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Aristotle on Perception at a Distance

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Abstract

This paper explores Aristotle's account of distance perception by considering how he would respond to one of Plotinus' objections to perceptual mediation in *Enneads* 4.5. I argue that we should think of the special objects of the distance senses on the model of Aristotle's account of the eclipse in *Posterior Analytics* 2: sounds, odours, and the effects of colour in the medium inhere 'in' the bodies that serve as media—air and water—but are 'of' their distal causes, like bells, or cheese, etc. This model allows us to explain why we perceive distant bodies and not the medium itself.

Keywords

Aristotle – Plotinus – perception – colour – sound – odour

1 Introduction

Aristotle insists that every act of perception requires a 'medium', or a body that separates the relevant sense organ from the corresponding perceptual object and mediates the relation between them. In the case of the distance senses—vision, audition, and olfaction—the media are air and water (*De anima* [*An.*] 2.11, 423b18–19).

It is not just a contingent fact that every act of perception takes place through a medium. Aristotle chastises Democritus for thinking we would see better if only we lived in an otherwise empty void—a world without bodies

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like air and water getting in the way (*An.* 2.7, 419a15–19).[1] Aristotle is so serious about this 'Medium Requirement' that he applies it to the contact senses too. Flesh, it turns out, is not the organ of touch or taste, but an internal medium separating the objects of touch and taste from the corresponding organs in the heart.

This conception of perceptual mediation seems to have been Aristotle's innovation. We possess no evidence for it in Aristotle's predecessors.[2] One can ask various questions about it, chief among them why Aristotle thinks a perceptual medium is *required* for every act of perception. In this paper I wish to hold that general question in suspense.[3] I explore instead the role of the medium in Aristotle's account of distance perception, where it is most obvious.

We can approach Aristotle's conception of distance perception through a powerful challenge issued by Plotinus in *Enneads* 4.5.2.[4] In the case of a contact sense like touch, Aristotle denies that there is any perception at a distance. One cannot feel the heat of a distant fire so long as it remains distant, only that of the intervening air. In effect, Plotinus challenges Aristotle to explain why it is any different with colours, sounds, and odours: why don't the effects of coloured, noisy, odorous bodies in the medium—and so the medium itself—'get in the way', rendering distance perception impossible?[5]

1 Something similar seems to hold for Empedocles, at least according to Aristotle. Apparently, Empedocles thinks we see distal objects through media like air and water because air and water have tiny pores that let the effluences from distal objects through (*De generatione et corruptione* [*Gener. Corr.*] 1.8, 324b26–35 and 326b6–13). Here too, it seems we would see distal objects just as well in a vacuum. Aristotle compares Empedocles with Leucippus (and so presumably with Democritus by extension) explicitly at 325b5–6.

2 One could make a case that some of what Plato says about the 'visual stream' in the *Timaeus* (45b2–d7) resembles Aristotle's talk of perceptual mediation. Yet at best this similarity holds only for vision, whereas Aristotle insists on mediation across the board. And what Plato says is not *very* much like Aristotle's talk of perceptual mediation. Similar remarks apply to the image of the sun that introduces the divided line at *Republic* 6, 507c6–509b10. Plato explicitly acknowledges that there is nothing analogous to light for the other senses besides vision (507c10–d5), and in any case it is not clear that light plays the role of medium in the sense at issue, rather than some other kind of causal precondition. My thanks to a reviewer for drawing my attention to the relevance of the image of the sun.

3 I address this topic in a separate paper, in progress.

4 Plotinus raises several serious objections against perceptual mediation in *Enneads* 4.5, which deserve independent discussions of their own. My goal is not to defend Aristotle from this onslaught wholesale, but to use one of Plotinus' challenges in particular as an invitation to explore Aristotle's views in greater detail.

5 Sorabji voices a similar objection to Aristotle in a well-known paper on the individuation of the senses (1971, 71). See also Priscian's *Metaphrasis in Theophrastum* 12,10–14.

As I understand it, Aristotle's response in outline is as follows. Heat is a *per se* property of (sublunary)[6] body, which means that every body is a candidate for being hot (or cold). This includes the intervening air in Plotinus' example, which may have acquired its heat from the distant fire, but is now hot in its own right and without reference to the fire. It is precisely this fact—that the heat in the air is independent from the heat in the fire—that explains why feeling the heat in the air does not put us in a position to feel the distant fire.[7]

The situation is quite different with the effects of the special objects of the distance senses and their distal causes. The effects of coloured, sounding, and odorous bodies in the medium enjoy a peculiar ontological status: while they exist as physical effects *in* the medium, they continue to depend essentially upon their distal sources in a way the heat in the air does not continue to depend upon the heat in the fire. The sound is *in* the air but *of* the bell, the odour is *in* the air but *of* the cheese, and the effects of colour are *in* the air but *of* the distal colour in the surface of the apple.[8] It is this continued connection between effect and distal source that explains why sounds and odours themselves, and the *effects* of colour in the medium, afford perceptual access to their distal causes, and not merely inferential access.

This answer to Plotinus' challenge trades on important differences in the natures of the special objects of the distance senses and the special objects of the contact senses. In exploring these differences, I hope to bring out connections that have gone largely unnoticed between Aristotle's accounts of these qualities and other important ideas in his natural philosophy and metaphysics, and especially the notions of indeterminacy and determinacy.

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6 Going forward I will suppress this qualification, but see the discussion of the sun and celestial spheres below (text to n. 38).

7 One might feel the heat in the air and *infer* that there is a fire nearby, but that is a different matter.

8 Aristotle aficionados will recognize that this ontological status corresponds to Aristotle's discussion of the eclipse in *Posterior Analytics* [*Post. An.*] 2: a lunar eclipse is *in* the moon but *of* the earth. This is not just the familiar point that the activity of the agent is in the patient (e.g. *An.* 3.2, 426a2–5), as the contrast with the case of heat makes clear. One difference is that while the *process* of heating the air depends upon the fire, once the process is complete the air is hot in its own right, independently of the fire. By contrast, the eclipse depends on the earth throughout its existence, without therefore being 'incomplete'. It is not as though an eclipse is an incomplete stage in a larger process that depends on the earth throughout its existence just because the larger process never achieves fruition. In any case, I say more about the model of the eclipse in section 6 below. For now, I simply want to emphasize that there is nothing *ad hoc* about my assigning this kind of ontological status to sounds, odours, and the effects of colour. Aristotle exploits it in various places throughout his natural philosophy, including his account of sleep (Code 2015).

I begin in section 2 with some preparatory remarks about the Medium Requirement before turning to Plotinus' challenge in section 3. In section 4 I present an outline of Aristotle's response as I understand it, and then I make the case for my interpretation in detail in sections 5–7. In section 8 I consider putative counterexamples.

2 The Medium Requirement

I begin with some evidence for the Medium Requirement and two observations:

> ὁ δ' αὐτὸς λόγος καὶ περὶ ψόφου καὶ ὀσμῆς ἐστίν· οὐθὲν γὰρ αὐτῶν ἁπτόμενον τοῦ αἰσθητηρίου ποιεῖ τὴν αἴσθησιν, ἀλλ' ὑπὸ μὲν ὀσμῆς καὶ ψόφου τὸ μεταξὺ κινεῖται, ὑπὸ δὲ τούτου τῶν αἰσθητηρίων ἑκάτερον· ὅταν δ' ἐπ' αὐτό τις ἐπιθῇ τὸ αἰσθητήριον τὸ ψοφοῦν ἢ τὸ ὄζον, οὐδεμίαν αἴσθησιν ποιήσει. περὶ δὲ ἁφῆς καὶ γεύσεως ἔχει μὲν ὁμοίως, οὐ φαίνεται δέ· δι' ἣν δ' αἰτίαν, ὕστερον ἔσται δῆλον. (*An.* 2.7, 419a26–32)[9]
>
> The same account [as holds for colour] also holds for sound and odour. For neither of these produces perception when it touches the sense organ, but the medium is moved by odour or sound, and each sense organ is moved by this [i.e. the medium]. Whenever one puts what sounds or smells up against the sense organ itself, it will not produce perception. This also holds for touch and taste, though it doesn't appear to. It will be clear later why this is so.

This passage occurs near the end of Aristotle's discussion of vision in *An.* 2.7 and prepares the way for the discussion of the other senses. By this point it is already clear that vision requires a perceptual medium. This explains why one cannot see 'what has colour' (*to echon chrōma*, 419a13) when it is placed directly upon the eye. The present passage announces the extension of the Medium Requirement from vision to the other senses.

My first observation is that the Medium Requirement should be construed as holding between a sense organ and 'what has' the corresponding special perceptible quality, not between the sense organs and the qualities themselves. We do not need a perceptual medium separating eye from colour, ear from sound, or nose from odour. On the contrary, one cannot hear sounds

9 Greek text of *De anima* is from Corcilius 2017, which is based on the edition by Förster (1912). All translations are my own unless otherwise noted.

separated from the ear or smell odours separated from the nose *at all*, because sounds and odours must enter their respective organs to be perceived.[10] Instead, the Medium Requirement demands a perceptual medium separating eye and 'what has colour' (τὸ ἔχον χρῶμα, 419a13)[11]—e.g. an apple—ear and 'what sounds' (τὸ ψοφοῦν)—e.g. a bell—and nose and 'what smells' (τὸ ὄζον)—e.g. some cheese.[12] It follows immediately that the bodies that serve as

10 This has been denied. Johnstone (2013) argues in an influential article that sounds do not travel through the medium for Aristotle after all. And presumably the same holds for odours (cf. Johnstone 2012, 169, although one gets a different impression from 171 n. 83). On his alternative, sounds stay with their sources, and it is only their causal influence that travels. I have two worries for this reading of Aristotle. First, there is overwhelming evidence that sounds and odours do in fact travel in the medium for Aristotle, unlike colours. We will see some of it below. Second, Johnstone's primary reason for denying that sounds travel in the medium depends on his understanding of the Medium Requirement: if sounds had to enter our ears to be heard, there would not be a medium separating ear and 'object' (2013, 642). Notice that this worry depends upon construing the Medium Requirement as holding between organ and *quality* ('Quality Construal'). But there is no reason to insist on that construal. On the contrary, Aristotle often speaks of the medium as separating the relevant sense organ from 'what has' the corresponding perceptible quality, as I have indicated in the main text. And if that is right, then it is no problem if sounds enter our ears when we hear, so long as no bells accompany them. As far as I am aware, there is just one passage which might be thought to require the Quality Construal, and it is the beginning of our passage from the main text: 'The same account [as holds for colour] also holds for sound and odour. For neither of these produces perception when it touches the sense organ […]'. I admit that 'neither of these' picks up 'sound' and 'odour' in the previous sentence. Yet that is hardly decisive. First, Aristotle reverts to his ordinary way of speaking in the second half of the passage: we need a medium separating organ and 'what sounds' and 'what smells'. Second, we can explain away the apparent support for the Quality Construal as harmless imprecision caused by the transition from colour on the one hand, to sound and odour on the other, since colour works differently from the others, as we will see. In any case, I hope I have said enough to motivate exploring alternatives. For a proposal that differs from my own in detail but is similar in spirit, see Ganson 2002.

11 Elsewhere, Aristotle says that one cannot see if one puts a 'white body' (*sōma leukon*) up against the eye, going out of his way to add 'body' (*An.* 2.11, 423b22).

12 Notice the subtle but important difference in terminology when it comes to sound and odour. While Aristotle is perfectly happy to say that bells 'have' sound, for example, he explains that this is just to say that bells sound, i.e. produce sound (cf. *An.* 2.8, 419b5–11 and section 6 below). Not so with colour. To say an apple has colour is not to say that it 'colours'. This linguistic difference reflects the fact that we ordinarily think of sounds and odours as effects that bodies produce, or 'give off'. We speak of sound and odour sources but not colour sources. One might worry that this contrast is undermined by *An.* 3.2, 425b26–426a28, where Aristotle seems to treat colour and sound analogously. I offer a different reading of this passage in Arsenault 2024, however, which is consistent with the point in the main text. While the point in the main text concerns colours and sounds in their own right, I argue that the relevant section of *An.* 3.2 is not about colour or sound as

media for distance perception—air and water—cannot *have* colours, sounds, and odours in the way bells and cheese do. For if they could, then we would need yet another medium separating us from them, and so on.[13] The Medium Requirement thus fits hand in glove with my claim that sounds and odours themselves on the one hand, and the effects of colour in the medium on the other, are physical effects *in*, but not *of*, the medium.

My second observation is that while the perceptual medium may not 'have colour' (or sound, etc.) in the way an apple does, colours do have genuine effects in the medium. They 'move' it. And likewise for sounds and odours, *mutatis mutandis*. This is suggested here and elsewhere by Aristotle's use of kinetic vocabulary (e.g. *kineitai*, 419a26) in describing what the perceptual medium undergoes itself, and what it does to the relevant sense organ in turn.[14]

This second observation is crucial background for understanding Plotinus' challenge. He and other Neoplatonists are perfectly happy to acknowledge that the forms responsible for distance perception exist in the space between perceiver and distal object. What Plotinus rejects is the more specific claim that these forms exist in the intervening space as 'corporeal'[15] (i.e. ordinary, soul/mind-independent) affections (e.g. 4.5.3, 26–7). Instead:

> ὥστε ἕκαστον μόριον τοῦ ἀέρος ὅλον οἷον τὸ πρόσωπον τὸ ὁρώμενον ἔχειν· τοῦτο δὲ οὐ κατὰ σώματος πάθημα, ἀλλὰ κατὰ μείζους καὶ ψυχικὰς καὶ ζῴου ἑνὸς συμπαθοῦς ἀνάγκας. (4.5.3, 35–8)[16]

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such, but about colour *qua* visible, and sound *qua* audible (or more generally *qua* perceptible). Thanks to Robert Roreitner for encouraging me to address this point.

