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Perception in Ancient Greek Philosophy

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Abstract and Keywords

Interest in perception specifically, as distinct from other forms of cognition, develops relatively early in Greek philosophy. The Presocratics draw a broad contrast between the deliverances of the senses and what we make of them through reflection and argument. By the mid-5th century BCE, there is increasing attention to the causal mechanisms underlying the different sense modalities and to the features of objects responsible for stimulating our sense organs. Although these epistemological concerns are still evident in Plato, in both his works and Aristotle's, perception comes to be a locus of philosophical interest in its own right, concerning perception's precise relation to the body; the character of perceptual awareness, including the awareness of perceiving itself; and the nature of perceptible qualities.

Keywords: Greek theories of perception, Presocratics, Plato, Aristotle, mind-body relation, perceptible content, perceptual awareness, perceptible qualities

MANY of the central questions in the Western philosophical tradition about perception—regarding the metaphysics of perception, the nature of perceptual content, and the role of perception as a basis for empirical knowledge—were first raised in ancient Greece and Rome, where they were the subject of detailed discussion and debate. This chapter will concentrate on the first two concerns, the metaphysics of perception and its content, from the beginnings of Greek philosophy through Plato and Aristotle, when the main lines of inquiry are initially formed. The subsequent development of these issues in later antiquity—most notably, the treatment of propositional content in the Stoics; the Epicureans' distinction between perceptual belief and what is given in perception; the sceptics' worries about illusions and phenomenal indiscernibility; and the role of concepts in perception in later Platonism—is too large a subject to cover here.[1]

For each set of philosophers, I will touch briefly on four issues: how perception is related to the body and soul; the nature of perception itself, including accounts of individual senses; what can be perceived; and perceptual awareness.[2]

1 The Emergence of Perception as a Philosophical Topic

There can be no doubt that the Greeks, from Homer on, frequently speak of seeing, hearing, smelling, tasting, and touching. But did early Greek philosophers regard these as (p. 30) activities that naturally belong together and are distinct in kind from the other activities of living things? It might seem odd to question this, given the obviousness of organs like the eyes, ears, nose, tongue, and hands, not to mention the familiar manipulation of our bodies to get a better look at something or to come within earshot, as well as the inevitable impairments and injuries that frustrate such access. In light of these facts, it is easy to take talk about the senses for granted, as necessarily presupposing the concept of perception. But this presumption has been challenged in two opposing ways. Some have argued that perception was not originally viewed as a distinctive type of cognition. The early Greeks understood *all* cognitive functions on the model of the senses, taking thought and emotion to be closely identified with specific bodily organs similar to the eyes and ears, though internal to the body. Higher cognitive functions were only distinguished from perception gradually over time.[3] At the other extreme, it has been argued that it is perception that is the latecomer here. Remarkably late, in fact. On this view, the original notion of perception is due to Plato (427–347 bce), developed for philosophical purposes in a specific passage of the *Theaetetus* (184–186). It is something confined to the organs, passive in nature, and non-cognitive, in contrast with the cognitive, rational activity of the soul by itself.[4] So there is a question as to when a concept of perception first emerges, whether it is present from the beginning of reflection on the topic, or only a later development.

Both views agree, however, that perception is not distinguished from other forms of cognition by earlier thinkers. This observation is not new. Aristotle (384–322 bce) and Theophrastus (371–287 bce), his colleague and former student, claim that their predecessors believed that perception and thought were 'the same' and a kind of bodily alteration.[5] This is an overstatement in several regards, as Theophrastus seems to have recognized himself.[6] But there is an element of truth as well in it that needs to be acknowledged. The verb *aisthanesthai*, which is standardly used by later philosophers for perceiving as a specific type of cognitive activity, occurs early on predominantly in a

broad epistemic sense for noticing, realizing, or grasping some fact, much like broader uses of the English 'perceive'. In such uses, what is noticed or recognized need not be an object of direct observation, but may be something arrived at by testimony or inference.[7] The noun *aisthêsis*, in contrast, is used more narrowly for sense perception. But it only begins to appear somewhat later in the fifth century bce, much as the two views we considered above would predict. Still, it would be a mistake, methodologically speaking, to rely so heavily on a single term or family of cognate terms. There is no good reason to think that the use of a concept is ever tied so closely to a single word: terminology often develops later, well after conceptual distinctions have emerged and begun to firm up. Restricting our scope to specific terms would unnecessarily blinker our investigation.

To appreciate this, we need only think of one of the more central themes in early Greek philosophy, the opposition between experience and reason, where the former is usually expressed simply by reference to the eyes and the ears. This opposition is unintelligible (p. 31) unless there is some significant contrast between two broad types of cognition, where the eyes, ears, and other sense organs represent a more or less unified group, whether or not they are denominated by a single noun like *aisthêsis*. On their own, we are repeatedly warned, our eyes and ears lead us into confusion and error; if they are to be of any use, we must bring our powers of understanding to bear. Heraclitus (6th–5th century bce) complains that the eyes and ears are 'bad witnesses' for those who do not understand the language of the senses, literally, those who have 'barbarian' souls (DK 22 B107). Epicharmus (early 5th century bce) goes further. He claims that it is the understanding (*nous*) which sees and hears, in contrast with 'the others'—the ears and eyes themselves—which are paradoxically said to be 'deaf and blind' (DK 23 B12). Parmenides (early 5th century bce) suggests that we may have to disregard our sensory experience in an even more radical way. The goddess in his poem admonishes us not to follow our 'aimless eye and echoing ear', but to judge her argument solely by reason (*logos*),[8] a trope echoed later by Empedocles (*c.*495–435 bce).[9] Later in the fifth century, the Hippocratic treatise *On Art* claims that the causes of disease elude the 'sight of the eyes' and can only be grasped by the 'sight of the mind' (*têi tês gnômês opsei*, 11.1–2).

The point of the contrast is not simply rhetorical or protreptic. The same opposition can be seen in Melissus' argument (mid-5th century bce) that our experience of sensory qualities conflicts with the principles of logic, which can only be resolved by accepting monism (DK 30 B8). The contrast is likewise central in the epistemology of Democritus (mid-late 5th century bce). In his *Canons*, he distinguishes two forms of cognition (*gnômê*), one 'legitimate,' the other 'illegitimate' (*skotiê*, literally, 'born in the shadows'), to which 'all of these belong: sight, hearing, smell, taste, contact' (DK 68 B11).[10] The list of all five canonical senses, including touch, is striking and he even uses the verb *aisthanesthai* later in the fragment, making it clear that is 'perceiving by contact', rather

than just coming into contact. Unlike Melissus, though, Democritus does not see the relationship between these two types of knowledge as a simple either/or choice. In another fragment he imagines the senses in a court of law, accusing reason of taking its evidence from them and using it to refute them; in so doing, the senses warn, reason will only undermine itself (DK 68 B125). The sophist Critias (460–403 bce) also uses the verb in a restricted sense, when he contrasts what is known by the mind (*gignôskei*) with 'what is *perceived* by the rest of the body' (*aisthanetai*, DK 88 B39).

