind of change literalism neither predicts nor explains. Based on these considerations, I conclude that neither spiritualism nor literalism provides a satisfactory account of Aristotle’s theory of smell.

In the second half of the paper I offer my own, positive account of Aristotle’s theory of smell. I begin by examining Aristotle’s views,

⁶ The most prominent recent advocate of spiritualism is Myles Burnyeat: ‘Is an Aristotelian Philosophy of Mind Still Credible? A Draft’ [‘Credible?’], in Nussbaum and Rorty (eds.), *Essays*, 15–26; ‘How Much Happens When Aristotle Sees Red and Hears Middle C? Remarks on *De anima* 2. 7–8’ [‘How Much Happens?’], in Nussbaum and Rorty (eds.), *Essays*, 421–34; ‘Aquinas on “Spiritual Change” in Perception’ [‘Aquinas’], in Perler (ed.), *Intentionality*, 129–53; ‘*De anima* II 5’ [‘*DA* II 5’], *Phronesis*, 47 (2001), 28–90. Burnyeat traces his interpretation of Aristotle on perception back to such earlier figures as John Philoponus, Thomas Aquinas, and Franz Brentano. Other notable recent proponents of spiritualist ideas include S. Broadie, ‘Aristotle’s Perceptual Realism’ [‘Perceptual Realism’], in J. Ellis (ed.), *Ancient Minds* (*Southern Journal of Philosophy*, 31, suppl.; Memphis, 1993), 137–59; T. K. Johansen, *Aristotle on the Sense Organs* [*Sense Organs*] (Cambridge, 1998); and D. Murphy ‘Aristotle on Why Plants Cannot Perceive’, *Oxford Studies in Ancient Philosophy*, 29 (2005), 295–339. It should be noted that although Broadie, Johansen, and Murphy all argue in favour of spiritualist conclusions, none of them endorses spiritualism outright.

⁷ This set of conditions will include the state of alertness and preparedness of the perceiver, the absence of obstructions or obstacles, the existence of certain favourable environmental conditions (such as the presence of light, for example, in the case of sight), and so on. In what follows I sometimes speak of a perceiver ‘encountering an object under suitable conditions’ as a convenient way of referring to this list.

⁸ I provide a more precise account of spiritualism and some of its core commitments below.

as expressed in *De sensu* 4–5, on the nature of odour and its relationship to flavour. According to Aristotle, odour and flavour are intimately connected, since both involve interaction between the ‘flavoured dry’ (*to enchumon xēron*) and the moist. This raises the question of what the difference between them is supposed to be, on Aristotle’s account. I agree with others who have considered this issue, especially Thomas Johansen,⁹ in concluding that the tasteable (*to geuston*) is formed by a *mixture* of the flavoured dry with the moist, whereas smell involves the flavoured dry acting on air or water in a different way. However, unlike Johansen I argue that this should not lead us to adopt a spiritualist account of perceptual mediation for the sense of smell. Aristotle’s text not only allows for, but in fact strongly supports, an alternative account. On this account, the flavoured dry acts on the moist medium of smell in a perfectly ordinary manner, by drying it, to some degree and in some determinate way. This conclusion is important for understanding Aristotle’s views on perceptual mediation. However, we might still wonder how exactly the drying of the organ and medium of smell is supposed to be related to the perception of odour as such. In the final section of this paper I argue that Aristotle’s discussion of the specific case of odour and smell suggests a plausible and interesting way of understanding the relationship, on his view, between ordinary material changes in the sense-organs and the activation of the capacity to perceive, considered merely as such.

I

In order to assess the prospects for a spiritualist interpretation of Aristotle’s theory of smell, it will be helpful to have a clear statement of spiritualism and its core commitments. According to the spiritualist, nothing happens when a perceiver encounters a sensible object under suitable conditions, save that the perceiver becomes perceptually aware of that object. However, it is extremely difficult to say exactly what kinds of change the spiritualist wishes to exclude. The first set of problems is terminological. Scholars speak variously of ‘physical’, ‘material’, and ‘physiological’ changes or processes, yet all of these terms raise difficulties in this context. The term ‘physical’ is problematic, not only because of the risk of con-

⁹ Johansen, *Sense Organs*, 237–42.

fusion with contemporary debates about physicalism, but also because spiritualists do not deny that perception is a 'physical' process in a sense: on their interpretation of Aristotle, perception requires and involves the body (since certain bodily 'standing conditions' must be in place if it is to occur), while the study of perception clearly falls within the purview of the study of nature (*phusis*).¹⁰ The term 'physiological' is less ambiguous, but has the disadvantage of effectively excluding changes in the *medium* of perception—which are very much at issue here—while tending to put the reader in mind exclusively of changes to muscles, nerves, and the like, rather than, say, interactions between the wet and the dry in sensible objects, medium, and sense-organ.¹¹ For these reasons, in what follows I prefer the term 'material' (as in 'material changes').¹²

Terminological issues aside, the first challenge is to provide a precise characterization of the kinds of change the spiritualist denies are part of perception *per se*. This is best done, I believe, by invoking a set of distinctions Aristotle draws in *De anima* 2. 5 between different kinds of alteration, a discussion frequently emphasized by spiritualists.¹³ The most important distinction, for present pur-

¹⁰ For a spiritualist account of the 'physical' side of perception, emphasizing standing conditions, see e.g. Broadie, 'Perceptual Realism', 139. Burnyeat attributes much confusion to the word 'physical', as in the claim, sometimes attributed to spiritualists, that for Aristotle perceiving is not a physical process ('I suspect that the root of the trouble is the word "physical"') (Burnyeat, 'Aquinas', 146). He prefers (as I do here) using the word 'material' to denote the kind of change spiritualists deny is part of perception *per se*. On this issue see especially Burnyeat, 'Aquinas', 149: 'a [spiritual change] is a physical change, but not a material change'.

¹¹ As F. Solmsen, 'Greek Philosophy and the Discovery of the Nerves', *Museum Helveticum*, 18 (1961), 150–97, and others have observed, Aristotle wrote surprisingly little about nerves and related physiological structures. However, Aristotle's apparent lack of interest in the operation of the nervous system should not lead us to conclude too hastily that he took no interest in the role of 'material' changes in perception at all (*pace* e.g. Burnyeat, 'How Much Happens?', 421–2, who cites Solmsen's work on ancient Greek philosophers on the nerves in support of an 'argument from silence' for spiritualism), since ordinary, material changes may also occur at the level of Aristotle's chemistry, involving interactions among the hot, cold, wet, and dry.

¹² Although it is important to be clear that it is the Aristotelian contrast between matter and form that is at issue here, not the more familiar modern contrast between 'material' and 'mental' events or processes.

¹³ I take Myles Burnyeat as my main guide to the spiritualist position here, especially in his 2001 article on *De anima* 2. 5. Cf. Hendrik Lorenz's careful discussion of Aristotle's distinctions between different kinds of alteration in *DA* 2. 5 ('Assimilation', 181–8). Although not himself a spiritualist, Lorenz largely supports Burnyeat's conclusions about the different kinds of alteration Aristotle distinguishes in this chapter.

poses, is between ‘destructive’ and ‘non-destructive’ alterations. In a destructive alteration one quality replaces another in a persisting subject within a range delimited by a pair of opposites, whereas in a non-destructive alteration there is no such replacement of one quality by another. A straightforward example of a destructive alteration is the case of a cold thing becoming hot. This change can be called ‘destructive’¹⁴ because it involves the *replacement* of one quality by another: the heated thing is no longer cold at the terminus of the change. Aristotle distinguishes such straightforward destructive alterations *both* from the kind of change that occurs when a person with the capacity to learn acquires new knowledge, *and* from the kind of change that occurs when someone who already possesses knowledge employs it in the activity of contemplation. Both of these kinds of change differ from straightforward, destructive alterations, since both involve a movement towards the full realization of the individual’s nature, not towards a state of privation.¹⁵ Nevertheless, as Aristotle makes clear, on his view learning is a different kind of change from employing knowledge one already possesses. In particular, learning is still a destructive alteration, since it involves the replacement of ignorance by knowledge. By contrast, the kind of change involved in employing knowledge one already possesses is genuinely non-destructive, since it involves *no* replacement of one quality by another.¹⁶ Rather, it involves *only* the activation of a capa-

¹⁴ Aristotle speaks of a *φθορά τις*, a ‘kind of destruction’ of a quality by its opposite (*DA* 417^b3).

¹⁵ At *DA* 417^b14–16 Aristotle distinguishes between two kinds of alteration: change into conditions of privation, and change towards a thing’s enduring state (*ἔξις*) and nature (*φύσις*). He claims that learning is an alteration of the latter kind, presumably since in acquiring new knowledge the learner progresses towards the completion of his or her nature. However, it is important to be clear that this is a *different* distinction from that between learning and contemplating, and that for Aristotle activating one’s capacity to perceive is analogous to contemplating, *not* to learning. Aristotle emphasizes the distinction between acquiring new knowledge and exercising knowledge already acquired at *DA* 417^a28–30. He explicitly claims that perceiving is analogous to contemplating but *not* to learning at *De sensu* 441^b22–3.

¹⁶ Thus, to be clear, Aristotle distinguishes *three* kinds of alteration in *DA* 2. 5: (i) straightforward destructive alterations; (ii) extraordinary destructive alterations involving a movement towards the fulfilment of one’s nature (e.g. learning); and (iii) extraordinary non-destructive alterations (e.g. contemplating). His claim is that the activation of one’s capacity to perceive, considered merely as such, is a non-destructive alteration (type iii), not merely that it is not a straightforward destructive alteration (which would exclude only type i). Thus, Aristotle is not thinking of just *any* exercise of a capacity when he seeks to isolate the kind of alteration involved in activating one’s capacity to perceive, since the acquisition of new knowledge is also

city one *already* possesses.¹⁷ As a result, this change is an alteration (*alloiōsis*) only in a highly qualified sense, if it can rightly be called an alteration at all.¹⁸

In *DA* 2. 5 Aristotle clearly commits himself to denying that the change that occurs when one's capacity to perceive is activated is a straightforward, destructive alteration. Indeed, it appears that on his view this change, considered in its own right, is not a destructive alteration at all. Rather, for Aristotle, the change that occurs when one's capacity to perceive is activated is a non-destructive alteration, comparable to the change involved in employing knowledge one already possesses in the activity of contemplation.¹⁹ The spiritualist insists on this point, and claims that this 'extraordinary' non-destructive alteration is identical to becoming perceptually aware

an exercise of a capacity, namely the capacity to learn. This point is often missed, for example by those who take Aristotle to have in mind *any* change involving the activation of a capacity (e.g. Everson, *Aristotle on Perception*, 92; cf. Sisko, 'Quasi-Alteration', 335–6), and also by those who take him to be interested in any change that preserves one's nature, as the acquisition of new knowledge would (e.g. Caston, 'Spirit and Letter', 265–9). I am indebted to Lorenz, 'Assimilation', for his clear discussion of these distinctions.

¹⁷ That is to say, without regard to any ordinary changes that may also be involved. Aristotle's comparison with the activation of the capacity to build (*DA* 417^b9) is illustrative here. He claims that in activating his or her capacity to build, considered merely as such, a builder is not altered in any way. This initially startling claim becomes perfectly intelligible if we suppose that there is a way of viewing the activation of a capacity one already possesses merely as such, in a way that disregards any corresponding bodily motions or other ordinary changes. So understood, the view is perfectly compatible with the claim that in any actual case a builder must, for example, move around or hammer things in order to create a structure out of his or her materials. Aristotle's distinction between exercising a capacity one already possesses, considered merely as such, and the ordinary changes that accompany doing so will be important for understanding his views on the relationship between the material and formal aspects of perception, which I consider in the final section of this paper.

