

ARISTOTLE ON THE REALITY OF COLORS AND OTHER PERCEPTIBLE QUALITIES

Victor Caston

Abstract: Recent interpreters portray Aristotle as a Protagorean antirealist, who thinks that colors and other perceptibles do not actually exist apart from being perceived. Against this, I defend a more traditional interpretation: colors exist independently of perception, to which they are explanatorily prior, as causal powers that produce perceptions of themselves. They are not to be identified with mere dispositions to affect perceivers, or with grounds distinct from these qualities, picked out by their subjective effect on perceivers (so-called “secondary qualities”). Rather, they are intrinsic qualities of objects, which are in reality just as they appear to be. At the same time, Aristotle rejects any “simple theory of color” according to which the essence and nature of colors is fully revealed in experience. Although the character of perceptibles as they are experienced is “better known to us,” their essence and nature only comes to be known through a correct theory.

It is commonplace to think of Aristotle as a kind of *realist* about perceptible qualities. On such a view, qualities like color, flavor, odor, pitch, warmth, and moisture are features of the environment around us. They are literally present on the surface of objects or emitted into the physical medium between us. Perceptible qualities, moreover, are what bring perception about. They make us aware of themselves and thereby the objects that have them. The senses thus “inform” us, to use Aristotle’s words, of “the many differences” between objects (*πολλὰς εἰσαγγέλουσι διαφορὰς*, *Sens.* 1, 437a2). Finally, he also maintains that to a great extent these qualities are just the way they appear to be. Perception tells us how the world really is.

We are inclined to think of such realism as somehow naïve, as simply reporting how the ordinary person takes the world—of knowledge before the Fall, so to speak, when we were shaken from our dogmatic slumbers by Descartes and others working at the dawn of the scientific revolution. But this gets the history precisely backwards. Aristotle is *reacting against* his predecessors’ theories, both the relativism of Protagoras and the atomistic world view of Democritus. Protagoras holds that perceptible qualities

exist only for the perceiver perceiving them: as Plato recounts his view in the *Theaetetus*, each only exists in relation to a perceiver in perceptual experience, as a result of causal interaction (*Tht.* 156C7–157A2; 182A4–B7), such that one and the same wind is simultaneously cold for me and not for you (152B1–8). Democritus arrives at a similar result. According to his theory, the ultimate truth about reality “lies in the depths” (*ἐν βυθῶ ἡ ἀλήθεια*): there is nothing at bottom but atoms and the void, which possess only geometric and kinetic properties; qualities such as colors, flavors, and odors are not part of the fundamental nature of things, but something admitted only “by convention” (*νόμῳ*, D. L. 9.72 = DK 68 B117 and B125).¹ To us, these views naturally suggest the sort of distinction between primary and secondary qualities that an early modern like Galileo, Boyle, or even Locke might be comfortable with. They are all led by causal theories of perception to deny that the perceptible qualities as they are revealed in experience are part of the real nature of things, independent of perception.²

Aristotle accepts a causal theory of perception too. But he thinks that if color and other perceptible qualities as such are the cause of perception, their external reality can be secured and so as a consequence the general veracity of the senses. Aristotle, then, does not come before the Fall, but *after*. The question for him is not so much how we can return to a pre-scientific conception of the world, but rather how “the manifest image,” as Sellars called it, can be preserved in a scientific age. The question for us is what exactly his answer amounts to.

This narrative is complicated, however, by an exegetical wrinkle. Although the realist interpretation I shall defend is in many ways a traditional one, it is standardly rejected today. Recent interpreters have argued that several key passages are not proof texts for this story after all, but instead show Aristotle inclining towards a kind of Protagoreanism. A closer reading, I believe, will show such revisionism to be mistaken and the realist interpretation to be well founded after all.

1 Perceptibles

It will be useful to begin by reflecting on how Aristotle speaks about perceptibles and the way he draws on this terminology in laying out the metaphysical groundwork for his theory. I shall make two observations, which will guide the rest of the discussion in a fairly direct way. The issues that concern us ultimately turn on the subtle ways in which each of these can be made precise.

¹ I leave to one side whether Democritus is better interpreted simply as a reductivist and so regarded colors as real, but just not fundamental, or whether he is (as often assumed) an eliminativist, who thinks colors are not real at all. See section 7.2.

² For an in-depth examination of Protagoras’s and Democritus’s theories of perception, as well as Plato’s and Aristotle’s responses to them, see Lee 2005; for more on the distinction between primary and secondary qualities in antiquity, see Lee 2011.

A key part of Aristotle’s framework is already manifest in the way he refers to what we perceive. In developing his theory, he does not generally use Greek terms for ‘object’ or ‘quality’—both originally terms of art, due to philosophers—but instead speaks simply of *perceptibles* (*αἰσθητά*), of what *can* be perceived, giving full weight to the modal force of the Greek suffix *-τος*, which generally functions like the English *-ible*. Similarly for the various types of perceptible: colors are classified as visible (*ὄρατά*), sounds as audible (*ἀκουστά*), and so on. Just what these modal expressions imply will be the nub of the matter. But one of the deep underlying commitments throughout Aristotle’s works is that something can have an ability or power even when it is not exercising it (*Metaph.* 9.3; Int. 12, 21b14–17). So something can be perceptible even when it is not being perceived, just as a perceiver has the ability to perceive even while not currently perceiving, but sleeping.

A second part of his framework is that perceptibles must be conceived of *relationally*: to be perceptible is to be capable of being perceived, where to be perceived is necessarily to be perceived *by a perceiver*, that is, something capable of perceiving. So perception must be understood as an encounter between a perceiver and something perceived—or to put it in terms he doesn’t himself use, a subject and object. As we shall shortly see, for Aristotle this places both in the category of “relatives” (*τὰ πρὸς τι*). Relational states of affairs are to be explained in terms of a set of things that *correlate* with one another: what it is to be each of these things essentially involves the other.

2 Relatives

Up to this point, Aristotle’s view isn’t anything new. In fact, according to his teacher Plato it is part of an older tradition to which nearly all of their predecessors subscribed. It is valuable to consider Plato’s characterization more closely, even though it contains some extraneous complications, because it brings out vividly the issues at stake. In the *Theaetetus*, Socrates examines Protagoras’s claim that “man is the measure of all things” and tries to explain its motivation in terms of an underlying model of perception, which he refers to as a “secret” or “hidden” doctrine (152C10, 155D10–11, 156A3). Socrates presents it in Heraclitean terms, as due to a metaphysical view about flux. But the process ontology is wholly incidental to our purposes. What matters is the basic framework it presupposes and Plato’s contention that this entails a kind of Protagoreanism.

According to the Secret Doctrine, what we take to be stable objects are in fact slow moving changes, which come in two types, one with the power (*δύναμις*) to act, the other the power to be acted upon. When they interact or “have intercourse,” as he puts it, they always give birth to “twins,” a perceptible quality and a perception that arises together with it, which

are faster changes that move through space (*Th.* 156A5–C3, C10–D3; 182A4–B7):

Whenever an eye and something else that fits it, having gotten intimate, together give birth to whiteness and a perception naturally arising with it (which would never have arisen had each of them approached anything else), then during this period, when sight is brought to the eyes and whiteness to the object that together with it gives birth to color, the eye becomes full of sight and so at that moment sees—that is, it becomes not sight, but a seeing eye—while that which together with it generates color is filled up with whiteness—that is, it becomes not whiteness, but white, whether a white board or a stone or anything else that happens to be colored with that sort of color. We should take this to hold in the same way for the rest: hard, hot, all of them. None, as we were saying before, is just itself on its own, but rather comes to be each and to be each sort of thing during intercourse with one another, as a result of the change.³

Putting the colorful reproductive imagery to one side, we see many of the same elements here that Aristotle stresses: perceptible qualities and perceptions must be understood as paired and in relation to one another, while the perceptual encounter itself is due to a causal interaction between something that has the power to act and another that has the corresponding power to be acted upon.

On Plato's model, however, the situation is perfectly symmetrical.⁴ Not only are the “parents,” the subject and the object, *mutually independent* of each other, such that each can and does exist prior to the encounter, but the two “twins” they beget are *mutually dependent*: neither this episode of seeing nor this instance of white can exist apart from this encounter. It is the last point that is surprising. For the claim is not simply the truism that nothing is perceived unless something is perceiving it, or seen to be white unless something sees it to be white. It is that *nothing is white* apart from

being perceived—it has this quality *only* in perceptual encounters. And it is this that leads to Protagoreanism. For the doctrine that “man is the measure of all things” seems to require not only

(*P*) Whenever things appear a certain way to some subject *S*, they are so⁵

but the converse as well,

(\bar{P}) Things are a certain way only when they appear so to some subject *S*.

Although (*P*) is what initially seems shocking about Protagoreanism, it is its converse, (\bar{P}), that will primarily occupy our attention. For it is (\bar{P}) that entails that reality *cannot outstrip experience*: it thus constitutes the core of Protagoras's antirealism. It is not simply that perception must always involve perceptible qualities like white, hot, hard, and “all the rest” (160A9–B1). It is that objects do *not have qualities like this* apart from perception (160B1–3; cf. 182A4–B7) according to (\bar{P}). In their case, to be *is* to be perceived.

3 Existential Independence

It is precisely at this juncture that Aristotle takes his point of departure. He agrees with the Twins Theory that perception and perceptibles must be understood relationally and so takes them to fall in the category of “relatives” (τὰ πρὸς τι).⁶ Aristotle holds, moreover, that all relatives *correlate*: what each is as such involves an essential reference to something else (τοῦθ' ὅπερ ἔστιν ἐτέρων λέγεται) that corresponds to it (πρὸς ἀντιστρέφοντα).⁷ But it does not follow that both are, to use his term, “coordinate in nature” (ἅμα τῇ φύσει). For two items to be coordinate in nature, neither can be prior or posterior to the other. On the contrary, they must mutually imply each other's existing or being (ἀντιστρέφει κατὰ τὴν τοῦ εἶναι ἀκολουθησιν): if there is an instance of one, there must also be a corresponding instance of the other; if either is eliminated, the other is as well.⁸ Most

⁵ For ease of exposition, I leave aside here the qualification that things are so ‘for *S*’ which Plato sometimes adds and sometimes omits, since there is controversy over whether it belongs to Protagoras's original theory, whether Plato consistently intends it to be kept in view, or exactly how it should be understood: for an in-depth discussion of many of the options, see Fine 1994. None of these refinements, however, affect my point here, which is more concerned with the direction of the relevant conditional.

⁶ *Categ.* 7, 6b2–4, b34–36; *Metaph.* 5.15, 1020b30–32.

⁷ *Categ.* 7, 6a36–37, b3–8, b28, 7a22–25.

⁸ *Categ.* 7, 7b15–22. Aristotle defines being coordinate in nature at *Categ.* 13, 14b27–33 and 15a8–10. One thing is prior in nature to another, if it is possible for the former to exist without the latter, but not vice versa, a test he credits Plato with having devised: *Metaph.* 5.11, 1019a1–4; cf. *Categ.* 12, 14a29–35. But Aristotle also distinguishes another case in which one item is prior in nature to another, even though they mutually imply each other's being, namely, where one is the cause of the other's being (τὸ αἴτιον ὁπωσοῦν θατέρω τοῦ εἶναι,

³ *Th.* 156D2–E7 (cf. 182A4–B7): ἐπειδὴν οὖν ὄμμα καὶ ἄλλο τι τῶν τούτῳ συμμετρῶν πλησιάσαν γεννήσῃ τὴν λευκότητά τε καὶ αἴσθησιν αὐτῇ σύμφυτον. ἂ οὐκ ἂν ποτε ἐγένετο ἑκατέρου ἐκείνων πρὸς ἄλλο ἐλθόντος, τότε δὴ μεταξύ φερομένων τῆς μὲν ὄψεως πρὸς τῶν ὀφθαλμῶν, τῆς δὲ λευκότητος πρὸς τοῦ συναποτίκτουτος τὸ χρώμα. ὁ μὲν ὀφθαλμὸς ἄρα ὄψεως ἐμπλεως ἐγένετο καὶ ὄρα δὴ τότε καὶ ἐγένετο οὐ τι ὄψις ἀλλ' ὀφθαλμὸς ὄρων, τὸ δὲ συγγενήσαν τὸ χρώμα λευκότητος περιεπλήσθη καὶ ἐγένετο οὐ λευκότης αὐτὰ ἀλλὰ λευκόν, εἴτε ξύλον εἴτε λίθος εἴτε ὄψωδον συνέβη χρώμα χρωσθῆναι τῷ τοιοῦτῳ χρώματι. καὶ τὰλλα δὴ οὕτω, σκληρὸν καὶ θερμὸν καὶ πάντα, τὸν αὐτὸν τρόπον ὑποληπτέον, αὐτὸ μὲν καθ' αὐτὸ μηδὲν εἶναι, ὃ δὴ καὶ τότε ἐλέγομεν, ἐν δὲ τῇ πρὸς ἄλλα ὀμίλῃ πάντα γίγνεσθαι καὶ παντοῖα ἀπὸ τῆς κινήσεως. The Greek here is from the OCT edition of Duke *et al.* All translations, unless otherwise noted, are my own.