The noun *aisthêsis* likewise occurs before Plato in the relevant sense. It may be used as early as Alcmaeon of Croton (early 5th century) in a fragment that contrasts understanding with sense perception: he claims that while only humans possess understanding, all animals have perception (DK 24 B1a). Even if one questioned whether this is a verbatim quotation though, the general distinction is not in doubt. And the noun certainly occurs in the Pythagorean Philoloaus of Croton (*c.*470–380s bce), to mark a similar distinction between animals, humans, and plants, where the heart is the organ that governs animals and perception (DK 44 B13). A broad distinction between perception and reason, then, which had (p. 32) begun to emerge early in the 5th century bce, is firmly in place by the end of that century, well before Plato wrote.

This is not to say that there are not competing conceptions of perception or of its range. When Plato offers a theory of perception in support of Protagorean relativism—which he hyperbolically claims is shared by nearly all of his predecessors (see section 3)—he not only characterizes the activities of canonical sense modalities like seeing, hearing, smelling, and feeling heat or cold as 'perceptions' (*aisthêseis*), but also pleasures and pains, desires, fears, and 'countless others without a name' (*Tht.* 156b2–7), a list that suggests a broader category of *feeling* or *experience*.[11] But the existence of competing views over the extension of the concept, or even over its exact nature, is compatible with there already being to hand some broad notion of perception, as distinct from thought or reasoning.

2 The Presocratics

As far as we can tell from our sources, the Presocratics' discussions of the senses were devoted largely to the physics and physiology of perception.[12] Much of our evidence concerns how information about distant objects is transmitted by physical means across the intervening medium and into the orifices of various organs,[13] along with a certain amount of detail on the structure and material constitution of these organs. One of the more elaborate and interesting accounts occurs in Empedocles, who describes humans as

having narrow 'receptors'—literally, 'palms' or devices for grasping (*palamai*)—spread throughout the body, though he complains that they are limited in what they are exposed to and wear down over time (DK 31 B2.1–3). He urges us to make use of every type of receptor and not to favour sight over hearing or hearing over taste or any others through which there is a 'conduit for understanding' (*poros noêsai*), so that we may understand 'how each thing is manifest' (DK 31 B3.9–13). The idea that perception involves conduits or channels (*poroi*) in the body is common among the Presocratics and goes back at least to Alcmaeon, who claimed that the peripheral sense organs were connected by conduits to a central organ, which he located in the brain (DK 24 A5; cf. A11). In Empedocles, the channels lie instead at the interface between subject and object. Their openings take in the 'emanations' (*aporrhoiai*) or streams of matter that flow from external objects through the intervening medium and enter not only obvious orifices such as ears or nostrils, but also tiny, imperceptible passageways that make up the crystalline lens of the eye and the porous membrane of the tongue.[14] (p. 33) The conduits for each sense differ in gauge, so that only matter of a 'commensurate' size (*summetros*) can 'fit' into them snugly (*enharmottein*). This, Empedocles claims, explains why each sense has its own proper objects and cannot perceive those of another. A sense will not perceive qualities whose material is either too large to enter or so small that it passes through without making contact (DK 31 A86 §7; A90; cf. A87). Fitting into a conduit is merely a necessary condition, however. For perception to take place, the emanation must further encounter material of a similar kind within the subject, on the principle that 'Like is known by Like' (DK 31 A86 §15).[15] This principle has both a causal dimension and an intentional one, concerning the content of perception: what we perceive on a given occasion must be like material inside our organs because (1) a perceptible object can only *affect* something like itself and thereby (2) bring about perception *of* itself. Both Aristotle and Theophrastus contrast this principle with Anaxagoras' view that only unlike or contrary materials can affect each other and so stimulate perception (which they also connect to his view that all perception involves a kind of irritation or pain).[16] In Empedocles, the likeness principle has a further significance, though. It is not possible without the analysis or separation of compounds into their constituent elements that he associates with the cosmological force of Strife. At the same time, perception also brings disparate things together, by fitting of matter into orifices and joining subject to object, and to this extent performs the work of Love (not unlike 'knowing' in the biblical sense).

In his poem, Empedocles offers detailed and colourful descriptions of the mechanisms involved for the individual senses, most famously comparing the eye to a lantern, whose light passes through screens made of horn into the surrounding darkness. It has often been thought, starting with Aristotle, that this was part of extromission theory of vision, prefiguring the theory in Plato's *Timaeus* (see section 3). But it is more likely a part of Empedocles' account of night vision, which he appears to have discussed in some detail.

Nocturnal animals must compensate for the surrounding darkness with larger amounts of fire inside the eye, which we can observe when we see their eyes flash in the night; diurnal animals, in contrast, require more water in order to compensate for the increased brightness during the day.[17] He compared the ear to a bell, in which the sounds from our environment echo (*De sens.* 9 = DK 31 A86), though it is unclear exactly how an internal sound is supposed to help. As Theophrastus rightly objects, how would we in turn hear *it*? The same thing needs to be explained all over again, he complains, and a homuncular regress looms.[18] (p. 34)

In virtually every ancient theory of perception, despite differences in physical theory and many details, one can find the basic framework of a causal theory of perception, the idea that the sensible characteristics of an object are in some way transmitted to the animal and affect its sense organs so as to produce a perception of those very characteristics and the object to which it belongs. Some of the variations, however, are significant and influential in their own right. The sophist Gorgias (early 5th century to early 4th bce), for example, is represented in Plato's *Meno* as having been a student of Empedocles' and accepted his theory of vision (76c4–e1 = DK 31 A92). Nevertheless, in his own work, the *Encomium of Helen*, Gorgias speaks of the soul being 'impressed' or 'moulded' (*tupoutai*) through sight with profound emotional and motivational effects (§15 = DK 82 B11), because of the way sight 'inscribes on the mind likenesses of the things seen' (*eikonas tôn horômenôn pragmatôn hê opsis enegrapsen en tôi phronêmati*, §17 = DK 82 B11), analogies which recur in Plato, Aristotle, and the Stoics. Democritus similarly speaks of an 'impression' (*entupôsis*) in explaining how sight comes about, comparing it to the moulds or imprints made in wax (*hôsper kai autos legei paraballôn ... hoion ei ekmaxeias eis kêron*, DK 68 A135 §51, cf. 52).[19] The image (*emphasis*) is not produced directly in the eye, however, but is impressed (*tupousthai*) into the air in front of it, which gets compressed between the eye and the emanation from the object (§50; cf. 74, 80). At first glance, this seems like a quite different theory than the one commonly ascribed to Democritus, which appeals to so-called 'simulacra' (*eidôla*) or 'replicas' (*deikela*), as he also called them (DK 68 B123): thin surface layers which are continually shed by objects and more or less preserve their shape as they move through space. But the two mechanisms are plainly compatible, and it is arguable that both are necessary. Distant objects cannot directly make an impression on the air in front of the eye, given their location. But their surface layers can, once they have become detached, so long as the arrangement of atoms retains a similar contour to the original object. On the other hand, it is plausible to think that only something fine and light like air could enter the eye, rather than the vast assortment of atoms emitted by objects. Democritus appears to have discussed the structure of the eye in extraordinary detail and paid special attention to the material conditions that would allow it to receive the impression. Among other things, the surface of the eye must be moist and have a thin exterior coating, free of thick grease or