¹⁸ Throughout *DA* 2. 5, Aristotle is hesitant to call the change involved in activating one's capacity to perceive an 'alteration' without significant qualification. He is clearly grappling here with the challenge of accommodating the kind of change involved in activating one's capacity to perceive (or, for that matter, to contemplate) within his general framework for classifying kinds of change, as presented in *GC* 1. 7 (he refers his reader to this discussion at *DA* 417^a1–2). If perceiving is to fit into this framework at all, it must be as a form of alteration; but if it is a form of alteration at all, it must be alteration of a non-standard kind.

¹⁹ Aristotle compares activating one's capacity to perceive with actively employing knowledge one already possesses throughout *DA* 2. 5 (e.g. at 417^a28–30; 417^b5–7; 417^b19–21). As he stresses, however, the parallel between the two cases is imperfect, since under normal circumstances I can employ my knowledge whenever I wish, while perception requires the actual presence of an external object (*DA* 417^b19–28).

of the sense-object. Furthermore, for the spiritualist—and this is a stronger claim—there is *no* accompanying ordinary or destructive alteration involved in perception.²⁰ Rather, according to the spiritualist, the extraordinary alteration that constitutes the rise to perceptual awareness is *all* that happens in perception, considered as such. As noted, this is not to deny that certain quite specific material ‘standing conditions’ need to be in place in order for perception to occur. However, on the spiritualist interpretation of Aristotle’s view, no ordinary, destructive alterations are part of perception *per se*. I take it that this claim represents a fundamental commitment of spiritualism. As such, it provides a clear criterion against which the spiritualist interpretation might be tested and potentially refuted.

II

The first question, then, is this: according to Aristotle, do any ordinary, destructive changes occur in the sense-organ when a perceiver encounters an odour under suitable conditions? My case that they do begins with a little-remarked passage²¹ from the end of *De anima* 2. 9:

ἔστι δ’ ἡ ὁσμὴ τοῦ ξηροῦ (ὡσπερ ὁ χυμὸς τοῦ ὑγροῦ), τὸ δὲ ὀσφραντικὸν αἰσθητήριον δυνάμει τοιοῦτον. (422^a6–7)²²

²⁰ This is a stronger claim because it is perfectly possible to agree with Burnyeat about the ‘extraordinariness’ of the kind of change involved in exercising the capacity to perceive, considered in its own right, while still maintaining that there are, *in addition* to this extraordinary change, ordinary, material changes in the sense-organs, changes which represent the material aspect of perceiving. Burnyeat himself acknowledges this possibility when he remarks, towards the end of his paper on *DA* 2. 5, that his interpretation leaves ‘logical space’ for underlying material changes, but denies that Aristotle provides any ‘textual space’ for such changes (Burnyeat, ‘*DA* II 5’, 82–3). On the contrary, I claim, there is ample ‘textual space’ in Aristotle’s discussion for ordinary, material changes in the sense-organs; indeed, in his treatment of the sense of smell he clearly commits himself to their occurrence.

²¹ It is briefly remarked on by Lorenz, ‘Assimilation’, 191 n. 22, who recognizes the difficulties it raises for spiritualism.

²² Here and in what follows I use Ross’s 1956 OCT edition of the Greek text, with occasional reference to his 1961 edition with paraphrase and commentary. I will also be using Ross’s 1955 edition of the text of the *Parva Naturalia*, with his accompanying commentary. Translations from *De anima* are based on Hamlyn’s 1968 Clarendon edition, although sometimes (as here) slightly modified. Translations from other Aristotelian works are based on the Revised Oxford Translation, sometimes slightly modified.

Odour is of the dry just as flavour is of the moist; and the organ of smell is potentially of this kind.

In this passage Aristotle claims that the organ of smell is potentially dry.²³ If an organ is potentially dry, it must actually be the opposite of dry, namely moist, at least to some degree.²⁴ Thus, the first thing to note about this passage is that in it Aristotle reveals an important fact about the organ of smell, namely that it is actually moist, at least to some degree. Furthermore, Aristotle traces the potential dryness of the organ back to the basic nature of odour, which is 'of' the dry (I say more about the connection between odour and dryness below). Since for Aristotle the capacity to smell just is the capacity to be acted on by odour in a certain way (*DA* 421^b21-3), this gives excellent reason to think that the moistness of the sense-organ is hardly accidental to it: it *must* be potentially dry, and hence actually moist, if it is to function as an organ of smell.

The next thing to note about this passage is that in it, for the first time in *De anima*, a 'sense-organ' (*aisthētērion*), as opposed to a 'sense' or 'sense-faculty' (*aisthēsis*, *aisthētikon*), is said to be 'potentially' (*dunamei*) of such-and-such a kind.²⁵ Presumably, the point of saying that the organ of smell is *potentially* dry is that it becomes *actually* dry when one encounters an odour under suitable conditions. It is difficult to see what else Aristotle could mean by claiming that the organ is potentially of such-and-such a kind.²⁶ This is, it seems, an alteration the sense-organ undergoes. Furthermore, it appears to be a paradigmatic case of an ordinary, destructive alteration: something moist, the potentially dry sense-organ, becomes actually dry, or is at least dried to some extent: it is no longer moist to the same degree at the terminus of the change. Yet as noted, the spiritualist can admit no ordinary destructive change when a perceiver encounters a sense-object under suitable

²³ I take it to be uncontroversial that when Aristotle claims here that the organ of smell is potentially 'of this kind' (*τοιούτου*), he means that it is potentially dry.

²⁴ See in this context *GC* 1. 7.

²⁵ Up to this point in *De anima*, Aristotle has spoken only of the sense-faculty (*τὸ αἰσθητικόν*) as potentially of such-and-such a kind (notably at 418^a3-4). Later in *De anima*, however, he does refer to the *organ* of taste as capable of being moistened (422^b1-2), and to the *organ* of touch as being potentially such as the tangible qualities already actually are, and as becoming like them when they act on it (423^b27-424^a2).

²⁶ Cf. *DA* 2. 10, 422^a34-^b5, where, in a more or less parallel passage, the organ of taste is first said to be *potentially* wet, and then explicitly said to become *actually* wet when it is acted on by something that is tasteable.

conditions, but merely the extraordinary, non-destructive alteration that is becoming perceptually aware of the sense-object in question. Aristotle's description of the organ of smell as potentially dry therefore presents a direct and serious challenge for any interpreter who wishes to read Aristotle's account of the sense of smell along spiritualist lines.

The spiritualist interpreter of Aristotle has two main options for responding to this passage. First, she might insist that, despite appearances to the contrary, the change in question really is an extraordinary alteration, and is therefore of a kind the spiritualist can readily admit. In order to make this plausible, she could claim that when Aristotle speaks of the 'organ' in this passage he is referring to the whole hylomorphic compound, not merely to its material aspect. On this interpretation, when Aristotle says that the sense-organ is of such-and-such a kind, what he really means is that the sense, the power of perception that resides *in* the organ, is of such-and-such a kind.²⁷ But this will not do here. Admittedly, Aristotle does occasionally use the term *aisthētērion* in a broad sense that includes the capacity for perception together with its material basis.²⁸ However, if this were the case here, we would expect Aristotle to say that the organ is potentially like the special sensible in question: in this case, that it is, say, potentially 'bitter-smelling' or 'sweet-smelling'. After all, according to Aristotle these are the kinds of quality picked up on by the sense of smell.²⁹ However, in the passage in question the organ is said to be, not potentially odorous, but potentially dry. Moisture and dryness are not qualities differenti-

²⁷ This seems to be Johansen's approach in *Aristotle on the Sense Organs*. At least, this would be one way to interpret his occasional slide between talking about the 'organ' and the 'faculty' of smell. For example, he writes: 'the difference between odour as belonging to the dry and flavour as belonging to the wet is supposed to give us different definitions of the *sense-faculties* (and organs) of smell and taste. The *sense-faculty* of smell has the potentiality to become dry but the *sense-faculty* of taste has the potentiality to become wet', after which he continues, in the same paragraph: 'the *organ* of smell is made dry by the action of odour. The *organ* of smell should be potentially dry but not actually so, for only then can it be made dry by the action of odour' (235–6, emphasis added). It is also possible that in treating references to the faculty and the organ as effectively interchangeable, as he does here, Johansen simply failed to appreciate the problem Aristotle's claim about the drying of the organ of smell raises for the spiritualist.

²⁸ This seems clear, for example, at *DA* 425^b23–5. On the distinction between the sense-organ, conceived as a spatially extended material structure, and the power to perceive that resides in it, see *DA* 424^a24–8.

²⁹ Odours are named after corresponding flavours: see *DA* 2. 9, 421^a26 ff.

ated by the sense of smell, as Aristotle describes it. In order to maintain that Aristotle is referring to an extraordinary, non-destructive alteration here—a rise to cognitive awareness of a sense-object—the spiritualist would therefore have to claim that awareness of odour is always at the same time awareness of dryness. But besides being unsupported by the text, there is simply no good reason to suppose this is the case. While odours may have a special relationship to dryness for Aristotle, dryness is not itself among the differentiae of the proper object of smell.

The second option for the spiritualist is to concede that on Aristotle's view an ordinary, destructive alteration occurs in the sense-organ whenever a perceiver encounters an odour under suitable conditions, but then insist that this alteration represents a 'mere concomitant', something accidental to perception as such. In a 2001 paper on Aquinas on perception, Myles Burnyeat suggests this line of response in interpreting Aristotle.³⁰ Although he does not adopt this approach to the sense of smell in his paper, he does so for Aristotle's views on the sense of taste.³¹ Burnyeat concedes that for Aristotle a person's tongue is always moistened when perceiving a flavour; such changes are, as he puts it, 'inevitable'.³² However, he argues, such changes can be dismissed as accidental to perceiving as such.³³ He motivates this claim by employing an analogy with sight: 'just as colours can only be perceived in light, so flavours can only be perceived in liquid—and liquid is bound to moisten things it is in contact with. But that moistening is accidental *to the perceiving*', since 'wetness is not a flavour, but an object of touch'.³⁴ Similarly, a spiritualist might claim that odours must be perceived 'in' the dry, even though drying is 'accidental to the perceiving' of odour. On this view, to borrow Burnyeat's terms, the drying of the organ of

³⁰ Burnyeat, 'Aquinas'. Although his official topic in this paper is Aquinas, much of it is explicitly on Aristotle, while Burnyeat makes it perfectly clear that he considers Aquinas to be an intelligent and accurate interpreter of Aristotle's theory of sense-perception (e.g. 'in my narrative, Aquinas has read Aristotle as a commentator should, with insight and integrity' (131)). In general, one of Burnyeat's main goals in this paper seems to be to enlist Aquinas as an ally in defending his spiritualist interpretation of Aristotle.

³¹ Burnyeat, 'Aquinas', 137. Burnyeat acknowledges 'natural changes' at all only in connection with the contact senses of taste and touch. His official view of Aquinas (and, he implies, of Aristotle) in this paper is that *no* 'natural changes' occur in the sense-organs when one perceives by sight, hearing, or smell.

³² Ibid. 137.

³³ Ibid. 136.

³⁴ Ibid. (emphasis original).

smell is 'irrelevant' to perceiving; it has 'nothing to do with' the perception of odour *per se*.³⁵

However, this response on the part of the spiritualist will not do either. For on what basis could the drying of the organ of smell be dismissed as 'merely accidental to', and as having 'nothing to do with', the perception of odour? In the case of taste, Burnyeat's position was that for Aristotle the presence of moisture represents a necessary background condition for gustatory awareness, much as the presence of light represents a necessary background condition for the perception of colour.³⁶ Yet even if this were true of the role of moisture in the case of taste (something I doubt, for reasons that will become clearer below), it does not provide a plausible account of the role of dryness in the case of smell. To begin with, it is difficult to make sense of the claim that odour can only be perceived 'in' the dry, much as colour can only be perceived 'in' the light; dryness does not appear to play the same role for Aristotle in the case of smell that light plays in the case of sight. Moreover, as noted, Aristotle makes it clear that dryness is connected in some fundamental way to the nature of odour itself. We have seen one such passage already ('odour is "of" the dry'), and I consider more below. If this is right, it becomes implausible to claim that the drying of the organ of smell has 'nothing to do with' the perception of odour. And what would be the motivation for insisting on the point? It is not a matter of being charitable to Aristotle: in fact, the spiritualist interpretation is consciously *uncharitable* to Aristotle.³⁷ In short, once it

³⁵ Ibid. 137.