⁴ A point rightly noted by Gottlieb (1993, 101).

relatives are in fact coordinate in nature in Aristotle's view (7b15–16). But not all are and in particular not cognitive relatives: in such cases, one of the relatives implies the being of the other, but not vice versa. Whenever there is knowledge, for example, it is impossible that there not be something corresponding to it that can be known. But there might well be things that can be known without there being any actual knowledge of them (7b22–35; cf. *Metaph.* 10.6, 1057a10–11). Perception is similar, Aristotle argues:

What is perceptible seems to be prior to perception. For if what is perceptible is eliminated, perception is eliminated with it; in contrast, if perception is eliminated, what is perceptible is *not* eliminated with it.⁹

Aristotle offers two arguments to support this claim. The first is based on the properties of bodies in general. All bodies are perceptible; so if perceptibles are eliminated, bodies will be as well. But then perceptions will be too, since they “concern a body and occur in a body” (*περὶ σῶμα καὶ ἐν σῶματι*, 7b36–8a3). The converse does not follow, though. Even if all animals were eliminated and thereby all perceptions (since only animals perceive),

there will still be something perceptible—a body, for example, or something warm, or sweet, or bitter, or anything else perceptible.¹⁰

Eliminating animals won't rid the world of perceptible qualities, because there will still be plants and inanimate objects, and they will continue to have the specific qualities they currently have, which includes perceptible qualities such as warm, sweet and bitter.¹¹

Aristotle's second argument concerns the preconditions of perception, in particular the material constitution of perceivers. Perception cannot come about without something capable of perceiving, that is, without an animal. But there cannot be an animal without the things it is constituted from, and these are all perceptible:

There is in any case something perceptible even before there is perception. For in general there is fire, water, and the sorts of thing from which an animal is in fact constituted even before there is an animal or perception.¹²

In Aristotle's view, everything in the sublunary realm, whether animate or inanimate, is ultimately constituted from the four elements, and these are themselves inanimate and so without perception.¹³ So there is no ground for thinking that they would be eliminated if animals were eliminated. But Aristotle takes it for granted that they would still be perceptible (*αἰσθητόν*, 8a8). Indeed, the four elemental qualities that define the elements—hot, cold, wet, and dry—are all tangible qualities, which Aristotle elsewhere describes as “the differentiae of *body as such*” (*αἱ διαφοραὶ τοῦ σώματος ἢ ἡ σῶμα*, *DA* 2.11, 423b26–29); and having granted these perceptible qualities, there is no reason to think bodies will lack the others. So even if all animals were eliminated, objects would still *be* warm, bitter, and sweet. The only difference is that they would not be *perceived* to be such.¹⁴

Perceptible bodies thus have a *one-way independence* from perceptions. It is true that we cannot specify their essence as perceptible without making reference to perceivers—they are by their nature the *kind* of thing that can get a perceiver to perceive them. But something can have this essence *without there being* a corresponding perception of it, either now or ever. This is not to claim that there are possible worlds where these qualities somehow get perceived even in the absence of perceivers—it is impossible for there to be perceptions without perceivers. Rather, it is to claim that in worlds without perceivers these qualities would still have the nature or constitution such that if there *were* perceivers in their vicinity in the right conditions, they *would* be perceived. There is something about what they actually are—warm, for example, or sweet or bitter—that would get a perceiver to perceive them in the right conditions. The features they actually have underwrite the relevant counterfactual regularities.

Categ. 12, 14b10–13). So mutual implication is at most a *necessary condition* for individuals being coordinate in nature: as Aristotle explicitly acknowledges, it must also be the case that neither is the cause of the other's being (13, 14b28–29, 15a9–10). As we shall see, perceptibles fail to meet *both* conditions. (I leave aside here the question of species of a common genus, which he also regards as coordinate in nature: 14b33–15a7.)

⁹ *Categ.* 7, 7b36–38: τὸ γὰρ αἰσθητὸν πρότερον τῆς αἰσθήσεως δοκεῖ εἶναι· τὸ μὲν γὰρ αἰσθητὸν ἀνααιρεθὲν συναναρεῖ τὴν αἴσθησιν, ἡ δὲ αἴσθησις τὸ αἰσθητὸν οὐ συναναρεῖ. The Greek is from Minio-Paluello's OCT edition.

¹⁰ *Categ.* 7, 8a5–6: αἰσθητὸν δὲ ἔσται, οἶον σῶμα, θερμόν, γλυκύ, πικρόν, καὶ τὰ ἄλλα πάντα ὅσα ἐστὶν αἰσθητά.

¹¹ Ross (1924) seems to hold that such objects are not actually warm, sweet or bitter, but only potentially such (1.278). But that is due to his interpretation of the *Metaph.* 4.5 and *DA* 3.2 passages we shall discuss below. The *Categories* passage above neither states nor requires such a qualification.

¹² *Categ.* 7, 8a8–11: τὸ δὲ γε αἰσθητὸν ἔστι καὶ πρὸ τοῦ αἰσθησῶν εἶναι. πῦρ γὰρ καὶ ὕδωρ καὶ τὰ τοιαῦτα, ἐξ ὧν καὶ τὸ ζῶον συνίσταται, ἔστι καὶ πρὸ τοῦ ζῶον ὄλως εἶναι ἢ αἰσθησῶν.

¹³ All sublunary bodies ultimately constituted from four elements: *Meteor.* 4.12, 389b26–28; see also *GC* 2.7, 334b16–20; *Meteor.* 1.2, 339a19–20; *PA* 2.1, 646b12–24; *Metaph.* 5.3, 1014a31–34. Against any elemental constituent as such having a soul, much less perception: *DA* 1.3, 406b15–25; 1.4, 409a10–15; 1.5, 409a31–b18, 409b24–411a2.

¹⁴ Ganson (1997) argues that while there would be colors in those possible worlds, they would not be *visible*, because they could not be seen (267 n. 9); see also Hussey 1983, 62 ad 201a27. But the same reasoning would equally rule out their being *perceptible*, contrary to the way Aristotle plainly describes them in these passages (and he must be using 'perceptible' non-rigidly, if the point he is making is to be effective). In general, I take Aristotle to treat white, color, visible, and perceptible in parallel ways. See pp. 56–57 below.

4 Explanatory Priority

There is a second way that two items can fail to be coordinate in nature, namely, if either is in any way “responsible for the other’s being” (*αἴτιον θάτερον θατέρω τοῦ εἶναι*).¹⁵ This necessary condition is independent of the first: it is in fact possible to have two things that do mutually imply each other’s being, but where one is nevertheless responsible for the other’s being and not vice versa. The example Aristotle gives is of a true statement and the state-of-affairs that is its truthmaker. They mutually imply each other’s being: if the statement is true, the state-of-affairs must be the case, and vice versa. Yet,

a true statement is in no way responsible for this being the case; rather it is in virtue of its being the case or not that the statement is said to be true or false.¹⁶

It is also possible for *both* necessary conditions to be violated: one thing might be prior in nature to another by being existentially independent of it *and* by being its explanatory ground. Perceptibles are prior to perception for both reasons. In fact, Aristotle makes the second claim in *Metaphysics* 4.5, about the explanatory priority of perceptibles, precisely as a way of pushing back against the Protagorean thesis that all appearances are true (1010b1 ff.). Let us consider this passage more closely.

Aristotle begins by pointing to a consequence of the Twins Theory’s claim that perceptibles like white do not exist independently of being perceived: if there were nothing animate, and so no perceivers, there wouldn’t be anything perceptible; but if there is nothing other than perceptibles, as Aristotle thinks Protagoreans also believe,¹⁷ then there would be *nothing at all* in the absence of perception.¹⁸ In Aristotle’s mind, there could not be a more decisive *reductio ad absurdum*. But in pivoting to make his own positive point, he frames it in the same terms, using the Greek *aisthēta*—I will leave it untranslated here, because of the ambiguity—to characterize

¹⁵ *Categ.* 13, 14b28–29, 15a9–10; cf. 12, 14b12–13. When Aristotle speaks of what is responsible for something’s “being” (*τοῦ εἶναι*), he often has in mind something’s existence, and I will sometimes speak of it in this way. But it can’t always be translated this way, since in a few cases he uses it predicatively, for example, where one thing is responsible for another’s *being good* (*EN* 1.4, 1015a28; cf. *EE* 1.8, 1218b21); and he also uses it veridically, for what is *the case*, in the case quoted just below, which Aristotle treats as his star example (*Categ.* 12, 14b14–22).

¹⁶ *Categ.* 12, 14b18–22 (cf. b14–22): ἔστι δὲ ὁ μὲν ἀληθῆς λόγος οὐδαμῶς αἴτιος τοῦ εἶναι τὸ πρᾶγμα, τὸ μέντοι πρᾶγμα φαίνεται πως αἴτιον τοῦ εἶναι ἀληθῆ τὸν λόγον· τῷ γὰρ εἶναι τὸ πρᾶγμα ἢ μὴ ἀληθῆς ὁ λόγος ἢ ψευδῆς λέγεται.

¹⁷ *Metaph.* 4.5, 1010a1–3; cf. 1009a22–23.

¹⁸ *Metaph.* 4.5, 1010b30–31: “And generally, if in fact there is only what is perceptible, there wouldn’t be anything if there weren’t animate things, since in that case there would not be perception.” (ὄλως τ’ ἔπερ ἔστι τὸ αἰσθητὸν μόνον, οὐθὲν ἂν εἴη μὴ ὄντων τῶν ἐμψύχων· αἰσθησις γὰρ οὐκ ἂν εἴη.) The Greek text is from Ross 1924.

the object as *actually perceived*, as the term is sometimes used.¹⁹ Otherwise it would be difficult to make sense of his denial:

Now, while it might perhaps be true that there would not be either *aisthēta* or perceptual stimulations, since this is a modification of the perceiver, it is impossible that the underlying things that produce perception would not exist in the absence of perception. For perception is surely not [perception] of itself, but of something else distinct from perception that is necessarily prior to perception. For what produces change is naturally prior to what undergoes change, even when they are characterized relative to one another.²⁰

Aristotle’s point about perceptual stimulations (*αἰσθήματα*)—that is, the effect or modification produced in the sense organs by perceptible objects—is straightforward: if there are no perceivers, then there are no sense organs and so no effects on them either. From this it follows that anything that still exists will not be *perceived*, even if they are the sorts of things that would be perceived, if there were perceivers. That, I take it, is the distinction Aristotle is making between (i) the “underlying things” (*τὰ ὑποκείμενα*) that produce perception and (ii) *aisthēta*. He is drawing a distinction between (i) the sorts of things that *can* get themselves perceived and so have the *power* to be perceived and are thus perceptible—what the *Categories* called *aisthēta*—and (ii) what is *actually* being perceived as such, which here are called *aisthēta*. Call this reading the “REALIST READING.”

The alternative would be to attribute to Aristotle a view he does not explicitly state anywhere else and which would be in direct contradiction with the *Categories*, namely, the view that since it is not possible for anything to be *perceived* when there are no perceivers, there is *nothing perceptible* in such circumstances either, so that objects would be without any perceptible qualities at all—without colors, flavors, odors, and so on. On this alternative view, they would become perceptible only when there are perceivers to perceive them, and apart from that they are strictly imperceptible. But if Aristotle were to accept this counterfactual about objects in a world without perceivers, what should he say about objects in remote parts of the *actual* world, such as the aether, where perceivers could not survive, or in areas which are inaccessible to perceivers because of their remoteness? Or objects much closer to us, but under adverse or

¹⁹ Significantly, in a passage summarizing the Twins Theory, *Thet.* 182B6. For this construal, see also Broadie 1992, 156–157.

²⁰ *Metaph.* 4.5, 1010b31–1011a1: τὸ μὲν οὖν μήτε τὰ αἰσθητὰ εἶναι μήτε τὰ αἰσθήματα ἴσως ἀληθές (τοῦ γὰρ αἰσθανομένου πάθος τοῦτό ἐστι), τὸ δὲ τὰ ὑποκείμενα μὴ εἶναι, ἃ ποιεῖ τὴν αἴσθησιν, καὶ ἄνευ αἰσθήσεως, ἀδύνατον. οὐ γὰρ δι’ ἣ γ’ αἰσθησις αὐτῆ ἐαυτῆς ἐστίν, ἀλλ’ ἔστι τι καὶ ἕτερον παρὰ τὴν αἴσθησιν, ὃ ἀνάγκη πρότερον εἶναι τῆς αἰσθήσεως· τὸ γὰρ κινεῖν τοῦ κινουμένου φύσει πρότερόν ἐστι, κἂν εἰ λέγεται πρὸς ἄλληλα ταῦτα, οὐθὲν ἥττον.

unfavorable conditions, say, colors when there is no illumination or at the center of the earth? It is hard to see why these objects should be any more perceptible. But if that's right, then the position is tantamount to (\bar{P}), the converse of (P): something is white, colored, or perceptible *only while it is being perceived*. Otherwise it seems like it could have that power independently of perceivers after all, not just on this or that occasion, but even if there were no perceivers, as the realist reading above claims. So call this alternative reading the "PROTAGOREAN READING." On this view, something is perceptible, has the power to be perceived, *only while it is exercising that power* and actually being perceived.