flesh, with fine, straight, empty passages to adapt to the impression's shape (DK 68 A135 §50, cf. 52). Through these mechanisms, Democritus hoped to explain how the contours of an object could be transferred to the eye's interior, along with information about perspective and possibly distance as well.[20]

Democritus devotes a great deal of attention to perceptible qualities such as colours and flavours, as well as certain tactile qualities like weight and hardness.[21] He consistently appeals to the microstructure of objects to explain these qualities and geometric properties in particular. Most often these are characteristics of molecular structures: their overall size and shape, as well as the position and arrangement of specific types of atoms and void (p. 35) within them (DK 68 A135 §§60, 67). In fact, it is unclear whether his explanations ever turn on the geometric features of individual atoms. Molecular structures are indisputably at issue in his explanations of the weight and hardness, which are functions not merely of the size and density of macroscopic objects, and so the amount of void included, but also whether the atoms are arranged in regular patterns. Iron is lighter than lead because it contains more void, but harder because of the irregular distribution of atoms, with certain areas more densely packed than others (DK 68 A135 §§61–2). But the 'shapes' (*skhêmata*) of molecular structures are also plainly at issue in his explanation of colours, which appeals to conduits and passages, or to lattices involving alternating pairings of atoms, or to large or small conglomerations of atoms (§§73–6, cf. 82).[22]

Democritus distinguished four primary colours: white, black, red, and yellow-green (§§73–5). He seems to have allowed for something like metamerism, at least in the case of white: not only are the inner surfaces of shells white, because of their hard, smooth surfaces and straight conduits, but also substances that are soft and crumble easily, which are composed of lattices of spherical atoms in alternating offset pairs (§73, cf. 79). Black, in contrast, is due to rough, uneven surfaces, with crooked and tangled conduits (§§74, 80); red to the fine-textured atoms that cause heat, though only in larger agglomerations; and yellow-green to various specific arrangements of atoms and void (§75). The remaining colours result from mixtures of other colours, each mixed colour corresponding to a distinct proportion (§78). Democritus thinks there are an infinite number of them, but gives specific combinations for at least eight types of greens, blues, and browns (§§76–8).

Flavours are also explained by reference to microscopic shapes (§68), though Theophrastus' report never makes clear whether these are shapes of molecules or individual atoms. A spicy or piquant flavour, for example, is due to tiny, jagged, angular shapes, while sweet flavours are due to somewhat larger, round ones: the former tear at our organs and create spaces, thereby heating them, while the latter permeate our body slowly and gently, moistening it and causing other atoms to flow. His explanations for

sour, sharp, salty, and acrid flavours all turn on the extent to which the microstructures in food heat or cool the organs, dry or moisten them, solidify or loosen them, pass through them, or plug them up.[23]

It is because of such explanations, no doubt, that Aristotle claimed that Democritus effectively reduced perceptible qualities to geometric properties. According to Aristotle, he refers all perceptible qualities back to what Aristotle calls 'common perceptibles' such as shape and size (*eis tauta anagousin, eis ta skhêmata anagei, Sens.* 4, 442b4–12) and so 'makes them all tangible' (*hapta poiousin*, 442a29–b1). But Theophrastus complains that these explanations contradict other things Democritus says, which effectively make perceptible qualities into 'modifications *of the senses*' (*pathê poiôn tês aisthêseôs*); he even goes so far as to say that on Democritus' account there is no nature to any of the perceptible qualities (*oudenos phusin*), despite the detailed accounts of the microstructures involved that Theophrastus reports (DK 68 A135 §§60–1, 63, 71; cf. also A49). For Democritus also seems to have maintained that perceptible objects do not appear the same to every perceiver, and that would have to be explained, Theophrastus argues, by appealing to the (p. 36) different constitutions perceivers have or the different conditions they are presently in, rather than the nature of the objects themselves—as the Epicurean Colotes would later charge, they will 'not be qualified one way rather than another' (*ou mallon toion ê toion*).[24] This might even be taken to suggest a subjectivist reading of Democritus' notorious saying 'by convention bitter, by convention sweet; but in reality, nothing but atoms and the void' (DK 68 B9). On this reading, perceptible qualities just belong to our experience of objects and not to the objects themselves; if we believe they do, we will be in error quite globally.[25]

It is clear from Theophrastus' reasoning, however, that Democritus is anything but a subjectivist about perceptible qualities, much less an eliminativist. His explanation of conflicting perceptual appearances is objective and causal: how things appear perceptually is a result of the way objects affect different perceivers, in their current condition (DK 68 B9 §136). This is also evident from the detailed explanations Theophrastus cites, which take the geometrical properties of objects to be the central explanatory factor of the qualitative character of our experiences, along with Democritus' general view that not only perceptions, but the content of beliefs and other mental states are a function of our bodily condition, to be understood ultimately in terms of its microstructure.[26] Finally, he also seems to have claimed that whatever appears to us perceptually is *true*.[27] So he cannot have thought that we were generally in error about perceptible qualities. How can these different reports be reconciled?

Here is one suggestion. First, distinguish perceptible *qualities* and perceptible *objects*, both of which can equally be expressed by the Greek *aisthêta*, and accept the detailed