³⁶ Burnyeat also uses another analogy to clarify his idea of merely concomitant material changes. In considering Aquinas' claim that 'natural changes' necessarily accompany 'spiritual changes' in episodes of taste and touch, he writes: 'Aquinas is doing no more than acknowledge, commonsensically, that a hot thing felt will produce other effects on the perceiver, effects which have nothing to do with the perceiving. Likewise, ice cream cools the tongue regardless of whether its taste is strawberry or peppermint. Aristotle would not wish to disagree' ('Aquinas', 135). Drawing on this analogy, we might suppose that the drying of the organ of smell associated with smelling is like the cooling of the tongue associated with tasting ice cream. However, this analogy also seems unpromising. One problem is that one does not perceive dryness at all when perceiving an odour, in the way that one perceives coldness when tasting ice cream. A deeper problem is that coldness has no special connection to flavour, in the way that dryness apparently does to odour for Aristotle. Flavour is not 'of' the cold, and one frequently perceives it without any cooling of the tongue. This proposed style of analysis therefore fails to take account of, let alone explain, the close connection on Aristotle's view between odour and dryness. (I say more about the connection between odour and dryness below.)

³⁷ For example, Burnyeat has famously claimed that if his interpretation of Aris-

is conceded that ordinary, material changes inevitably accompany perception by smell, and that the specific kind of change involved reflects Aristotle's stated views on the nature of odour, the claim that these changes have 'nothing to do with' perception loses all plausibility.

III

To this point, I have focused on what happens to the organ of smell when a perceiver encounters an odour under suitable conditions. I now turn to consider Aristotle's views on changes in the *medium* of perception. For Aristotle, smell, like sight and hearing, is a mediated distance sense: odours, like colours and sounds, are perceived at a distance through a medium (*DA* 421^b9). On his view, odours are perceived not only through air, but also through water, for water animals are able to perceive food at a distance and move towards it by following its odour (421^b10–13).³⁸ However, Aristotle claims, odours are not perceived through air and water *qua* air and water. Rather, just as in the case of colours, odours are perceived through different media because these media share some feature in common. In the case of colours, the feature in question was transparency: air and water are both transparent (*diaphanēs*), and all colours are perceived through a transparent medium (419^a9 ff.). By analogy, Aristotle explains, odours are perceived through air and water, not because these media are transparent, but in so far as they share a nameless common feature (419^a32–5). In *De anima* Aristotle says nothing specific about this common feature. However, in *De sensu* we learn that odour can be perceived through air and water because both are capable of 'washing' or 'rinsing' the 'flavoured dryness' (*De sensu* 442^b30–443^a1).³⁹ Furthermore, the reason why air and water

totle's theory of perception is correct, we should conclude that Aristotle's whole philosophy of mind is no longer credible and should be 'junked', or at least relegated to the status of mere historical curiosity (Burnyeat, 'Credible?', 26).

³⁸ This raises the question of why humans (and other animals that breathe) cannot smell under water. Aristotle answers this question by noting that humans cannot *inhale* under water (*DA* 422^a3–5; *De sensu* 444^b23), then positing the existence of a 'lid' or 'flap' inside the nose, analogous to the eyelid, which is pushed aside when one inhales, thereby exposing the organ of smell. The olfactory organs of fish, like the eyes of hard-eyed animals, lack such a lid or flap; this explains why they are able to smell without inhaling (*DA* 421^b25–422^a5; *De sensu* 444^b20–8).

³⁹ ἔστι δ' ὀσφραντὸν οὐχ ἢ διαφανές, ἀλλ' ἢ πλυτικὸν καὶ ῥυπτικὸν ἐρχύμου ξηρότητος.

have this power to ‘wash’ or ‘rinse’ (*plutikon kai ruptikon*, 443^a1; *plusis*, 445^a14) the flavoured dryness, Aristotle explains, is that both are *moist* (443^a6–8).⁴⁰ All odours, according to Aristotle, are perceived through a moist medium.

The involvement of moisture here should not be surprising, given the conclusions reached in the previous section. One striking feature of Aristotle’s theory of perception is that, for each of the three distance senses, the feature that allows the sense-organ to function as an organ of perception also allows the perceptual medium to function as such. For example, in the case of sight both the medium and the organ must be transparent, while in the case of hearing both medium and organ must involve air (or, presumably, water)⁴¹ that is capable of being moved as a mass.⁴² I take it that this point would be accepted by all major parties to the debate.⁴³ It now appears that the same holds true of smell: both the organ and the medium of smell must be moist if odour is to be perceived.⁴⁴

⁴⁰ εἰ οὖν τις θεῖη καὶ τὸν ἀέρα καὶ τὸ ὕδωρ ἄμφω ὑγρά, εἴη ἂν ἡ ἐν ὑγρῷ τοῦ ἐγγύμου ξηροῦ φύσις ὀσμῆ, καὶ ὀσφραντὸν τὸ τοιοῦτον. Although the claim that air and water are both moist is expressed here as the antecedent of a conditional, Aristotle clearly means to accept it, as is confirmed by his subsequent remarks at *De sensu* 443^b3–8. The view that both air and water are moist fits with Aristotle’s general theory of the elements, according to which air is by nature hot and moist, while water is by nature cold and moist. Aristotle notes that air is by nature moist, and attributes its ability to serve as a medium of smell to its moistness, at *De sensu* 443^b5–6.

⁴¹ Although Aristotle focuses almost exclusively on hearing through air in *DA* 2. 8, he does claim that we hear through water too, albeit less well (*DA* 419^b18).

⁴² On Aristotle’s account, the air that serves as a medium for the perception of sound must be struck a sudden blow as the result of the impact of two solid objects, in such a way that it does not have the opportunity to disperse (*DA* 419^b19–25).

⁴³ It is certainly accepted by Burnyeat, who writes: ‘precisely as in the case of perceiving colour, the mediate effect [of sound] on the organ is the same as the immediate effect on the medium’ (‘How Much Happens?’, 429). It is also apparently accepted by Everson, a prominent literalist, who remarks that ‘the water of the *kovē* [eye jelly] will be affected just as any transparent object is’ (*Aristotle on Perception*, 229). It is perhaps worth observing here that Aristotle’s requirement that there be symmetry of effects in medium and sense-organ raises serious problems for literalism. The literalist is committed to holding that in the case of vision (for example) the sense-organ becomes coloured in a way that a third party could observe. If she also accepts the symmetry of effects in organ and medium, she seems to be committed to saddling Aristotle with the implausible view that the intervening medium also becomes coloured in a way a third party could observe. To put the point another way: if the *medium* of sight does not literally become coloured—as it manifestly does not—then the symmetry of effects in organ and medium gives us good reason to doubt whether the *organ* of sight literally becomes coloured, on Aristotle’s view, as any literalist must maintain.

⁴⁴ This idea, that the medium and organ of smell must have the same key feature,

What remains to be determined is precisely *why* the medium of smell must be moist if an odour is to be perceived through it. The organ of smell, I have argued, is moist because it must be capable of becoming dry, at least to some extent. Is the same true of the medium? Is the moist medium dried, and therefore changed in an ordinary way, when it is acted on by an odorous object?

In order to answer this question, it will be useful to begin by considering, by way of comparison and contrast, the standard spiritualist account of perceptual mediation. This account has received its most powerful and sustained exposition in Myles Burnyeat's influential discussion of Aristotle's views on the senses of sight and hearing.⁴⁵ In this article Burnyeat asks how much happens, according to Aristotle, when a perceiver sees a colour or hears a musical tone. His answer is that according to Aristotle no ordinary alteration occurs in the medium of perception in such cases; at most, the medium undergoes what he calls a 'quasi-alteration'. In the case of sight, this means that nothing happens to the transparent medium when someone perceives a colour, save that the colour appears to the perceiver through it. In order to illustrate what he has in mind, Burnyeat asks the reader to imagine looking at a red object through a glass full of water. Colour is 'in' the medium, he argues, in just the same way that redness is 'in' the water: not in the way it would be in the water if, say, red dye were added to it, but only in the highly qualified sense that the red object appears to the perceiver *through* the water.⁴⁶ Nothing happens *to* the medium when this occurs, save that the sense-object appears to the perceiver through it.⁴⁷

Could a spiritualist account of perceptual mediation along these general lines accommodate Aristotle's views on the sense of smell? Unfortunately, Burnyeat does not consider this question about smell, the third of the three mediated distance senses, in his 1995 article, or indeed in any of his published writings. However, the challenge of applying a spiritualist account of perceptual mediation to the sense of smell has been taken up by Thomas Johansen, in his 1998 book *Aristotle on the Sense Organs*. Essentially, Johansen accepts Burnyeat's account of perceptual mediation for the sense

is supported by Aristotle's remarks at *GA* 744^a1–5, where he claims that the organ of smell involves passages (*πόροι*) connecting with the external air and themselves full of *πνεῦμα* (this *πνεῦμα* will be moist, just like the external air).

⁴⁵ Burnyeat, 'How Much Happens?'

⁴⁶ *Ibid.* 425.

⁴⁷ *Ibid.* 426.

of sight, albeit with minor modifications,⁴⁸ then seeks to extend this account to cover the sense of smell.⁴⁹ On the resulting view, the medium of smell undergoes no ordinary change. Odour is *in* the medium only in the highly qualified sense that it appears to a perceiver *through* the medium; nothing happens to the medium of smell when a perceiver encounters an odour under suitable conditions, save that the odour appears to the perceiver through it.

However, the spiritualist account of perceptual mediation faces serious problems accounting for what Aristotle actually says about the specific case of smell. To begin with, the analogy between sight and smell, upon which Johansen relies, is somewhat stretched. To see this, we might observe, for example, that in the case of smell there is no equivalent to light (*phaos*) and the role it plays in the case of sight. Light, Aristotle tells us in *De anima* 2. 7, is 'the actuality of the transparent *qua* transparent' (418^b9–10; cf. 419^a11).⁵⁰ However, in the case of smell there is no additional factor that must be in place if perception is to occur, no activation of the salient feature of the perceptual medium, and hence no need for any equivalent to a light source. In view of such differences, the spiritualist is not entitled simply to carry over his analysis of perceptual mediation in the case of sight and to apply it to smell, without finding some textual basis for this interpretation in the discussion of smell itself and providing at least some explanation of how the analogy between the two cases is supposed to hold.

The spiritualist account of perceptual mediation also faces a general difficulty, one that becomes especially acute in the specific

⁴⁸ One apparent difference between the views of Johansen and Burnyeat is that on Johansen's interpretation a sense-object cannot act on a medium in *any* way in the absence of an actual perceiver. Thus, Johansen writes that 'the transparent is changed only when the colour appears all the way through it, and here appearing implies appearing to a perceiver. It is only insofar as the colour appears to a perceiver that it appears through the medium at all. So the transparent could not be changed by the colour unless there was a perceiver at the other end of it to whom the colour appeared through the transparent' (*Sense Organs*, 135). This maintains the consistency of spiritualism, but only by saddling Aristotle with the view that a tolling bell or slice of ripe cheese has *no* effect on the surrounding air in the absence of an actual perceiver. Needless to say, on this view the medium can only ever be said to be 'changed' (or 'moved', *κινείται*) in an *extremely* attenuated sense. Burnyeat, by contrast, endorses the model of a wave for understanding Aristotle's views on the effects of sounds on the medium, implying that the medium undergoes changes even in the absence of an actual perceiver ('How Much Happens?', 429–31). On this point see also n. 53 below.