We know that Aristotle rejects this last claim, though, because he invokes it later in *Metaphysics* 9.3 as an absurd consequence of a more general view about powers that he ascribes to the Megarian school:

There are some who claim, like those in the Megarian school, that something is able [to do something] only when it is engaged in that activity, and not able when it is not engaged. For example, the person who is not building a house is not able to build a house, but instead the one who is building one while he is building one; and similarly in the other cases as well.²¹

To be clear, on the Megarian view it is not simply the case that engaging in an activity at a time implies possessing the corresponding power at that time, but *the converse as well*: possessing a power at a time implies concurrently engaging in that activity. The Megarians are thus committed to every instance of the following biconditional schema

(M) x has the power to ϕ at $t \leftrightarrow x \phi$'s at t

where expressions for objects, activities, and times are substituted, respectively, for ' x ', ' ϕ ', and ' t .' Aristotle does not tell us the motivations for (M), but he attacks it vigorously with a battery of arguments. Our skills and abilities would disappear simply from disuse, without any loss of memory, or illness, or prolonged neglect (*Metaph.* 9.3, 1046b33–1047a4). (M) would further eliminate the powers of inanimate objects, in particular their *perceptible qualities*:

This will likewise hold for inanimate objects as well, since there will not be anything cold or hot or sweet or in general

perceptible when no one is perceiving. Consequently, they will be committed to maintaining Protagoras's thesis.²²

Aristotle is right about this. When applied to perceptible qualities, the power of objects to be perceived, the Megarian thesis (M) entails Protagoreanism, or at any rate (\bar{P}), the converse of (P), that things are a certain way only when they appear to be so to some subject (see section 2 above).²³ It should not be surprising, then, that Aristotle continues by inferring the corresponding absurdity, namely, that we would lose our powers of perception as well when they are not being used:

In fact, one will not have [the power of] perception either when not perceiving or exercising [it]. If a blind person is someone who lacks sight, but naturally would have had it at that time and in the way that would be natural too, then the same people will turn out to be blind many times a day, and deaf as well.²⁴

Aristotle takes this result too to be unacceptable on its face. But the larger point is that being perceptible in any of these ways—having the power to be perceived—stands or falls with the power to perceive. If we cannot reasonably deny that an eye continues to have the power to see even when it is not seeing, then an object will also be perceptible, and indeed white or sweet, even when it is not concurrently being perceived. Aristotle thus rejects both Protagoreanism and the Megarian thesis.

If that's right, then it is *not* the case, as Plato suggests in the *Theaetetus*, that causal theories of perception necessarily lead to Protagoreanism. If one allows things to possess powers even when they are not exercising them, as Aristotle himself insists, then one can maintain a causal theory while rejecting Protagoreanism.

5 The Power of Perceptibles

On Aristotle's view, the power that perceptibles have in so far as they are perceptible is a causal power in our sense of the word: perceptibles have the power to *get* themselves perceived by *producing* a perception of themselves.

²² *Metaph.* 9.3, 1047a4–7: καὶ τὰ ἄψυχα δὴ ὁμοίως· οὔτε γὰρ ψυχρὸν οὔτε θερμὸν οὔτε γλυκὴ οὔτε ὀλως αἰσθητὸν οὐθέν ἔσται μὴ αἰσθανομένων· ὥστε τὸν Πρωταγόρου λόγον συμβήσεται λέγειν αὐτοῖς.

²³ For a closer examination of whether the Megarians could wriggle free from this consequence, see Makin 2000, 66–68, who concludes that they cannot.

²⁴ *Metaph.* 9.3, 1047a7–10: ἀλλὰ μὴν οὐδ' αἰσθησῶν ἔξει οὐδὲν ἂν μὴ αἰσθάνηται μὴδ' ἐνεργῆ. εἰ οὖν τυφλὸν τὸ μὴ ἔχον ὄψιν, πεφυκὸς δὲ καὶ ὅτε πέφυκε καὶ ἔτι ὡς. οἱ αὐτοὶ τυφλοὶ ἔσονται πολλάκις τῆς ἡμέρας, καὶ κωφοί. I read ὡς with the more recent manuscripts, rather than ὄν with the older ones (EJAb, as well as Alexander and Moerbeke); Jaeger's OCT achieves something similar by retaining ἔτι ὄν but then inserting τροπὸν afterwards.

²¹ *Metaph.* 9.3, 1046b29–32: εἰοὶ δὲ τινες οἱ φασιν, οἷον οἱ Μεγαρικοί, ὅταν ἐνεργῆ μόνον δύνασθαι, ὅταν δὲ μὴ ἐνεργῆ οὐ δύνασθαι, οἷον τὸν μὴ οἰκοδομοῦντα οὐ δύνασθαι οἰκοδομεῖν, ἀλλὰ τὸν οἰκοδομοῦντα ὅταν οἰκοδομῆ· ὁμοίως δὲ καὶ ἐπὶ τῶν ἄλλων. As David Sedley points out (1977, 105 n. 3), Μεγαρικός denotes a follower of Euclides, rather than someone with a local connection to Megara, which would be Μεγαρεὺς.

Aristotle begins his discussion of the qualities of homoeomerous bodies in *Meteorology* 4.8, by saying that

they all differ from each other by the qualities related exclusively to the senses, since they are able to produce an effect. For [an object] is white, fragrant, noisy, sweet, hot, or cold because it can produce an effect, namely, perception.²⁵

Objects, that is, are perceptible—white, fragrant, noisy, sweet, or hot—because they have the *power to produce perceptions* of these very qualities. Aristotle makes this causal claim repeatedly in a number of texts throughout his psychological writings, explicitly identifying perceptibles as having the power to bring about perception.²⁶

This isn't merely a commonsense observation. Aristotle takes it as evidence that perception is to be analyzed as a *causal interaction* between an agent and a patient, specifically as a type of alteration.²⁷ As such, it is to be explained using the same basic framework he uses to account for all agent-patient interactions,²⁸ which is unaffected in this regard by the further qualifications he adds that are peculiar to this type of change (see below, pp. 52–53, 57–58). Causal interactions like these all involve “assimilation” or likening (*ὁμοιοῦσθαι*), where the agent makes the patient like itself with respect to the active quality that the agent exercises in the

interaction.²⁹ If I put a kettle on to boil, the heat in the fire makes the water in the kettle hot: it is because the fire is hot that the water becomes hot, when they come into close enough contact. So too in perception. This is sometimes referred to as a “transmission” model of causation, because the agent transmits the active quality that it itself possesses to the patient. But the agent need not lose or expend this quality. What is essential is that it *reproduces* or *replicates* the active quality that it has in the patient. Hot things make other things hot.³⁰ According to Aristotle's theory, perception is supposed to occur in an analogous way.

Much of the discussion in the literature has focused on the end state, over the exact nature of the change produced in the perceiver. But considerably less attention has been given to the initial state, prior to the change, which for our purposes is pivotal. Not just any two things can interact in the relevant way (*Phys.* 1.5, 188a32–34). If the sense is to become like the perceptible object, it must be initially *unlike* it, so that it can become like it by the object's acting on it.³¹ Nor is it enough to be unlike. In order to be acted upon in this way, the sense must be the *sort* of thing that *can* take on that quality, or in Aristotle's phrasing, it must be “potentially such as the agent is actually.” It is a matter of considerable dispute just how the sense becomes like its object in the case of perception: whether the sense literally takes on the same quality, or some quality essentially connected with it, or whether it can still be said to receive its form in some other way.³² But what I wish to emphasize instead is what these doctrines imply *about the agent*—that is, the perceptible—*prior* to the change. Aristotle is unequivocal:

²⁵ *Meteor.* 4.8, 384b34–385a4: ταῦτα δὲ διαφέρει ἀλλήλων τοῖς τε πρὸς τὰς αἰσθήσεις ἰδίους ἅπαντα, τῷ ποιεῖν τι δύνασθαι· λευκὸν γὰρ καὶ εὐώδες καὶ ψοφητικὸν καὶ γλυκὺ καὶ θερμὸν καὶ ψυχρὸν τῷ ποιεῖν τι δύνασθαι τὴν αἴσθησίν ἐστι. . . . The Greek text is taken from Fobes's edition (1918). I follow the current scholarly consensus in regarding Book 4 of the *Meteorology* as authentic: for the classic discussion in favor of authenticity, see Furley 1983; for a survey of the debate and additional arguments, see Lewis 1996, 3–9.

²⁶ *DA* 2.5, 417b19–21: “[Perception and thought] differ in that what is able to produce the former activity is external: the visible, the audible, and similarly the remaining perceptibles as well.” (διαφέρει δὲ, ὅτι τοῦ μὲν τὰ ποιητικὰ τῆς ἐνεργείας ἔξωθεν, τὸ ὁρατὸν καὶ τὸ ἀκουστόν, ὁμοίως δὲ καὶ τὰ λοιπὰ τῶν αἰσθητῶν.) *Sens.* 2, 438b22–23 (cf. b5): “For the perceptible causes perception to be active.” (τὸ γὰρ αἰσθητὸν ἐνεργεῖν ποιεῖ τὴν αἴσθησιν.) *Sens.* 6, 445b4–8: “Are perceptibles modifications too, for example, color, flavor, odor, sound, heavy and light, hot and cold, hard and soft; or is that impossible? For each of these is able to produce perception, since they are all said to be [perceptible] because they are able to trigger it.” (ἄρα καὶ τὰ παθήματα τὰ αἰσθητὰ, ὄλον χρῶμα καὶ χυμὸς καὶ ὄσμη καὶ ψόφος, καὶ βαρὺ καὶ κοῦφον, καὶ θερμὸν καὶ ψυχρὸν, καὶ σκληρὸν καὶ μαλακόν, ἢ ἀδύνατον· ποιητικὸν γὰρ ἐστὶν ἕκαστον αὐτῶν τῆς αἰσθήσεως· τῷ δύνασθαι γὰρ κινεῖν αὐτὴν λέγεται πάντα.) *Insomn.* 2, 459a24–25: “For the perceptibles for each sense organ produce perception in us.” (τὰ γὰρ αἰσθητὰ καθ' ἕκαστον αἰσθητήριον ἡμῶν ἐμποιοῦσιν αἴσθησιν.) Compare also *Sens.* 3, 439a16–17; 4, 442b22–23; *DA* 2.10, 422a17. The Greek texts for the *De anima* are taken from Jannone's edition, while those for the *Parva naturalia* are from Siwek's.

²⁷ *DA* 2.5, 416b33–34 (cf. 2.4, 415b24): “Perception, as was said, occurs while undergoing change and being affected, since it seems to be a kind of alteration.” (ἡ δ' αἴσθησις ἐν τῷ κινεῖσθαι τε καὶ πάσχειν συμβαίνει, καθάπερ εἴρηται· δοκεῖ γὰρ ἀλλοιούσας τις εἶναι.)

²⁸ In *DA* 2.5, 417a1–2, Aristotle explicitly cross-references his discussion of agent-patient interactions in *GC* 1 (εἰρήκαμεν ἐν τοῖς καθόλου λόγοις περὶ τοῦ ποιεῖν καὶ πάσχειν).

²⁹ See *DA* 2.11, 424a1–2: “Consequently, the agent makes it the sort of thing it is itself in actuality, as [the patient] is so in potentiality.” (ὥστε τὸ ποιοῦν ὄλον αὐτὸ ἐνεργεῖα, τοιοῦτον ἐκείνο ποιεῖ δυνάμει ὄν.) For the point generalized to all agent-patient interactions, see *GC* 1.7, 324a10–11 (cf. a12–13): “and in general the agent makes the patient similar to itself” (καὶ ὅλως τὸ ποιητικὸν ὁμοιοῦν αὐτῷ τὸ πάσχειν). For further discussion, see section 6 below.

³⁰ Aristotle often uses a biological slogan to express this, ‘man begets man’: see esp. *Metaph.* 7.7, 1032a24–25; *GC* 1.5, 320b17–21; 1.7, 324a9–11. Also *Phys.* 2.7, 198a26–27; *Metaph.* 7.8, 1033b32; 7.9, 1034a21–25; 9.8, 1049b24–27; 12.3, 1070a8, a27–28; 12.4, 1070b34; and more generally Bonitz [1870] 1955, 59b40–45. For extended discussion of this formula, see Oehler 1963, esp. section II.

³¹ *DA* 2.5, 418a4–5: “For since it is not alike, it is affected, and having been affected, it has become alike and is the sort of thing the former [*sc.* the perceptible object] is.” (πάσχει μὲν ὄν οὐχ ὁμοιον ὄν, πεπονθὸς δ' ὁμοίωται καὶ ἐστὶν ὄλον ἐκείνο.) This is an elaboration of similar claim earlier in the chapter, at 417a20: “For what is unlike is affected, and because it has been affected, it is like.” (πάσχει μὲν γὰρ τὸ ἀνόμοιον, πεπονθὸς δ' ὁμοίον ἐστὶν.) For the more general point concerning agent-patient interactions, see *GC* 1.7, 323b15–324a9, which makes clear that when Aristotle speaks about what is “unlike” or “not alike,” he does not have in mind a mere contradictory, but the contrary or intermediate state (324a8): to use his example, whiteness cannot be affected by a line. It must be something which is the same in genus, but different in species. I would like to thank Eric Brown for pressing this point in discussion (21 April 2017).

³² For in depth discussion, see my 2005.

What can perceive is in potentiality such as *the perceptible is already* [ἤδη] in actuality, as has been stated.³³

Aristotle invokes this point in the case of the individual senses as well.³⁴ Perceptible objects have their perceptible qualities in actuality *before* bringing about a perception of themselves. In fact, in his view it is *precisely because* the agent already has this quality in actuality that it can initiate the change and stimulate perception. As we shall see in the next section, this is true of all agent-patient interactions in general: everything that undergoes this sort of change is affected by an agent that is already in actuality the relevant sort of thing (ὕπὸ τοῦ ποιητικοῦ καὶ ἐνεργείᾳ ὄντος, DA 2.5, 417a17–18).

6 The Activity of Perceptibles

When Aristotle comes to describe the actual interaction between the perceptible and the sense in *De anima* 3.2, he again does not treat it as something peculiar to perception, but rather as an instance of a pattern that holds for agent-patient interactions in general. When any agent meets a patient suitable to it in the appropriate circumstances, the first exercises its power to act and the second its power to be acted upon, and the patient undergoes the change in question as a result:

If, therefore, the change and action and modification occur in the thing acted upon, then necessarily sound and hearing as an activity occur in hearing as a power. For the activity of what can act and initiate change takes place in what is modified. . . . The same reasoning holds for the other senses and perceptibles too. And just as acting and being modified occur in what is modified and not in what acts, so too the activity of the perceptible and the activity of what can perceive occur in what can perceive.³⁵

Aristotle holds even more strongly that the exercise of each power constitutes *one and the same activity*, rather than two simultaneous parallel

³³ DA 2.5, 418a3–4 (cf. *Phys.* 8.4, 255a33–34): τὸ δ' αἰσθητικὸν δυνάμει ἐστὶν ὅσον τὸ αἰσθητὸν ἤδη ἐντελεχείᾳ, καθάπερ εἴρηται. Aristotle does not in fact say this earlier, at least not in exactly these words. But as Hicks (1907) suggests (ad loc.), one can “piece it together” from 417b18 ff. and 417b3–7 and 417a12–20. For our purposes, all that matters is that Aristotle takes this to be the clear implication of what he has said before and is something he endorses.