explanations we find in Theophrastus at face value. Then on Democritus' view, whenever we have an experience of a certain quality, we have been affected by a specific type of microstructure that impinges on our organs.[28] If he further identifies the perceptible quality with this microstructure, then every perception will be true of something in our environment, namely, the object which possesses the microstructure affecting us. On the other hand, even if it does belong to the object, it may not be the *only* microstructure the object possesses. Wine contains microstructures that taste sweet as well as those that taste sour; a pigeon's neck possesses structures that look green as well as those that look purple. Which ones happen to affect us on a particular occasion will be a function of the conditions in our environment, how we are situated in it, and the nature and state of our organs. The jagged character of spicy particles of food cannot do anything other than tear animals' tongues. But it may be prevented from achieving this effect, or at least lessened, because of the yogurt that presently coats my tongue. Similarly, if I eat a dessert between glasses of wine, I will no longer be affected predominantly by the sweet structures in the wine that moisten my tongue, but only the tannic ones. But it will not be any more (*ou mallon*) true to say that (p. 37) the wine is sweet rather than sour (DK 68 A134; A112). It has both kinds of structure and so my perceptions are both equally true of it, since they accurately correspond to the flavour structures in it that are then affecting me. Whether it is true to say that the *wine* is sweet (or sour), therefore, is precisely a matter of 'convention' (*nomos*): it is a matter of which characterizations of wine are accepted predominantly by perceivers in the relevant community. But the truth of the matter, as Democritus says, is 'in the depths' (DK 68 B117). It depends on which microstructures an object possesses and which ones are actually affecting a perceiver on a given occasion, detailed facts from which we are 'removed' (DK 68 B6). Hence, we quite frequently do not grasp how each object truly is or is not (DK 68 B10). The perceptual variability Democritus invokes thus concerns how *objects* can appear differently to different perceivers or on different occasions. The specific *microstructures*, in contrast, will always '*appear the same* to everyone and so be a test of their truth', a remark Theophrastus is otherwise at a complete loss to explain (DK 68 A135 §69). Where all causal conditions are the same, including the situation and state of the observer, how things qualitatively seem to a perceiver will be the same, 'as he himself seems to attest' (*hoper kai autos an doxeien epimarturein*), because the underlying nature of these qualities is the same (§70). The appearance of *qualities* is thus invariant. The only variation is in how *objects* appear, about the qualities they seem to have, which is a function of just which microstructures in an object are actually affecting a subject in a given set of circumstances.

3 Plato

Perception looms large in the writings of Plato, not least because of the contrast he draws time and again between the ever-changing realm of perceptible objects and the stable realm of intelligible Forms.[29] But his remarks about perception in its own right are also of interest independently of this and cast a long shadow over the subsequent tradition. Because most of his works are in dialogue form, it is difficult to determine whether the views expressed in them can be attributed to Plato himself, or even whether the views expressed in one work can be conjoined with those in another. But thankfully these questions do not need to be answered here. It is sufficient that Plato found such views worth exploring, critically and at length, whether or not he subscribed to them himself or even found them tempting.

A feature that recurs in many of Plato's works is a very strong form of dualism of soul and body, for which he offers some of the most striking statements that can be found in the Western tradition. Not only does he regularly distinguish between the two, but he also stresses the independence and autonomy of the soul in relation to the body. On several occasions he argues not only for the soul's continued existence after death, but its also having existed prior to this life, separate from a body and knowing things by itself on its own. But if we ask where perception is to be located within this scheme, interestingly Plato's works differ widely as to whether it is primarily the work of the body, the soul, or both body and soul; and, if it belongs to both, as to how their respective roles are to be distinguished. (p. 38)

In the *Phaedo*, for example, the senses are treated as powers of the body. When Socrates urges us to leave sense experience behind and to use reason purely by itself, he characterizes this as a separation of the soul *from the body*. When, moreover, he disparages the senses unremittingly as not offering any clear or accurate information and as leading the soul into error and confusion, he assumes that perceptions have content.[30] Thus, perceptual activity both belongs to the body *and* has content on this view. Several later dialogues, in contrast, regard the *soul* as the locus of perceptual awareness. Even if the body and the soul are both affected in perception (*Phlb.* 33d4–6, 34a3–5), we are not conscious of this stimulation unless this affection is transmitted through the body to the soul (*epi tên psukhên, mekhri tês psukhês*) or mind (*epi ton phronimon*).[31] In a pivotal passage of the *Theaetetus*, Socrates argues that we do not perceive *with* (*hois*) our senses, but *through* (*di' hôn*) them (184c1–e7). Instead, we perceive with our souls (184d4–5, 185d3–4). The senses on this view are merely 'instruments' or 'tools' (*organa*) through which we access the world.[32] He then goes on to argue, even more strongly, that

perceptions cannot themselves constitute knowledge because they cannot 'attain truth' (186d2–e10). The interpretation of this last claim is controversial. But some take it to mean that perceptions do *not* have content (for discussion, see below in this section).

Republic VII falls somewhere between these extremes. Like the *Phaedo*, it contrasts the senses with the soul (523a10–525a2). The senses also plainly transmit information: they are said to 'report' to the soul (*parangellei têi psukhêi*, 524a3; *têi psukhêi hai hermêneiai*, b1). But sometimes they do this in seemingly contradictory ways. When touch, for example, 'says' (*legei*) that my finger is both hard and soft, or sight says it is both large and small, the soul puzzles over what the relevant sense 'means' (*sêmainei*) by 'hard' (524a6–10) and calls upon thought and reasoning to sort it out (524b3–d5; cf. X, 602c4–603a9). But other features can be fully discerned by the senses (*ta hupo tês aisthêseôs krinomena*), which 'reveal' (*dêloi*) their nature, as for example when I see that my finger is a finger (523a10–b4, cf. c3, d5). In both cases, the activity of the senses has content and in the second they can even attain truth (cf. *Phdr.* 249b6–c1).

In various dialogues, there is also discussion of the nature of perception as such and how it comes about. In the *Theaetetus*, Plato examines at length a causal theory of perception, which holds that our perceptions are about the very objects that bring them about.[33] Discussion of it is complicated by the highly dialectical context in which it occurs. Socrates offers it in support of Protagorean relativism—the view that things actually are just as they appear for each person, at least as far as perception is concerned (152a1–c6) —to which the first half of the dialogue is devoted. But he also makes clear that this causal theory is not something the historical Protagoras was ever known to advocate. Socrates mischievously presents it as an esoteric 'secret doctrine' that Protagoras revealed only to his inner circle (152c8–10; 155d9–e1) and a 'mystery' which only the initiated know about (156a2–4, cf. 155e3), and in developing it draws heavily on Heraclitean notions of flux. (p. 39) There is no decisive evidence that Plato accepted this causal theory himself either, though this is often assumed.[34] It is explicitly offered as an amalgam of views shared by virtually *all* of his predecessors, from Homer on down, with Parmenides being the sole exception (152e1–153a4; cf. 155e–156a). The core idea is that perception arises when a perceptible object and a perceiver's sense organ encounter each other and causally interact (153d8–154a3, 160c4–5). The object has the power to act, the organ the power to be acted upon (156a6–7, 182a6–9), and when they have 'intercourse', they produce a pair of 'twins' as offspring, an act of perceiving (*aisthêsis*) and a perceptible quality (*aisthêton*, 156a7–b1)—in fact, Plato coins the word 'quality' (*poiotês*) to characterize the latter more generally when he later summarizes this view (182a9–b1). The twins in turn qualify the 'parents': when the eye, for example, encounters a stone or a piece of wood and they together generate the twins whiteness and sight, the eye 'becomes, not sight, but a seeing eye' and the stone or wood 'becomes

not whiteness, but white' (156d3–e9, 182a7–9). This sort of view, Plato argues, entails that objects only have perceptible qualities while a perceiver perceives them on a given occasion (156d5, 160b1–8). They are 'private' (*idion*) in the sense that they exist only in these individual encounters, in relation to the perceiver to whom it appears (154a2–3; cf. 166c4–7). No one else, he claims, can perceive the very same quality, just as that particular act of perceiving can only be directed at it (159e7–160a3, 160c4–5). But if perception is always directed at the object it is presently interacting with, as it is qualified through the interaction, then perception necessarily corresponds to its object and is unerringly true (160c7–9). In Plato's view, the causal theory of perception underlying his predecessors' views thus leads to and supports Protagoras' relativism (160d1–3), as least with regard to perceptible qualities.[35]