⁴⁹ Johansen, *Sense Organs*, 238–42.

⁵⁰ *φῶς δὲ ἐστὶν ἡ τούτου ἐνέργεια, τοῦ διαφανοῦς ἢ διαφανέος.*

case of smell. On the standard spiritualist view, a sense-object has no effect on the perceptual medium besides appearing to the perceiver through the medium. When applied to the sense of smell, this implies that an odorous object (say, a piece of ripe brie) has no ordinary effect on the air that surrounds it, at least not *qua* odorous, and no effect whatsoever in the absence of an actual perceiver. However, this view is plainly contradicted by evident empirical facts of a kind of which Aristotle was surely aware. Indeed, in *DA* 2. 12 Aristotle seems to accept that an odorous object (*qua* odorous) is capable of affecting the air that surrounds it in such a way that the air itself can be smelt, and thus that it has some ordinary effect on it even in the absence of an actual perceiver.⁵¹ Further evidence against the spiritualist interpretation on the point can be adduced from Aristotle's view that odours, like sounds, affect the intervening medium progressively, beginning with the portion of the medium closest to the object and arriving at the air adjacent to the organ of the perceiver only after a delay.⁵² It is simply not plausible, I maintain, to

⁵¹ At *DA* 2. 12, 424^b14–18. This passage takes the form of a list of unanswered questions, making it difficult to discern exactly what Aristotle commits himself to; yet these questions *depend* on the assumption that air can be affected in such a way as to become odorous. Sarah Broadie, who interprets Aristotle's theory of perception along spiritualist lines, considers this passage in some detail ('Perceptual Realism', 152–3). Broadie acknowledges that Aristotle accepts here that air can become odorous as a result of being acted on by odour. Nevertheless, she argues that this passage is consistent with spiritualism, since the only thing Aristotle says is that the air becomes *perceptible* in a certain way, and air might become perceptible (she argues) without acquiring any powers other than the power to be perceived, and hence without undergoing any ordinary change (153). However, presumably the power to be perceived is based on *some* feature the affected air now possesses, which distinguishes it from air not so affected. Broadie's view requires that for Aristotle two portions of air can differ in *no* way, save that one can be perceived and the other cannot. On this interpretation, consistency with spiritualism is preserved only at a high cost: we must conclude that for Aristotle perceptibility floats free, as it were, fundamentally disconnected from other features of the world. Besides being strange and unappealing in its own right, there are good reasons to think that Aristotle did not hold this view. For one thing, he apparently regarded sensible qualities such as odorousness as systematically correlated with—and presumably in some way dependent upon—other features of perceptible objects such as the proportions of moisture and dryness they contain. For example, at *De sensu* 5, 443^a15–21, Aristotle explains the relative odorousness of various kinds of metal and wood in terms of the amount of moisture contained in each. I revisit this point about a correlation between odorousness and moisture or dryness in the concluding section of this paper.

⁵² In *De sensu* 6 Aristotle wonders whether the objects of sense-perception, or at least the movements proceeding from them, always arrive first at a middle point, 'as odour and sound seem to do' (446^a23). He observes that 'he who is nearer perceives the odour sooner, and the sound of a stroke reaches us some time after it has been struck' (446^a24–5). He concludes that this is true of odours and sounds, but not of

think that such a temporally extended process should fail even to get underway in the absence of an actual perceiver, or that nothing happens *to* the medium as it progresses, as the spiritualist must maintain.⁵³

Finally, the spiritualist account of perceptual mediation fails to explain *why* the medium of smell must be moist, according to Aristotle. To be sure, the spiritualist can trace the shared ability of both air and water to act as media for the perception of odour to their possession of a common power, the power to wash and rinse flavoured dryness. One might even give the shared feature a name, as Johansen does when he coins the term ‘transodorance’ (in direct parallel with Aristotle’s own use of the term ‘transparency’ in the case of sight).⁵⁴ Nevertheless, in the absence of any independent grasp of what ‘transodorance’ is, the term serves as a mere placeholder for whatever feature allows both air and water to be

colours, which affect the whole of the intervening medium simultaneously: thus ‘the parts of media between a sensory organ and its object are not affected all at once, except in the case of light’ (447^a8–10).

⁵³ Burnyeat (‘How Much Happens?’, 429) anticipates this objection in the case of sounds. He attempts to respond to it by denying that sounds, for Aristotle, involve air travelling from the point of impact to the ear of the perceiver, in the manner of a wind. Rather, he claims, they affect each stationary part of the intervening air sequentially, like the water in a pond gradually freezing over, or like the motion of a wave. This is surely right as far as it goes—Aristotle clearly wished to reject the view that sounds (or odours) involve air *travelling* from the sense-object to the organ of the perceiver. However, it does not follow from the fact that air does not travel like a wind that it does not move at all, as Burnyeat concludes (*ibid.* 430), since it could vibrate in place. Vibration and freezing are not ‘quasi-alterations’ of the kind the spiritualist can admit, any more than drying is. Burnyeat uses the model of a wave to argue *against* the view that the perceptual medium undergoes any ordinary alteration when it is acted on by a sound. Specifically, he argues that there is no locomotion in the case of a wave, on the basis that locomotion for Aristotle requires a change of place and everything is back where it began after a wave has passed through (‘Aristotelian physics does not recognize the movement of a wave or vibration as movement properly so called’, 430). Yet moving quickly from A to B and then back to A surely *involves* ordinary locomotion, on Aristotle’s account (picture the movement in a length of rope after it has been flicked). If the spiritualist is willing to concede that air undergoes an ordinary change in the manner of a wave when it is acting as a medium for sound, say by vibrating in place and transmitting that movement to the adjacent portions of air, then he or she has already conceded the main point at issue. To anticipate somewhat: my own view, developed below, is that for Aristotle odours affect the medium by means of just such a successive qualitative change, as each portion of the intervening air dries those adjacent to it.

⁵⁴ The word ‘transodorant’ (δίοσμος) is never used by Aristotle. However, Johansen (*Sense Organs*, 242 n. 24) cites with approval its use by Alexander (*In De sensu* 185. 9 Wendland) and by Theophrastus, as reported by Themistius.

smelt through. I have claimed that the common feature in question is moisture; on my view, a medium is 'transodorant' (*diosmos*) just in case it is moist. Since spiritualists cannot admit any ordinary interaction between an odorous object and the medium of smell, they are unable to say anything informative about *how* an odorous object sets a moist medium in motion or *why* the medium of smell must be moist if an odour is to be perceived through it (or, for that matter, about why Aristotle chooses to use the language of 'washing' or 'rinsing' to characterize this process). As a result, any spiritualist will be forced to leave the nature and operation of the medium's transodorance utterly mysterious and unexplained.

So what *does* happen to the medium of smell when it is acted on by an odorous object, on Aristotle's account? The most straightforward answer, and it seems to me the correct one, is that an odorous object acts on the medium of smell by drying it, presumably in some determinate way. This explains why the medium of smell must be moist. It also explains why odour, which is 'of' the dry, is the appropriate kind of thing to interact with the medium of smell (since for Aristotle it belongs to the nature of dry things to act on moist things by drying them, at least in the presence of heat). Interestingly, this answer also helps make sense of Aristotle's otherwise puzzling claim that coldness negates the effect of odours (since, on Aristotle's view, heat is required for the dry to act on the moist).⁵⁵ In addition, it allows us to regard the washing or rinsing of the flavoured dryness by the medium of smell as involving an ordinary interaction between moist and dry, surely the most natural way of understanding these phrases. It avoids the unattractive view that an odorous object has no ordinary effect on the surrounding medium, allowing room to explain the fact, accepted by Aristotle, that the air around an odorous object can itself become odorous.⁵⁶ It also

⁵⁵ In *De sensu* 5, 444^a8 ff., Aristotle explains that odour has beneficial effects on humans, since odour, as a power, is naturally heat-giving, and helps to warm the cold area around the brain (this area is also said at *De sensu* 444^b1-2 to benefit from the effect of odours, because it is excessively moist). In this connection, it should be remembered that for Aristotle the dry can only act on the wet in the presence of heat (since the dry and the wet are passive in and of themselves, as Aristotle stresses throughout *Meteor.* 4). This suggests that the medium and organ are warmed slightly as they are dried, a suggestion confirmed by Aristotle's claim that odours are negated when the air is cold (*De sensu* 443^b14-16), presumably because the dry cannot act on the moist in the absence of heat, and the slight warming effect of odours is overwhelmed and negated by the cold.

⁵⁶ I suggest that Aristotle's view be understood as follows: the odorousness of a

explains Aristotle's claim that an odour, like a sound, affects each portion of the medium successively. And finally, it matches the drying of the organ of smell, thus maintaining the parallel between effects in the medium and effects in the organ that Aristotle adheres to in his descriptions of sight and hearing. My proposal, then, is that on Aristotle's account the medium of smell becomes dry, to some extent and presumably in some determinate way, when it is acted on by an odorous object.

If this is correct, Aristotle's views on the mediation of odour are incompatible with spiritualism. For Aristotle, the moist medium of smell is dried when it is acted on by an odour. This drying of the medium is an ordinary, destructive alteration, just like the drying of the organ of smell discussed above. Once again, it will not do for the spiritualist to fall back on the view that any ordinary alterations that occur are merely accidental to the perception of odour as such; all of the arguments advanced above will apply again, and still more strongly. Indeed, if both medium and organ of smell must be moist for perception by smell to occur, and if both undergo an ordinary, destructive alteration of a kind that reflects Aristotle's stated views on the fundamental nature of odour, the idea that the changes involved have 'nothing to do with' the perception of odour collapses completely.

IV

To this point, I have argued that for Aristotle both the organ and the medium of smell are moist, and that both are dried when acted on by an odorous object. If this is right, and if these changes cannot plausibly be dismissed as having nothing to do with perception, then spiritualism does not provide a satisfactory account of Aristotle's theory of smell. However, this conclusion should provide no special comfort for the literalist, since the changes in question are not

flavoured dry object is correlated with, and in some sense depends on, its ability to dry the medium of smell. The air or water so affected takes on, at least temporarily, the power to dry further portions of air or water—and ultimately the sense-organ of a perceiver—in the same way. Note that this view avoids the symmetry problem for the literalist mentioned above (n. 43). The challenge for the literalist was to explain why we should think that for Aristotle the transparent eye jelly literally becomes coloured when the transparent medium manifestly does not. But there is no equivalent problem in supposing that the medium and organ of smell both become dry, to some extent and in some determinate way, when acted on by an odorous object.

the ones literalism would lead us to expect. If literalism were correct, we should expect Aristotle to maintain that the organ of smell becomes odorous—sweet- or bitter-smelling, for example—and not that it becomes dry. After all, as noted above, dryness is not among the qualities differentiated by the sense of smell. Admittedly, nothing I have said rules out the possibility that the organ (and medium) of smell might become odorous *in addition to* becoming dry. Thus, Aristotle's claims about the sense-organ and medium of smell becoming dry do not rule out literalism in the clear-cut way that they rule out spiritualism. Nevertheless, interactions between the wet and the dry play a central role in the operation of the sense of smell on Aristotle's account, as I am arguing it should be understood. Literalism simply has nothing to say to explain these changes, or the role they play in perception for Aristotle.