13 What about the contact senses? Given that our flesh genuinely becomes hot when we touch something hot, and our saliva sweet when we eat something sweet, how is it that our flesh and saliva do not get in the way, so that we never feel or taste external bodies, but only ourselves? I take it that it makes a difference that the medium is, and must be, a part of the (animal) body in these cases. See the admittedly 'artificial' example of the solider struck through their shield at *An.* 2.11, 423b13–17.

14 On this point compare *An.* 3.12, 434b28–435a6, where it is absolutely clear that sounds and odours and the effects of colour are physical effects in the medium that propagate through it and affect the sense organs accordingly (*mutatis mutandis* for light and the effects of colour, which do not strictly speaking count as *travelling*, as we learn in *De sensu* [*Sens.*] 6, 446b27–447a1). My thanks to a reviewer for reminding me of this useful passage.

15 Henceforward I will follow my translation of Plotinus in speaking of 'corporeal' changes to avoid certain undesirable connotations of the word 'physical'.

16 Greek text of *Enneads* is from the edition by Henry and Schwyzer (1977).

> As a result, each part of the air contains the whole visible object, for example a face. But this is not a corporeal affection, but one that accords with greater psychic necessities—one living thing in sympathy with itself.

Plotinus rejects Aristotle's suggestion that perception requires a medium separating sense organ and perceptual object in favour of an explanation in terms of the living unity of the cosmos and the sympathy of its parts with one another. Since my goal in exploring Plotinus' challenge is to better understand Aristotle, we need not explore the details of Plotinus' positive views here.[17] The key point is just that Plotinus understands the view he rejects—Aristotle's view or one just like it[18]—as requiring a corporeal affection in a medium. And that is indeed Aristotle's view.[19]

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17 For a vivid depiction of the role of sympathy in Plotinus' account of perception, see the remarkable thought experiment in which he imagines someone at the edge of our cosmos looking out, and then asks whether someone thus situated could see another cosmos beyond our own, if the two *kosmoi* were not two parts of the same all-encompassing living being (4.5.8).

18 It is beyond question that Plotinus is aiming at a Peripatetic(s) in the passages of interest to us. There is a question, however, whether it is Aristotle in particular, and/or someone else (cf. Emilsson 1988, 38–40). For our purposes it makes little difference. The objections *do* apply to Aristotle, whoever else they might also apply to.

19 There is a tendency among later ancient commentators with Neoplatonic leanings to conflate Aristotle's views with Neoplatonic views in certain contexts, and perceptual mediation is one of them. For example, commentators like [Ps.] Simplicius (e.g. Commentary on Aristotle's *De anima* [*In An.*] 136, 20–137, 13, and especially 136, 37–137, 13) and Philoponus (Commentary on Aristotle's *De anima* [*In An.*] 309, 15–29; 334, 38–336, 3; though see Lautner 2013) tend to read Aristotle in a way that 'dematerializes' what goes on in the medium, to borrow Sorabji's phrase (2001). Priscian—who may be identical to [Ps.] Simplicius (cf. Bossier and Steel 1972)—does the same with Theophrastus (*Metaphrasis* 12, 17–28). In an interesting quirk of recent scholarship, some modern scholars follow suit. Burnyeat (1992, 1995, 2001) in particular is well known for defending a view that has come to be known as 'spiritualism', according to which 'there is no physiological process which stands to the awareness of a colour or a sound as matter to form' (1995, 421), because *nothing* happens in the medium when a colour, e.g., is seen, except that the colour appears through it (426). According to Burnyeat, then, Plotinus must be wrong that Aristotle requires a corporeal affection in the medium. At best, the medium undergoes what Burnyeat calls a 'quasi-alteration'. For a useful discussion of the debate between spiritualism and its rival, literalism, see Caston 2005. Whereas spiritualism rejects corporeal affections in the medium, literalism embraces a specific kind of corporeal affection in the medium: colours 'literally' reproduce themselves in the medium and thereby in our sense organs, and likewise for the other special objects. Understood in this admittedly crude way, literalism is a version of the kind of position that Plotinus' challenge foists on

3 Plotinus' Challenge

Without further ado, here is the text of Plotinus' challenge:

> Εἰ γὰρ τῷ προπαθεῖν τὸν ἀέρα ἡ αἴσθησις ἡμῖν, οὐκ ἂν πρὸς αὐτὸ βλέποντες τὸ ὁρώμενον εἴδομεν, ἀλλ᾽ ἐκ τοῦ παρακειμένου ἔσχομεν ἂν τὴν αἴσθησιν, ὥσπερ ἐπὶ τοῦ θερμαίνεσθαι. Ἐκεῖ γὰρ οὐ τὸ πόρρωθεν πῦρ, ἀλλὰ ὁ ἀὴρ ὁ παρακείμενος θερμανθεὶς θερμαίνειν δοκεῖ· ἁφῇ γὰρ τοῦτο, ἐν δὲ τοῖς ὁράμασιν οὐχ ἁφή· ὅθεν οὐδ᾽ ἐπιτεθὲν τῷ ὄμματι τὸ αἰσθητὸν ὁρᾶν ποιεῖ, ἀλλὰ φωτισθῆναι δεῖ τὸ μεταξύ· (4.5.2, 50–6)
>
> For if perception came about for us by the air being affected first, we would not see the object of sight itself when we looked at it, but we would have perception from the adjacent air, just as in the case of being heated. For here it is not the distant fire, but the adjacent air, having been heated, that is thought to heat us. For heating occurs by contact, but in acts of seeing there is no contact. This is why the perceptible does not cause vision even when it is placed on the eye, but it is necessary that the medium should be illuminated.

Plotinus has no issue with distance perception *per se*. His target is Aristotle's more specific claim that distance perception is mediated by the corporeal effects of colour, etc. in a medium. He challenges this claim by juxtaposing it with Aristotle's commitments where the contact senses are concerned: if we cannot feel the heat of a distant fire, but only its corporeal effects in the air in between, why is it any different with the colours, sounds, and odours of distant bodies? For ease of expression, I will label the Aristotelian claims at issue P1 and P2:

> P1 We can (indeed, must, according to the Medium Requirement) perceive the objects of the distance senses—vision, audition, and olfaction—by means of their ordinary, 'corporeal', effects in the medium (i.e. a body between object and perceiver).
> P2 We cannot perceive the objects of the contact senses—touch and taste—by means of their effects in a medium (i.e. a foreign body between

Aristotle. For if colours reproduce themselves in the intervening air in the way the heat of a fire does, then Plotinus would be quite right to worry that the medium should get in the way, just as the intervening hot air gets in the way of our feeling the distal fire.

> object and perceiver).[20] We never feel the heat of a distant fire so long as it remains separated from us, only the warmth of the intervening air.

In effect, Plotinus argues that Aristotle should give up P1 in light of P2.[21]

We have already seen that Aristotle is committed to P1. He is also committed to P2. Consider the beginning of the discussion of flavour and taste in *An.* 2.10:

> Τὸ δὲ γευστόν ἐστιν ἁπτόν τι· καὶ τοῦτ᾽ αἴτιον τοῦ μὴ εἶναι αἰσθητὸν διὰ τοῦ μεταξὺ ἀλλοτρίου ὄντος σώματος· οὐδὲ γὰρ ἡ ἀφή.[22] καὶ τὸ σῶμα δὲ ἐν ᾧ ὁ χυμός, τὸ γευστόν, ἐν ὑγρῷ ὡς ὕλῃ· τοῦτο δ᾽ ἁπτόν τι. διὸ κἂν εἰ ἐν ὕδατι ἦμεν, ᾐσθανόμεθ᾽ ἂν ἐμβληθέντος τοῦ γλυκέος, οὐκ ἦν δ᾽ ἂν ἡ αἴσθησις ἡμῖν διὰ τοῦ μεταξύ, ἀλλὰ τῷ μιχθῆναι τῷ ὑγρῷ, καθάπερ ἐπὶ τοῦ ποτοῦ. τὸ δὲ χρῶμα οὐχ οὕτως ὁρᾶται τῷ μίγνυσθαι, οὐδὲ ταῖς ἀπορροίαις. ὡς μὲν οὖν τὸ μεταξὺ οὐθὲν ἔστιν· ὡς δὲ χρῶμα τὸ ὁρατόν, οὕτω τὸ γευστὸν ὁ χυμός. (*An.* 2.10, 422a9–17)

> The tastable is something perceived by contact [*hapton*]. This also explains why the tastable is not perceptible through the medium of a foreign [*allotriou*] body. For touch does not come about that way either. The body in which flavour is—the tastable—is also in moisture as matter; and this is something perceived by contact [*hapton*]. Hence if we were in water, we would perceive when something sweet was thrown in, but our perception would not come about through a medium, but by means of this sweet thing having been mixed with the water, just as with a drink. But colour is not seen in this way—namely by mixture, nor by effluences. So then there is no [foreign] medium. But as the visible is colour, so the tastable is flavour.

Aristotle begins with the claim that tasting occurs by contact—flavour[23] is *hapton ti*—and infers immediately that one cannot perceive flavour through

20 As I mentioned above, there *is* a medium for touch and taste, namely flesh. The relevant difference between the distance senses and the contact senses is that the distance senses involve a foreign medium, whereas the contact senses do not.

21 Of course, one could give up P2 instead, but that would not suit either figure.

22 Here I follow the ἡ ἀφή in Förster's original text and the manuscripts against Ross's emendation of τῇ ἁφῇ.

23 The reference of *to geuston* may shift around a bit in this chapter—indeed, in this passage—between flavour and 'what has' flavour, but to the extent that this is true it is harmless to the argument. To say that flavour is one of the special perceptibles we perceive by contact is to say that we perceive flavour when we (or more specifically, our tongues) make contact with the body that has flavour.

a foreign medium or, which comes to the same thing, at a distance. This line of reasoning shows that Aristotle is committed to P2 because it applies equally to heat and the other special objects of the contact senses: if we could feel the heat of a fire through the intervening air, we would be perceiving something *hapton* through a foreign medium. And that is something Aristotle expressly rejects.

To be sure, it does not follow that touch is entirely useless where distant fires are concerned. While touch may not enable us to *feel* a distant fire directly, it may sometimes enable us to 'infer'[24] that one exists and to locate it. Just as one can often infer fire upon seeing smoke, so one may infer fire in the next room upon feeling heat in the adjoining wall.[25] This last case might seem like a cheat: what about when we are sitting by the hearth? Surely we *feel* the fire itself and not just the heat in the air. Strong though such intuitions may be, it is open to Aristotle to reply that they simply reflect general causal knowledge and the way we speak, while acknowledging that one can learn a lot about distal fires by detecting changes in the intensity of the heat in the air. For all that, however, we do not count as *feeling* the distant fire. Touch is a contact sense. Indeed, it is the contact sense *par excellence*.[26]

Before moving on, let us turn briefly to the counterfactual scenario in this passage. Suppose I am swimming in a (freshwater) pond, and you kindly throw some cake into my vicinity. If I began to taste something sweet, Aristotle suggests, it would not be the sweetness of the still distant cake but that of the newly sweetened water in my mouth.

So far this is just like Plotinus' example of heat. Yet there is one important disanalogy: Something more is required for freshwater to take on a sweet flavour than is required for air to take on heat. Whereas freshwater can acquire a sweet flavour only if something like cake mixes with it, heating can, but need not, involve mixture. I will come back to this point below (section 7), but in brief the reason for this difference is as follows. It is not just any body that possesses flavour for Aristotle: flavour belongs only to bodies with nutritional value, and nutritional value belongs only to bodies that are compound (in a certain way). Freshwater lacks flavour because it lacks nutritional value, and

24 I do not have anything particularly strong in mind by 'inference' here. An association between perceptions of heat in the air and *phantasiai* of fires would suffice.

25 See also the worries about intervening bodies in the discussion of touch at *An.* 2.11, 423a22–423b17.

26 Thanks to Robert Roreitner for encouraging me to say more on Aristotle's behalf on this point.

this is because it is not (the right sort of) compound.[27] This explains why something must be mixed into freshwater for it to acquire a flavour: it needs to be compounded with something else to support nutritional value and flavour. Heating, by contrast, does not require mixture because hot and cold are *per se* properties of body (cf. *An.* 2.11, 423b27–9 and section 4 below). Every body is hot or cold (or somewhere in between) and is a candidate for being heated/cooled, without needing to satisfy further prerequisites that might call for mixture, like needing to be (a certain sort of) compound.

Summing up and setting aside the niceties in the last paragraph for now, the basic contrast between the special objects of the distance senses and the contact senses is clear: whereas we do perceive colours, etc. through a foreign medium, and so at a distance (P1), we cannot perceive the objects of touch or taste that way (P2). This leaves us face to face with Plotinus' challenge: what explains this difference between the special objects of the distance senses and the special objects of the contact senses?