³⁴ Touch: DA 2.11, 423b29–424a2. Smell: DA 2.9, 422a6–7; *Sens.* 2, 438b21–23. Taste: DA 2.10, 422a34–b5.

³⁵ DA 3.2, 426a2–11: εἰ δὴ ἐστὶν ἡ κίνησις καὶ ἡ ποίησις καὶ τὸ πάθος ἐν τῷ ποιουμένῳ, ἀνάγκη καὶ τὸν ψόφον καὶ τὴν ἀκοὴν τὴν κατ' ἐνεργεῖαν ἐν τῷ κατὰ δυνάμιν εἶναι· ἡ γὰρ τοῦ ποιητικοῦ καὶ κινήτικοῦ ἐνεργεῖα ἐν τῷ πάσχοντι ἐγγίνεται. . . . ὁ δ' αὐτὸς λόγος καὶ ἐπὶ τῶν ἄλλων αἰσθήσεων καὶ αἰσθητῶν. ὡσπερ γὰρ καὶ ἡ ποίησις καὶ ἡ πάθησις ἐν τῷ πάσχοντι ἀλλ' οὐκ ἐν τῷ ποιούντι, οὕτω καὶ ἡ τοῦ αἰσθητοῦ ἐνεργεῖα καὶ ἡ τοῦ αἰσθητικοῦ ἐν τῷ αἰσθητικῷ.

activities, even though what it is to exercise one differs from what it is to exercise the other (425b25–426a1). This, too, is a feature of agent-patient interactions quite generally, something he discusses at length in *Physics* 3.3. It is essential to the notion that there is an *interaction* between agents and patients that their activity is not just contemporaneous (cf. 2.3, 195b16–21), but *conjoined* in a single event (3.3, 202a15–36), even though it is not the case that whatever can be predicated of one can be predicated of the other (202b8–22). If we are to say that the patient is changed by the agent's action, this event must be understood as taking place *in* the patient (202b6–8).

Aristotle believes that by applying these doctrines to the case of perception we can solve a difficulty his predecessors face about the reality of colors and other perceptibles:

Since the activity of what can perceive and the activity of the perceptible are one, though their being is different, it necessarily follows that hearing and sound, when spoken of in this way, cease to be and persist contemporaneously, as do flavor and taste and the rest similarly; but this is not necessary when they are spoken of as powers. Earlier naturalistic philosophers, though, did not address the issue well when they held that nothing is white or black without sight or a flavor without taste. They spoke correctly in one way, but incorrectly in another. For perception and perceptible are said in two ways, as a power in some cases and as an activity in others, and while their statement holds for the latter, it does not for the former. But they were speaking simply without making any qualification, about things that are not spoken of without qualification.³⁶

Aristotle's reply to his predecessors is, in effect, *Distinguo*. If we draw a distinction between powers and their exercise, we can see that his predecessors' intuitions apply at most to the latter, while the crucial question regarding the independent reality of perceptibles concerns the former. For as we have seen (section 3), Aristotle insists on the one-way independence of powers from their exercise, when he rejects the Megarian thesis in *Metaphysics* 9.3. So even though the power to be perceived is only *exercised* in the perceptual encounter, things will continue to *possess this power* even when they are not actually being perceived and hence will *be perceptible*

³⁶ DA 3.2, 426a15–26: ἐπεὶ δὲ μία μὲν ἐστὶν ἐνεργεῖα ἢ τοῦ αἰσθητικοῦ καὶ τοῦ αἰσθητοῦ, τὸ δ' εἶναι ἕτερον, ἀνάγκη ἅμα φθίρεσθαι καὶ σώζεσθαι τὴν οὕτω λεγομένην ἀκοὴν καὶ ψόφον, καὶ χυμὸν δὴ καὶ γεῦσιν, καὶ τὰ ἄλλα ὁμοίως· τὰ δὲ κατὰ δυνάμιν λεγόμενα οὐκ ἀνάγκη· ἀλλ' οἱ πρότερον φυσιολόγοι τοῦτο οὐ καλῶς ἔλεγον, οὐθὲν οἰόμενοι οὔτε λευκὸν οὔτε μέλαν εἶναι ἄνευ ὄψεως, οὐδὲ χυμὸν ἄνευ γεύσεως. τῇ μὲν γὰρ ἔλεγον ὀρθῶς, τῇ δ' οὐκ ὀρθῶς· διχῶς γὰρ λεγομένης τῆς αἰσθήσεως καὶ τοῦ αἰσθητοῦ, τῶν μὲν κατὰ δυνάμιν τῶν δὲ κατ' ἐνεργεῖαν, περὶ μὲν οὖν τούτων συμβαίνει τὸ λεχθῆναι, ἐπὶ δὲ τῶν ἑτέρων οὐ συμβαίνει. ἀλλ' ἐκεῖνοι ἀπλῶς ἔλεγον περὶ τῶν λεγομένων οὐχ ἀπλῶς.

prior to perception. But since colors like white, as well as sounds, flavors, odors, temperatures and moisture, are perceptible for Aristotle, they will also exist prior to being perceived. An object does not come to be white, therefore, only when it is perceived as such, as the Twins Theory from the *Theaetetus* maintains. It is white independently beforehand. Aristotle's solution here seems to be very much the same as the one we have been developing throughout.

6.1 Moderate Protagoreanism?

Or is it? Most recent interpreters have denied that it is.³⁷ They have taken the passage instead to represent a very different view, one that rejects this sort of realism about colors and other perceptibles. According to some, it even embraces a form of Protagoreanism.

One way to motivate this sort of view is to reconsider the Twins Theory. First, as presented in the *Theaetetus*, it is committed to objects existing independently of perception. For even though an object only becomes white during the perceptual encounter, when it becomes “filled” with whiteness, the object itself nevertheless exists beforehand, just as the eyes do: even though they only see and become “full” of sight during the perceptual encounter, they are present beforehand when they are not seeing (*Th.* 156D6–E7, 182A4–B7). The object, moreover, is described as a causal agent that has the *power* to produce perception (*δύναμιν δὲ τὸ μὲν ποιεῖν ἔχον*) when it makes contact with the appropriate perceptual organ, which in turn has a corresponding power to be affected by it (*τὸ δὲ πάσχειν*, *Th.* 156A6–7). So in some sense there are both perceptibles and perceivers even when there is no perceiving going on. According to the Secret Doctrine, both may still be undergoing some kind of change, but these “slower moving” changes seem to exist independently of the “faster moving” changes generated within the perceptual encounter itself (156C8–D3). So apart from the Heracliteanism, one might think that this position is not so very different from Aristotle's after all.

Wherein lies the disagreement, then? In just this. In the *Theaetetus*, the object may well be *perceptible* beforehand, but it is *white* only while it is being perceived (156E7, 182B2). Aristotle thinks this is misleading, though, at least if stated without qualification: for he thinks there is a way in which the object *is* white independently of being perceived, and this is to be explicated in terms of his distinction between powers and their activity or exercise. But how much of a difference is this? The alternative reading predominant in the secondary literature takes his correction to be largely verbal. There will still be substantive agreement with the Protagoreans: the object is *actually* white only during the perceptual encounter. Before that, it is white *merely in potentiality*—it has *the power* to be white, rather than being white in actuality—something again the Protagoreans can agree to.

³⁷ For references, see footnote 39 below.

What Aristotle's predecessors failed to recognize, on this reading, is just that there is nevertheless a legitimate sense in which objects can be said to be white beforehand: being potentially white is a way of being white too. But in its primary sense ‘white’ only applies when something is actually white, and that still only occurs during perception, just as the Protagoreans claim.

So on the alternative reading Aristotle *accepts* the core of Protagoreanism. But he does so without a Megarian view about powers, much less a Heraclitean view about flux and becoming. Call this position “MODERATE PROTAGOREANISM.”³⁸ It holds that while there are objects in the world with the power to produce perceptions and which are thus genuinely perceptible, they still don't have colors and odors and so forth *in the full sense* independent of their actually being perceived. The view thus maintains a certain objectivity about causal powers, while at the same time insisting on the subjective character of colors, flavors, and other perceptible qualities, which actually exist only within experience. Because of the way these claims are balanced, there might be disagreement as to how best to classify the position: one commentator, for example, describes it as a *rejection* of realism, while another celebrates it as a *defense* of a form of “subtle realism.”³⁹ But either way it is at odds with the kind of realism we have seen in Aristotle's other texts, at least on their most straightforward reading.

6.2 Color as a First Actuality

Does the distinction between powers and their exercise in *De anima* 3.2 support Moderate Protagoreanism? I don't think that it does. Moderate Protagoreanism still treats being perceptible and having a color like white *asymmetrically*: on this alternative, the object is actually perceptible before the perceptual encounter, because it actually has the power to be perceived, whereas it is white only in potentiality; it comes to be actually white only while it is being perceived. But Aristotle standardly treats being perceptible and having colors, flavors, and so on *symmetrically*, for the simple reason that he takes the latter to be *a kind of perceptible*; and both are to be understood as parallel to the corresponding power to perceive that constitutes the various senses. In all three cases, moreover, our ordinary ascriptions of predicates are well-founded. It is correct to speak of objects

³⁸ For a defense of this reading of the passage, see Gottlieb 1993, 112–113; it may be Ross's view as well (1924, 1.278).

³⁹ For the first reaction, see Terence Irwin's “The Rejection of Realism,” §164 of 1988, 313–314; also §165, which suggests that this antirealism is underwritten by his response to scepticism and in particular his commitment to the infallibility of the senses. For the second reaction, see Anna Marmodoro's “Aristotle's Subtle Perceptual Realism,” ch. 3 of Marmodoro 2014, esp. §3.2, 134–141. But most tend to see it along the first line: G.R.T. Ross and Christopher Taylor both take this passage as in tension with Aristotle's other realist commitments (Ross 1906, 149–150; Taylor 1990, 140–141); while Shields takes it to be a denial of “naive realism” (2016, 268–269).

beforehand as perceptible and white in the full sense, even when perception is not occurring, just as we speak of perceivers as having sight. These views are grounded both in his theory of perception and more broadly in his theory of causation (which I shall discuss in this and the next subsection, respectively).

Aristotle treats perceptibles and perceptual powers as strictly parallel throughout the passages quoted above from *De anima* 3.2, insisting that “the same reasoning holds” for both cases (ὁ δ’ αὐτὸς λόγος καὶ ἐπὶ τῶν αἰσθήσεων καὶ αἰσθητῶν, 426a8–9). But in his view we have the sense of sight fully, and not in a qualified way, even when our eyes are shut or we are asleep; it’s just that we are not *using* them at those times and so not *perceiving*. This distinction is a central theme in the *De anima*, from the beginning of Book 2, and forms the backbone of his definition of the soul and his treatment of perception generally. In *De anima* 2.1, he distinguishes between *actually possessing* a power—which he calls a “first actuality” (ἐντελέχεια ἡ πρώτη, 2.1, 412a22–b9)—and *actually exercising* it. The soul itself is an actuality of the first kind: each of us actually has a soul and so is a certain kind of living creature in virtue of the powers we possess even when we are asleep or inactive, and to make this plausible Aristotle explicitly compares the soul with the power of sight (412b27–413a1). Later, in *De anima* 2.5 he uses the same distinction to argue that perceiving is the exercise of a power we already possess and so is just the realization of its nature, not an alteration or transformation. He contrasts this with the changes that led to the *acquisition* of that power in the first place (417a21–b16), the latter being something that happened earlier, with the formation of the organs in the embryo. Prior to that point, an embryo possesses those powers and that type of soul *only potentially* (417b16–18; GA 2.3, 736b8–14, b21–27). But once they are formed, it possesses them actually.

Now if Aristotle regards perceptibles in the same way, as he says he does, then we should regard being perceptible generally and perceptible qualities like color as *first actualities* too.⁴⁰ That is, an object is perceptible and possesses color literally, fully, and without qualification even when it is not seen, because it *actually possesses* the power to produce perception, just as he characterizes perceptibles like “white, fragrant, noisy, sweet, hot, or cold” in *Meteorology* 4.8 and the other passages we considered above (section 5, esp. footnote 26).⁴¹ An object would only *potentially possess*

a power, in contrast, because it *can acquire* that power by undergoing change. An object that is potentially white is one that as a result of being painted, bleached, or otherwise altered develops the surface features that can affect vision in the way that white objects characteristically do. It is thus at an *even lower level* than something that actually possesses the power but is not at the moment exercising it. Aristotle explicitly draws this distinction between two senses of ‘potentiality’ in *Physics* 8.4 and *De anima* 2.5.⁴² Actually possessing a power is *not merely* a potentiality when it is not being exercised, because it does not require any further *internal* change to its nature in order to be activated: in the right circumstances, its “stimulus conditions,” it will be exercised straightaway, unless there is some external hinderance that blocks it. It is for just this reason that Aristotle describes this higher level of potentiality as a first *actuality* (ἐντελέχεια ἡ πρώτη, DA 2.1, 412a27, b5) and distinguishes it from a still higher level of actuality, when that power is *actively exercised*—its “second actuality,” as the tradition standardly refers to it. Clear water in a glass is only potentially colored and so only potentially visible, because a red dye (say) can be dropped into it. But once the dye has been mixed in, the water is actually colored and actually visible, even if there is no subject around to see it, because it now actually possesses the power to be perceived by sight:

powers and is not how Aristotle typically speaks about the power to produce perception or, as we shall see in the next subsection, how he speaks about active powers generally.