Plato also explores a causal theory of perception in the *Timaeus*, where one likewise perceives objects as having certain qualities as a result of those very qualities acting on the relevant sense, but adds extensive details about the physical mechanisms of perception and the nature of the perceptible qualities themselves. He distinguishes between those affections which are common to the body as a whole—essentially those relating to touch, along with pleasure and pain—and those which are exclusive to particular organs, such as the tongue, the nose, the ears, and the eyes (65b4–c1; cf. 64a2–5). Like Democritus, all of his accounts are based on the magnitudes and geometric structure of physical objects, together with the causal powers they have as a consequence, except that Plato appeals to the geometrical properties of elemental particles rather than molecular structures. He seems to take perceptible qualities, moreover, to be the *effect* (*pathêma*) of these geometric properties on our body, rather than the properties themselves. Among tactile qualities, for example, the searing quality of heat is due to the sharpness of the fire atoms responsible for it and the way they cut and penetrate our body (61d5–62a5); things feel soft when their particles yield and give way, because they have a smaller width, and hard when they are more (p. 40) rectangular and resistant (62b7–8); other tactile qualities are handled in a similar way.[36] In bringing about perception, most qualities either consolidate or disperse the elements composing bodies (65a3–5); and because the same mechanism is involved, the quality spaces of the different sense modalities share certain correspondences, despite producing different phenomenal experiences (67d6–e4). In the case of flavours, these changes are due mostly to roughness and smoothness, and whether these characteristics melt or cut the tongue, produce tiny blisters, or moisten and assuage it (65c1–66c7).[37] The sense of smell constitutes an interesting exception. Since none of the elemental shapes is inherently suited to the nostrils, on his view odour does not belong to any of the elements on their own, but only compound bodies undergoing a change of state, to liquid or gas (66d1–67a6).[38] Sound is air striking the brain and blood, via the ears, which is transmitted to the soul, and the change caused by this is hearing. It is high-pitched when

the blow occurs quickly, and low when it occurs slowly (67a7–b6).[39] Plato devotes the most space to vision. There is a special kind of fire inside the eye that flows out through the pupil in a 'visual stream' (*to tês opseôs rheuma*) to meet an emanation from the object, which together form a single continuous, material link to the object and transmit changes originating from the object back to the subject's soul, where seeing occurs (45b–d; cf. 58c5–7). Depending on the size of the particles emanating from an object, different colours are seen. Those which are bigger than the ones in the visual stream consolidate the stream and are dark; those which are smaller fragment or disperse it and are light; those which are equal in size cannot be seen (67d2–e6). When fire particles penetrate into the eyes' channels and meet the fire inside, a dazzling effect occurs (67e6–68b1). Various hues are explained as mixtures of the brilliance that produces this together with white and then subsequently with other colours, although Plato insists that it is impossible for mortals to give a precise account of these matters (68d2–7; cf. b6–8).[40]

Plato's views on perceptual content are harder to elicit. But many recent commentators have taken one of the central arguments in the *Theaetetus* to have profound consequences for his conception of it, at least at one stage. As has been mentioned, Socrates argues that we do not perceive qualities like white and black or high and low *with* our sense organs (184b7–c8). Instead, we perceive *through* the senses: the effects perceptible objects have on them are transmitted through the body to a single 'form, soul, or whatever it ought to be called'.[41] If they did not converge on some single thing, the senses would be like the different soldiers inside the Trojan Horse (184d1–2), rather than parts of a unified subject of experience. It would be impossible to differentiate or compare the different things we do perceive, since none of the senses is able to perceive the objects of another (184e8–185c8). Any features these things exhibit in common, moreover—such as being, number, sameness or difference, (p. 41) similarity or dissimilarity, and being admirable or shameful, good and bad—are things which the soul is aware of on its own, not through any bodily organ (185c4–d3, 186a2–b1).[42] One of these common features in particular is pivotal to Socrates' argument. *Being*, he reiterates, is not something grasped through perception, but only by the soul on its own (186a2–c5; cf. 185d8–e2). But since one cannot attain truth without 'attaining being' (186c7–d1), it follows that perception *cannot attain truth* (d4–5, e4–5); and given that one cannot attain knowledge without truth, Socrates argues, knowledge cannot be found in perception itself, but only in our reasoning about perception (186d2–3, e4–7).

What is it to 'attain' or 'grasp' being, though? If we follow the interpretations most prevalent today,[43] what is at issue is the *predicative* or *copulative* use of the verb 'to be', that is, whether we can perceive *that* a given object *is* a certain sort of thing or perceive it *as being* some sort of thing— in short, whether perception has propositional content or indeed any content at all. If things do not seem *to be* a certain way in perception, then

perceptions cannot even be true and so *a fortiori* cannot constitute knowledge. Only the soul's *judgements* about perception will have content. The resulting view radically degrades perception. It is hard to see how it can involve awareness or even 'registering', as some of these interpretations claim, much less the transmission of information or 'reports', such as we find in the *Republic*. If touch does not enable us to feel something *as* hard or soft (cf. 186b2–4), for example, and so does not have the power to discriminate between different tactile qualities, it is not clear what the activity of the senses involves beyond a mere bodily affection. This might be a reason why Socrates goes on to speak about the soul becoming aware *of* the affections in the body which are transmitted to it (186c1–2).

Another possibility, though, is that Socrates is not denying that perception in general has content, but only that it has content involving the 'common' features he focuses on, of which being is just one. His concern with being, moreover, is not a concern with predication and truth generally, but rather with what things *really* are—that is, with what their *essence* or nature is—along with other 'common' concerns, such as whether they are the same or different as other things, similar or dissimilar, good or bad, and so forth. In short, he is concerned with knowledge of deeper, underlying truths about things that go beyond mere appearance.[44] This would not only fit dialectically with the rest of the dialogue, as part of a general stance against Protagoras and his sympathizers, but would connect this discussion with one of the main themes that runs throughout earlier Greek philosophy, namely, the search for the real (p. 42) nature of things beneath the play of conflicting appearances. On this alternative reading, the senses *do* transmit information about the world and do have content. But they cannot grasp the deeper truth about things on their own, because they cannot compare and sift through our experiences, to reach an underlying explanation. To accomplish this, we must work over the information that comes *through* the senses *with* the reasoning powers of the soul. If something like this is right, then this passage is not so far off views we have already come across in the *Republic* or even the *Phaedo*.