At this juncture, a literalist might object that her view retains a significant advantage, in that it provides a simple and straightforward way of understanding Aristotle's claims about perceptual assimilation. For Aristotle, as is well known, sense-perception is a form of receptivity to certain features of the world, in which the perceiver becomes in some way *like* the object perceived (e.g. *DA* 2. 5, 418^a3–6). The literalist's way of understanding this idea is, as I say, straightforward: the perceiver's sense-organ takes on, in a literal way, the sensible quality that the sense-object already possesses. Mindful of this advantage,⁵⁷ the literalist might present me with a challenge. Certainly, she might say, you have raised problems for my view. But what do *you* have to say about perceptual assimilation? You have argued that perceiving odour necessarily involves a kind of ordinary, material alteration that my theory does not predict or explain. But what do these changes have to do with perception

⁵⁷ To be clear, in my view the literalist is actually poorly placed to provide a plausible account of the kind of change involved in 'becoming like' the sense-object, described in passages such as *DA* 2. 5, 418^a3–6. As noted above, Aristotle understood this change as an extraordinary, non-destructive alteration, involving only the activation of a capacity one already possesses. The literalist, by contrast, is committed to understanding the assimilation in question as a perfectly ordinary, destructive alteration. Thus, I agree with those interpreters, such as Lear, *Desire to Understand*, Burnyeat, 'DA II 5', and Lorenz, 'Assimilation', who argue that Aristotle's claims in *DA* 2. 5 effectively rule out literalism. Thus, while the straightforwardness of the literalist's account may be an advantage, literalism has other, serious problems as an account of Aristotle's views about perceptual assimilation. In my view, the proper subject of the change described in *DA* 2. 5 is the sense or sense-faculty, the power to perceive that resides *in* the sense-organ (on this see the final section of this paper below).

as such? The challenge is a reasonable one. What *does* dryness have to do with odour, on Aristotle's account, and what does the drying of the organ of smell have to do with our perception of it? In the remainder of this paper, I provide my answers to these questions. I begin with Aristotle's views on the nature of odour, its mode of operation, and the differences between it and flavour (*chumos*), as this is perceived by the closely related sense of taste.

V

Aristotle's most detailed discussion of the nature of odour occurs in *De sensu* 5.⁵⁸ This discussion is explicitly and closely connected to his treatment of flavour and taste in the immediately preceding chapter, *De sensu* 4. The reason for this close connection, as soon becomes clear, is that the proper objects of both taste and smell arise as a result of the action of the 'flavoured dry' (*to enchumon xēron*) on the moist. In order to understand Aristotle's theory of odour, it is therefore necessary to begin with his theory of flavour (*chumos*). The quality we call flavour, Aristotle claims in *De sensu* 4, arises as the result of the action of a certain subclass of dry, earthy substances on water in the presence of heat. Water itself is flavourless, so the question arises of how water becomes flavoured (*De sensu* 441^a3–4). Having rejected the Empedoclean view that all water already contains within itself tiny imperceptible traces of every possible flavour (441^a10–17), and also a second view that water is a kind of matter from which various flavours can be generated (441^a18–20), Aristotle concludes that water becomes flavoured as a result of its being acted on in some way (441^a20–1). He rejects the idea that water is affected by the application of heat alone, even though heat does play the role of a 'co-cause' (*sunaition*) (441^a21–9).⁵⁹ Rather, he argues, water acquires flavour by nature in much the same way as it can be seen

⁵⁸ In what follows I concentrate (as Aristotle mostly does) on odours that are related to the flavours associated with taste. Aristotle thinks that there is a second class of odours with no connection to flavours, such as the fragrance of flowers (*De sensu* 443^b19). These odours, which are experienced by humans alone (on account of the relatively large size and moistness of the human brain, which is warmed and stimulated by them (*De sensu* 444^a29–^b6)), are pleasant in their own right; their pleasantness does not depend on a desire for food.

⁵⁹ Cf. *Meteor.* 4. 6, 383^a12, where Aristotle claims that water alone among liquids does not thicken when heated or cooled, because it alone does not contain dry, earthy matter.

to change when people ‘wash’ colours or flavours in it (441^b15–17): when water moves through certain dry and earthy substances by the agency of heat it acquires a certain quality (*poion ti*, 441^b18).⁶⁰ Indeed, this is what we should expect to happen, Aristotle maintains: everything is acted upon by its opposite; the opposite of the wet is the dry; and while fire and earth are both dry (hence fire too can act on water), dryness is most characteristic of earth (441^b8–12). Flavour, he concludes, is an affection (*pathos*, 441^b20), brought about in water by the flavoured earthy dry, which is capable of transforming the sense from potentiality to actuality (441^b19–21).⁶¹

Having completed his discussion of flavour, Aristotle turns at the beginning of *De sensu* 5 to consider odour. However, throughout this discussion he draws heavily on the conclusions he had reached in the preceding chapter. This procedure reflects Aristotle’s earlier claim, at the very beginning of *De sensu* 4, that odour and flavour are ‘pretty much the same affection’ (*σχεδὸν γάρ ἐστι τὸ αὐτὸ πάθος*, 440^b29). Thus the property of odorousness, Aristotle claims in *De sensu* 5, is based on flavour, as evidenced by the fact that flavourless things are also odourless (*De sensu* 443^a8–21), and by the striking analogies in the ways in which flavours and odours are named (*De sensu* 443^b8–12; *DA* 421^a26–b2). Indeed, at the very beginning of *De sensu* 5 we are instructed to think of odours in the same way as flavours, inasmuch as what the dry effects in the moist, the flavoured moist (*to enchumon hugron*) effects in a different kind (*ἐν ἄλλῳ γένει*)⁶² in air and water alike (*De sensu* 442^b27–9).⁶³ This similarity

⁶⁰ In his discussion of the sense of taste, Johansen helpfully likens the way that flavour comes to be in water (a precondition for it becoming tasteable) to the way that hot water squeezed through coffee grounds takes on the flavour of coffee. This concrete image helps us to understand how flavours that originate in the soil come to be present in water, and then subsequently in plants (Johansen, *Sense Organs*, 238).

⁶¹ καὶ ἐστι τοῦτο χυμός, τὸ γιγνόμενον ὑπὸ τοῦ εἰρημένου ξηροῦ πάθος ἐν τῷ ὑγρῷ, τῆς γεύσεως τῆς κατὰ δύναμιν ἀλλοιωτικὸν εἰς ἐνέργειαν.

⁶² Aristotle means, presumably, in a different province of sense. The proviso here is important since it allows that while the affection in question may be the same in both cases, odour and flavour are not strictly identical, since the moist may be affected in different ways by each (to anticipate somewhat: by blending with the flavoured dry in the case of flavour, and by being dried by it in the case of odour).

⁶³ ὅπερ γὰρ ποιεῖ ἐν τῷ ὑγρῷ τὸ ξηρόν, τοῦτο ποιεῖ ἐν ἄλλῳ γένει τὸ ἐγχυμον ὑγρόν, ἐν ἀέρι καὶ ὕδατι ὁμοίως. In his commentary on this passage, Ross argues that it shows that for Aristotle odour must always arise from full-fledged flavour, so that the ‘flavoured dry’ must always first blend with moisture to form the ‘flavoured moist’ before it can be smelt (Ross, *De anima*, 213). Against this, Johansen has argued that we should simply omit the phrase τὸ ἐγχυμον ὑγρόν at line 442^b29, following the authority of the single manuscript L (Johansen, *Sense Organs*, 237), to make this passage

is emphasized again at 443^b12–14, where we learn that odour is in both air and water what flavour is in water alone.⁶⁴ After stressing the idea that odour is perceived through both air and water, and in the light of the fact that both air and water are moist, Aristotle eventually defines odour as ‘the nature of the flavoured dry in the moist’ (*De sensu* 443^a7).⁶⁵

These striking similarities and connections between flavour and odour threaten to create a serious difficulty for Aristotle’s theory of smell. This is because if both odour and flavour result from the action of the flavoured dry on the moist, it quickly becomes unclear what the ultimate difference between odour and flavour is supposed to be. Two of the more obvious responses to this problem can be rejected as unhelpful. First, it will not do to distinguish smell from taste by reference to the sense-organs involved in the perception of each, say by claiming that odour is perceived by humans through the nose and flavour through the tongue. This is not helpful because, on Aristotle’s view, the distinction between different senses must be drawn in terms of the proper objects of each; thus the organ of smell just is whatever part of its body an organism uses to perceive odour.⁶⁶ Nor will it do simply to point out that for Aristotle

agree with Aristotle’s remarks elsewhere (e.g. at 443^a1–2 and at 443^a7) that ‘the flavoured dry’ (not ‘the flavoured moist’) is the agent that produces odour. My own view is that Johansen is right to resist Ross’s conclusion that odour arises *only* as an after-effect of full-fledged flavour, but wrong to think that we need to excise part of the best-attested text to achieve this result; for it could perfectly well be that *both* the unblended flavoured dry *and* the flavoured moist (consisting of a blend of the flavoured dry in the moist) are capable of affecting a moist medium in the manner of an odour, since the flavoured dry could retain some of its original powers even when it is part of a mixture.

⁶⁴ δῆλον ἄρα ὅτι ὅπερ ἐν τῷ ὕδατι ὁ χυμός, τοῦτ’ ἐν τῷ ἀέρι καὶ ὕδατι ἡ ὄσμη.

⁶⁵ ἡ ἐν ὑγρῷ τοῦ ἐγγύμου ξηροῦ φύσις ὄσμη. Cf. *De sensu* 5, 445^a14–15, where Aristotle remarks that the object of smell has been well described by likening it to a dipping (βαφή) or washing (πλύσις) of the dry in the moist.

⁶⁶ At *DA* 421^b21–3. In fact, on Aristotle’s view, the precise location of the organ will vary considerably between different kinds of animal. In humans, it seems, the organ of smell is in the head, since odour enters the head when we inhale (*De sensu* 445^a25). Aristotle sometimes identifies the organ in humans as the *μυκτῆρες* (*HA* 1. 15, 494^b12—presumably here ‘the nostrils’), although elsewhere it becomes clear that strictly speaking the organ in humans must be located somewhere *inside* the nose. However, this is by no means common to all creatures. In some cases the differences from humans are slight: birds, for example, lack *μυκτῆρες* but perceive odour through *πόροι* in their beaks (*PA* 2. 16, 659^b13–14). The differences are more striking in those animals that do not breathe: thus, for example, we learn at *PA* 2. 16, 659^b16–17, that insects smell through the middle part of their bodies. However, Aristotle also claims that in the cases of insects (and fish) the sense-organ of smell can be difficult

smell is a distance sense, while taste is a contact sense. While this is correct, it will help only if we already have a clear grasp of the difference between the distance and contact senses for Aristotle. In fact, this is not as straightforward as one might think. One way of seeing the problem is to ask what the difference is between smell and taste for a water animal: water seems to extend all the way to the relevant sense-organ in both cases, but is said to act as a medium only in the case of smell.⁶⁷ Thus, in order to make sense of Aristotle's distinction between odour and flavour, and hence to obtain a clear sense of his views on the nature of odour, we need some principled way of distinguishing between what happens to water when it serves as a *medium* for perception of odour, and what happens to it when it is involved in perception by taste.

The answer to this problem, I suggest, is that on Aristotle's account taste, unlike smell, involves a *mixture* of the flavoured dry in the moist.⁶⁸ This is more or less explicit in *DA* 2. 10, where Aristotle asserts that if we lived in water, we would perceive by taste a sweet object added to the water *not* through a medium, but due to its mixture with the water, as in a drink (422^a 11–14).⁶⁹ This solution to the problem also fits with Aristotle's view that food must be composite (*De sensu* 445^a 18–19), which he uses to explain why unmixed water does not suffice for food (*De sensu* 445^a 20–1).⁷⁰ More importantly, it accommodates Aristotle's view that taste is a contact sense, while smell is a distance sense. To see this, it is helpful to picture a flavourful dry substance such as salt dissolving in water. In such cases, the salt mixes with the water so that the water becomes salty, a process Aristotle apparently took to involve a thorough blending

to discern (*De sensu* 444^b 15; cf. *HA* 2. 13, 505^a 33–5). He does not seem overly concerned by this fact: what matters to him, it seems, is establishing *that* such animals are able to perceive odour; determining the precise location of the organ in each individual case was apparently of less interest.