⁴² *Phys.* 8.4, 255a30–b5: “Given that ‘in potentiality’ is said in many ways. . . . The person who is learning is a knower in potentiality in one way and the person who *already* possesses [knowledge], but is not exercising it [is a knower in potentiality in another]. But it is always the case that when what can act and what can be modified are together, what is potential comes to be in actuality: the person learning, for example, goes from being a [knower] in potentiality to being something else in potentiality, since a person who possesses knowledge, but is not contemplating, is still a knower in potentiality in a one way, but not in the way he was before acquiring knowledge. Whenever this is the case, and nothing prevents it, he will engage in the activity and contemplate; otherwise, he will be in the contradictory state and in ignorance.” (ἐπεὶ δὲ τὸ δυνάμει πλεοναχῶς λέγεται. . . . ἔστι δὲ δυνάμει ἄλλως ὁ μανθάνων ἐπιστήμων καὶ ὁ ἔχων ἤδη καὶ μὴ ἐνεργῶν. αἰεὶ δ’, ὅταν ἅμα τὸ ποιητικὸν καὶ τὸ παθητικὸν ὦσιν, γίγνεται ἐνεργεῖα τὸ δυνατόν, οἷον τὸ μανθάνον ἐκ δυνάμει ὄντος ἕτερον γίγνεται δυνάμει· ὁ γὰρ ἔχων ἐπιστήμην μὴ θεωρῶν δὲ δυνάμει ἔστιν ἐπιστήμων πως, ἀλλ’ οὐχ ὡς καὶ πρὶν μαθεῖν, ὅταν δ’ οὕτως ἔχη, εἴαν τι μὴ κωλύη, ἐνεργεῖ καὶ θεωρεῖ. ἢ ἔσται ἐν τῇ ἀντιφάσει καὶ ἐν ἀγνοίᾳ.) The Greek is taken from Ross 1936.

DA 2.5, 417a22–29: “For something is a knower in one way, namely, in the way we would say that a person is a knower because a human is one of the things that knows and possesses knowledge, but in another way we say a person possessing knowledge of grammar is *already* a knower. Each of these is potential, just not in the same way: one is because his genus and matter is of a certain kind, while the other is because he is capable of contemplating whenever he wishes, unless something external prevents, whereas the person who is already contemplating knows this A in actuality and in the principal sense.” (ἔστι μὲν γὰρ οὕτως ἐπιστήμων τι ὡς ἂν εἴπομεν ἀνθρώπων ἐπιστήμονα ὅτι ὁ ἀνθρώπος τῶν ἐπιστημόνων καὶ ἐχόντων ἐπιστήμην· ἔστι δ’ ὡς ἤδη λέγομεν ἐπιστήμονα τὸν ἔχοντα τὴν γραμματικὴν· ἐκάτερος δὲ τούτων οὐ τὸν αὐτὸν τρόπον δυνατός ἐστιν, ἀλλ’ ὁ μὲν ὅτι τὸ γένος τοιοῦτον καὶ ἡ ὕλη, ὁ δ’ ὅτι βουληθεὶς δυνατός θεωρεῖν, ἂν μὴ τι κωλύσῃ τῶν ἔξωθεν· ὁ δ’ ἤδη θεωρῶν, ἐντελεχεία ὦν καὶ κυρίως ἐπιστάμενος τὸδε τὸ Α.)

⁴⁰ I am not the first to apply this distinction between first and second actuality to this passage: e.g., Kosman 1975, 513–114; Lloyd 1979, 136–38, 140, 148; Modrak 1987, 30; Lear 1988, 103–108, 111; Calderon 2015, 85–88. It is also arguably what underlies Alexander of Aphrodisias’ remarks at *In Sens.* 42.6–11. But as we shall see, it is really just an application of Aristotle’s more general view of causation.

⁴¹ Both Ganson (1997, 272–275) and Broackes (1999, 67–68) hold that a color actually has the power to produce perception *only while it is affecting* either the medium (in Ganson’s case) or the eye (in Broackes’s case). Such a reading veers too close to the Megarian view of

if there *were* a subject present (and there were no hinderances), the subject *would* see the colored water, without requiring any further change in the water. Until that moment, it will not actually *be seen* or *perceived*. But it will nonetheless be *perceptible*, fully and in actuality. On the reading I have been advocating, the color white is a particular power to be perceived, and not the exercise of that power, as Moderate Protagoreanism claims, in just the same way that being perceptible is. Because an object actually possesses both powers before being perceived, it is correctly said to be both white and perceptible, literally and fully.

6.3 Causal Powers as First Actualities

In Aristotle's view, perception does not differ in this regard from any other agent-patient interaction. All of the doctrines above are causal generalizations that apply to agent-patient interactions across the board. In order for there to be such change, the relevant powers must be present beforehand: there must be something capable of acting and another thing capable of being acted upon prior to their interaction.⁴³ And both of these powers will be conjointly exercised during their interaction, something explored at length in *Physics* 3.3. But the agent and patient also differ in one crucial respect. The agent *already is in actuality* what the patient as of yet only has the power to become:

What produces change is *already in actuality*: for example, what is hot heats [things] and in general what possesses the form produces . . . Likewise in each of the other cases where what produces change is something that necessarily has the same named feature.⁴⁴

This prior actuality is presupposed by the transmission model of causation, where “the agent always supplies some form” to the patient (εἶδος αἰεὶ οἴσεται τι τὸ κινεῖν, *Phys.* 3.2, 202a9) and thereby makes the patient similar to itself (ὄλως τὸ ποιητικὸν ὁμοιοῦν ἑαυτῷ τὸ πάσχον, *GC* 1.7,

3234a10–11).⁴⁵ But there is also a more general metaphysical point underlying it, namely, that as in all things actuality is prior to potentiality in change as well.⁴⁶ Aristotle applies the point explicitly to perception in *De anima* 3.7:

In a single thing what is in potentiality is temporally prior, but in the wider context it is not even temporally prior. For everything that comes into being does so *from something in actuality*. The perceptible plainly makes [the sense] go from being something in potentiality—that is, something that can perceive—to something in actuality.⁴⁷

So even though the agent's power to initiate change will only be exercised in the change, it still *actually possesses* that power prior to the change. This power is therefore *not* a mere potentiality of the sort the patient has beforehand, but a *first actuality*, an active quality that the patient too will come to possess afterwards as a result of the change.⁴⁸ It is only because

⁴⁵ *Phys.* 3.2, 202a9–12: “What initiates change always supplies some form, either some particular type of thing or sort of thing or amount, and this is the source responsible for the change, whenever it initiates change. For example, a human in actuality produces a human out of what is potentially a human.” (εἶδος δὲ αἰεὶ οἴσεται τι τὸ κινεῖν, ἤτοι τὸδε ἢ τοιοῦνδε ἢ τοσόνδε, ὃ ἔσται ἀρχὴ καὶ αἴτιον τῆς κινήσεως, ὅταν κινή, οἷον ὁ ἐντελεχέα ἄνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὄντος ἀνθρώπου ἀνθρώπον.)

GC 1.5, 320b17–21: “One thing comes into being, simply as such, out of another (as has also been put forward elsewhere) and due to the action of something that is in actuality in a like species or the same genus, as for example fire comes into being due to fire or a human due to a human, or due to an actuality.” (γίνεται μὲν οὖν ἀπλῶς ἕτερον ἐξ ἑτέρου, ὥσπερ καὶ ἐν ἄλλοις διώρισταί, καὶ ὑπὸ τινος δὲ ἐντελεχέα ὄντος, ἢ ὁμοιοειδοῦς ἢ ὁμογενοῦς, οἷον πῦρ ὑπὸ πυρός ἢ ἄνθρωπος ὑπὸ ἀνθρώπου, ἢ ὑπὸ ἐντελεχέας.)

GC 1.7, 324a9–14: “Hence it thereby also makes sense that fire heats and what is cold cools, and in general that the agent makes the patient similar to itself. For what acts and what is affected are contraries, and generation is into what is contrary. Consequently, what is affected changes into what acts, so that generation will in this way be into the opposite.” (διὸ καὶ εἴλογον ἦδη τὸ τε πῦρ θερμαίνει καὶ τὸ ψυχρὸν ψύχειν, καὶ ὄλως τὸ ποιητικὸν ὁμοιοῦν ἑαυτῷ τὸ πάσχον· τὸ τε γὰρ ποιοῦν καὶ τὸ πάσχον ἐναντία ἐστὶ, καὶ ἡ γένεσις εἰς τοῦναντίον. ὥστ' ἀνάγκη τὸ πάσχον εἰς τὸ ποιοῦν μεταβάλλειν· οὕτω γὰρ ἔσται εἰς τοῦναντίον ἡ γένεσις.)

⁴⁶ *Metaph.* 9.8, 1049b24–27: “For what is [F] in actuality comes to be from something that is [F] in potentiality due to the action of something [that is F] in actuality, for example a human is from a human and a cultured person due to a cultured person, where what produces the change *always comes first*; and what produces change is *already* [F] in actuality.” (δεῖ γὰρ ἐκ τοῦ δυνάμει ὄντος γίνεσθαι τὸ ἐνεργεῖα ὄν ὑπὸ ἐνεργεῖα ὄντος, οἷον ἄνθρωπος ἐξ ἀνθρώπου, μουσικός ὑπὸ μουσικοῦ, αἰεὶ κινεῖν τὸς τινος πρώτου· τὸ δὲ κινεῖν ἐνεργεῖα ἦδη ἔστω.)

⁴⁷ *DA* 3.7, 431a2–5: ἡ δὲ κατὰ δυνάμιν χρόνω προτέρα ἐν τῷ ἐνί, ὄλως δὲ οὐδὲ χρόνω· ἔστι γὰρ ἐξ ἐντελεχέα ὄντος πάντα τὰ γινόμενα· φαίνεται δὲ τὸ μὲν αἰσθητὸν ἐκ δυνάμει ὄντος τοῦ αἰσθητικοῦ ἐνεργεῖα ποιοῦν. The μὲν *solitarium* in the last clause emphasizes αἰσθητὸν, further underscored by the veridical use of φαίνεται with a participle ποιοῦν.

⁴⁸ At the end of *Metaph.* 7.9, Aristotle contrasts an agent that is fully actual, like a human parent producing a child, with a quantity or quality, which pre-exists “only potentially” (δυνάμει μόνον, 1034b16–19). But the contrast is only meant to show the latter are not

⁴³ *Phys.* 8.1, 251a10–16: “Therefore, there must be things present that are capable of being changed for each type of change. . . . Consequently, there must be something *beforehand* that can be burnt *before* it is burnt and something that can burn *before* it burns.” (ἀναγκαῖον ἄρα ὑπάρχειν τὰ πράγματα τὰ δυνάμει κινεῖσθαι καθ' ἑκάστην κίνησιν. . . . ὥστε δεῖ πρότερον καυστὸν εἶναι πρὶν καέσθαι καὶ καυστικὸν πρὶν καίειν.)

⁴⁴ *Phys.* 8.5, 257b9–12 (cf. 8.4, 255a22–23): τὸ δὲ κινεῖν ἦδη ἐνεργεῖα ἔστω, οἷον θερμαίνει τὸ θερμὸν καὶ ὄλως γεννᾷ τὸ ἔχον τὸ εἶδος. . . . ὁμοίως δὲ καὶ τῶν ἄλλων ἕκαστον, ὅσων τὸ κινεῖν ἀνάγκη ἔχειν τὸ συνώνυμον.

the agent already has this active quality in actuality, in fact, that it can initiate change in the patient.⁴⁹ If an agent has this quality in actuality, then it will act straightaway once it finds itself in the appropriate stimulus conditions:

This holds, similarly, for natural things. For what is cold is potentially hot, and once it has undergone this transformation and *already* is fire, it burns, so long as nothing prevents or impedes it. Likewise for what is heavy and light: for what is light comes into being from something heavy . . . and once it *already* is light, then it will go into activity straightaway, should nothing prevent it . . . and likewise for what is of a certain quantity or a certain quality.⁵⁰

Ice may be hot in potentiality, but in its current state it won't heat your drink; it will only cool it. Likewise, although someone might say that firewood has the power to heat—that, after all, is why people stock up on it for the winter—it too is hot merely in potentiality: if you leave it unlit in the fireplace it will not warm your living room. It is only once it has been lit and become actually hot that it actually has the power to heat in the relevant sense, in the sense that it can straightaway heat the cooler air surrounding it (again, absent external hindrances).

On the view defended here, then, being perceptible, visible, colored, and white are all to be understood in the same way.⁵¹ They are causal powers and so should all be understood as *first actualities*.⁵² They are

second actualities before the interaction. They are still first actualities, since their bearers *actually* possess the causal power; and this is a higher level of actuality than something that *merely could possess* that power.

⁴⁹ This doctrine is sometimes cited by its scholastic tag, *omne agens agit in quantum est in actu*. See e.g., Thomas Aquinas, *De potent.* q. 2, a. 1 (unumquodque agens agit secundum quod actu est); *Contra Gent.* 3.66 (omne agens facit esse actu); *In Phys.* III, lect. 4 (cum omne agens agit in quantum est actu).