4 An Outline of Aristotle's Response

We get a key hint of how Aristotle would respond near the end of the following important passage from *An.* 2.12, which I divide into three parts (A, B and C):

> [A] ἀπορήσειε δ' ἄν τις εἰ πάθοι ἄν τι ὑπ' ὀσμῆς τὸ ἀδύνατον ὀσφρανθῆναι, ἢ ὑπὸ χρώματος τὸ μὴ δυνάμενον ἰδεῖν· ὁμοίως δὲ καὶ ἐπὶ τῶν ἄλλων. εἰ δὲ τὸ ὀσφραντὸν ὀσμή, εἴ τι ποιεῖ, τὴν ὄσφρησιν ἡ ὀσμὴ ποιεῖ· ὥστε τῶν ἀδυνάτων ὀσφρανθῆναι οὐθὲν οἷόν τε πάσχειν ὑπ' ὀσμῆς· ὁ δ' αὐτὸς λόγος καὶ ἐπὶ τῶν ἄλλων· οὐδὲ τῶν δυνατῶν, ἀλλ' ᾗ αἰσθητικὸν ἕκαστον. ἅμα δὲ δῆλον καὶ οὕτως. οὔτε γὰρ φῶς καὶ σκότος οὔτε ψόφος οὔτε ὀσμὴ οὐδὲν ποιεῖ τὰ σώματα, ἀλλ' ἐν οἷς ἐστίν, οἷον ἀὴρ ὁ μετὰ βροντῆς διίστησι τὸ ξύλον. [B] ἀλλὰ τὰ ἁπτὰ καὶ οἱ χυμοὶ ποιοῦσιν· εἰ γὰρ μή, ὑπὸ τίνος ἂν πάσχοι τὰ ἄψυχα καὶ ἀλλοιοῖτο; ἆρ' οὖν κἀκεῖνα ἐμποιεῖ ἢ οὐ πᾶν σῶμα παθητικὸν ὑπ' ὀσμῆς καὶ ψόφου; καὶ τὰ

27 It may be that all the freshwater there is, was, and ever will be on earth is already compound in Aristotle's estimation, and indeed that the elements never occur just on their own (*Gener. Corr.* 2.3, 330b21–5). Nonetheless, Aristotle tends to treat freshwater as if it was pure, or 'simple', both in contexts like this one, and when discussing the composition of our sense organs and the medium (e.g. *An.* 3.1, 424b29–30). In the end, however, it makes little difference whether freshwater is already compound or not, so long as it is not the right sort of compound to support nutritional value and flavour until something is mixed with it. For more on all this, see the discussion of odour and flavour in section 7 below.

> πάσχοντα ἀόριστα, καὶ οὐ μένει, οἷον ἀήρ; ὄζει γὰρ ὥσπερ παθών τι. [C] τί οὖν ἐστι τὸ ὀσμᾶσθαι παρὰ τὸ πάσχειν τι; ἢ τὸ μὲν ὀσμᾶσθαι αἰσθάνεσθαι, ὁ δ᾽ ἀὴρ παθὼν ταχέως αἰσθητὸς γίνεται; (*An.* 2.12, 424b3–18)
>
> [A] Someone might be puzzled whether what is unable to smell can be affected by odour at all, or what is unable to see affected by colour, and similarly for the other senses. If the object of the sense of smell is odour, then if odour moves anything, it moves the sense of smell, with the result that what is unable to smell is not able to be affected by odour (and the same argument applies also for the other sense modalities). Not even what is capable [of perceiving is affected], except insofar as each is such as to perceive. And at the same time this is clear also in this way. For neither light nor dark nor sound nor odour affects bodies at all, but that in which they are does, as for example it is the air accompanying thunder that splits timber. [B] But tangible properties and flavours affect [bodies]. For if they didn't, by what would un-ensouled things be affected and altered? Then will even those things [i.e. odour, colour, and sound] affect things? Or is it that not every body is such as to be affected by odour and sound? And the ones that are affected are indeterminate, and do not remain, like air (for it smells just as if it were affected in a certain way)? [C] What, then, is smelling beyond being affected? Or, on the one hand, is smelling perceiving, while on the other, the air, when it is affected, readily becomes perceptible?

As I understand it, the general point of this passage is to counteract the suggestion that the special objects of our senses have no effect on the world but the effect they have on perceivers in (A), as a prelude to raising some difficult questions about the relationship between their mind/soul-independent effects and the activity of perception itself in (C). In consequence, this passage provides additional confirmation of Aristotle's commitment to P1: Colour, sound, and odour have—or *are* in the case of sound and odour—'corporeal' (i.e. ordinary, mind/soul-independent) effects in air and water.[28]

While (C) has drawn most of the scholarly attention, I am more interested here in (A) and (B), and especially (B). Aristotle's strategy in (B) is to leverage the independent plausibility of the idea that the objects of the contact senses affect animate and inanimate bodies alike as a reason for supposing that the

28 Perhaps surprisingly, this passage has sometimes been taken as evidence *for* spiritualism, primarily on the basis of (C). I address this reading of the passage in Arsenault 2024.

objects of the distance senses do too, with the desired result that *all* special perceptible qualities affect animate and inanimate bodies alike.

This passage also explains why one might doubt whether the special objects of the distance senses have corporeal effects in inanimate bodies, even though they surely do: the effects are easy to miss because they tend to be relatively fleeting. And they tend to be relatively fleeting because they are effects imposed on bodies that are *indeterminate*—i.e. lack stable boundaries of their own—whether animate or inanimate.[29] Indeed, the special objects of the distance senses affect only bodies of this sort. Naturally, this includes the relevant sense organs, which are composed of air and water themselves so as to be receptive to these effects: the eye is made of water, and the ear and nose of air (cf. *Sens.* 2, 438a12–14; *An.* 3.1, 424b23–425a14).[30] It may go without saying, but it is important not to mistake the fleetingness of these effects for incorporeality. It is one thing to be fleeting, and another thing entirely to be incorporeal, let alone subjective, or a 'quasi-affection', etc.

The significance of this claim that the special objects of the distance senses affect indeterminate bodies in particular has hardly even been noticed, let alone explored. Yet I am going to argue that it provides the key to understanding how Aristotle would respond to Plotinus' challenge, as part of a more general package of views we might summarize as follows: Only (relatively[31]) determinate bodies like apples, bells, and cheese—i.e. bodies with determinate boundaries of their own—can *have* colours, sounds, and odours, in the sense of 'have' (*echein*) we saw briefly above (section 2), and which I will characterize further below (especially section 6). Indeterminate bodies like air and water, by contrast, cannot. Nevertheless, indeterminate bodies are susceptible to being affected by the colours of determinate bodies, and sounds and odours *just are* effects of determinate bodies in indeterminate bodies.[32] This is

29 See also *Sens.* 3, 439b1–12, discussed below.

30 As Theophrastus observes (*Metaphrasis*, 19,22–20,5), the ear and the nose cannot be made *just* out of air, or else it would be a mystery why we cannot smell sounds and hear odours! I address the sense in which our sense organs are—and must be—simple, and homoiomerous, in a manuscript on the contact senses and mediation, in progress. For the idea that the sense organs are homoiomerous, see *Parts of Animals* (*Part. An.*) 2.1, 647a3–24.

31 This qualification will be important in dealing with alleged counterexamples in section 8. Having mentioned it here, however, I will suppress it for the time being.

32 To be clear, *being* a sound and *having* a sound are different, as are *being* an odour and *having* an odour. So even if a sound (/odour) is *in* the air, it does not follow that the air *has* a sound (/odour). We obscure these distinctions if we speak without further qualification of air as being 'noisy' or 'smelly'. This distinction invites a further question: what should we say about odours that linger in the fridge after the offending food has been removed, and sounds that echo in cathedrals after the events that produced them have ceased?

why Aristotle says here that colours, sounds, and odours affect indeterminate bodies—whether animate or inanimate—fleeting though such effects may be.

How does this help in responding to Plotinus' challenge? Consider the case of heat again, by way of contrast. Since heat is a *per se* property of body, *any* body is a suitable candidate for being heated and cooled, including air and water. This means that while the hot air near the fire may originally have acquired its heat from the fire, it is now hot in its own right and without reference to the fire. The air heats the perceiver independently of the fire. This is why feeling the heat in the air does not suffice for feeling the heat in the fire, any more than seeing smoke counts as seeing fire—because they are independent. The fire makes a *new* hot thing out of the air, and it is this new hot thing we feel, properly speaking.

The situation is crucially different with the special objects of the distance senses. Colours, sounds, and odours are not *per se* properties of body. Not every body can *have* them—only determinate bodies can.[33] Yet it does not follow that indeterminate bodies like air and water are wholly unaffected by coloured, sounding, odorous determinate bodies insofar as they are such (coloured, etc.). Indeed, Aristotle tends to think of indeterminate bodies as being especially susceptible to affection, and so it would be quite surprising if they turned out

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I discuss sound in sections 6 and 8 below, so let us focus on odour. There are several issues here. First, there are the problems that sometimes attend the time lag involved in such cases. Suppose the offending food—some cheese—has been eaten and digested, and so no longer exists. Can I still be said to smell not only the odour of the cheese in the fridge, but also the *cheese itself* in such a case? Perhaps not, because perception belongs to the category of relatives for Aristotle, and relations require the existence of their relata. But the matter is not entirely clear, and Aristotle does not express an explicit opinion. Another issue is whether we are forced to think of the air as *having* the odour once the cheese is destroyed, or whether nothing *has* it in the relevant sense. What is true in any case is that the odour inheres *in* the air in the fridge. Whether anything counts as 'having' the odour in such a case in the sense outlined above and discussed further below is another matter. There are considerations on both sides. On the one hand, Aristotle connects odour with flavour, and denies that air can have flavour (see section 7 below). This is one reason to resist saying that air can *have* odour in the sense of being an odour-maker or producer. On the other hand, there are circumstances in which the wind can 'whistle' and so can *have*—i.e. produce—sound (see section 8). So why not an odour too? Perhaps it can in exceptional circumstances. Yet if so, it is the exception that proves the rules articulated below, rather than the typical case. My thanks to Robert Roreitner for encouraging me to say more here, and see n. 73 below for yet more.

33 I offer proof of this claim below. As a brief preview, recall that Aristotle says explicitly that colour is the limit of *determinate* body (*Sens.* 3, 439b11–12), that air is soundless because it is easily dispersed (*An.* 2.8, 420a8–9), and that odours are produced by bodies with flavour, and that what has flavour is composite, or 'has a certain consistency' (*Sens.* 4, 441a21–9), which both air and freshwater are explicitly said to lack.

to be impervious to determinate bodies in these (or many other) respects. What does follow is just that when coloured, sounding, and odorous determinate bodies act on air and water, it cannot be a matter of straightforwardly reproducing their own features in the air and water, in the way a distant fire can straightforwardly reproduce its heat in the air.

So what does happen? I suggest that coloured, sounding, and odorous determinate bodies have a distinctive kind of corporeal effect on indeterminate bodies, which I will call an 'imposition'. While the analogy is not perfect, it might help to think of the effects of a waterglass (or the banks of a pond) on the water inside. As the determinate boundaries of a waterglass shape the water inside, so the colours of determinate bodies shape the light in the indeterminate body they bound, the determinate bodies of sound producers shape the indeterminate body they impact, and similarly for odour, *mutatis mutandis*.

Impositions have two important features for present purposes. First, they are corporeal. There is nothing incorporeal, or subjective, about the effects of colour on air or water, any more than there is something incorporeal about the effects of a waterglass on the water inside. Second, while impositions inhere, or exist, *in* indeterminate bodies, they also continue to depend on their determinate causes in a distinctive way. Impositions are *in* indeterminate bodies but *of* determinate bodies. This special connection between imposition and source explains why impositions sustain perceptual access to their causes and not merely inferential access. Instead of getting in the way, they make distance perception possible.[34]

34 A reviewer asks whether my account makes particular use of the fact that the air and water in our distal sense organs are confined, and so relatively determinate. By way of reply, I want first to acknowledge that this confinement is crucially important for our capacity to see, hear, and smell (see *Sens.* 2, 438a12–25, as well as the 'thought experiment' at *Part. An.* 2.8, 653b24–30, which is a counterpart of the amusing thought experiment in *An.* 2.11, 423a2–22). It certainly seems as though the shape and structure of our eyes (*Generation of Animals* [*Gener. An.*] 5.1, 780a26–36), ears (*An.* 2.8, 420a8–19; *Gener. An.* 5.2, 781b13–17), and nose (*An.* 2.9, 421b32–422a6; *Gener. An.* 5.2, 781b9–13) make an important contribution to our capacity to perceive by means of these organs, as does the fact that the air and water involved in our sense organs are 'connate', or 'grown-together' with the rest of the perceptual system (e.g. *Gener. An.* 2.6, 743b33–9; *An.* 2.8, 420a8–19). Nonetheless, I do not think that these important facts tell for, or against, my account. In particular, I do not think that this confinement furthers vision by, for example, enabling the eye to *take on*, or *have*, colour in a way the indeterminate medium cannot (the colour of the iris notwithstanding). Aristotle emphasizes that the medium passes on the affection to the eye, and consequently that the eye must be transparent too. In this respect, the eye—and particularly the lens—is a bit like ice, discussed in section 8 below. That is, the eye is relatively determinate, and yet it is transparent rather than coloured. (Compare, in this connection, the ancient practice of using 'crystalline' in connection with this or that part

At this point one might object that there is no such thing as corporeal affection without straightforward (qualitative) reproduction in Aristotle. Let me try to address this concern in general terms here, reserving some of the details that pertain specifically to this or that sense for the relevant sections below (5–7).