⁶⁷ This problem is well observed by Johansen, *Sense Organs*, 233.

⁶⁸ On this point I am in agreement with Johansen, *Sense Organs*, and in his earlier 'Aristotle on the Sense of Smell', *Phronesis*, 41 (1996), 1–19.

⁶⁹ διὸ κἂν εἰ ἐν ὕδατι ἦμεν, ἡσθανόμεθ' ἂν ἐμβληθέντος τοῦ γλυκέος, οὐκ ἦν δ' ἂν ἡ αἴσθησις ἡμῶν διὰ τοῦ μεταξὺ, ἀλλὰ τῷ μίχθῆναι τῷ ὑγρῷ, καθάπερ ἐπὶ τοῦ ποτοῦ.

⁷⁰ It also explains why odours do not provide nourishment. Aristotle explains these facts about nourishment by claiming that animals are nourished only by a *mixture* of the wet and the flavoured (specifically the sweet) earthy dry: 'Neither the dry without the moist nor the moist without the dry is nourishment; for nourishment for animals is not one thing alone, but rather what has been mixed [τὸ μείγμενον]' (*De sensu* 441^b 25–7).

of the salt with the water.⁷¹ When a perceiver tastes salty water, this salty blended mixture, which has properties of both salt and water, comes into direct contact with the tongue. Because it requires contact in this way, taste is to be understood as a contact sense, a species of touch. In fact, on Aristotle's view, flavour can *only* be tasted in moisture: a flavourful dry substance placed on the tongue can be tasted only because it is the nature of the tongue to moisten, thus dissolving the dry substance in liquid.⁷² This idea is reflected in a certain ambiguity in Aristotle's terminology; for although he often refers to flavour (*chumos*) as the proper object of taste, flavour proper resides in flavoured earthy dry substances, while 'the tasteable' (*to geuston*)⁷³ is a *blend* of the flavoured earthy dry with liquid; it is the 'enflavoured moist',⁷⁴ as Aristotle sometimes puts it, a compound substance that is capable of nourishing an organism.⁷⁵

Taste, then, involves a mixture of the flavoured dry in the moist. In the case of distance senses such as smell, by contrast, the sense-object does not travel right up to the sense-organ, but rather operates at a distance through a medium.⁷⁶ There is, in other words, no movement of particles from the sense-object to the organs of the perceiver. In fact, we now know that Aristotle was wrong about

⁷¹ Aristotle's most detailed discussion of the nature of mixture and blending occurs in *GC* 1. 10. For discussion of this chapter, and of Aristotle's views about mixture in general, see D. Frede, 'On Generation and Corruption I. 10: On Mixture and Mixables', in F. De Haas and J. Mansfeld (eds.), *Aristotle: On Generation and Corruption Book I. Symposium Aristotelicum [On Generation and Corruption I]* (Oxford, 2004), 289–314, and J. Cooper, 'A Note on Aristotle on Mixture', *ibid.* 315–26.

⁷² On the moistening of the tongue see *DA* 422^a34–^b10.

⁷³ This shift in terminology, from *χυμός* to *τὸ γευστόν* in *DA* 2. 10, is well noted by Polansky, *Aristotle's De anima*, 313–14.

⁷⁴ The tasteable (*τὸ γευστόν*) is also said to be moist at *DA* 442^a34. Incidentally, this shows again why Johansen's suggested excision of *τὸ ἐγχυμον ὑγρόν* at line 442^b29 is unnecessary. See n. 63 above.

⁷⁵ Thus for Aristotle 'it is *qua* tasteable [*γευστόν*] that assimilated food nourishes' (*De sensu* 442^a1). He goes on to claim that 'all animals are nourished by the sweet' (*πάντα γὰρ τρέφεται τῷ γλυκεῖ*, *De sensu* 442^a2), a claim repeated at 442^a8. I am grateful to Michael Bennett for drawing my attention to these passages.

⁷⁶ As Aristotle eventually makes clear, the contact senses also operate through a medium, since the flesh serves as the medium for perception by touch, with the true organ of touch lying further within (*DA* 423^b17–26). This does not collapse the distinction between distance and contact senses, since odours, colours, and sounds act on a perceiver at a distance through an external medium, whereas the objects of taste and touch must come into direct contact with the perceiver's body. In addition, we do not perceive tangibles as a result of the separate agency of the medium (as in the case of the distance senses), but rather *together with* the medium, in much the same way as a warrior who is struck on his shield is affected together with the shield (*DA* 423^b12–17).

smell on this point: it *does* involve tiny particles travelling from the odorous object to the nose. Yet I think we can also sympathize with the motivation behind his view; for it certainly seems that the piece of ripe brie on the far side of the room acts on me so that I perceive *it* (not, say, something between me and it), and that I cannot similarly *taste* it at a distance. Aristotle wished to reject the view that perception involves effluences from the object striking the sense-organs.⁷⁷ At the same time, he wanted to maintain the intuitively appealing view that it really is possible to perceive things at a distance. He achieved this by introducing an intermediary, the medium; the sense-object first moves the medium, and the medium then moves the sense-organ.⁷⁸ Importantly, nothing needs to *travel* from one place to another for this to occur. If the operation of odour involved a mixture of the flavoured dry with the moist medium, the resulting blend would come into direct contact with the organ of smell, since the medium extends all the way to the organ. However, this cannot be what occurs in the case of smell, on Aristotle's view, since smell is a distance sense. Hence odour cannot be in the medium in the manner of a mixture.

So how *does* the flavoured dry thing I smell at a distance interact with the moist intervening medium of air or water, if not by mixing with it? The answer, I claim again, is that it does so by drying it, to some extent and presumably in some highly determinate way.⁷⁹ This drying need involve no locomotion; rather, I maintain, it is to be understood as a progressive, qualitative change in which each part of the intervening medium affects the next by drying it, much as heat passes down a stationary metal rod.⁸⁰ In this way, Aristotle

⁷⁷ Aristotle apparently believed that this view would have the undesirable consequence of reducing all five special senses to forms of touch (see e.g. *De sensu* 440^a15–20).

⁷⁸ At *DA* 2. 7, 419^a27–8. The point is initially made for the three distance senses and is extended to cover touch and taste in the immediately following discussion (since the flesh acts as a medium in these cases).

⁷⁹ Johansen simply neglects this possibility. His basic argument in favour of a spiritualist interpretation of Aristotle's views on perceptual mediation in the case of smell proceeds by elimination: either odour is in the medium as in a mixture, or else the spiritualist account of perceptual mediation must be correct; odour is not in the medium as in a mixture; therefore, the spiritualist account must be correct (Johansen, *Sense Organs*, 237–42, especially 241–2). This argument rests on a false dichotomy, since it ignores the very real third possibility that an odorous object might act on the moist medium by drying it, in the way I have described.

⁸⁰ Aristotle understood heating as a qualitative (as opposed to quantitative) change.

retains the idea that odour acts on a perceiver at a distance, and with it the distinction between contact and distance senses. He also preserves the contrast between his view and effluence theories: for no particular piece of air (or water) needs to *travel* across the space separating sense-object and perceiver in order for perception by smell to occur. This account has the advantages already mentioned: it accommodates the temporally extended, progressive nature of the changes wrought in the medium of smell by odour, and the possibility of the air becoming odorous. As noted, it also reflects the underlying chemistry of the situation, as Aristotle understood it: an odorous object is dry; the medium of smell is moist; and it is the nature of the dry to interact with the moist by drying it, at least in the presence of heat. As a result of being dried, the medium of smell acquires the power to act in the same way on the sense-organ. Thus, finally, the organ of smell becomes dry in the way the odorous object already is.

VI

On Aristotle's view, as I have argued it should be understood, both the organ and the medium of smell become dry when acted on by an odorous object. This is an ordinary, destructive change, not an extraordinary change of the kind the spiritualist admits; yet it is also not the change literalism would lead us to expect. As a result, neither literalism nor spiritualism offers us a satisfactory way of understanding Aristotle's theory of smell. Nevertheless, important questions remain about the alternative I am proposing. In particular, we still need a clearer account of the relationship between the drying of the organ of smell and the activation of our capacity to perceive odour, considered merely as such. I have argued that the drying of the organ of smell cannot be dismissed as having *nothing* to do with the perception of odour, as the spiritualist must maintain. Nevertheless, it cannot be *all* there is to the perception of odour, on Aristotle's account.⁸¹ The correct thing to say here, it seems to me, is that these ordinary changes in the organ and medium of smell

⁸¹ Why couldn't the ordinary, material changes in the sense-organs be *all* there is to perception, on Aristotle's account? For one thing, as is generally agreed, Aristotle was no reductive materialist. And even if he *had* wished to advocate a form of reductive materialism, the changes in question would presumably have been those claimed by the literalist, not changes of the kind identified here.

represent the *material aspect* of the perception of odour. If this is right, we still need a way of understanding Aristotle's views on the *formal aspect* of perception, and concerning its connection to the material changes I have identified.⁸²

In fact, Aristotle's treatment of the sense of smell suggests a plausible and interesting way of understanding his views on the formal aspect of perception—and its relation to the material aspect—more generally. To see this, we should first be clear about the relationship between odour and the earthy, flavoured, dry substances in which it resides. Aristotle does not *identify* odour with the flavoured dry. Rather, he prefers to speak of odours as 'deriving from' the flavoured dry, or as being 'of' the dry (using a genitive construction).⁸³ We might want to say, not that the flavoured dry *is* odour, but rather that it *has* odour.⁸⁴ To *have* odour, for Aristotle, is to have the power to act on a perceiver so as to activate his or her capacity to *perceive* odour.⁸⁵ Aristotle makes it clear that flavoured dry substances—whether on their own or after being blended with moisture—are

⁸² Richard Sorabji also insists that we need to specify a formal aspect of perception on Aristotle's view, in addition to the material aspect. Indeed, he criticizes Slakey, 'Aristotle on Sense Perception', for effectively reducing perception for Aristotle to its material aspect (Sorabji, 'Body and Soul', 53–6). However, Sorabji never really explains how he understands the formal aspect of perception for Aristotle. Indeed, it is not clear what the formal aspect of perception *could* consist in, on his account, or on the basis of what Aristotelian text he could explain it, since as a literalist he understands all of Aristotle's claims about the sense (*αἰσθητικόν, αἴσθησις*) becoming like the sense-object or receiving sensible form exclusively in terms of ordinary, material changes occurring in the sense-organs.

⁸³ As noted above, Aristotle defines odour, not as 'the flavoured dry', but rather as 'the nature [*φύσις*] of the flavoured dry in the moist' (*De sensu* 5, 443^a7). He goes on to write: 'it is clear that odour is an affection that derives from the flavoured' (*ὅτι δ' ἀπ' ἐγγύμου ἐστὶ τὸ πάθος, δῆλον, De sensu* 443^a8). Sea water, for example, 'has' odour because it has both flavour and dryness (443^a12–13). He also claims that odour is well likened to a kind of 'dipping' (*βαφή*) or 'washing' (*πλύσις*) of the dry in the moist and fluid (*De sensu* 445^a13–14). I suggest that the picture that emerges from these remarks is the following: odour is an affection wrought in the moist medium as a result of its interaction with the flavoured dry; and an object is odorous because, and in so far as, it contains flavoured dry material, which is by its nature capable of producing such effects in a moist medium. This also, finally, explains the sense in which odour is 'of' the dry (*DA* 422^a6).

⁸⁴ Clarity and consistency strike me as especially important here. Johansen's account loses both when he shifts, in the space of two pages, from speaking of odour as being dry, to claiming that odour is 'found in' air and water, to claiming that odour is 'perceived in' air and water, to claiming that water is a 'vehicle for' odour, to finally claiming that 'the flavoured dryness on its own *constitutes* odour' (*Sense Organs*, 236–7, emphasis added).