⁵⁰ *Phys.* 8.4, 255b5–13 (cf. *Metaph.* 9.5, 1048a5–7, a15–21): *ὁμοίως δὲ ταῦτ' ἔχει καὶ ἐπὶ τῶν φυσικῶν· τὸ γὰρ ψυχρὸν δυνάμει θερμὸν, ὅταν δὲ μεταβάλλῃ· ἤδη πῦρ, καίει δέ, ἂν μὴ τι κωλύῃ καὶ ἐμποδίζῃ. ὁμοίως δ' ἔχει καὶ περὶ τὸ βαρὺ καὶ κοῦφον· τὸ γὰρ κοῦφον γίγνεται ἐκ βαρέος . . . καὶ ἤδη κοῦφον, καὶ ἐνεργήσει γ' εὐθύς, ἂν μὴ τι κωλύῃ. . . καὶ τοῦθ' ὁμοίως ἔχει καὶ ἐπὶ τοῦ ποσοῦ καὶ ἐπὶ τοῦ ποιού.*

⁵¹ On this point, I differ from Ganson, who follows Alexander of Aphrodisias in holding that being a color can come apart from being visible or perceptible: unlike the Twins Theory, a color can be active as a color even when it is not being perceived, but it will not actually be perceptible then (Alex. Aphr. *In Sens.* 42.7–10; Ganson 1997, 266–268). Hussey seems to take a similar position (1983, 62 ad 201a7). Although I disagree with key features in Ganson's solution, I am in sympathy on many other points and have learned a great deal from his wonderfully rich and nuanced article. It not only draws widely from the Aristotelian corpus, but engages highly relevant details from the Greek commentators and early modern figures like Galileo and Descartes.

⁵² Klaus Corcilius has objected that Aristotle does not explicitly speak of first and second actualities in connection with perceptibles in *De anima* 3.2, but merely characterizes perceptibles

actual features of objects capable of producing change, and even though they only attain second actuality during the change, while exercising that power, they already have those powers fully prior to the change. Just as Aristotle would say that an object is actually perceptible and actually visible before it is perceived and seen, so he would say that it is actually colored and actually white in those same circumstances—these attributes are on all fours. Moderate Protagoreanism has to deny this and treat them *asymmetrically*, much like the Twins Theory: although being perceptible or visible are powers that objects possess prior to the interaction on this view, the color white is *not*, but merely the exercise of a power, and so is actual only in perception; before that, white is a *mere* potentiality of the object. But if Aristotle classifies colors like white as visible and perceptible, he should equally regard them as causal powers. Which in fact he does, not only in *Meteorology* 4.8 and other passages cited above (section 5, esp. footnote 26), but in the *De anima* itself, when he characterizes color as something that “contains within itself what is responsible for being visible” (ἐν αὐτῷ ἔχει τὸ αἴτιον τοῦ εἶναι ὁρατόν, 2.7, 418a30–31). As such, a color must already be actual beforehand as a first actuality, just like heat and other causal powers. Its actually being seen and perceived is just the exercise of this power, its second actuality, which is an attainment of color, and not its first occurrence.

If that's right, then the activity of a color in perception is *not* a change or transformation of its nature as a color, but only an exercise of its power to produce a perception of itself, a power it already possessed beforehand and continues to possess. The transition from a first to second actuality does not exhaust and destroy its power or alter its nature, as Aristotle emphasizes with the corresponding power to perceive. Instead, exercising such a power is a “progression towards itself and towards its realization” (εἰς αὐτὸ ἢ ἐπίδοσις καὶ εἰς ἐντελέθειαν, *DA* 2.5, 417b2–7, at a6–7).⁵³

as being in potentiality prior to perception (2016, 302–303 n. 20). The textual observation is correct, but not probative. First, Aristotle does not use the term ‘first actuality’ in any of the physical works we have just been considering. Yet there can be no doubt that on his theory, the active qualities of agents are both a power, which is exercised in the causal interaction, and nonetheless something the agents actually possess beforehand, since mere potentialities cannot function as the source responsible for the change. Therefore, active qualities must in general be understood as first actualities, whether or not Aristotle explicitly calls them that. Perceptibles are no different. Second, *DA* 3.5 says that *light* makes potential colors *actual* colors (τὸ φῶς ποιεῖ τὰ δυνάμει ὄντα χρώματα ἐνεργεῖα χρώματα, 430a17–18), a level of actuality that seems to be independent of being seen: it doesn't say that light causes them to be seen, but only to be actual colors. But if so, then Aristotle assumes again that colors are at first actuality prior to being seen.

⁵³ As Herzberg (2011) correctly notes (80), Aristotle does not explicitly apply his views about second actualities to perceptibles in *DA* 2.5. But again this silence is not probative: as we have seen, Aristotle takes both cases to be parallel (see p. 52 above). Herzberg adds a further argument (80–81, esp. n. 76) that is meant to differentiate perceptibles generally from food and other natural agents (*DA* 2.4, 416a29–b7; *GC* 1.7, 324a32–b3). But I think this is a false contrast. In the *DA* 2.4 passage, Aristotle says that food is transformed by digestion and made

The perceived color is thus *the very same color* it was prior to perception, except that now it is getting itself seen; and since these basic perceptions are veridical on Aristotle's view, it is perceived *as* what it in fact already *is*. This is what gives Aristotle's realism the purchase on reality he intends. Perception does not transform or even "energize" the world. Rather, it *reveals* the perceptible nature of things and informs us of the qualitative differences objects possess (*Sens.* 1, 436b12–437a9). The only thing colors are missing prior to being perceived is *being perceived*. Perception does not change *how* colors appear, just *whether* they appear: their "looks" are exactly the same. The color as it is in itself and the color as experienced thus "resemble" each other in the strongest sense possible. This is a consequence Moderate Protagoreanism cannot accept, though, if this position is to be distinct from the sort of realism I have advocated. Aristotle must therefore reject Moderate Protagoreanism.

7 What are Colors?

For all of this, one might still wonder what colors and other perceptible qualities *are*. We have seen that for Aristotle these perceptible qualities are *causal powers*—perceptible objects, in so far as they are perceptible, have the power to affect things, in particular to produce perception in virtue of these perceptible qualities. But are these qualities anything more than that, or are they simply to be *identified with* such causal dispositions, full stop? Or should they be identified instead with the features of the object that *ground* these dispositions? And if so, must Aristotle have held a Lockean or (more plausibly) a Democritean position, according to which the fundamental properties (so-called "primary qualities") are all at bottom *geometrical* and *kinetic*, so that the combinations that stimulate perception (so-called "secondary qualities"), though picked out by their subjective effect, are essentially other than they appear?

7.1 Against Dispositionalism

Given that perceptible qualities are causal powers for Aristotle, the first question to ask is whether they can be understood as anything more than the disposition to affect perceivers in certain ways and so more than just relationally. At the generic level, it seems as though reference to the effect on a subject is inescapable. Perceptibles (*αἰσθητά*) for Aristotle are what can

similar to the body of the living thing. But he is treating food as the *patient* in the process, and so its assimilation to the body would be parallel, if anything, to what the *sense organ* undergoes in perception, not the external perceptible, since in digestion it is the soul that is the agent (416b19–23). The other passage, in contrast, from *GC* 1.7 does speak about food as an agent that also undergoes a concurrent change (*ποιούν καὶ αὐτὸ πάσχει* τ, 324b1–2). But the reciprocal change it mentions is due to the fact that food *makes contact* with what it affects, and not a consequence of its agency as such. But the only thing the perceptible is in contact with is the medium, and this contact is constant before and during perception. So perceptibles would not be *further* affected simply by there being a perceiver at the other end perceiving it.

be perceived by a perceiver or more specifically something that can affect perceivers in such a way as to produce a perception of themselves. The same holds for the various types of perceptible, like what is audible and visible. Shouldn't colors, then, which are essentially visible and perceptible,⁵⁴ be characterized in analogous way, as the ability to affect perceivers in specific ways, by reference to the subjective quality of the resulting experience? One might even think that the link to experience was not just intimate, but *definitional* for Aristotle. He could still maintain the kind of existential independence and causal priority established above, while at the same time insisting that color and other types of perceptible should be defined purely as dispositions to produce specific types of subjective experience.

That, however, would be a mistake. He does not even think that color is *coextensive* with the visible, although commentators sometimes speak as if it is.⁵⁵ Aristotle makes quite clear that in addition to colors, which are only seen in the light, there are also objects that can be seen in the dark—we speak of such objects as "phosphorescent," though Aristotle notes there is no Greek word for them (*DA* 2.7, 418a26–28; 419a1–7). So colors are at best one kind of visible quality. But a defender of this sort of view might reasonably push back against this. In the first place, the failure of coextension is idiosyncratic to vision, because of the peculiar role of light, and so would not generalize to other perceptibles. But secondly, with regard to the underlying issue, it is a moot point. Even if color is merely a species of the visible, it could still be defined as a power to be seen and perceived, and so could still be specified essentially in terms of our subjective response, regardless of whether there are other species of visible quality as well.

We do not need to rely on questions of extension, though, since Aristotle explicitly denies that to be a color is to be visible.⁵⁶ In the *De anima*, he states that vision is not mentioned in the definition of color:

⁵⁴ Against Ross (1936), who claims (538 ad 201b4; 1924, 2.328 ad 1065b32) that visibility is an extrinsic characteristic, contingent on whether there is light. It is true that it is only *possible* to see a color when there is light. But Aristotle should not regard this as involving a change in the color's *powers*, any more than there would be in the absence of perceivers—Aristotle's position here should be no different than the one he takes about perceptibles generally in *Categ.* 7 or *Metaph.* 4.5. This appears to be contradicted by *DA* 3.5, 430a17–18, which says that light makes potential colors actual colors. But unless we take this to mean that objects only *acquire* colors when there is illumination—a reading I have not seen anyone suggest—"potential color" here must simply signify the color of an object being *at a lower level* of potentiality, because according to Aristotle's theory it cannot have an effect on the medium unless it is illuminated.

⁵⁵ E.g., Hussey (1983, 62) and Ganson (1997, 267), though both are quick to deny that they are *necessarily* coextensive, because they hold that colors will not be visible in a world without perceivers. I disagree on both counts: colors will be visible in such worlds (see footnote 14 above), but not everything visible is a color even in the actual world.

⁵⁶ *Phys.* 3.1, 201b3–4 (cf. 201a29–b5) and its doublet in *Metaph.* 11.9, 1065b32: "Since they [*sc.* being bronze and being a change] are not the same, just as color and visible are not . . ." (*οὐ ταῦτόν, ὥσπερ οὐδὲ χροῖμα ταῦτόν καὶ ὄρατόν . . .*)

Color is what is on the outside of things that are intrinsically visible, though it is intrinsically [visible] not by definition [οὐ τῷ λόγῳ], but because color has within it what is responsible for its being visible [τὸ αἴτιον τοῦ εἶναι ὁρατόν]. Every color is able to effect change in what is actually transparent, and this is its nature.⁵⁷

Since color is not defined in terms of vision, it can be specified independently of it. But then one can explain why something is visible *without circularity*: its nature (*φύσις*) is such as to be able to produce a change in the transparent medium,⁵⁸ and it is because it has this nature that it possesses the ground responsible (*αἴτιον*) for being visible “within itself” (*ἐν αὐτῷ*).⁵⁹ Color on Aristotle’s view is thus *definitionally prior* to vision, even though it is intrinsically and necessarily visible.⁶⁰ It is therefore *a fortiori* not defined as a disposition to produce a visual experience of a certain kind. Rather, it is something that *has* that disposition as a consequence of its own nature.

We can go further. While Aristotle classifies perception and what is perceptible, and likewise vision and what is visible, as relatives (*τὰ πρὸς τι*), which are essentially characterized in terms of each other, colors in contrast are *not* relatives but *qualities* (*ποιότητες*), as are flavors and temperatures and all the rest. They are qualities because the things that possess them are said to be “qualified” in virtue of them (*τὰ δεδεγμένα ποιᾷ λέγεται κατ’ αὐτάς*, *Categ.* 8, 9a28–35). More specifically, they are “affective qualities” because they are intrinsic features of objects capable of producing a qualitative modification in the senses (*τῷ κατὰ τὰς αἰσθήσεις ἐκάστην τῶν εἰρημένων ποιότητων πάθος εἶναι ποιητικὴν*, 9a35–b9). Aristotle categorizes knowledge (*ἐπιστήμη*) the same way. For knowledge

⁵⁷ DA 2.7, 418a26–b2: τοῦτο δ’ ἐστὶ τὸ ἐπὶ τῶν καθ’ αὐτὸ ὁρατῶν· καθ’ αὐτὸ δὲ οὐ τῷ λόγῳ, ἀλλ’ ὅτι ἐν αὐτῷ ἔχει τὸ αἴτιον τοῦ εἶναι ὁρατόν. πᾶν δὲ χρῶμα κνητικόν ἐστὶ τοῦ κατ’ ἐνέργειαν διαφανοῦς, καὶ τοῦτ’ ἐστὶν αὐτοῦ ἡ φύσις. This definition is repeated again more briefly later in the chapter, at 419a9–11: “For this is for it *just what it is to be a color*, namely, to be capable of effecting change in what is actually transparent” (τοῦτο γὰρ ἦν αὐτῷ τὸ χρῶματι εἶναι. τὸ κνητικῷ εἶναι τοῦ κατ’ ἐνέργειαν διαφανοῦς.) Shields (2016) reads αὐτό with W instead of αὐτῷ, but translates as if it read τὸ αὐτό. The received text is preferable not only philological grounds, but on philosophical grounds, since it avoids ambiguities in “the same” that Aristotle sometimes exploits.

⁵⁸ Aristotle’s own considered position should thus be contrasted with the example offered at *Top.* 1.15, 107b28–31, which specifies the differentia of bodily colors in terms of vision (“what is able to disperse or concentrate sight”), a definition that echoes Plato’s characterization in *Timaeus* (67C–68D; cf. 45B–D).