Aristotle's account of sound is a first clear case of corporeal affection without straightforward reproduction (citations and more details in section 6 below). Aristotle distinguishes sounds and sound producers. A sound is, or is grounded in, a certain kind of motion in air (or water). A sound producer is a pair, or plurality, of determinate bodies (which may be two or more parts of the same body) that produce a sound when struck together. For example, I make a clapping sound by clapping my hands together.

When I make a clapping sound, what is it that my hands already have that is straightforwardly reproduced in the surrounding air? A certain kind of motion in the air? That makes little sense in Aristotelian terms. Indeed, while Aristotle is perfectly happy to say that sound producers 'have sound', this just means they can produce sound (see *An.* 2.8, 419b4–11 and section 6 below). Another suggestion might be that the clapping itself is somehow reproduced in the air. When I clap, I make the air a clapper too, and so a sound *producer*. Yet this doesn't make much sense either, and moreover it invites the awkward question of how any of us ever manages to hear *people* clap, and not just air. So it seems that sound production is not a straightforward case of (qualitative) reproduction for Aristotle. Does it follow that sounds are somehow 'incorporeal'? Surely not. Aristotle's view that a sound is something like a vibration in the air is reasonably close to certain strands in modern thinking about sound, and we do not think that sounds are incorporeal.[35]

At this point one might worry that if the causal process underlying distal perception falls short of straightforwardly reproducing the features of distal objects, then it is a mystery how such a process enables us to perceive those distal features in the first place. In response, let us step back for a moment and consider our own views about vision. We tend to think of vision as a causal

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of the eye, as in 'crystalline humor', or 'crystalline lens', etc.). Indeed, Aristotle stresses that the sense organs—especially the distal sense organs—are, and must be, homoiomerous and as simple as possible, in order that they should be receptive (*Part. An.* 2.1, 647a2–9). Finally, it is not clear how the eye could become coloured in vision in the first place. It is not true in general that the colour of one determinate body acts on the colour of another (relatively) determinate body, even when they are in direct contact (e.g. my apple doesn't colour my desk). And since vision occurs at a distance, the apple would have to 'paint' my eye from afar, which seems even less likely.

35 See n. 19 above.

process, and yet nobody expects that a third party watching me gaze at a red apple would see something red (or anything else, for that matter) stretching from the apple to my eye.[36] So long as the character of the underlying causal process varies with, and depends upon, the relevant features of the distal object in the right sort of way, that is enough.

In this respect, at least, I do not see why Aristotle is any worse off than we are. Indeed, I argue below that Aristotle makes this sort of point in connection with audition at *An.* 2.8, 420a26–420b5, namely that we can *hear* certain features of sound producers (e.g. size, motion, composition, etc.)[37] by hearing the sounds they make, precisely because there are various correspondences between these distal features and the sounds produced. Consider the experience of listening to a bowling ball as it rolls down an alley. Someone interested in explaining our ability to enjoy this kind of experience is not forced to say that the sounds we hear must be heavy and rolling themselves. Sounds are not heavy, and they do not roll, except metaphorically (i.e. by transfer of meaning). There is correspondence but not reproduction.

It is not just in perceptual contexts that corporeal affections sometimes fall short of straightforward reproduction in Aristotle. Consider his account of voluntary motion. When I decide to pirouette, what motion am I reproducing? It is not that my soul spins and then my body follows suit. Rather, my soul causes a thermic change in my heart, which expands or contracts, which causes motion in the surrounding muscles, etc. (cf. *Movement of Animals* 7). The causal process involved in a pirouette thus takes different forms at different stages, which may or may not involve straightforward reproduction. It is certainly not the case that my soul heats itself up first and then heats my heart. Similarly, but going in the opposite direction—i.e. locomotion to alteration—Aristotle argues that the heat we ordinarily ascribe to the sun does not come from the sun after all (*On the Heavens* [*Cael.*] 2.7, 289a19–35). Like other celestial bodies, the sun is made of the 'fifth element' and so cannot have features like temperature. Instead, the heat we ascribe to the sun is generated by the motion of the celestial spheres as they move.[38] Here again we have affection (the heating of the air) without straightforward reproduction.

36 Why should the causal process that underlies vision have to be straightforwardly visible itself?

37 Notice that the sound itself is in the medium and then ultimately in the ear, whereas the distal features we hear by means of hearing sound are the more or less 'mechanical' features of the object that go into its production.

38 On such matters see Thorp 1982.

The previous examples are not meant to prove the existence of what I am calling 'impositions' in Aristotle. I simply want to clear the way for the evidence below by pointing out that there is no simple dichotomy in Aristotle's detailed treatments of various causal phenomena between straightforward cases of 'corporeal qualitative reproduction' and anything like incorporeal quasi-affection. Coloured, sounding, and odorous determinate bodies cannot straightforwardly reproduce their qualities in indeterminate bodies. But this does not mean either that indeterminate bodies are impervious to the relevant features of determinate bodies, or that the only effects they admit are 'incorporeal', whatever that might mean.

Given what I have said so far, one might worry that my talk of determinacy and indeterminacy makes a mountain out of what is only a molehill in *An.* 2.12. It does not. The notions of indeterminacy and determinacy play a fundamental role in Aristotle's physics and 'chemistry'.

Aristotle maintains that every sublunary body is ultimately composed from four elements: earth, air, fire, and water. In turn, each element is explained in terms of qualities drawn from two pairs of basic contraries: hot–cold and wet–dry. Earth is cold/dry, air is hot/wet, fire is hot/dry, and water is cold/wet (*Gener. Corr.* 2.3, 330a30–330b7). These basic contraries are the principles of perceptible body (*Gener. Corr.* 2.2, 329b7–18).[39] All the other tactile contraries trace back (*anagontai*, 330a25) to them in one way or another.[40] I am not saying that Aristotle *reduces* the other tactile contraries to the primary ones. It would be better to say that he wishes to make it intelligible how they 'emerge' from them.[41]

Aristotle treats hot and cold as active and wet and dry as passive.[42] A typical 'chemical' process will thus involve the mixture or separation of wet and dry under the influence of hot or cold. Think of the role of heat in cooking, for

39 When Aristotle says at *An.* 2.11, 423b26–30 that the objects of touch are the differences of body *qua* body, he refers explicitly to the discussion in *Gener. Corr.* 2.2. See also Philoponus *Commentary on Aristotle's De generatione et corruptione* [*In Gener.*] 213, 18–214, 13.

40 *Gener. Corr.* 2.2, 329b7–10; 2.7, 334b8–30; *Physics* (*Phys.*) 1.6, 189a17; *Part. An.* 2.1, 646a14–21; *Meteorologica* (*Mete.*) 4.12, 390b2–14; cf. Philoponus *In Gener.* 232, 6–12.

41 As it stands, the claim in the main text is too weak. *All* perceptible contraries (including colours, etc.) emerge from the primary (tactile) contraries in one way or another. Yet we cannot feel all perceptible contraries by touch—we cannot *feel* colours or odours. So the non-primary tactile contraries must stand in a more intimate relation to the primary tactile contraries than the non-tactile perceptible contraries do. The way forward is suggested by *An.* 2.11 (422b18–34): The other tactile contraries stand to hot/cold and wet/dry as volume stands to sound.

42 *Gener. Corr.* 2.2, 329b24–6. *Mete*. 4.1, 378b10–14.

example.[43] With this background in mind, here is how Aristotle characterizes wet and dry in *Gener. Corr.* 2.2 and then goes on to use them:

> [A] ὑγρὸν δὲ τὸ ἀόριστον οἰκείῳ ὅρῳ εὐόριστον ὄν, ξηρὸν δὲ τὸ εὐόριστον μὲν οἰκείῳ ὅρῳ, δυσόριστον δέ.
> [B] Τὸ δὲ λεπτὸν καὶ παχὺ καὶ γλίσχρον καὶ κραῦρον καὶ σκληρὸν καὶ μαλακὸν καὶ αἱ ἄλλαι διαφοραὶ ἐκ τούτων· ἐπεὶ γὰρ τὸ ἀναπληστικόν ἐστι τοῦ ὑγροῦ διὰ τὸ μὴ ὡρίσθαι μὲν εὐόριστον δ' εἶναι καὶ ἀκολουθεῖν τῷ ἁπτομένῳ, τὸ δὲ λεπτὸν ἀναπληστικόν. (*Gener. Corr.* 2.2, 329b23–35)
>
> [A] Wet is that which is not determined by a boundary of its own but is easily bounded, whereas dry is what is well determined by its own boundary, but is difficult to bound.
> [B] Fine and coarse, viscous and brittle, hard and soft, and the other differences are from these. For since the ability to fill things belongs to the wet on account of its being indeterminate but easily bounded and on account of its following [in respect of its boundaries] that with which it is in contact, and what is fine is able to fill things.

The crucial point comes in A: Aristotle characterizes wet and dry precisely in terms of indeterminacy and determinacy.[44] Yet the material in B is no less striking. Aristotle sets out to trace the other tactile contraries back to the primary ones, beginning here in B with fineness and the wet, before proceeding to the other contraries listed in B (330a4–12). While he does not try explicitly to trace all the other—non-tactile—features of perceptible bodies back to the primary contraries in *Gener. Corr.* 2.2, there are various indications elsewhere that he is committed to doing so, in one way or another. There is little doubt, for example, that the colour of a body depends ultimately on its elemental makeup, and so on the mixture of hot, cold, wet, and dry it contains.[45]

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43 As Aristotle notes himself, much of the language of his 'chemistry' is drawn from cooking (*Mete.* 4.2, 379b14–18)! So are many of his examples. See Lloyd 1996, Ch. 4. I enclose 'chemistry' in scare quotes to acknowledge the difficulties that come with applying modern scientific labels to Aristotle. My thanks to Andrea Falcon for discussion.

44 He does the same in *Mete.* 4.1 at 378b21–26.

45 See for example the passages collected and discussed by Ierodiakonou (2018, 84), including: *Gener. An.* 2.2, 735b33–7; *Gener. An.* 5.1, 779b28–33; *Gener. An.* 5.4, 784b13–15; *Gener. An.* 5.6, 786a2–7; 786a12–21; *Mete.* 3.4, 374a7–8; 374a18–19; *Mete.* 3.6, 377b22–3. Again, this is not a matter of reduction. Aristotle keeps a healthy distance between the property wet and the property transparent—the property in terms of which he understands colour. For example, he claims that it is not insofar as the eye is *wet* that it is a suitable organ

In fact, wet and dry play a special role in the composition of *all* compound bodies, precisely because they are sources of determinacy and indeterminacy:[46]

> ἐπεὶ δ' ἐστὶν τὸ μὲν ὑγρὸν εὐόριστον, τὸ δὲ ξηρὸν δυσόριστον, ὅμοιόν τι τῷ ὄψῳ καὶ τοῖς ἡδύσμασι πρὸς ἄλληλα πάσχουσι· τὸ γὰρ ὑγρὸν τῷ ξηρῷ αἴτιον τοῦ ὁρίζεσθαι, καὶ ἑκάτερον ἑκατέρῳ οἷον κόλλα γίγνεται, ὥσπερ καὶ Ἐμπεδοκλῆς ἐποίησεν ἐν τοῖς φυσικοῖς "ἄλφιτον ὕδατι κολλήσας." καὶ διὰ τοῦτο ἐξ ἀμφοῖν ἐστιν τὸ ὡρισμένον σῶμα. (*Mete.* 4.4, 381b29–382a2)
>
> Since the wet is easily bounded, but the dry with difficultly, they affect each other like a dish and its seasoning. For the wet causes the dry to take shape, and each serves as a sort of glue for the other, just as Empedocles says in his poem *On Nature*: 'Gluing meal together with water.' It is on account of this that determinate body is composed from both.[47]

Against this background it can hardly be an accident that Aristotle identifies the media for distance perception with the two elements he characterizes in terms of the wet—air (hot/wet) and water (cold/wet)[48]—nor can it be an accident when he observes accordingly that the special objects of the distance senses affect indeterminate bodies in particular. Not a molehill, then, I hope, but the tip of an iceberg.

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for vision, but insofar as it is transparent (*Gener. An.* 5.1, 780a4–5). Of course, this does not mean that the wet and the transparent are totally unrelated. Similar claims hold for sounds and odours and flavours, as we will see below. In this connection, see also *Mete*. 1.3, 340b16–17.

46 Compare *Gener. Corr.* 2.8, 334b31–335a9.

47 My translation here is based on that of Lee (1952). Notice that wet and dry are not purely passive: they are active in relation to one another. Moreover, it is a two-way street—at least sometimes. For though one might have expected Aristotle to insist that the determinate principle—the dry in this case—always acts on the indeterminate principle—the wet—he defies that expectation here and treats the wet as active. See in this connection Stavrianeas (2022, 48) and Lloyd (1964). Nonetheless, various passages in Aristotle display a preference for determinacy. For example, Aristotle often associates determinacy with form and indeterminacy with matter: *Phys.* 4.2, 209b6–9; *Cael.* 2.8, 293b13–16; *Metaphysics* (*Metaph.*) 13.10, 1087a16–18.