⁸⁵ Cf. *Meteor.* 4, 8, 385^a1–4, where Aristotle claims that in general a thing is white, fragrant, noisy, and so on in virtue of possessing a certain power (*δύναμις*).

what possess this power. At the same time, as I have argued, flavoured dry substances, being dry, have the power to act on the moist medium—and ultimately on the organ of smell—by drying it, to some extent and in some determinate way. My suggestion is simply that for Aristotle these two powers are connected. On this view, an odorous object (i.e. a flavoured dry substance) possesses *both* the power to dry a moist medium *and* the power to activate a perceiver's capacity to perceive odour. The object acts on a perceiver materially by drying the sense-organ, via the medium, in a manner corresponding to the way in which it is already dry. And it acts on the perceiver formally by activating his or her capacity to perceive odour—the power that resides *in* the sense-organ—considered merely as such.⁸⁶

On the interpretation I am proposing, Aristotle's account of smell was genuinely hylomorphic:⁸⁷ an odorous object affects the perceiver's sense-organ *both* by drying it (an ordinary, material change) *and* by activating the capacity to perceive odour that resides in it. The latter change, considered in its own right, is an extraordinary, non-destructive alteration of the kind described in *DA* 2. 5, consisting of the bare activation of a capacity one already possesses: the capacity to perceive odour, considered merely as such. This activation of the capacity to perceive is a non-destructive alteration, consisting of the reception of sensible form by the sense-faculty.⁸⁸ However, as

⁸⁶ On the relationship between the sense-organ (conceived as a spatially extended material structure) and the power to perceive that resides in the organ, see *DA* 2. 12, 424^a24–8. Hicks's comments on this passage in his commentary capture the point well, as I understand it: 'The organ and the faculty are one and the same, but we can separate the two in thought. If we look at the organ (*τὸ αἰσθανόμενον*) as a concrete thing and take account of its matter, it is an extended magnitude: if we abstract from the matter and attend only to the form it is a power or faculty residing in this extended magnitude, but itself unextended and immaterial' (R. D. Hicks, *Aristotle, De anima* (Cambridge, 1907), 417). The organ (regarded merely as a material structure) and the power residing in it are one in number, but different in being (*DA* 424^a25–6). My claim is that the same can be said of the material structure and power to stimulate perception in the *agent* of the change in question: the odorous, flavoured dry object of smell.

⁸⁷ I am well aware that spiritualists and literalists claim that their accounts are 'hylomorphic' too. However, according to the spiritualist the *only* thing that happens when a perceiver encounters an odorous object under suitable conditions is a purely formal change (the material aspect of perception is exhausted by 'standing conditions'), while the literalist understands *all* of the changes Aristotle actually describes in *De anima* in purely material terms, leaving no room for a distinctly specifiable formal aspect to perception.

⁸⁸ In defence of the idea that the sense or sense-faculty can itself serve as the proper subject of such an extraordinary alteration, see Lorenz, 'Assimilation'.

I have argued, for Aristotle there is *also* an essential material component to the perception of odour, consisting of the drying of the organ and medium of smell. This is part of what we need to know about if we wish to understand perception by smell; hence the attention Aristotle gives to explaining the nature of odour, especially its connection to flavour and dryness and its interaction with the moist medium of smell. The true student of nature who wishes to provide a complete explanatory account of perception by smell will need to understand *both* the extraordinary alteration involved in activating the capacity to perceive odour, considered merely as such, *and* the ordinary, material changes wrought in the medium and organ of smell by flavoured dry substances.

A hylomorphic account of this general kind has a number of significant advantages over both literalism and spiritualism, some of which I note below. Nevertheless, any such interpretation must face the challenge of explaining how the material and formal aspects of perception are related to each other, on Aristotle's view. The danger is that the ordinary change occurring in the sense-organ and the extraordinary change that is the activation of the capacity to perceive, considered merely as such, become too distinct, as if they merely happened to occur simultaneously. Indeed, a critic might object that a material change in the sense-organ and the formal change that is the activation of one's capacity to perceive could not possibly 'hook up' in the appropriate way.⁸⁹ Even if we set aside this worry,

⁸⁹ e.g. Everson, *Aristotle on Perception*, 254–6; Burnyeat, 'DA II 5', 82 n. 143. Both Burnyeat and Everson note that any strict identity view will face the difficulty of explaining how a *κίνησις* can be identical to an *ἐνέργεια*, for Aristotle. I do not think this is really an issue here. According to Aristotle's stated view in *Metaphysics* Θ 6, a distinguishing mark of an *ἐνέργεια* is that it is always true to say that one has ϕ -ed, even while one is still ϕ -ing: *ἐνέργεια* are in this sense complete at every moment, in contrast to *κινήσεις*. However, we are surely not to imagine that the sense-organ becomes progressively drier at every moment an odour is being perceived (in the manner of an 'incomplete' *κίνησις*). Rather, on the view as I envisage it, the sense-organ temporarily takes on a determinate form of dryness—a change that could happen almost instantaneously—and remains in this condition for as long as the odour is being perceived, before subsequently returning to its original state. Furthermore, the view I am proposing is less radical than such criticisms typically presuppose. It does not require, for example, that Aristotle understood the material and formal changes involved in perception as related to each other in precisely the way that matter and form are related in objects. Rather, the important point is this: both ordinary, destructive changes (the drying of the sense-organ and medium of smell) and extraordinary, non-destructive ones (the activation of the capacity to perceive, considered merely as such) are centrally and essentially involved in the perception of odour, so that descriptions of both will form part of a complete explanatory account of the

we might still wonder *why* the drying of the organ and medium is necessary to perception by smell, on Aristotle's account. After all, what does drying have to do with perceiving odour? Fortunately, Aristotle's discussion of the sense of smell suggests an interesting and attractive way of answering this question. I conclude this paper by sketching this response.

My suggestion, stated simply, is that when the perceiver's sense-organ takes on the same determinate form of dryness that the odorous object possesses, the perceiver receives *information* about that object, information that is essential to the perception of its odour. This explains how the material changes highlighted in this paper hook up, as it were, with the formal change that is the activation of the capacity to perceive odour, considered merely as such. It also explains why underlying material changes are essential to perception; for on this view, information is transmitted from object to perceiver *by means of* these underlying material changes. Crucially, this explains why ordinary, material changes in the sense-organ and medium are necessary to perception, without *reducing* perception to them.⁹⁰ We might picture, by way of analogy, the manner in which the letters of a written text are necessary to conveying the text's message, without being identical to that message. In much this way, I suggest, the drying of the organ of smell underpins the transmission of salient information from sense-object to perceiver; it is the vehicle for the transmission of information about the odour of the odorous object in question.

On the view I am proposing, the perceiver receives information about the sense-object by undergoing ordinary changes in the sense-organ, and in this way is 'in-formed' by it. This may be all that needs to be said about the formal aspect of perception, and its relation to the material aspect, on Aristotle's account. Nevertheless, perhaps it is also possible to say more. For it may well be that on

phenomenon, with the former falling under the heading of 'material cause'. This is consistent with various ways of understanding the underlying metaphysics.

⁹⁰ This account also ascribes to Aristotle an attractive way of explaining a potentially puzzling feature of perception, namely its intentionality: for on this account, I perceive an object existing apart from me because I am caused *by* it to become *like* it in such a way as to receive salient information *about* it. Victor Caston, in 'Aristotle and the Problem of Intentionality' ['Intentionality'], *Philosophy and Phenomenological Research*, 58 (1998), 249–98, and in 'Spirit and Letter', who like me advocates a view on which information is transmitted from sense-object to perceiver by means of ordinary changes in the sense-organs, emphasizes this appealing feature of Aristotle's view.

Aristotle's view the activation of one's capacity to perceive, considered merely as such, involves not only receiving information about the sense-object but also, in addition, becoming perceptually aware of that object. On this view, to have one's capacity to perceive odour activated is, at least in part, simply to become perceptually aware of odour. On this interpretation, Aristotle's view of the *formal* aspect of perception was very much as spiritualists such as Burnyeat have maintained. The chief difference between the present account and that of the spiritualist is that on the present account this is not *all* there is to say; for there is also an ineliminable material aspect to perception by smell, involving ordinary changes in the sense-organ and perceptual medium.

The idea that ordinary changes in the sense-organs underpin the transmission of salient information from the sense-object to the perceiver is by no means new in the interpretation of Aristotle's theory of perception.⁹¹ Nevertheless, it has remained vulnerable to arguments from silence, offered by literalists and spiritualists alike. Spiritualists typically argue that Aristotle had *nothing* to say about ordinary, material changes in the sense-organs or perceptual medium, and that this silence on his part strongly suggests that he did not believe *any* such changes occur.⁹² I hope to have said enough already to refute this argument from silence, at least in the case of smell. Interestingly, literalists too sometimes offer an argument from silence in favour of their position. For example, Stephen Everson rejects all interpretations of Aristotle of the kind advocated here, on the basis that they are inevitably unsatisfactorily vague.⁹³ Against the view that the sense-organs undergo material changes without literally taking on the same sensible quality as the

⁹¹ Variations on an 'information transfer' account have been advanced by Modrak, *Power of Perception*; Ward, 'Perception and *Logos*'; Silverman, 'Colour'; Bradshaw, 'Dual-Logos Theory'; and Caston, 'Intentionality' and 'Spirit and Letter'. Lear, *Desire to Understand*, and Lorenz, 'Assimilation', also offer hylomorphic interpretations of Aristotle, on which *both* ordinary changes in the sense-organs *and* an extraordinary change in the sense-faculty are essential to perception. However, unlike the other thinkers listed in this note, Lear and Lorenz seek to understand the formal side of perception primarily in terms of becoming perceptually aware of the sense-object (rather than in terms of being informed about it). As I note in the preceding paragraph, we may not need to choose between these two interpretations, since the activation of one's capacity to perceive may involve *both* receiving information about the sense-object *and* becoming aware of it.

⁹² This kind of argument from silence for spiritualism is especially prominent in Burnyeat's work. See e.g. Burnyeat, 'How Much Happens?', 421–3; 'DA II 5', 81–3.

⁹³ Everson, *Aristotle on Perception*, 96–9.

sense-object, he raises a simple question: what form might these changes take? While there may be logical space for such a view, he claims, there is no evidence for it in what Aristotle actually wrote. He concludes that *if* perception involves ordinary, material changes in the sense-organs—which, as a literalist, he believes it does—they *must* be of the kind literalism recommends. Aristotle's discussion of smell is especially interesting and important because it provides a clear answer to this argument from silence as well: Aristotle has a good deal to say about ordinary, material changes in the sense-organ and medium of smell, while these changes involve the organ and medium becoming dry, not e.g. bitter- or sweet-smelling as literalism predicts.

In addition to its potential to disarm arguments from silence, Aristotle's discussion of the sense of smell can also help us understand his views on perception in another way. On the present interpretation, the perceiver receives salient information about the sense-object by undergoing an ordinary change in the relevant sense-organ. This view requires that there be some systematic correlation, on Aristotle's view, between the proper sensible in question and the changes the sense-organ undergoes; for in the absence of such a correlation, the ordinary changes in the sense-organ would be incapable of playing the role they must play in the transmission of information. In the case of smell, this means that there must be a systematic correlation between the odour of an odorous object and the determinate form of dryness that characterizes it, and that comes to be present in the sense-organ of the perceiver. Aristotle's discussion of the sense of smell is especially interesting in this context because it provides excellent reason to think that Aristotle took just such a correlation to exist. Indeed, I contend, the ordinary changes that occur in the organ of smell whenever a perceiver encounters an odour under suitable conditions are exactly the kind we should expect if the interpretation I am proposing were correct.