There is reason, moreover, to think that in the later dialogues perception does have content of some kind. In the *Philebus*, Plato discusses how we can be puzzled over what appears to us, for example, about whether something near a rock under a tree is a human or not (38c12–d10). This sort of reflective questioning and weighing up of alternatives is how Plato elsewhere characterizes thinking more generally, as a 'silent dialogue' the soul has with itself, uttering its thoughts in a kind of silent speech—a language of thought, if you will—which finally issues in a belief, if the soul succeeds in arriving at a conclusion.[45] In the *Philebus*, he playfully compares the soul to a book and suggests that there is a scribe inside of us writing down what appears to us to be the case. But he elucidates this

metaphor by saying that it is our *perceptions, memories, and experiences* which 'inscribe' these words in our souls (*hoion graphein hêmôn en tais psukhais logous*, 38e12–39a7). Perception is not a passive, inarticulate affection, about which we form interpretations separately in thought. On the contrary, perception *articulates* a view about how things are, which we may or may not accept, based on how it agrees or disagrees with our other perceptions, memories, and experiences. The resulting discourse in the soul is not pure and abstract either. He suggests that there is also a painter in our soul who illustrates it, providing images from sight or other senses which can in some sense be seen within ourselves (39b3–c1). In the *Sophist*, belief similarly does not arise just from the soul's silent thought on its own, but from perception as well, in which case it is called 'representation' (*phantasia*, 264a4–6). But he emphasizes that *all* of these states are 'akin to language' (*tôi logôi sungenôn*) and so capable of falsehood (264b1–4). There is no strict division of labour here with regard to content, where perception is viewed as entirely non-cognitive and interpreted separately by thought—all of these states have articulable content. The contrast that interests Plato is rather between how things immediately appear to us and how they appear on reflection, through the cooperation of all of our faculties, especially rational ones.

Plato has a few, mostly critical things to say about perceiving that we perceive, made in passing, since it serves mainly as a foil to self-knowledge, which is his primary concern. In *Alcibiades I*, Socrates suggests that our eyes could follow the Delphic inscription to 'Know Thyself' by looking in a mirror at ourselves, in particular our pupils, where seeing is said to occur (132d5–133b5). But we cannot achieve self-knowledge in this way, since the self, considered on its own, cannot be identified with the body or with the composite of body and soul, but only with the soul alone (129b1–131a3). In the *Charmides*, Plato considers reflexive mental attitudes more generally to see whether it is even coherent to speak about self-knowledge. Using sight and hearing as his prime examples, he says that we could not see that we see or hear that we hear, unless seeing or hearing were themselves visible and audible and so possessed colour or sound respectively (168d3–169a7; cf. 167c8–d10). None of this, however, precludes the possibility that we might *perceive* that we see or hear, without (p. 43) literally seeing or hearing these activities, a suggestion Aristotle would make in due course when taking up very similar objections.[46]

4 Aristotle

In the opening chapter of his treatise *On the Soul*, Aristotle considers whether any psychological state—in which he explicitly includes 'perceiving generally' (*holôs aisthanesthai*)—occurs exclusively (*idion*) in the soul. He argues that none does. Rather,

they are all 'shared' (*koinon*) with the body, which in each case does or undergoes something at the same time (1.1, 403a3–7, a16–19).[47] An adequate definition of perception must therefore refer not only to the kinds of formal characteristics the analytic philosopher (*ho dialektikos*) focuses on, but also the underlying material structures and changes the natural philosopher (*ho phusikos*) studies (403a29–b9). Thus, while Aristotle distinguishes between what it is to be a sense—that is, the power to perceive—and what it is to be a sense organ, he nonetheless regards a sense and the corresponding sense organ as 'one and the same' (2.12, 424a24–8). Like the soul and the body, they are one in the way that matter and form in general are one (2.1, 412b6–9; cf. 412b17–413a3).

As with other psychological states, Aristotle distinguishes between the power (*dunamis*) to perceive and its exercise or activity (*energeia*). Having this power, whether it is being exercised or not, is what distinguishes animals from plants and is the basis for other related powers that they share, such as the capacity for feelings of pleasure and pain, desire, representation, and dreams.[48] Perceiving is the exercise of this power: it is not a modification or alteration away from this power, in the way that acquiring or losing the ability would be, but rather the realization of its own nature (2.5, 417b2–16).[49] Perceiving is a change brought about by the object of perception itself: the object has the active power to affect the sense organ and by acting on it brings it into activity. As with other agent–patient interactions, the activity of the perceptible object and the activity of the sense are not two parallel events, but a single event, taking place in the organ acted upon. They are 'one and (p. 44) the same', even though their 'being' is different (*to einai heteron*), since what it is to perceive differs from what it is to be perceived (3.2, 425b26–426a19; cf. *Phys.* 3.3). What can be perceived—colours, sounds, flavours, odours, heat, and moisture, for example—continue to exist apart from perception, because they exist even when they are not exercising their power to affect perceivers. They are objective features of the world, independent of being perceived. Aristotle criticizes his predecessors for failing to realize this, when they assumed that the objects of perception cannot exist unperceived (426a20–6).[50] Because perceiving depends on the objects of perception to bring it about and the latter are external to the perceiver, it follows that perception is not something that is 'up to us', but depends upon what is furnished by our environment.[51]

What can perceive and what can be perceived are thus relative (*pros ti*) to one another (*Categ.* 7, 6b3, b35–6), where the latter causally acts on the former and is therefore prior in nature.[52] Each sense is a power to perceive a certain type of object and its essence is defined by reference to it. The object is thus the sort of thing that, as such, is intrinsically (*kath' hauto*) capable of causing that sense exclusively (*idion*) to perceive it (*DA* 2.6, 418a24–5). The power of sight, for example, is defined in terms of what can be seen. This

turns out to be colour—not by definition, Aristotle is quick to add, but because colour possesses within itself what is responsible for being seen (2.7, 418a29–b2). To be visible and to be a colour are thus *not* the same (*Phys.* 3.1, 201b2–4; *Metaph.* 11.9, 1065b32–3), even if colours *are* in fact the sorts of things that can be seen.[53] Aristotle offers extensive accounts of the different senses,[54] the perceptible qualities they are directed at,[55] and the various organs that subserve them.[56]

As with any other agent-patient interaction for Aristotle, the object of perception causes the sense to *become like* itself. The active quality or form of the agent—in this case, the (p. 45) perceptible quality itself—is transmitted to the patient, which 'receives' it or takes it on. Thus, having been unlike the object initially, the sense organ becomes similar to the object (*DA* 2.5, 417a17–20, 418a3–6; 2.11, 424a1–2). But not every patient perceives the agent acting on it. Plants, for example, are made warm by the sun, but they do not feel warmth, even though according to Aristotle they have a soul and warmth is a perceptible quality (2.12, 424a32–b1). Plants are unable to perceive because they lack a 'mean' or balance (*mestotês*) along a range of sensible qualities that would make them sensitive to the various qualities along that range. Consequently, they are modified by a sensible quality like warmth 'along with the matter' and transformed as a result (424b1–3). Each sense, in contrast, is capable of receiving the perceptible form of the object 'without the matter', something Aristotle compares to the way sealing wax receives the insignia from a signet ring, without the ring's iron or gold (424a17–24).