48 Indeed, air and water are the *most* indeterminate bodies, given that other sublunary bodies are compounds of wet and dry (and so of water and earth, *Gener. Corr.* 2.8, 334b31–335a6).

So much by way of introduction to Plotinus' challenge and overview of Aristotle's response. The proof is in the details in the following sections. I consider colour first and at greatest length (section 5), then sound (section 6), and then odour and flavour together because of their intimate relation (section 7). I turn to putative counterexamples in section 8.

5 Colour and Vision

The goal of this section is to establish the foregoing general picture in the case of colour and vision in particular. To that end, I try to establish three claims:

> C(olour)1 Only determinate bodies have colours properly speaking for Aristotle.[49]
> C2 The colours of determinate bodies have distinctive effects in indeterminate bodies (air and water).
> C3 The effects of colour in indeterminate bodies make visual perception possible without themselves being the *objects* of visual perception, i.e. without being *what* we see.

It is easy enough to get C1 on the table because Aristotle simply says it in *Sens.* 3. Here is the relevant pronouncement, which is Aristotle's official characterization of colour in *Sens.* 3: 'So then colour is the limit of the transparent in determinate body' (ὥστε χρῶμα ἂν εἴη τὸ τοῦ διαφανοῦς ἐν σώματι ὡρισμένῳ πέρας, 439b11–12).[50]

If colour is the limit of the transparent in determinate body, then only determinate bodies have colour, properly speaking. So far so good. To put flesh on the bones of this claim, however, we need to know what 'transparent' means here, and for that it will help to turn first to C2 and *An.* 2.7.

Near the beginning of *An.* 2.7, Aristotle claims that 'every colour is such as to move what is transparent in actuality, and this is the nature of it' (418b1–2). We are soon told that the transparent (*to diaphanes*) belongs to air, water, and 'many solids' (*polla tōn stereōn*, 418b6–7). While the scope of 'many solids' is not immediately clear (see section 8 below), Aristotle goes on to explain (*gar*, 418b7) that it is not the same thing to be transparent and to be made out of air or water because the transparent is a common nature belonging

49 Recall that determinacy is a matter of degree. See sections 7 and 8 below.
50 Greek text of *De sensu* is from the edition by Ross (1955).

both to air and water and 'the body above'—the 'fifth element' that makes up the celestial spheres (418b9)—presumably because we see heavenly bodies through the celestial spheres.[51] So far then, at least, *to diaphanes*—'the transparent'—applies to bodies one can see through.

In addition to presenting these examples, Aristotle also glosses the transparent by saying that it is visible *not* in its own right (*kath' hauto*) but because of the colour of something else, something foreign to the transparent body—*alla di' allotrion chrōma* (418b5–6). Though this gloss is rather less helpful than the examples, it does make one thing clear: it is not the effects of colour in the medium that we see. We 'see through them' to the coloured bodies beyond. The question is how that is possible.

This brings us to light. Colour doesn't just move the transparent. It moves what is transparent in actuality, and Aristotle claims that the transparent is actual in conditions of illumination—i.e. in the presence of a light source like a torch. Indeed, Aristotle says that the actuality of the transparent *is* light (418b9–10) and that light is 'a sort of' (*hoion*, 418b11) colour of the transparent. According to *An.* 2.7, then, the colours of *other* (*allotria*) bodies are naturally such as to act on the light in transparent bodies like air and water. Presumably, this is because light is of a piece with colour inasmuch as it is 'a sort of' colour itself. This claim is left hanging somewhat in *An.* 2.7, but we will see momentarily that it is made good in *Sens.* 3. In effect, then, it seems as though light is in transparent bodies like air and water what colour is in opaque bodies. Or as I would have it: Light is in indeterminate bodies what colour is in determinate bodies. So when the actuality of the transparent in determinate bodies—colour—acts on the actuality of the transparent in indeterminate bodies—light—we have a clear case of what I am calling 'imposition'.[52]

51 This is no problem for my suggestion that the transparent belongs to air and water because of their indeterminacy. The same higher-level quality—the transparent—can emerge from different bases. In any case, Aristotle faces a general problem in explaining how the sublunary and superlunary 'worlds' relate. See Falcon 2005, especially Ch. 4.

52 Some of Plotinus' objections to Aristotle's account of perceptual mediation—in fact the one that Plotinus regards as 'most important', *megiston* (4.5.3, 1)—have to do with light, and especially the fact that one can see luminous bodies in the dark (4.5.3, 1–15). I'm inclined to think that Aristotle treats the perception of luminous bodies (including fire) and luminance itself somewhat differently from the perception of colour, and so to that extent they deserve a separate treatment, which I hope to present elsewhere. As far as perceptual mediation in particular is concerned, however, I'm not convinced that luminous bodies present a special problem. If a distant campfire were to affect the medium in the 'corporeal' way required by Aristotle's account, Plotinus worries, then the medium should be illuminated, contrary to the supposition that it is dark out. I do not see why Aristotle should endorse this conditional. Perhaps it is one thing for a fire to light a room (e.g.) to a sufficient degree that the colours of other things can be seen in it, and another thing for a

Let's turn back to *Sens.* 3, bearing the foregoing account of the transparent from *An.* 2.7 in mind. Indeed, Aristotle refers to it himself in *Sens.* 3 (439a18–21) before extending the account in a surprising way:

> ὃ δὲ λέγομεν διαφανὲς οὐκ ἔστιν ἴδιον ἀέρος ἢ ὕδατος οὐδ' ἄλλου τῶν οὕτω λεγομένων σωμάτων, ἀλλά τίς ἐστι κοινὴ φύσις καὶ δύναμις, ἣ χωριστὴ μὲν οὐκ ἔστιν, ἐν τούτοις δ' ἔστι, καὶ τοῖς ἄλλοις σώμασιν ἐνυπάρχει, τοῖς μὲν μᾶλλον τοῖς δ' ἧττον· (*Sens.* 3, 439a21–5)
>
> But what we call transparent is not a special feature of air or water or any of the other bodies we call this [i.e. 'transparent'], but a common nature and power, which cannot exist in separation, but belongs in these and in the rest of the bodies, in some more and some less.

Apparently, *to diaphanes*—the transparent—does not belong just to bodies one can see through. It belongs to all bodies, including opaque bodies. So far this is just a pronouncement. Yet we get a kind of argument for it in what follows, which culminates in the characterization of colour in terms of determinate body with which I began this section:

> φαίνεται δὲ καὶ ἀὴρ καὶ ὕδωρ χρωματιζόμενα· καὶ γὰρ ἡ αὐγὴ τοιοῦτόν ἐστιν. ἀλλ' ἐκεῖ μὲν διὰ τὸ ἐν ἀορίστῳ οὐ τὴν αὐτὴν ἐγγύθεν καὶ προσιοῦσι καὶ πόρρωθεν ἔχει χρόαν οὔθ' ὁ ἀὴρ οὔθ' ἡ θάλαττα· ἐν δὲ τοῖς σώμασιν, ἐὰν μὴ τὸ περιέχον ποιῇ μεταβάλλειν, ὥρισται καὶ ἡ φαντασία τῆς χρόας. δῆλον ἄρα ὅτι τὸ αὐτὸ κἀκεῖ κἀνθάδε δεκτικὸν τῆς χρόας ἐστίν. τὸ ἄρα διαφανὲς καθ' ὅσον ὑπάρχει ἐν τοῖς σώμασιν (ὑπάρχει δὲ μᾶλλον καὶ ἧττον ἐν πᾶσι) χρώματος ποιεῖ μετέχειν. ἐπεὶ δ' ἐν πέρατι ἡ χρόα, τούτου ἂν ἐν πέρατι εἴη. ὥστε χρῶμα ἂν εἴη τὸ τοῦ διαφανοῦς ἐν σώματι ὡρισμένῳ πέρας. (*Sens.* 3, 439b1–12)
>
> Both air and water appear coloured. For their gleam [*augē*] is also like a colour. But in their case neither the air nor the sea has the same colour when one approaches close by and from afar, on account of being in an indeterminate body. But in [determinate] bodies, unless the surroundings should cause it to change, the appearance of the colour is determinate. It is clear then that the same thing is receptive [*dektikon*] of colour

distant fire to engage the medium in such a way as to make itself visible through it, without making its surroundings (equally) visible. For his own part, Plotinus acknowledges that someone might bite this bullet, at which point he defaults to a version of the objection to perceptual mediation that is the impetus for this paper (4.5.3, 10–13). My thanks to a reviewer for encouraging me to address these further aspects of Plotinus' discussion.

> both in that case and in this case. So the transparent, to the extent that it belongs in [determinate][53] bodies (and it belongs in all, in some more and in some less), causes [them] to partake [*metechein*] of colour. And since colour is in the limit, it is in the limit of this. Hence colour is the limit of the transparent in a determinate body.

The trajectory of this passage is remarkable. Aristotle manages to begin with the claim that indeterminate bodies like air and water have a sort of colour—their gleam is 'such' (*toiouton*)—and yet to conclude that colour belongs only to determinate bodies, properly speaking![54] This trajectory makes some sense, however, if we suppose that Aristotle is working backwards from *An.* 2.7's account of the effects of colour in transparent bodies like air and water to the nature of colour itself in opaque bodies.[55] This is not just the (too simple) thought that the gleam of air and water must share the same nature with colour because they are similar. There is causal reasoning at work too: if colour has distinctive effects in transparent bodies like air and water, then colour must have something to do with the transparent as well. This is because Aristotle endorses a qualified version of the principle that like affects like, according to which causes must be generically like their effects. He glosses this principle in *Gener. Corr.* 1.7 by saying that '[…] it is natural for body to be affected by body, flavour by flavour, colour by colour, and generally what is of a given genus by its like' (*Gener. Corr.* 1.7 323b33–324a1).[56]

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53 The initial contrast with indeterminate bodies requires us to understand 'determinate' in connection with the first occurrence of ἐν δὲ τοῖς σώμασιν. This second supplement follows naturally on the first and is in any case required by the argument. That is because this sentence draws the conclusion ('So the transparent […]' τὸ ἄρα διαφανές) that it is the transparent that makes *determinate* bodies participate in colour from the premise that it is the same thing that makes indeterminate and determinate bodies receptive to colour, together with the claim that it is the transparent that makes indeterminate bodies receptive to colour.

54 Sorabji argues that we should understand the corporeal effects of colours in the medium and our sense organs on the model of this description of the colour of the sea—what Sorabji calls a case of 'borrowed colour' (2004, 131). While I am generally sympathetic to Sorabji's approach, this cannot be quite right. As he notes himself (2001, 53), Aristotle seems to be describing a special case in which an indeterminate body like the sea looks to have a colour. Yet when I see a red apple, neither its effect in the medium nor its effect in my eye look any way at all, either to myself or anyone else. More on this as we proceed.

55 This fits well with Aristotle's description of the division of labor between *De anima* and *De sensu* at the beginning of *Sens.* 3.

56 Given this view of causation, it is natural to think that if colour affects light, light is 'a sort of' colour. And vice-versa: if colour affects light—the actually transparent—then colour is some sort of function of the transparent too.

As I have said, the argument begins with the idea that air and water have a sort of colour—their gleam is 'such' (*toiouton*)—albeit not quite the way determinate bodies do. Aristotle immediately exploits the similarity between this gleam and colour to draw the conclusion ('It is clear then […]') that the very same feature of indeterminate bodies that makes them receptive to this gleam also makes determinate bodies receptive to colour.

Having concluded that the same feature makes indeterminate and determinate bodies *receptive* to colour—and recalling that what makes indeterminate bodies receptive to colour is their transparency—Aristotle draws the further conclusion that it must be the transparent that makes determinate bodies *partake* of colour. This shift from talk of 'reception' to 'participation' is deliberate. We know from Aristotle's infamous characterization of perception as the *reception* of form without matter (*An.* 2.12, 424a17–19) that something can receive a form without straightforwardly embodying, or 'having', it: I can see red without my soul or my eyes literally turning red.[57] I am not suggesting that Aristotle uses the language of 'reception' here to evoke that infamous characterization of perception, just that he is comfortable using the language of 'reception' in such a way that X can receive Y without 'having' Y. This terminology works well here because it would have been false to say that the same nature is responsible for indeterminate and determinate bodies *having* colour, since indeterminate bodies do not have colour. So, we get the language of 'reception' instead.[58]

Having argued that it is in virtue of the same feature of indeterminate and determinate bodies that they are receptive to colour, Aristotle concludes that it is in virtue of the transparent that determinate bodies *partake* of colour. This talk of participation reflects the fact that determinate bodies do not just 'receive' colour: they have it.[59] And this is why Aristotle concludes that colour is the limit of the transparent in determinate bodies.[60]

In sum, this stretch of argument in *Sens.* 3 confirms the impression we got from *An.* 2.7 above: light and the 'gleam' in indeterminate bodies on the one hand, and colour on the other, are similar inasmuch as they are both manifestations of the same underlying nature—the transparent. Yet they are different.