To see this, we should first recall that Aristotle was operating with an extremely rudimentary theory of chemistry. On his view, a wide range of the higher-level properties of physical objects are explicable in terms of the proportions of moisture and dryness they contain, and the manner in which the moist is 'determined' by the dry. Aristotle held that many sensible qualities should be included in this class, and may well have thought that flavour (and hence

odour) was among them.⁹⁴ After all, as we have seen, he clearly thought that there was some intimate relationship between dryness and odour, while he sometimes explicitly explains odorousness or its lack in terms of the proportions of moisture and dryness a particular substance contains.⁹⁵ We should also not assume that Aristotle could not have held such a view, on the basis that odours are too complex and multi-faceted to be captured by the single spectrum between wet and dry. For one thing, as noted, Aristotle was extremely optimistic about the possibility of discovering correlations between the proportions of moisture and dryness that characterize different bodies and various other properties they possess. Furthermore, he apparently understood particular odours as at least primarily existing along a single spectrum between the extremes of sweet- and bitter-smelling. In this respect, odours are like all other sensible qualities, for Aristotle, with the possible exception of tangible qualities: for example, particular colours lie on a spectrum between black and white, sounds between high and low pitch, flavours between sweet and bitter.⁹⁶ If odours too vary along a single

⁹⁴ See especially *Meteorologica* 4. In that chapter Aristotle turns to consider the forms taken by the passive qualities of bodies, which he identifies as the moist and the dry. All bodies, he claims, are compounded of the moist and the dry, and whichever of these elements predominates in the body determines its nature (381^b23–7). The moist is easily determined, while the dry is determined with difficulty; as a result, their relationship to one another is ‘like that between a dish and its condiments’ (381^b29–31). In particular, the moist and the dry are interdependent in determinate bodies, with each serving as a kind of ‘glue’ for the other, so that every determined body includes both (381^b31–382^a2). Since earth is especially representative of the dry, and water of the moist, every determinate body contains both water and earth (381^b3–5). Aristotle goes on to trace such features of bodies as hardness, softness, malleability, fragility, compressibility, divisibility, and combustibility back to the proportions of moisture and dryness each substance contains, and the manner in which the moist and the dry ‘determine’ (ὁρίζουσιν) each other. Homogeneous bodies (e.g. the various metals, together with the substances from which living things are composed: flesh, bone, skin, and the like) differ in all these ways, and also with respect to their odour, taste, and colour (388^a10–13). By implication, these features too depend on the proportions of moisture and dryness each body contains, and the manner in which the moist and dry in these bodies ‘determine’ each other.

⁹⁵ For example, in *De sensu* 5 Aristotle claims that kinds of wood that contain more water are less odorous than those that are drier, and traces the relative odorousness of different metals, such as bronze, iron, silver, and tin, back to the amount of moisture contained in each (443^a15–21).

⁹⁶ ‘Every sense seems to be concerned with one pair of opposites, e.g. sight with white and black, hearing with high and low pitch, taste with bitter and sweet’ (*DA* 422^b23–5). Although Aristotle goes on to qualify this remark in the context of his discussion of tangible qualities, in other contexts he is happy to treat the proper objects of a particular sense-modality as lying on a single spectrum between a pair of

dimension, there is no barrier to supposing that Aristotle took there to be a systematic correlation between particular odours and the determinate forms of dryness characteristic of different flavoured dry objects. This is not to suggest that odour is *identical* to dryness, for Aristotle, or that it can be reduced to it.⁹⁷ Rather, on the view I am proposing, odour is *encoded by* dryness, in object, medium, and organ alike.⁹⁸ It is *this* fact about it that makes the drying of the sense-organ and medium relevant to perception by smell.

In this paper I have focused on Aristotle's views about a single sense-modality, the sense of smell. Is an account of the kind I have offered generalizable to the other four special senses? I believe the prospects for such generalization are good, although the case cannot be made in detail here.⁹⁹ Such a view, should it prove generalizable, would have significant advantages over both literalism and spiritualism, and not only because it promises to be more charitable to Aristotle.¹⁰⁰ To begin with, it has the potential to make bet-

extremes, as in his lengthy discussion of the different colours as consisting of a mixture of black and white in various proportions (*De sensu* 439^b19–440^b23); cf. *De sensu* 4, 442^a12–13: 'as the intermediate colours arise from the mixture of black and white, so the intermediate flavours arise from the sweet and bitter'.

⁹⁷ To be clear, my suggestion is not that sensible qualities such as odours are somehow unreal, on Aristotle's account, or that they are 'nothing but' material ones. As in Aristotle's philosophy more generally, at least as I understand it, a certain power may reside in a certain physical structure without being reducible to, or straightforwardly identifiable with, that structure. My claim is rather that on Aristotle's view particular odours are correlated with, and in some sense depend upon, certain organizational features of the bodies in which they reside, namely the determinate forms of dryness that characterize them.

⁹⁸ The notion of 'encoding' information is borrowed from C. Shields, 'Intentionality and Isomorphism in Aristotle', *Proceedings of the Boston Area Colloquium in Ancient Philosophy*, 11 (1997), 307–30 at 319–20. Shields's use of the language of 'isomorphism' in his paper is also congenial to my interpretation.

⁹⁹ This generalization would require textual evidence that Aristotle thought ordinary, material changes occur in the sense-organ and medium whenever a perceiver encounters a colour, sound, flavour, or other tactile quality under suitable conditions. In fact, there is good evidence in every case that Aristotle took just such changes to occur. See below, n. 101, for suggestions concerning potentially relevant passages.

¹⁰⁰ Why is this account more charitable to Aristotle than the major alternatives? Unlike literalism, it avoids saddling Aristotle with a crude and empirically implausible view of the physiological changes involved in perceiving, while merely pushing the hard questions one step back. For example, on the literalist account it is unclear why my eye jelly turning red explains my perceiving red. Everson's supposition that for Aristotle I become mediately aware of the redness of the external object in virtue of becoming directly aware of the redness of my own eye jelly (Everson, *Aristotle on*

ter sense of the full range of salient texts, since it can accommodate both those passages that suggest the occurrence of ordinary, material changes in perception¹⁰¹ and also those in which Aristotle claims that the activation of the capacity to perceive is itself no ordinary change.¹⁰² Second, it allows us to avoid some of the radical and potentially unattractive implications of the spiritualist interpretation for our understanding of Aristotle's hylomorphism more generally, including the unappealing view that Aristotle believed in a world full of purely formal changes and processes without any material correlates, a 'physics of form alone' (to borrow Burnyeat's felicitous

Perception, 137–8) strikes me as textually unsupported and philosophically weak. On the other hand, it offers a way of avoiding the spiritualist's avowed conviction that Aristotle's theory of perception, and indeed his whole theory of the mind, should be 'junked', since it rests on assumptions about changes without material correlates that we can barely even understand, let alone accept.

¹⁰¹ Various examples have been identified and debated in the literature. My claim here is not that these passages can *only* be understood as committing Aristotle to the occurrence of ordinary, material changes in the sense-organs and/or medium, but rather that they all *can* be read in this way, and in most cases are *most naturally* so read. Important examples include the following. (1) Sight: in *De generatione animalium* 5. 1 Aristotle claims that blue eyes contain less moisture than brown eyes, and for this reason are more easily set in motion by light and by visible objects, both *qua* moist and *qua* transparent (780^a1–3). If being moved *qua* transparent constitutes the formal aspect of vision, it is difficult to say what being moved *qua* moist amounts to, if not a correlated material change. (2) Hearing: in *DA* 2. 8 Aristotle claims that air 'rebounds' (*ἀφάλλεσθαι*) from the impact of two solid surfaces and 'vibrates' (*σειέσθαι*) when it is affected in such a way as to convey sound to the ear of the perceiver (420^a25–6). (3) Smell: in addition to the passages already discussed, Aristotle observes that even bloodless animals can be damaged or destroyed by strong odours such as those of bitumen and sulphur (*DA* 421^b23–5). (4) Taste: in *DA* 2. 10 Aristotle claims that the tongue must be potentially moist, and that it becomes actually moist when it is acted on by a tasteable object (422^b1–2). (5) Touch: in *DA* 2. 11 Aristotle claims that the organ of touch must already have some of the tangible qualities, and that it will be unable to perceive the qualities it already possesses, since it must be potentially such as the tangible qualities perceived already are and become like them when they act on it (*DA* 423^b27–424^a2). This claim about 'blind spots' is difficult to understand unless we suppose that the sense-organ of touch undergoes an ordinary, material change. (6) In general: in *DA* 2. 12 Aristotle claims that excesses in the objects of perception—such as especially bright lights, loud sounds, or strong flavours—are capable of damaging the relevant sense-organs, and thus destroying, at least temporarily, a person's ability to perceive sensibles of that kind (424^a28–32). All of these passages create serious problems for spiritualism, while some also raise difficulties for literalism. All could be readily accommodated on an account with the basic structure I am suggesting, if it should be generalized to cover the remaining special senses (a task I am not attempting here, but believe is fully possible).

¹⁰² Especially in *DA* 2. 5.

phrase).¹⁰³ And finally, it offers a way of understanding Aristotle's theory of perception that is consistent with his stated views on the structure of adequate explanations in psychology, as illustrated by his well-known example in *DA* 1. 1 of anger as *both* a boiling of blood around the heart (the material aspect) *and* a desire for retribution (the formal aspect).¹⁰⁴ Although spiritualists can argue—and have argued—that this discussion is meant to apply only to the passions, and not to perception, this seems to me a difficult task;¹⁰⁵ for those unpersuaded by such arguments, this final point may even be thought decisive in favour of an account with the structure I recommend. For all of these reasons, Aristotle's treatment of the sense of smell provides a promising model for understanding his views on perception more generally.

For Aristotle, as I have argued his view should be understood, the activation of our capacity to perceive odour requires and involves ordinary changes in the sense-organs and perceptual medium. The organ of smell is dried by an odorous (i.e. flavoured dry) object, acting through the medium, in a sufficiently determinate way to receive quite specific information about it, information that is essential to the perception of its odour. At the same time, I have claimed, the perceiver's capacity to perceive odour is activated. This activation of the capacity to perceive odour, considered in its own right, is a non-destructive alteration of the kind identified by Aristotle in *DA* 2. 5, involving the assimilation of the sense-faculty (the power that resides *in* the sense-organ) to the sensible quality perceived. In this way, Aristotle's account of perception by smell is genuinely hylomorphic: a complete account of smell should specify both

¹⁰³ Burnyeat, 'How Much Happens?', 430, 431; 'Aquinas', 149: 'spiritual change . . . is a change of form alone'.

¹⁰⁴ *DA* 403^a24–403^b19. On Aristotle's view, although both descriptions of anger are correct in their way, each is incomplete when considered in isolation. A full and adequate explanation of the phenomenon, of the kind a true student of nature should seek, will make reference to *both* its material *and* its formal aspects. Note also that if this model is taken to apply to perception as well as to emotions such as anger, the division of labour between *De anima* and *De sensu* makes perfect sense: the former, as a work on the soul, focuses predominantly on the formal side of perception, while the latter has more to say about its material dimension.

¹⁰⁵ Burnyeat, '*DA* II 5', 82 n. 143, dismisses as a 'widespread illusion' the claim that Aristotle's methodological remarks in this passage commit him to the view that perception involves concomitant material changes (so too Johansen, *Sense Organs*, 11). For argument that Aristotle *does* commit himself here to the view that perception, like anger, necessarily involves concomitant material changes, see Caston, 'Spirit and Letter', 283–5.

its material and its formal aspects, and a true student of nature will need to know about both in order to understand the phenomenon. This interpretation is more charitable to Aristotle than the major literalist and spiritualist alternatives, for the reasons noted. It ascribes to Aristotle an independently interesting position that is consistent with his stated views about hylomorphic explanations in psychology more generally, and that fits the text. In particular, it accommodates the passages describing material changes in the organ and medium of smell in a way that, as I have argued, neither literalism nor spiritualism is able to achieve. In this way, Aristotle's discussion of the sense of smell counts strongly against both literalism and spiritualism, while providing a template for a different, and more attractive, way of understanding his theory of sense-perception considered as a whole.

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