Just how to understand this contrast is quite controversial. Some, like Aquinas, take it to mark off a special kind of reception, where the form is received 'immaterially'—or, as he also says, *spiritually* or *intentionally*—which consists in nothing more than perception's coming to be directed at the object. Against this, others think that the perceptible quality is *literally* instantiated in the sense organ (cf. 3.2, 425b22–4), but without the matter of the object in which the form was originally instantiated. It seems unlikely that literal instantiation is at issue, though, since that would no longer offer a contrast with plants, as Aristotle intends, given that plants also become warm without receiving matter from the source of the heat. On two occasions, moreover, Aristotle actually ridicules the view that cognition requires a literal replica of the object within ourselves (1.5, 410a7–11; 3.8, 431b28–9). On the other hand, it seems unlikely that receiving form 'without the matter' could *merely* consist in its being directed at an object, without any further underlying material change, given the comparison to a signet ring's producing a seal in wax. A third alternative lies between these extremes, however. Perception might be directed at an object in virtue of material changes in the sense organ *without* the object's perceptible form being literally embodied. To receive the form 'without the matter' would instead be to embody only certain essential features of the form in a different type of material, without producing a replica. For example, according to Aristotle each colour is defined by

a ratio of black to white (*Sens.* 3, 440b14–26). On the present suggestion, the eye would receive a colour 'without the matter' by embodying the same numerical ratio in a different pair of opposites—hot and cold, say, or runny and viscous—in the vitreous jelly, which Aristotle believes is the sensitive part of the eye, without the jelly needing to change colour at all. In effect, the senses would act as *transducers:* they would preserve certain essential features of the perceptible form in a new medium and in so doing transmit information about the character of the objects in the world acting on our senses.[57]

What is perceptible according to Aristotle, at least in the basic or fundamental case, are (1) the qualities that are intrinsically (*kath' hauto*) perceptible to a single sense exclusively (*idia*), or 'exclusive' perceptibles, for short: colours, for example, are intrinsically perceptible exclusively to sight, tones to hearing, odours to smell, flavours to taste, and temperature and moisture to touch (*DA* 2.6, 418a11–15, a24–5). Since on Aristotle's theory a perception is about what brings it about, the resulting perceptions of these qualities *cannot* be mistaken, (p. 46) although he adds we can be mistaken about the coloured object, with regard to *what* it is, for example, or *where*.[58] As these remarks suggest, Aristotle does not think that exclusive perceptibles are the only thing we can perceive, even if they are what is fundamentally perceptible (*kuriôs aisthêta*, 418a24). There are also features of objects that are (2) intrinsically perceptible to more than one sense, the so-called shared or 'common' (*koina*) perceptibles, such as change and rest, number and unity, shape, extension, and duration.[59] Finally, there are (3) 'extrinsic' (*kata sumbebêkos*) perceptibles, features that are extrinsic to features that are intrinsically perceptible to a given sense.[60] This last category includes features that are intrinsically perceptible to a different sense, but it extends much more widely, to include perceiving the son of Diares and even a universal like colour.[61] It seems that many of the features relevant for human action and animal behaviour would fall in this last category, such as when a dog and a lion smell or hear their prey (*EN* 3.10, 1118a16–23). With the last two kinds of perceptible, error is not only possible, but frequent.[62] Aristotle makes clear, moreover, that in such cases the perceptions themselves are false, as distinct from representations generated from them (*DA* 3.3, 428b25–30), not to mention the judgements subsequently formed on their basis.

Given Aristotle's physics and the range of things he thinks can be perceived, the aetiology of perception in these three cases must be very different. This is especially clear with the last kind, where Aristotle explicitly says that our senses are *not* affected by the extrinsic characteristics in question as such (*DA* 2.6, 418a23–4). But Aristotle still regards them all as genuine forms of perception, even if he regards one, the perception of exclusive qualities, as the fundamental case (2.6, 418a24–5).[63] Whenever we mis-see or mis-hear,

Aristotle says, we nonetheless see or hear something real; it is just not *what we take it to be* (*Insomn.* 1, 458b31–3).[64] This suggests that in all perception, what we perceive are the individuals acting on us, but we always perceive them *as* being certain sorts of things, a point on which we can be mistaken. Thus, we not only perceive an individual, like Callias; our perception is *of a certain sort* of thing, 'of a human, Callias' (*An. Post.* 2.19, 100a16–b1; cf. 1.31, 87b28–30). That is why perception is a *discriminative* power (*kritikê*, 99b35): it allows us to distinguish between different types of things in our environment and thereby contributes (p. 47) to our survival and well-being (*Sens.* 1, 436b19–437a15).[65]

But then perceptual content must somehow involve universals as well, even in cases where these are not grasped conceptually. In fact, on Aristotle's view it must be possible to grasp these contents non-conceptually, since our most basic concepts first arise from earlier perceptual experiences, which are said to 'implant' the universal in us (*An. Post.* 2.19, 100b5), while other animals, though completely without concepts, are still capable of perceptual discrimination.[66]

Although Aristotle does occasionally speak of the after-effects of sensory stimulation, like after-images (*Insomn.* 2, 459b7–13), as something perceptible (460b2–3), in general he speaks about phenomenal qualities as belonging to the objects themselves. He regards colours, tones, flavours, odours, warmth, and moisture as public, objective features of the world, external to us, that cause us to perceive them, rather than as properties of our own experiences (*Sens.* 6, 446b17–26).[67] Yet he also seems to think that whenever we perceive, we perceive that we perceive (*EN* 9.9, 1170a29–b1; *Sens.* 7, 448a26–30). In one passage, he argues that we accomplish this by means of a 'common power' of perception, shared by all the senses, by means of which we are also aware and discriminate the perceptibles of different senses (*Somn.* 2, 455a15–22).[68] But at the beginning of *On the Soul* 3.2, he offers a more extended discussion and arguments (425b12–25). The interpretation of this passage is controversial, but on the most common reading he argues that this higher-order perception cannot be the function of a distinct power of perception, on pain of infinite regress. On an alternative reading (favoured by Brentano), the argument concerns the *activity* of perception rather than the power (the Greek *aisthêsis* being ambiguous between the two). The argument would then be that perceiving that we see or hear cannot be a distinct activity from the original act of seeing or hearing, on pain of an infinite regress. Every act of perception, in addition to being directed at an external object, must also be reflexively directed at itself 'on the side' (*en parergôi, Metaph.* 12.9, 1074b25–26).[69]