⁵⁹ Aristotle’s distinction thus contradicts Broadie’s claim that he is committed to what she calls “the Restricted Efficacy of Sensibilia” (1992, Section III, but esp. 145–147, 153). His point is precisely that color’s causal power can be described and indeed is defined without reference to perception, in terms of its effects on the inanimate medium.

⁶⁰ A point well made by Everson (1997, 21–30), and noted by Lee (2011, 32 n. 21), although the key point had been noticed earlier by Sorabji (1980), namely, that his definitions of various perceptible qualities rarely mention the senses (55 n. 2). For further discussion, see Broackes 1999, 60–61.

and what can be known are likewise relatives, since they are essentially characterized in terms of each other (*Categ.* 7, 6b3–6, b33–35, 7b23–35). But he still classifies specific branches of knowledge such as grammar (*γραμματική*) and music (*μουσική*), as qualities, a solution he takes to hold “for practically all” dispositions and states (*σχεδὸν ἐπὶ πάντων τῶν τοιούτων*, 8, 11a20–36). They are themselves intrinsic characteristics of the subject that bears them, and it is precisely because of their own nature that they can fill or play a generic role which is characterized relationally. Colors are thus visible and perceptible because their nature enables them to play a causal role in perception.

The fact that color is not defined dispositionally, moreover, is what allows an account of it to be informative. So while it may be *true* to say that sight is “of that of which there is sight” (*οὐ ἐστὶν ὄψις, καίτοι γ’ ἀληθές τοῦτο εἰπεῖν*), what we should say instead is that “it is directed towards a color or something else of that sort” (*ἀλλὰ πρὸς χρῶμα ἢ πρὸς ἄλλο τι τοιοῦτον*, *Metaph.* 5.15, 1021b1–2), that is, something “distinct from perception, which is necessarily prior to it” (*ἀλλ’ ἐστὶ τι καὶ ἕτερον παρὰ τὴν αἴσθησιν, ὃ ἀνάγκη πρότερον εἶναι τῆς αἰσθήσεως*, 4.5, 1010b36–37).

7.2 Against Eliminativism and Reductivism

It might seem natural, then, to identify color instead with the *categorical basis* of this disposition, that is, with the underlying properties that are capable of affecting the transparent medium in the relevant ways and analogously for the other perceptibles. But here we must be careful too. For Aristotle resoundingly rejects the kind of account that Democritus and some of his other predecessors offered, which explains perceptible qualities in terms of more fundamental properties, in particular the ones that we often refer to as “primary qualities,” such as surface texture, shape, and geometrical features:

Democritus and most of the naturalistic philosophers who discuss perception do something completely absurd, since they turn all perceptible [qualities] into tangible ones. Yet if so, then evidently each of the other senses is a form of touch as well. It is not hard to see that this is impossible. Furthermore, they treat the [perceptibles] common to all the senses as though they were exclusive [to just one]; for extension, shape, roughness, smoothness, sharpness and bluntness in solids are common to the senses, or if not all, then at least to sight and touch. (That is why people make errors about them, while they do not make errors about those exclusive [to one sense]: sight, for example, doesn’t [make errors] with regard to color or hearing with regard to sounds.) For these philosophers trace all exclusive

[perceptibles] back to [common perceptibles], in the way Democritus does: for he claims that white and black are rough and smooth, while he traces flavors back to shapes.⁶¹

Aristotle's characterization of Democritus here, at least in outline, seems to be confirmed by other sources, which report that Democritus wrote separate works on colors and flavors. Many of these details are summarized by Aristotle's student and later colleague, Theophrastus, especially with regard to the various shapes and textures responsible for specific colors and flavors.⁶²

What matters here, though, is not Aristotle's historical accuracy, but the position he targets as flawed. One thing he plainly abhors is any hint of eliminativism, the view that in reality there are no colors or other perceptible qualities and that our experiences are completely and systematically mistaken. On such a view, which he sometimes ascribes to Democritus, the atomic structure of objects might be responsible for things appearing that way to us, but the structures themselves will not be colored. Such apparent differences are to be explained

by altering the same thing in orientation, order, and differences in arrangement, as Democritus does. Because of this, he also *denies that there is color*, since it is by orientation that things are colored.⁶³

At points, Theophrastus puts it even more strongly:

He says that none of the perceptibles other [than heavy, light, hard and soft] has a nature [φύσις], but rather are all

modifications of the sense while it is undergoing alteration, from which an appearance is produced.⁶⁴

In his subsequent critique, Theophrastus contrasts the qualities that have an "intrinsic nature" (*καθ' αὐτὰ φύσεις*), such as weight and hardness, with those like heat and color, whose character is on this view only "relative to perception" (*πρὸς τὴν αἴσθησιν*, *De sens.* §68, *Doxogr. gr.* 519.8–12).

It is not clear that Democritus is committed to eliminativism, though, and even Theophrastus acknowledges that it would be in conflict with his repeated appeal to shapes to explain the different perceptible qualities.⁶⁵ We might therefore take Aristotle's objections in the *De sensu* passage quoted above to be more nuanced. For he does not say there that Democritus denies the existence of colors and other perceptibles, but only that he "traces them back" (*ἀνάγει*) to other qualities (our so-called "primary" qualities), which are explanatorily responsible for the subjective effects on perceivers instead. On such a view, there will still be colors and the like, but they will be *posterior* to these more fundamental qualities and *epiphenomenal*. That would explain why Aristotle charges the theory with transforming perceptible qualities like color into tangible properties or, somewhat more carefully, common perceptibles. Putting aside whether this charge is fair or not, the objection is clear enough. He thinks such a view commits a kind of category mistake, by explaining colors and other qualities in terms of features at the fundamental level that *lack these qualities*. On Aristotle's view, perceptible qualities like colors are themselves responsible, intrinsically and as such, for the changes that lead to perceptions of them. Any account that cites something else gets the explanation fundamentally wrong. It is because colors and flavors and the rest are each intrinsically perceptible to a single sense exclusively that Aristotle regards them as perceptible in the *basic* or *fundamental* sense (*κυρίως*) and holds that the essence of each sense is by nature related to them (*πρὸς ἃ ἡ οὐσία πέφυκεν ἐκάστης αἰσθήσεως*, *DA* 2.6, 418a24–25). For this reason, perceptible qualities like colors are not "secondary" on his view at all. In this regard, he thinks that they are on all fours with heavy and light, and should not be treated differently from them, as Theophrastus claims Democritus did in the

⁶¹ *Sens.* 4, 442a29–b12: Δημόκριτος δὲ καὶ οἱ πλείστοι τῶν φυσιολόγων, ὅσοι λέγουσι περὶ αἰσθήσεως, ἀποπάτατον τι ποιοῦσιν· πάντα γὰρ τὰ αἰσθητὰ ἀπὸ τι ποιοῦσιν. καίτοι εἰ οὕτω τοῦτ' ἔχει, δῆλον ὡς καὶ τῶν ἄλλων αἰσθήσεων ἐκάστη ἀφ' ἧς τίς ἐστιν· τοῦτο δ' ὅτι ἀδύνατον, οὐ χαλεπὸν συνιδεῖν. ἐπὶ δὲ τοῖς κοινοῖς τῶν αἰσθήσεων πασῶν χρώματα ὡς ἰδίοις· μέγεθος γὰρ καὶ σχῆμα καὶ τὸ τραχὺ καὶ τὸ λείον, ἐπὶ δὲ τὸ ὄξυ καὶ τὸ ἀμβλὺ τὸ ἐν τοῖς ὄγκοις κοινὰ τῶν αἰσθήσεών ἐστιν, εἰ δὲ μὴ πασῶν, ἀλλ' ὄψεως γε καὶ ἀφῆς. διὸ καὶ περὶ μὲν τούτων ἀπατώνται, περὶ δὲ τῶν ἰδίων οὐκ ἀπατώνται, οἷον ὄψις περὶ χρώματος καὶ ἀκοή περὶ ψόφου. οἱ δὲ τὰ ἴδια εἰς ταῦτα ἀνάγουσιν, ὥσπερ Δημόκριτος· τὸ γὰρ λευκὸν καὶ τὸ μέλαν τὸ μὲν τραχὺ φησὶν εἶναι τὸ δὲ λείον, εἰς δὲ τὰ σχήματα ἀνάγει τοὺς χυμούς.

⁶² For the book titles, see Democritus, DK 68 B5g & h and A33; for Theophrastus's summary of the views, see his *De sens.* §§61–82; *De causis plantarum* (= *CP*) 6.1.6, cf. 6.1.2. For a brief overview and interpretation of Democritus's views, see my 2015, 34–37; see also Lee 2011, 21–28 and Taylor 1999, 176–179, who argues that color is a secondary quality for Democritus and essentially experience-relative.

⁶³ *GC* 1.2, 315b33–316a2 > DK 68 A 123 < T49 Taylor: . . . τροπή καὶ διαθρηγῆ μετακινούντα τὸ αὐτὸ καὶ ταῖς τῶν σχημάτων διαφοραῖς, ὅπερ ποιεῖ Δημόκριτος. διὸ καὶ χροῖαν οὐ φησὶν εἶναι· τροπή γὰρ χρωματίζεσθαι. For discussion, see Joachim 1922, 74–75, who rightly emphasizes Democritus' insistence on a real basis for colors.

⁶⁴ *De sens.* §63, *Doxogr. gr.* 517.8–12 < DK 68 A 135: . . . τῶν δὲ ἄλλων αἰσθητῶν οὐδενὸς εἶναι φύσις, ἀλλὰ πάντα πάθη τῆς αἰσθήσεως ἀλλοιουμένης, ἐξ ἧς γίνεσθαι τὴν φαντασίαν.

⁶⁵ *De sens.* §69, *Doxogr. gr.* 519.12–15: "But the greatest tension in general, which pervades everything, is that he makes them modifications of sense while at the same time explaining them by shapes . . . for it is impossible for shape to be a modification [of sense]." (ὅπως δὲ μέγιστον ἐναντίωμα καὶ κουνὸν ἐπὶ πάντων, ἅμα μὲν πάθη ποιεῖν τῆς αἰσθήσεως, ἅμα δὲ τοῖς σχήμασι διορίζω . . . οὔτε γὰρ οἶον τε τὸ σχῆμα πάθος). In his *De causis plantarum*, Theophrastus actually *contrasts* Democritus's appeal to shapes to explain flavors with an account in terms of the senses' modifications (*CP* 6.1.2), which is how he characterizes the account in Plato *Tim.* 65B–66A (6.1.3–5). But Theophrastus then acknowledges, twice, that Democritus might still invoke shapes to explain the production of these modifications (6.1.2, 6.2.1).

passages above. They are real, intrinsic features of objects, independently of perception, and are causal powers in their own right, not merely in virtue of still more fundamental properties.⁶⁶

7.3 Against Primitivism

It does not follow from this, however, that perceptible qualities must be treated as *primitive* properties for which no further account can be given, or that Aristotle accepts a “simple view” of color and other perceptible qualities, whose nature is exhaustively “revealed” to us by their presence in experience.⁶⁷ As with any natural object of inquiry, Aristotle standardly thinks that we proceed from what is clearer and more knowable to us (*ἐκ τῶν γνωριμωτέρων ἡμῶν καὶ σαφέστερων*) to what is clearer and more knowable by nature (*ἐπὶ τὰ σαφέστερα τῇ φύσει καὶ γνωριμώτερα*); and while the senses are the most authoritative (*κυριώταται*) in the former case, thought and reasoning are required for the latter.⁶⁸ So while we may be acquainted with colors and other perceptibles directly and as such through their action on the senses (their “look”), it is *not* the case that their essence is fully revealed to us in perception. To develop a correct scientific account of perceptible qualities takes theoretical work. So further inquiry into the nature of colors and other perceptibles and how they affect the medium and our senses is not just possible, but necessary.

Aristotle pursues just this sort of inquiry into the nature of colors, flavors, and odors in chapters 3–5 of his *De sensu*. He explains the difference between colors, for example, as due to the mixture of white and black (or better, light and dark), the different hues being defined by determinate proportions of these two qualities. This formal feature is realized, in turn, by the corresponding amounts of transparent material mixed together with

more opaque materials that constitute the colored body.⁶⁹ The different flavors and odors are likewise characterized in terms of proportions, though here the material realizations will naturally be different.⁷⁰ It is highly plausible that Aristotle regards sounds and tangible qualities like temperature in the same way, although he does not devote separate discussions to them.⁷¹ But these formal and material characteristics are *not* part of the purely “chromatic nature” of colors, that part of their nature which is knowable to us directly from experience. They are not “self-intimating,” but something known as a result of fairly advanced theorizing. This seems incompatible with primitivism.⁷²

Perceptible qualities, then, are not to be identified with the mere disposition to produce a certain type of perception in a perceiver, or with some underlying categorical grounds to which they are reduced that is fundamentally different from how such qualities appear. Rather they are qualities of material objects that have the power to produce certain types of perception in virtue of their own formal and material nature. The latter are not something other than the quality, but rather what *constitute* or *realize* it.⁷³ So even though perceptible qualities on Aristotle’s view are indeed just as they appear, it need not be immediately evident in perception how to specify these features more precisely.⁷⁴ Colors and the rest are thus *primary qualities* for Aristotle, which have explanatory priority in accounting for the perceptual experiences they produce, without being *simple* or *primitive*

⁶⁹ Different colors as essentially characterized by mixtures of white to black in different proportions: *Sens.* 3, 440b14–26, which adapts the earlier treatment of proportions from a rival account described at 439b19–440a6. The material basis for color depends on the amount of transparent substance in the matter that constitutes the body: *Sens.* 3, 439a21–b18, esp. b8–10. Different types of matter contain different amounts of transparent material, where earth is usually assumed to be the most opaque for Aristotle: see *Alex. Aphr. DA* 45.5–20; *Quaest.* 1.2, 6.26–7.7; and Sorabji 1972, 293 n. 1 and 2004, 130.