57 *Pace* the crude version of literalism described in n. 19 above.

58 See also the use of *dektikon* in *An.* 2.7 at 418b27–9.

59 As I understand this terminology, whatever embodies/has X also receives X, but not vice versa. Note in consequence that 'receiving colour', or 'being receptive to colour', does not entail acquiring colour from elsewhere. It is rather a matter of being the underlying subject in which colour *or its effects* occur.

60 Why does Aristotle say that colour is in the *limit* of determinate body in particular? Strictly speaking, determinate bodies are coloured throughout (439a33–b1). But the colour of a determinate body is actual only at its external surface, where it is exposed to light.

And they differ precisely because light is the manifestation of the transparent in indeterminate bodies, whereas colour is the manifestation of the transparent in determinate bodies. So when colour acts on light—as it surely can—it will not be a matter of straightforward qualitative reproduction, but what I am calling imposition.

Thus far we have evidence for C1 and C2: colour belongs to determinate bodies (C1) and has distinctive effects in indeterminate bodies (C2). This brings us to C3, which we can break down into three further questions: 1) What do we see, properly speaking: colour, or its effects? 2) (Assuming the former) How do we see colour by means of its effects? 3) How is it that seeing colour enables us to see 'what has colour', e.g. an apple?

The first question is easily answered, at least as a matter of Aristotle's text. There is little doubt that colour is what we see in the first instance for Aristotle, not light or the effects of colour therein. First, Aristotle claims that colour is visible *per se* (*An.* 2.7, 418a29–b1). Second, and by contrast, he denies that the transparent in indeterminate bodies is visible *per se*. Rather, as we saw, he says it is visible only because of the colour of something else, which claim evidently gives pride of place to colour as the object of vision. Third, Aristotle often claims that colour is seen *in* light (e.g. 418b3; 419a1–2; 419a7–11). This suggests that light and the effects of colour therein play the part of enabling conditions rather than proper objects:

> νῦν δ' ἐπὶ τοσοῦτον φανερόν ἐστιν, ὅτι τὸ μὲν ἐν φωτὶ ὁρώμενον χρῶμα. διὸ καὶ οὐχ ὁρᾶται ἄνευ φωτός· τοῦτο γὰρ ἦν αὐτῷ τὸ χρώματι εἶναι, τὸ κινητικῷ εἶναι τοῦ κατ' ἐνέργειαν διαφανοῦς· ἡ δ' ἐντελέχεια τοῦ διαφανοῦς φῶς ἐστιν. (*An.* 2.7, 419a7–11)
>
> At present this much is clear: What is seen in light is colour. This is also why colour is not seen without light. For this is what it was to be colour, to be such as to move what is transparent in actuality. And the actuality of the transparent is light.

The second question is more difficult. Yet one thing is clear: it is *not enough* to say that the effects of colour in the medium enable us to see colour because they are effects of colour—because an (efficient) causal relation is involved. The insufficiency of this move is one of the lessons of Plotinus' challenge: the heat in the intervening air is also an effect of the distant fire, yet it does not support perceptual access to the distant fire. If we are to explain the possibility of visual perception at a distance, then, the relation between colour and its effects in the medium and the eye must be more intimate than simple (efficient) causation.

This is where the notion of an imposition earns its keep. Air and water cannot support colour in their own right. It must be imposed on them from without by a determinate body. In consequence, both the existence and the character of the resulting imposition in the medium (and eye) depend on the activity of the imposing colour in a way that the heat in the air does not depend on the heat in the fire. This explains why the effects of colour on indeterminate bodies are 'fleeting'. Remove the imposing colour and the imposition goes with it. We will see more evidence for the peculiar ontological status of impositions below.

The third and final question is easy to answer in outline but would take a separate paper to answer in detail. It is easy to answer in outline because there is no great mystery about how seeing colour puts one in a position to see 'what has colour'. Since the colours we see belong to the surfaces of determinate bodies, seeing colour gives us access to the topology of those bodies. This is in sharp contrast with the difficulty of explaining how sounds and odours put us in a position to perceive their sources. It will be useful to express the relationship between colour and its bearer in Aristotle's more formal terminology: there is a *per se* connection between colour and determinate body. In particular, the surface of a determinate body is the *per se* subject (*hupokeimenon*) for colour. Aristotle says as much in various places: *Metaph.* 5.18, 1022a14–19; *Metaph*. 7.4, 1029b, 13–20; *Metaph.* 12.4, 1070b19–21. It is also implied in the characterization of colour with which we began this section. What this means is that there is an *essential* connection between colour and determinate body: it is in the essence of colour to belong to a certain kind of body. And that helps to explain why seeing colour puts one in a position to see such bodies.

6 Sound and Hearing

The goal of this section is to establish corresponding claims about sound and hearing, *mutatis mutandis*:

> S1 Only determinate bodies have sounds properly speaking for Aristotle.
> S2 The sounds of determinate bodies are distinctive effects these determinate bodies produce in indeterminate bodies (air and water).
> S3 Sounds are the special objects of auditory perception. Yet while sounds take on a (sort of) life of their own *in* the medium, we also hear sound sources by hearing the sounds they produce in the medium.

The most important difference between colours and sounds is that whereas colours are attached to determinate bodies and produce further corporeal effects in the medium, sounds *just are* corporeal effects in the medium and

progress through it. This is clear right from the beginning of Aristotle's discussion of sound in *An.* 2.8:

> Νῦν δὲ πρῶτον περὶ ψόφου καὶ ἀκοῆς διορίσωμεν. ἔστι δὲ διττὸς ὁ ψόφος· ὁ μὲν γὰρ ἐνεργείᾳ τις, ὁ δὲ δυνάμει· τὰ μὲν γὰρ οὔ φαμεν ἔχειν ψόφον, οἷον σπόγγον, ἔρια, τὰ δ᾽ ἔχειν, οἷον χαλκὸν καὶ ὅσα στερεὰ καὶ λεῖα, ὅτι δύναται ψοφῆσαι. τοῦτο δ᾽ ἐστὶν αὐτοῦ μεταξὺ καὶ τῆς ἀκοῆς ἐμποιῆσαι ψόφον ἐνεργείᾳ. γίνεται δ᾽ ὁ κατ᾽ ἐνέργειαν ψόφος ἀεί τινος πρός τι καὶ ἔν τινι· πληγὴ γάρ ἐστιν ἡ ποιοῦσα. διὸ καὶ ἀδύνατον ἑνὸς ὄντος γενέσθαι ψόφον· (419b4–11)
>
> Now let us determine first about sound and hearing. Sound is twofold: there is sound in actuality, and sound in potentiality. For we say that some things do not have sound, like sponge, or wool, and that others have it, like bronze and as many things as are solid and smooth, because each is able to sound—that is, produce an actual sound between itself and the organ of hearing. The actual sound that comes about is always the sound of something against something and in something. For what produces it is a blow. This is also why it is impossible for sound to come about when there is just one thing.

It takes three to make a sound: when two things (or two parts of one thing) meeting certain conditions strike each other they produce a sound *in something else* between themselves and the organ of hearing, i.e. in the medium. Note that Aristotle mentions the organ of hearing here only for convenience. Sounds always travel between their sources and *something* (cf. *Phys.* 7.5), and since *An.* 2.8 is about hearing the most natural *terminus ad quem* is the ear. The key point for our purposes is clear enough: sounds are not attached to their sources in the way colours are attached to their surfaces.[61]

This passage makes at least two other important points. First, it introduces the notion of a sound source, or 'what has sound' in the sense of something that is able to produce a sound in a medium. Sounds might exist *in* a medium—bodies of air and water—but they are *of* things like bells. We will

61 One could try to insist that while sounds may be produced *in* the medium, they keep to their sources all the same. But what in Aristotle's physics would predict such behaviour? This is certainly not how Aristotle describes the partwise motion of sounds and odours through the medium in *Sens.* 6 (446b13–17). I address that passage and the *aporia* (beginning at 445b20) to which it belongs in a manuscript on *Sens.* 6, in progress.

come back to this point in a moment. Second, this passage gives us some initial indications of the conditions a body must meet to count as *having* a sound.

When Aristotle says that sound sources are solid and smooth it is clear they must be (a subset of) determinate bodies. To see why, it will help to know more about what Aristotle thinks sounds are. A sound is a certain kind of change in air (or water):

> αὐτὸς μὲν δὴ ἄψοφον ὁ ἀὴρ διὰ τὸ εὔθρυπτον· ὅταν δὲ κωλυθῇ θρύπτεσθαι, ἡ τούτου κίνησις ψόφος. (*An.* 2.8, 420a8–10)
>
> Air itself is soundless on account of being easily dispersed. But whenever it should be prevented from being dispersed, the motion of it is sound.

Air is soundless because it is indeterminate. Nonetheless, sounds are produced in air when it is suddenly (and temporarily) unified by the clash of two determinate bodies against one another and it:

> τὸ δὲ κενὸν ὀρθῶς λέγεται κύριον τοῦ ἀκούειν. δοκεῖ γὰρ εἶναι κενὸν ὁ ἀήρ, οὗτος δ' ἐστὶν ὁ ποιῶν ἀκούειν, ὅταν κινηθῇ συνεχὴς καὶ εἷς. ἀλλὰ διὰ τὸ ψαθυρὸς εἶναι οὐ γεγωνεῖ, ἂν μὴ λεῖον ᾖ τὸ πληγέν. τότε δὲ εἷς γίνεται ἅμα διὰ τὸ ἐπίπεδον· ἓν γὰρ τὸ τοῦ λείου ἐπίπεδον. ψοφητικὸν μὲν οὖν τὸ κινητικὸν ἑνὸς ἀέρος συνεχείᾳ μέχρις ἀκοῆς· (*An.* 2.8, 419b33–420a5)
>
> What is empty is rightly said to be in charge of hearing.[62] For it seems that air is empty, and this is what produces hearing, whenever it should be moved continuously and as one. Yet because it is friable this would not occur, unless what strikes [it] should be smooth. For the surface of what is smooth is one. So then what is able to sound is what is able to move air continuously and as one up to hearing.

As Burnyeat rightly insists (1995, 429–431), Aristotle is not saying that the air associated with a sound moves as a mass from source to ear like a breeze.[63] After all, Aristotle claims that the air 'stays put' (*hupomenē*, 419b22). Rather, sound is a vibration, or a wave, which travels through the air so long as it is

62 Notice that Aristotle says air is 'in charge of' (*kurion*) *hearing* here, not sound. Aristotle explicitly denies that air and water are in charge of sound (*kurios*, *An.* 2.8, 419b19–20). It is determinate bodies that are responsible for sound.

63 See also Johnstone 2013, 637.

unified: sounds occur when air 'quivers and vibrates *en masse*' (ἀθροῦν ἀφάλλεσθαι καὶ σείεσθαι, *An.* 2.8, 420a26–7). It might help to think of the way a wave travels down a rope when you 'snap' one end: the wave that travels down the rope is like the sound, and the rope is like the unified air.[64] Just as the rope does not need to move from place to place for the wave to travel down it, so the air does not have to move from source to ear for sound to travel through it. The movement of sound through air is constituted by the up and down movement of successive parts of the air.

So much for my initial case for S1 and S2. Unlike the case of colour, it is the last claim that causes trouble where sound is concerned. How is it that hearing sounds in the medium puts us in a position to hear their distant sources? Why isn't hearing sounds in the medium just like feeling heat in the adjacent air *rather than* the distant fire?

To answer this question, we need to think more about the peculiar ontological status of sounds (and thereby of impositions more generally). The colour *of* an apple is *in* its surface. But the sound *of* a bell is *in* the air. How can that be? A version of this question was discussed in the ancient commentary tradition on Aristotle's *Categories* (*Cat.*). The commentators worried that sounds and odours constitute a kind of counterexample to Aristotle's claim in the *Categories* that accidents cannot exist separately from the substances in which they inhere (*Cat.* 2, 1a24–5). If the ringing sound is an accident of the bell, how can it fly off unaccompanied without violating this inherence condition?[65]

The commentators respond in various ways, helpfully collected and discussed in Ellis 1990. Porphyry (*In Cat.* 79, 28–34) argues that accidents can jump from one substance to another so long as they always belong to *some* substance or other.[66] Ammonius (*In Cat.* 28, 15–29,4)[67] suggests an account of odour in terms of effluences so that odours are always accompanied by (minuscule parts of) their sources. Yet even if Aristotle endorsed an effluence view of odour—he did not[68]—it could hardly be applied to sound! Olympiodorus (*In Cat.* 49, 5–9) and Elias (*In Cat.* 152, 12–15) seem to endorse a view they

64 For the analogy with a vibrating chord, see Johansen 2012, 167.

65 To be clear up front: I do not take a stand on the relevance of sounds and odours to the interpretation of inherence in the *Categories*. Whether the discussion of sounds and odours belongs precisely there, or somewhere else, it is an interesting problem. My thanks to Klaus Corcilius for encouraging me to insist on this qualification.