⁷⁰ Different flavors distinguished by proportions: *Sens.* 4, 442a12–29; *Metaph.* 10.2, 1053b28–1054a13. Different odors explained by close analogy with flavors: *Sens.* 4, 440b28–30; 5, 443b3–20, 444a3–8.

⁷¹ For evidence regarding proportions in sounds and temperatures, see my 2005, 312–313.

⁷² According to Byrne and Hilbert (2007), one way to explicate “Minimal Primitivism” is in terms of the view that “colors have no non-chromatic nature,” where chromatic sentences are limited to characterizations of the identity, similarity, and difference of colors as experienced to one another (78). None of the formal and material characteristics Aristotle considers is immediately evident from color experience in this way—in Byrne and Hilbert’s terminology, they are not “self-intimating” (77 ff.). This seems straightforwardly incompatible with Johnston’s notion of Revelation and might be incompatible with Campbell’s as well, depending on whether he would assign such theoretical claims to knowledge of truths about colors (see footnote 67 above). Yablo’s Naive View, on the other hand, might well allow it, since he thinks that even if *X* is *F* by nature, one is not obliged to conceive of *X* as *F* (1995, 493; for discussion, see Byrne and Hilbert 2007, 92–93).

⁷³ I thus think that Alexander goes too far when he concludes that being and being perceptible are not the same for perceptible qualities (*In Sens.* 1.14–18, 41.15–18), since the nature proper to each kind of perceptible is not extrinsic to it, but essential.

⁷⁴ A point well made by Ganson (1997, 281), who refers to this as a rejection of the “Transparency Thesis” (278), referring to the views of Strawson (1989), Campbell (1993), and

⁶⁶ On this point, I agree with Broadie (1992, 138), although not her causal exclusion argument (144). To say that vision is brought about by an object in so far as it is colored or, say, crimson does not exclude there being formal and material features that enable it to have that effect, as I will now argue.

⁶⁷ See e.g., Johnston (1992) and Campbell (1993) who both spell out their views by appealing to Bertrand Russell’s notion of knowledge by acquaintance. They seem to understand this differently, though. Johnston, who coins the term ‘Revelation’ for one of his key theses (1992, 138–142), holds that the intrinsic and essential features of colors are fully evident in experience, following Galen Strawson’s formulation (1989, 224); and Gow (2014) even takes Revelation to be part of the “common sense view” (803–804). In contrast, Campbell (2005) more cautiously restricts what he calls ‘Transparency’ to a nonpropositional knowledge of things, distinct from any knowledge of truths, including facts about the essence or nature of colors (2005, 107, 111–112). For further discussion of the difference between the two, see Maund 2012, 32–35.

⁶⁸ Proceeding from what is more knowable to us to what is more knowable by nature: *Phys.* 1.1, 184a16–18; *APo* 1.2, 71b33–72a5; *DA* 2.2, 413a11–12; *Metaph.* 7.3, 1029b3–8; cf. *EN* 1.4, 1094b2–4. Perception as authoritative regarding perceptible particulars: *Metaph.* 1.1, 981b11; *Cael.* 3.7, 306a16–17; *EN* 7.3, 1147a26.

qualities. A perceptible quality's causal power to affect the medium and thereby a sense is determined by its formal and material features, which are not defined dispositionally and can be further investigated theoretically on the basis of our experiences.⁷⁵

8 Conclusion

If what has been said so far is correct, then for Aristotle colors and other perceptible qualities are (1) *existentially independent* of perceptions and perceivers; (2) *explanatorily prior* to acts of perception; (3) *intrinsic features* of external objects, which (4) have the *power* to affect the medium and thereby produce perceptions of themselves, in virtue of their formal and material characteristics, and so are (5) *not* to be identified as the *mere disposition* to affect perceivers in this way or otherwise defined in terms of the qualitative state they produce in the perceiver. In the most basic kinds of sense perception, not only do (6) objects have the perceptible qualities we perceive them to have, but (7) the qualities themselves are just as they appear to be. That is compatible, though, with (8) some of their formal and material characteristics of these qualities not being immediately evident in experience (“more knowable to us”), but something that can be grasped through further investigation and theorizing (“more knowable in themselves”).

Victor Caston
E-mail: vcaston@umich.edu

References:

Bonitz, Hermann. [1870] 1955. *Index Aristotelicus*. Zweite Auflage. Graz: Akademische Druck- u. Verlagsanstalt.

Johnston (1992). But it is more a rejection of what Johnston calls “Revelation,” since Campbell thinks transparency is not knowledge of truths about a perceptible quality, but just acquaintance with it: see footnote 67 above.

⁷⁵ One might wonder whether Aristotle's view differs from primitivism in yet another way. According to Gow (2014), primitivism regards colors as nonrelational properties (808 ff.), whereas to the extent Aristotle regards them as powers—namely, the power to affect the medium in a certain way—he must conceive of them relationally. But in fact Gow (2014) denies that dispositions as such are relational in the relevant sense: although dispositions are specified relationally, she does not take them to be “metaphysically relational properties” (807), and so are not incompatible with primitivism in this respect. Much the same could be said about Aristotle's conception: though colors are causal powers to affect the medium and as such are described in relation to it, what color an object has does not vary depending on the medium it is in contact with or the perceiver, as a relational property would. Rather it is determined by the proportion of light to dark, as determined by the materials that constitute it, both of which are intrinsic features of the object.

Acknowledgements I would like to thank my audiences at Saint Louis University and Simon Fraser University at the Ancient Approaches to Perception conference for their helpful comments, as well as the detailed and very helpful comments of an anonymous reviewer, Todd Ganson, and Tad Schmaltz.

- Broackes, Justin. 1999. “Aristotle, Objectivity, and Perception.” *Oxford Studies in Ancient Philosophy* 17: 57–113.
- Broadie, Sarah. 1992. “Aristotle's Perceptual Realism.” In *Ancient Minds*, edited by John Ellis, 137–159. Memphis, TN: Memphis State University. = *The Southern Journal of Philosophy*, suppl. vol. 31 (1992).
- Byrne, Alex and David R. Hilbert. 2007. “Color Primitivism.” *Erkenntnis* 66: 73–105. <https://doi.org/10.1007/s10670-006-9028-8>.
- Campbell, John. 1993. “A Simple View of Colour.” In *Reality, Representation, and Projection*, edited by John Haldane and Crispin Wright, 257–268. New York: Oxford University Press. Reprinted in *Readings on Color, vol. 1, The Philosophy of Color*. (1997). Alex Byrne and David R. Hilbert (eds.). Cambridge, MA: The MIT Press, 177–190.
- Campbell, John. 2005. “Transparency versus Revelation in Color Perception.” *Philosophical Topics* 33: 105–115. <https://doi.org/10.5840/philtopics20053313>.
- Caston, Victor. 2005. “The Spirit and the Letter: Aristotle on Perception.” In *Metaphysics, Soul, and Ethics: Themes from the Work of Richard Sorabji*, edited by Ricardo Salles, 245–320. Oxford: Oxford University Press.
- Caston, Victor. 2015. “Perception in Ancient Philosophy.” In *Oxford Handbook of the Philosophy of Perception*, edited by Mohan Matthen, 29–50. Oxford: Oxford University Press.
- Corcilius, Klaus. 2016. “Common Sense and Extra Powers: A Discussion of Anna Marmodoro, Aristotle on Perceiving Objects.” *Oxford Studies in Ancient Philosophy* 50: 289–320.
- Everson, Stephen. 1997. *Aristotle on Perception*. Oxford: Clarendon Press.
- Fine, Gail. 1994. “Protagorean Relativisms.” *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 10: 211–243. <https://doi.org/10.1163/2213441794X00120>. Reprinted in *Plato on Knowledge and Forms: Selected Essays*. (2004). Oxford: Clarendon Press, 132–159.
- Fobes, F. H. 1918. *Aristotelis Meteorologica libri quattor*. Cambridge, MA: Harvard University Press.
- Furley, David J. 1983. “The Mechanics of Meteorology IV: A Prolegomenon to Biology.” In *Zweifelhaftes im Corpus Aristotelicum: Studien zu einigen Dubia*, edited by Paul Moraux and Jürgen Wiesner, 73–93. Berlin: Walter De Gruyter.
- Ganson, Todd Stuart. 1997. “What's Wrong with the Aristotelian Theory of Sensible Qualities?” *Phronesis* 42: 263–282. <https://doi.org/10.1163/15685289760518162>.
- Gottlieb, Paula. 1993. “Aristotle versus Protagoras on Relatives and the Objects of Perception.” *Oxford Studies in Ancient Philosophy* 11: 101–119.
- Gow, Laura. 2014. “Colour.” *Philosophy Compass* 9: 803–813. <https://doi.org/10.1111/phc3.12173>.
- Herzberg, Stephan. 2011. *Wahrnehmung und Wissen bei Aristoteles: Zur epistemologischen Funktion der Wahrnehmung*. Quellen und Studien zur Philosophie, Band 97. Berlin: De Gruyter.
- Hicks, Robert Drew. 1907. *Aristotle, De anima*. Cambridge: Cambridge University Press.
- Hussey, Edward. 1983. *Aristotle Physics, Books III and IV*. Oxford: Clarendon Press.
- Irwin, Terence. 1988. *Aristotle's First Principles*. Oxford: Clarendon Press.
- Joachim, Harold H. 1922. *Aristotle, On Coming-to-Be and Passing-Away (De generatione et corruptione)*. Oxford: Clarendon Press.
- Johnston, Mark. 1992. “How to Speak of the Colors.” *Philosophical Studies* 68: 221–263. <https://doi.org/10.1007/BF00694847>. Reprinted in *Readings on Color, vol. 1, The Philosophy of Color*. (1997). Alex Byrne and David R. Hilbert (eds.). Cambridge, MA: The MIT Press, 137–176.
- Kalderon, Mark Eli. 2015. *Form without Matter: Empedocles and Aristotle on Color Perception*. Oxford: Oxford University Press.
- Kosman, L. A. 1975. “Perceiving that we Perceive: On the Soul III, 2.” *The Philosophical Review* 84: 499–519. <https://doi.org/10.2307/2183851>.

- Lear, Jonathan. 1988. *Aristotle: The Desire to Understand*. Cambridge: Cambridge University Press.
- Lee, Mi-Kyoung. 2005. *Epistemology after Protagoras: Responses to Relativism in Plato, Aristotle, and Democritus*. Oxford: Clarendon Press.
- Lee, Mi-Kyoung. 2011. "The Distinction between Primary and Secondary Qualities in Ancient Greek Philosophy." In *Primary and Secondary Qualities: The Historical and Ongoing Debate*, edited by Lawrence Nolan, 15–40. New York: Oxford University Press.
- Lewis, Eric. 1996. "Introduction." In Alexander of Aphrodisias, *On Aristotle Meteorology 4*. Translated by Eric Lewis, 1–60. Cornell University Press.
- Lloyd, Antony C. 1979. "Was Aristotle's Theory of Perception Lockean?" *Ratio* 21: 135–48.
- Makin, Stephen. 2000. *Aristotle, Metaphysics Book Θ*. Oxford: Clarendon Press.
- Marmodoro, Anna. 2014. *Aristotle on Perceiving Objects*. Oxford: Oxford University Press.
- Maund, Barry. 2012. "Color." *Stanford Encyclopedia of Philosophy* <<https://plato.stanford.edu/archives/win2012/entries/color/>>.
- Modrak, Deborah K. W. 1987. *Aristotle: The Power of Perception*. Chicago: The University of Chicago Press.
- Oehler, Klaus. 1963. *Ein Mensch zeugt ein Menschen: Über den Mißbrauch der Sprachanalyse in der Aristotelesforschung*. Wissenschaft und Gegenwart, Heft 27. Frankfurt am Main: Vittorio Klostermann.
- Ross, G. R. T. 1906. *Aristotle, De sensu and De memoria*. Cambridge: Cambridge University Press.
- Ross, W. D. 1924. *Aristotle's Metaphysics*. Oxford: Clarendon Press.
- Ross, W. D. 1936. *Aristotle's Physics*. Oxford: Clarendon Press.
- Sedley, D. N. 1977. "Diodorus and Hellenistic Philosophy." *Proceedings of the Cambridge Philological Society* 23: 74–120. <https://doi.org/10.1017/S0068673500003941>.
- Shields, Christopher. 2016. *Aristotle, De Anima*. Oxford: Clarendon Press.
- Sorabji, Richard. 1972. "Aristotle, Mathematics, and Colour." *The Classical Quarterly* 22: 293–308. <https://doi.org/10.1017/S0009838800042087>.
- Sorabji, Richard. 1980. "Aristotle on Demarcating the Five Senses." *The Philosophical Review* 80: 55–79. <https://doi.org/10.2307/2184311>.
- Sorabji, Richard. 2004. "Aristotle on Colour, Light, and Imperceptibles." *Bulletin of the Institute of Classical Studies* 47: 129–140. <https://doi.org/10.1111/j.2041-5370.2004.tb00247.x>.
- Strawson, Galen. 1989. "Red and 'Red'." *Synthese* 78: 193–232. <https://doi.org/10.1007/BF00869372>.
- Taylor, C. C. W. 1990. "Aristotle's Epistemology." In *Epistemology*, edited by Stephen Everson. *Companions to Ancient Thought*, vol. 1, 116–142. Cambridge: Cambridge University Press.
- Taylor, C. C. W. 1999. *The Atomists, Leucippus and Democritus: Fragments*. Toronto: University of Toronto Press.
- Yablo, Stephen. 1995. "Singling Out Properties." *Philosophical Perspectives* 9: 477–502. <https://doi.org/10.2307/2214231>.