66 See also Ammonius (*In Cat.* 28, 11–15).

67 Simplicius (*In Cat.* 49, 10–30) largely follows Ammonius.

68 As Philoponus observes (*In. An.* 392, 8–33).

(rather dubiously) ascribe to Plotinus, according to which odours remain in their sources and yet 'reproduce' themselves in the medium.[69]

These solutions ignore the fact that there is more than one relation of interest in cases like sound and odour. There is what sounds and odours are *in* and what they are *of*. And these are not the only cases like this. Initially, at least, you might think we face a similar problem with (lunar) eclipses. What do eclipses inhere in, the earth, or the moon (*Post. An.* 2.2, 90a12–13)? Plausibly enough, Aristotle settles on the idea that eclipses belong to, or in, the moon, *because of* (*hupo*, 90a16; 93b7) the interposition of the earth. In fact, eclipses are Aristotle's chief example of a class of phenomena that are special precisely because they exist in one thing (e.g. the moon) and yet depend essentially on something else (e.g. the earth and its interposition). Aristotle goes so far as to say that the essences of phenomena of this sort—the causes of their being (*aition tēs ousias*)—are referred to something else (*Post. An.* 2.9, 93b26).

Crucially, sounds belong to this class too. We know this because Aristotle's other main example is thunder: thunder belongs to/in clouds because fire is extinguished therein (*Post. An.* 2.8, 93b7–12).[70] So it turns out that sounds (and odours) are not quite so problematic after all. Sounds are in air (or water), full stop. They do not have to migrate from their sources into the air, or be chaperoned by effluences, because they were never in their sources to begin with in the way they are in air (or water).

What is more, the foregoing suggests a solution to our problem of explaining how sounds put us in a position to hear their sources. We have just seen that sounds inhere in one thing but also depend essentially on something else: sounds inhere in air (and water) but also depend essentially on their sources. In a way, then, sounds are both like and unlike colours. Sounds are like colours inasmuch as there is a *per se* connection between sound and source, just as between colour and bearer. This is crucial, because it means there is a much closer connection between sounds and their sources than the simple (efficient) causal connection between the heat in the air and the heat in the fire. Yet sounds are also unlike colours inasmuch as the nature of the *per se* connection

69 Philoponus' view is harder to discern. It may be that the aforementioned dematerialization (n. 19) comes in handy: the odour isn't *really* in the medium, it is just 'transmitted' through it. See Ellis 1990, 295–9.

70 There is no conflict between the claim that thunder is in the clouds and the claim that sounds are always in air and water. Aristotle knows that clouds are made of water vapour (*Mete.* 1.9, 346b33–4). As for the question of how the extinction of fire makes a sound, the point is moot anyway, because this is just a toy account of thunder. Aristotle gives a different account of thunder in *Mete.* 2.9, according to which thunder is produced by the striking of a dry exhalation against 'relatively' dense clouds.

is different. Colours inhere in their bearers but sounds do not inhere in their sources. Put differently: a sound *is* an imposition, whereas a colour is a feature of a determinate body in virtue of which it imposes on other bodies.

To this picture of the relation between sounds and their sources we can add the final lines of Aristotle's account of sound in general in *An.* 2.8:

> αἱ δὲ διαφοραὶ τῶν ψοφούντων ἐν τῷ κατ᾽ ἐνέργειαν ψόφῳ δηλοῦνται· ὥσπερ γὰρ ἄνευ φωτὸς οὐχ ὁρᾶται τὰ χρώματα, οὕτως οὐδ᾽ ἄνευ ψόφου τὸ ὀξὺ καὶ τὸ βαρύ. ταῦτα δὲ λέγεται κατὰ μεταφορὰν ἀπὸ τῶν ἁπτῶν· τὸ μὲν γὰρ ὀξὺ κινεῖ τὴν αἴσθησιν ἐν ὀλίγῳ χρόνῳ ἐπὶ πολύ, τὸ δὲ βαρὺ ἐν πολλῷ ἐπ᾽ ὀλίγον. οὐ δὴ ταχὺ τὸ ὀξύ, τὸ δὲ βαρὺ βραδύ, ἀλλὰ γίνεται τοῦ μὲν διὰ τὸ τάχος ἡ κίνησις τοιαύτη, τοῦ δὲ διὰ βραδυτῆτα. καὶ ἔοικεν ἀνάλογον ἔχειν τῷ περὶ τὴν ἁφὴν ὀξεῖ καὶ ἀμβλεῖ· τὸ μὲν γὰρ ὀξὺ οἷον κεντεῖ, τὸ δ᾽ ἀμβλὺ οἷον ὠθεῖ διὰ τὸ κινεῖν τὸ μὲν ἐν ὀλίγῳ τὸ δὲ ἐν πολλῷ, ὥστε συμβαίνει τὸ μὲν ταχὺ τὸ δὲ βραδὺ εἶναι. περὶ μὲν οὖν ψόφου ταύτῃ διωρίσθω. (420a26–420b5)
>
> The differences belonging to the things that sound are made clear in actual sound. For just as colours are not seen without light, so sharp and flat are not heard without sound. These get their names from the objects of touch by metaphorical extension. For what is sharp moves perception a great deal in a short time, whereas what is flat moves it a little in a long time. It is not that the sharp is fast, then, and the flat slow; rather, the one motion comes to be because of swiftness, and the other because of slowness. This also seems to be analogous to sharp and blunt in touch. The sharp pierces, as it were, while the blunt pushes, as it were, because the one moves in a short time, the other in a long, with the result that the one turns out to be quick and the other is slow. Concerning sound, then, let this much be decided.

Admittedly, all Aristotle says *explicitly* is that some of the names for the auditory properties of sounds are borrowed from the names of tactile properties belonging to their sources. Yet as often in Aristotle, this linguistic observation suggests a more intimate metaphysical connection between the auditory properties of sounds and the corresponding 'mechanical' properties of their sources.[71] We do not hear a dull thud and merely infer that the blow was struck with a mace rather than a sword: we *hear* the heft of the mace in the sound it

71 That Aristotle thinks of sounds as bearers of auditory properties is also clear from passages like *An.* 2.11, 422b28–34.

makes.[72] And that is because there is an essential connection between sound and source, like that between lunar eclipses and the earth.[73]

7 Odour and Smell

The goal of this section is to establish corresponding claims about odour and smell:

> O1 Only determinate bodies have odours properly speaking for Aristotle.
> O2 The odours of determinate bodies are distinctive effects that these determinate bodies have in indeterminate bodies (air and water).
> O3 Odours are the special objects of olfactory perception. Yet while odours take on a (sort of) life of their own *in* the medium, we also smell odour sources by smelling the odours they produce in the medium.

The case of odour and smell is much like that of sound and hearing, with one important difference. It is a distinctive feature of odour that it is intimately related to flavour—the special object of taste. Indeed, Aristotle begins the discussion of flavour in *Sens.* 4 with the claim that flavour and odour are pretty

72 Admittedly, Aristotle says only that sounds make *clear* (*dēlountai*) the differences in the things that have sound and leaves it at that. He does not say more specifically that we *hear* such differences. Nonetheless, I think he clearly means the latter. Notice, in passing, that Aristotle compares sounds with light here, rather than with colour. He does the same when comparing echoes with the reflection of light (*An.* 2.8, 419b25–33). This is yet one more indication that sounds are effects in the medium, more analogous in that respect to the effects of colour on light than to colour itself.

73 Picking up where n. 32 left off, we can ask: If there is an essential connection between sounds and odours and their sources, how is it that sounds and odours can persist in the medium even after their sources have ceased to exist? This seems especially puzzling if we think, as I am inclined to do, of the relation between sounds and odours and their sources as a special case of a *per se*$_2$ relation (*Post. An.* 1.4, 73a37–73b1), in which both the medium, and the source, count as *per se* subjects of the sound, albeit in different ways. One response is as follows. It is well known that ontological and definitional priority can come apart in Aristotle (*Metaph.* 13.2, 1077a36–b9). Accordingly, it may be that sounds are partly defined in terms of their sources, and so essentially related to them, but not ontologically grounded in them. Rather, sounds are ontologically grounded in the medium. If that is right, then the continued existence of sounds and odours in the medium need not depend on the continued existence of their sources. My thanks to Christian Pfeiffer for discussion of this point.

much the same affection, albeit *in* different things (440b29–30). I will follow Aristotle's lead and begin with flavour too.

We already encountered the introduction to Aristotle's discussion of flavour in *An.* 2.10 above (section 3). *Sens.* 4 begins similarly. We are told that water—freshwater—is flavourless (*Sens.* 4, 441a3–4). Nevertheless, water—or the wet—plays the role of *matter* for flavour. How does it come to have flavour? Let us begin with the following passage, which considers—and rejects—the possibility that the wet acquires flavour through the application of heat alone:[74]

> ὅτι μὲν τοίνυν οὐχ ὑπὸ τῆς τοῦ θερμοῦ μόνον δυνάμεως λαμβάνει ταύτην τὴν δύναμιν ἣν καλοῦμεν χυμόν, φανερόν. λεπτότατον γὰρ πάντων τῶν οὕτως ὑγρῶν τὸ ὕδωρ ἐστί, καὶ αὐτοῦ τοῦ ἐλαίου (ἀλλ' ἐπεκτείνεται ἐπὶ πλέον τοῦ ὕδατος τὸ ἔλαιον διὰ τὴν γλισχρότητα· τὸ δ' ὕδωρ ψαθυρόν ἐστι, διὸ καὶ χαλεπώτερον φυλάξαι ἐν τῇ χειρὶ τὸ ὕδωρ ἢπερ ἔλαιον), ἐπεὶ δὲ θερμαινόμενον οὐδὲν φαίνεται παχυνόμενον τὸ ὕδωρ αὐτὸ μόνον, δῆλον ὅτι ἑτέρα τις ἂν εἴη αἰτία· οἱ γὰρ χυμοὶ πάντες πάχος ἔχουσι μᾶλλον· τὸ δὲ θερμὸν συναίτιον. (*Sens.* 4, 441a21–9)
>
> It is clear, then, that it is not by the agency of heat alone that [water] receives this power which we call 'flavour'. For water is the thinnest of liquids, even more than oil itself. (Yet oil extends over a greater distance than water on account of its viscosity. Water is easily dispersed, by contrast, which is also why it is more difficult to hold in the hand than oil.) But since it is manifest that water alone by itself does not thicken when heat is applied, it is clear there must be a different cause. For all flavours have a fair degree of consistency. Heat is a co-cause.

Aristotle's focus on 'consistency' here, or determinacy, is remarkable.[75] So is his clear acknowledgement of the fact that determinacy and indeterminacy come in degrees: every flavour involves a 'fair degree' of consistency. This will be crucial in making sense of odour below and in addressing various counterexamples in the next section.

74 Why would someone think the wet acquires flavour through heat (alone)? Perhaps because heating can 'bring out' certain flavours, as Aristotle mentions in the case of fruit (*Sens.* 4, 441a10–17).

75 'Consistency' makes good sense in culinary contexts, as in 'the consistency of the soup' in the sense of its thickness. I take this to be a context-specific way of talking about determinacy.

Given the 'chemistry' of *Gener. Corr.* 2 and *Mete.* 4, it is no surprise that what we need to add to water—or the wet—to generate flavour is the dry:

> ὥσπερ οὖν οἱ ἐναποπλύνοντες ἐν τῷ ὑγρῷ τὰ χρώματα καὶ τοὺς χυμοὺς τοιοῦτον ἔχειν ποιοῦσι τὸ ὕδωρ, οὕτως καὶ ἡ φύσις τὸ ξηρὸν καὶ γεῶδες, καὶ διὰ τοῦ ξηροῦ καὶ γεώδους διηθοῦσα καὶ κινοῦσα τῷ θερμῷ ποιόν τι τὸ ὑγρὸν παρασκευάζει. καὶ ἔστι τοῦτο χυμός, τὸ γιγνόμενον ὑπὸ τοῦ εἰρημένου ξηροῦ πάθος ἐν τῷ ὑγρῷ, τῆς γεύσεως τῆς κατὰ δύναμιν ἀλλοιωτικὸν ⟨ὂν⟩ εἰς ἐνέργειαν· (*Sens.* 4, 441b15–21)
>
> So just as those who wash colours and flavours in the wet make the water such, so also nature [washes] the dry and earthy, and filtering the liquid through the dry and earthy and setting it in motion by means of heat, imparts a certain quality to the liquid. And this is flavour, the affection brought about in the wet by the aforementioned dry, capable of altering the sense of taste from potentiality to actuality.

Aristotle's description of the way flavour is generated in water is more elaborate than is necessary for our purposes. The key point is just that flavour requires the *mixture* of wet and dry. This is confirmed in the lines that follow:

> ὅτι δ' οὐ παντὸς ξηροῦ ἀλλὰ τοῦ τροφίμου οἱ χυμοὶ ἢ πάθος εἰσὶν ἢ στέρησις, δεῖ λαβεῖν ἐντεῦθεν, ὅτι οὔτε τὸ ξηρὸν ἄνευ τοῦ ὑγροῦ οὔτε τὸ ὑγρὸν ἄνευ τοῦ ξηροῦ· τροφὴ γὰρ οὐχ ἓν μόνον τοῖς ζῴοις, ἀλλὰ τὸ μεμειγμένον. (*Sens.* 4, 441b23–7)
>
> It is necessary to grasp that flavours are not an affection or a privation of any dry, but only of the one that nourishes, from the following. Neither the dry without the wet nor the wet without the dry [has flavour]. For neither one of them alone is nourishment for animals, but what has been mixed [is nourishment].

In short, flavour involves a certain kind of mixture of the dry in the wet.[76]

Now let us turn to odour. The discussion of odour in *Sens.* 5 begins in earnest:

76 See also *Gener. Corr.* 2.8, 335a9–23.

> Τὸν αὐτὸν δὲ τρόπον δεῖ νοῆσαι καὶ περὶ τὰς ὀσμάς· ὅπερ γὰρ ποιεῖ ἐν τῷ ὑγρῷ τὸ ξηρόν, τοῦτο ποιεῖ ἐν ἄλλῳ γένει τὸ ἔγχυμον ὑγρόν, ἐν ἀέρι καὶ ὕδατι ὁμοίως. (442b27–9)
>
> One should also think about odours in the same way. For what the dry causes in the wet, the flavoured moist causes in a different kind—in air and water similarly.

This passage suggests two important points. First, when Aristotle says that what the dry produces in the moist—namely, flavour—flavour then produces in turn in something else, I take it he means that a body with a sweet flavour produces a sweet odour in turn, for example.[77] Second, I mentioned a moment ago that Aristotle claims that flavour and odour are pretty much the same affection, albeit in different things. This passage explains that claim: Whereas we know already from *Sens.* 4 that flavours exist only in relatively determinate compounds of wet and dry, we are now told that odours exist only in indeterminate bodies like air and water. Aristotle is unusually explicit about this point:

> [A] εἰ οὖν τις θείη καὶ τὸν ἀέρα καὶ τὸ ὕδωρ ἄμφω ὑγρά, εἴη ἂν ἡ ἐν ὑγρῷ τοῦ ἐγχύμου ξηροῦ φύσις ὀσμή, καὶ ὀσφραντὸν τὸ τοιοῦτον.
> [B] ὅτι δ᾽ ἀπ᾽ ἐγχύμου ἐστὶ τὸ πάθος, δῆλον ἐκ τῶν ἐχόντων καὶ μὴ ἐχόντων ὀσμήν· τά τε γὰρ στοιχεῖα ἄοσμα, οἷον πῦρ ἀὴρ γῆ ὕδωρ, διὰ τὸ τά τε ξηρὰ αὐτῶν καὶ τὰ ὑγρὰ ἄχυμα εἶναι, ἂν μή τι μειγνύμενον ποιῇ. διὸ καὶ ἡ θάλαττα ἔχει ὀσμήν (ἔχει γὰρ χυμὸν καὶ ξηρότητα). (*Sens.* 5, 443a6–13)
>
> [A] So if someone should suppose that both air and water are wet, odour would be the nature of the flavoured dry in the wet, and the object of smell is such.
> [B] That the affection [i.e. odour] is from what is flavoured is clear from what has odour and what doesn't. For the elements are odourless, I mean fire, air, earth, and water, because the dry and the wet in them are flavourless, unless they should be mixed with something. This is also why the sea has odour (for it has flavour and dryness).

77 For a discussion of this claim and some counterexamples, see Theophrastus *De causis plantarum* 6.16.1–8; *De odoribus* 3, 5.

Aristotle explicitly identifies the fact that *the wet* belongs to air and water as the reason why odours exist in them. This is equivalent to saying that odours exist in these bodies because they are indeterminate, given that Aristotle understands the wet in terms of indeterminacy. Moreover, B tells us that while odours exist *in* indeterminate bodies like air and water, such bodies do not 'have' odour: air and water are odourless because flavourless (and flavourless because uncompounded). This structure should ring a bell, because it is just like sound.[78] Odours are *in* indeterminate bodies but *of* determinate—flavoured—bodies. When Aristotle says that odours are 'the nature of the flavoured dry in the wet', he is not saying that 'the nature of the flavoured dry' is *mixed* with the medium.[79] That would be a case of flavour, not odour.[80] He is talking rather about what I have been calling an imposition: an odour just is the imposition of the nature of the flavoured dry on an indeterminate (i.e. wet) body insofar as that is possible.[81]

We find additional confirmation in a final passage:

> ὅτι μὲν οὖν ἐνδέχεται ἀπολαύειν τὸ ὑγρόν, καὶ τὸ ἐν τῷ πνεύματι καὶ τὸ ἐν τῷ ὕδατι, καὶ πάσχειν τι ὑπὸ τῆς ἐγχύμου ξηρότητος, οὐκ ἄδηλον· καὶ γὰρ ὁ ἀὴρ ὑγρὸν τὴν φύσιν ἐστίν. ἔτι δ' εἴπερ ὁμοίως ἐν τοῖς ὑγροῖς ποιεῖ καὶ ἐν τῷ ἀέρι οἷον ἀποπλυνόμενον τὸ ξηρόν, φανερὸν ὅτι δεῖ ἀνάλογον εἶναι τὰς ὀσμὰς τοῖς χυμοῖς. (*Sens.* 5, 443b3–8)
>
> So then it is not unclear that it is possible both in breath [i.e. air] and water to enjoy the wet, and to suffer something at the hands of the flavoured dry. For air is also wet according to its nature. Moreover, if what is dry causes a kind of washing in wet things and in air alike, it is clear that odours must be analogous to flavours.

78 It is also similar to the case of light and colour, *mutatis mutandis*. The same nature that produces colour in determinate bodies produces light in indeterminate bodies.

79 Aristotle insists that air cannot have flavour under any circumstances because it cannot be made to have the right consistency (*Sens.* 5, 445a22–3).

80 Both Johansen (1996, 14) and Johnstone (2012, 167) rightly insist that flavour involves mixture, whereas odour need not. Johnstone also stresses the role of drying in Aristotle's account of odour (2012, 170).

81 Aristotle mentions a second kind of odour that has nothing to do with nourishment, and to which only we humans are sensitive (*Sens.* 5, 443b26–444a19). While this notion is peculiar, it does not pose a special problem for my interpretation. Aristotle does not tell us how these odours are produced, and so there is no reason why they should not also be impositions of determinate bodies on indeterminate bodies. All we know is that they are not impositions of flavoured bodies *per se*.

So much for my case for O1 and O2: only determinate bodies—flavoured compounds—*have* odours (O1), whereas odours themselves—actual odours—are effects of such bodies *in* indeterminate bodies (O2). As for O3, the answer is parallel to sound: we smell odorous bodies by smelling the odours they produce in the medium. And this is possible because the connection between odours and their sources is not *merely* efficient-causal—like the heat in the air and the fire—but also essential, like the connection between sounds and their sources.

8 Putative Counterexamples

There are two main kinds of counterexample to consider: indeterminate bodies that behave like determinate bodies, and determinate bodies that behave like indeterminate bodies. I do not aspire to show that Aristotle's account is entirely free from counterexamples. I do not endorse his physics. The goal is just to defend the charitability of my interpretation by showing how it handles some counterexamples that should have been obvious to Aristotle.

I begin with indeterminate bodies that behave like determinate bodies. Many cases fall under this umbrella. Some liquids are coloured, like blood and milk (cf. also Aristotle's mention of colours washed out in liquids above).[82] The wind whistles, and water poured on water 'plops'.[83] The sea, and many other liquids, *have* odour.

I suggest that Aristotle can deal with all these putative counterexamples in the same way as he does the sea and its odour. As we have just seen, Aristotle's strategy in that case is to observe that determinacy comes in degrees. To be sure, the sea is not determinate in the way a rock is. Yet Aristotle is quite explicit that the sea has an odour only because it has a flavour and thus *a certain* consistency, or determinacy.

We can tell a similar story for coloured liquids like blood and milk. Blood and milk are mixtures with a certain consistency, and so are (relatively) determinate. Milk is obviously nutritious, and Aristotle thinks of blood as containing earth and (in some cases) fibrous material (*Mete.* 4.10, 389a19–24). To the

82 Sorabji mentions the case of coloured liquids without trying to resolve it, as well as transparent solids like glass (2004, 131).

83 Some of these putative counterexamples are also mentioned by Theophrastus (*Metaphrasis*, 16, 19–22).

extent that such liquids are coloured, then, it is owing to the determinacy afforded by these components.[84]

Similarly, when the wind whistles it is because a sufficient quantity of air moves as a mass and with enough force to set other air in motion in the manner of a sound. In this respect a gust of wind is relatively determinate, and that is why it can impose itself on other parts of the air to create a sound.[85] The same goes for water poured on water, *mutatis mutandis*.

Now let's turn to determinate bodies that 'behave like' indeterminate bodies. Here I focus on one especially prominent type of case: transparent solids like ice and glass.[86] Consider the following passage from *Parts of Animals* (*Part. An.*) 2.3:

> Ἐχόμενον δὲ καὶ περὶ ξηροῦ καὶ ὑγροῦ διελθεῖν ἀκολούθως τοῖς εἰρημένοις. Λέγεται δὲ ταῦτα πλεοναχῶς, οἷον τὰ μὲν δυνάμει τὰ δ' ἐνεργείᾳ. Κρύσταλλος γὰρ καὶ πᾶν τὸ πεπηγὸς ὑγρὸν λέγεται ξηρὸν μὲν ἐνεργείᾳ καὶ κατὰ συμβεβηκός, ὄντα δυνάμει καὶ καθ' αὑτὰ ὑγρά, γῆ δὲ καὶ τέφρα καὶ τὰ τοιαῦτα μιχθέντα ὑγρῷ ἐνεργείᾳ μὲν ὑγρὰ καὶ κατὰ συμβεβηκός, καθ' αὑτὰ δὲ καὶ δυνάμει ξηρά· διακριθέντα δὲ ταῦτα τὰ μὲν ὕδατος ἀναπληστικὰ καὶ ἐνεργείᾳ καὶ δυνάμει ὑγρά, τὰ δὲ γῆς ἅπαντα ξηρά. Καὶ τὸ κυρίως καὶ ἁπλῶς ξηρὸν τοῦτον μάλιστα λέγεται τὸν τρόπον. (*Part. An.* 2.3, 649b9–19)

> It follows to consider dry and wet in accordance with what was said. These are said in several ways, e.g. dry and wet in potentiality and dry and wet in actuality. For ice and every congealed liquid is called dry in actuality and incidentally, but in themselves and potentiality they are wet, and earth and ash and the like when mixed with liquid are wet in actuality and incidentally, but in themselves and potentially they are dry. When these mixtures have separated, there are watery components that are such as to fill their containers and wet both in potentiality and actuality, and those of earth that are altogether dry. And it is in this sort of case that 'dry' is most of all used properly and absolutely.

84 See also the latter half of the passage from *Part. An.* 2.3 below. The phenomenon of borrowed colour (n. 54 above) may also depend on a disparity in the relative degrees of determinacy of the medium and the body that presents a borrowed colour.

85 Compare the idea attributed to Anaximenes that air turns to wind when it is first condensed (DK13A5).

86 Aristotle says little about glass, although he could hardly have been ignorant of it. There was human-made colourless glass in the court of Philip II of Macedon, for example (Ignatiadou 2002). He must also have been familiar with volcanic glass, not to mention transparent crystals of various kinds.

Once again, Aristotle highlights the importance of wet and dry—and so of indeterminacy and determinacy—this time in *Part. An.* I have largely stuck with 'wet' and 'dry' as translations of ὑγρόν and ξηρόν for consistency, but Peck (1937) uses 'fluid' and 'solid' instead, with good reason. In any case, it is striking that Aristotle insists that these congealed *liquids*[87] are dry/solid only accidentally but wet/liquid according to their own natures.[88] This fact might go some way towards explaining why ice behaves like an indeterminate body in being transparent.

9 Conclusion

In *An.* 2.4 Aristotle tells us that capacities like perception and thought are to be defined in terms of their objects (*An.* 2.4, 415a17–23). True to his word, he goes on to define vision in terms of colour, audition in terms of sound, etc. (*An.* 2.6, 418a25–6 and *An.* 2.7–11).[89] It follows straightforwardly that if we want to understand perception, we need to understand colours, sounds, and odours, etc. If this is right, then the account of perception announced in the *De anima* can only be understood against the background of Aristotle's natural philosophy more generally, including not just *De sensu*—in which Aristotle tells us explicitly that he is interested in the qualities themselves in a way he had not been in *De anima* (439a6–17)—but also other texts, like *Gener. Corr.* and *Part. An.*, etc. In this way, Burnyeat (2002) is quite right to insist on the importance of the connections between Aristotle's *De anima* and the rest of his natural philosophy. In this same spirit—but with very different results—I have tried to cast a wide net in understanding the resources available to Aristotle in responding to Plotinus' challenge.

In the end I hope I have shown that there is nothing magical about the role that the medium plays in distance perception, unless there is something magical about a determinate body imposing itself on an indeterminate body in a certain respect. Coloured, noisy, and smelly bodies affect air and water in distinctive, yet perfectly 'corporeal', ways—by imposition.[90]

87 'Congealed liquid' would apply to glass too, since Aristotle would have known that glass starts its life as a liquid 'in actuality'.

88 As Justin Vlasits pointed out in conversation, these remarks about ice are reminiscent of Anaxagoras' charming claim that snow looks white but is *really* black, because it is *really* water (DK59A97).

89 Cf. Sorabji 1971.

90 I would like to thank Klaus Corcilius, Andrea Falcon, Mark Johnstone, Robert Roreitner, and Justin Winzenrieth for written comments, as well as audiences in South Carolina,

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