5 Conclusion

From even this preliminary survey, it should be clear that an interest in perception specifically, as distinct from other forms of cognition, develops relatively early in Greek philosophy. The Presocratics are preoccupied with getting past the manifold appearances the world takes on in experience to achieve a deeper understanding of the nature of things. Their self-conscious appeal to reason, as a way of sorting out the puzzling and conflicting (p. 48) elements in our experience, leads naturally to a broad contrast between the deliverances of the senses and what we make of them through reflection and argument. It is not surprising that by the mid-fifth century bce there is increasing attention to the causal mechanisms underlying the different sense modalities and to the features of objects responsible for stimulating our sense organs: for example, the confluence of similar material elements inside and outside the subject in Empedocles; the production of impressions by the object of vision in both Gorgias and Democritus; and the latter's appeal to geometric and structural properties of an object quite generally to explain the qualitative character of the resulting perceptual experience. Identifying these causes is a natural first step towards determining what precisely the senses can tell us about the world—or cannot, as the case may be. Both the epistemological pessimism we find in Democritus and Protagoras' optimistic turning of the tables in favour of relativism (if Plato is right) are equally due to reflections on perception as a form of causal interaction.

Epistemological concerns are still evident in Plato. But the nature of perception and of perceptible qualities are already coming to be of interest in their own right: what exactly perception's relation is to the body or to causation more generally; how we should understand the awareness we have of objects and indeed the awareness of perceiving itself; and finally the ontological status of perceptible qualities and their role in explaining the character of perceptual experience. The specific answers that Plato and Aristotle devised had much influence in the subsequent tradition. But it is the framing of the questions that would have enduring value.

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Notes:

([1]) For a fuller treatment of these issues from the beginnings of Greek philosophy to later Neoplatonism, with translations and more extensive references to primary sources and scholarship, see my *Perception in Ancient Philosophy* (in progress).

([2]) In what follows, all translations are my own. I use standard abbreviations for the titles of ancient works, along with citations for Presocratic fragments and testimonia from H. Diels and W. Kranz, *Die Fragmente der Vorsokratiker*, 6th edn (= DK).

([3]) See esp. Snell, 1960: ch. 1 ('Homer's View of Man'). For a healthy corrective, see the excellent articles of Lesher (1994) and Hussey (1990).

([4]) Frede (1987).

([5]) Arist. *DA* 3.3, 427a21–7; *Metaph.* 4.5, 1009b12–15; Theophr. *De sens.* 4, 23.

([6]) For an excellent critical examination of these claims, see Laks, 1999: 255–62 and Lesher, 1994: 11–12; see also Caston, 1996: 25–7, 33–8.

([7]) For wide-ranging and detailed examination of the use of this family of terms before Plato, in both Ionic and Attic, philosophical and non-philosophical authors, see Schirren (1998).

([8]) DK 28 B7.4–5. Something similar is reported for Xenophanes (DK 21 A32).

([9]) In DK 31 B17.21, he urges us to look on the cosmological role of Love, not with 'confused eyes', but with our understanding instead.

([10]) For discussion, see Kahn, 1985: 19–21, although I see Democritus as more continuous with the tradition than Kahn does.

([11]) Solmsen (1968) generalizes this point, in fact, arguing that the Greek *aisthêsis* and Latin *sensus* are ambiguous between perception and feeling throughout ancient philosophy.

([12]) Beare (1906), though questionable and outdated on many points, is still useful as a compendium for a preliminary survey of the evidence. Much of it derives from critical summaries in Aristotle and above all from Theophrastus' *De sensibus*, an invaluable resource for early theories of perception. There is an English translation and commentary of the latter by the psychologist G. M. Stratton (1917), though it too is very dated and needs to be redone in light of recent advances. For an examination of the methodology of Theophrastus' treatise, see Baltussen (2000).

([13]) On the 'topology of sensation', see Laks, 1999: 263–7.

([14]) The longest (and most famous) description of the *poroi* is not attributed to Empedocles directly, but to Gorgias as the student of Empedocles (DK 31 A92). But it is

confirmed for Empedocles as the mechanism for perception in general at DK 31 A86 (§§7, 9) and A87. On emanations (*aporrhoiai*) specifically, see DK 31 B89; also A86, §7.

([15]) For the principle that 'like is known by like': DK 31 B109 (also Arist. *DA* 3.3, 427a27–9); DK 31 A86 §§1, 2, 10, 15, 17. Cf. DK 31 B90.

([16]) On contraries: Theophr. *De sens.* 27 (cf. 31–3); cf. Arist. DA 2.5, 416b35–417a2. On pain: Theophr. *De sens.* 17, 29. For a thorough examination of Anaxagoras' general views on perception, especially his views that all perception involves pain or irritation and that there are least perceptible differences beyond which we cannot discriminate (DK 59 B21), see Warren, 2007: 19–36.

([17]) Lantern fragment: DK 31 B84; cf. A86 §7. Day and night vision: DK 31 A86 §§8, 18; cf. A91. For a defence of the interpretation here, see Caston (1986) and, along somewhat different lines, Sedley (1992). Katerina Ierodiakonou (2005) has demonstrated convincingly that Empedocles' account of colour vision acknowledges only two primary colours, white and black (or more exactly, light and dark), the rest being the result of their mixture in various proportions (DK 31 A86 §59; cf. also DK 68 A135 §79).

([18]) *De sens.* 21 (= DK 31 A86 §21), reading *to gar auto* with the mss. Empedocles has little to say about the remaining senses. According to Theophrastus, he only links smelling to breathing and says nothing about touch and taste beyond the general claim that all perception is due to emanations fitting into conduits (DK 31 A86 §§9, 20).

([19]) Accepting Burchard's correction of *sklêron*; cf. *apomattetai kathaper kêros* in §52.

([20]) On the role of perspective, see Rudolph (2011); on the perception of distance, see Avotins (1980); on the structure of the eye, see Rudolph (2012).

([21]) DK 68 A135 §§61–82. The list of Democritus' works includes titles for separate essays on colours and flavours (DK 68 B5g & h; A33).

([22]) See Fritz, 1953: 95–9, who was the first to emphasize this.

([23]) For the explanation of different flavours, see DK 68 A135 §§65–7; A129. For a general statement of the underlying explanatory strategy in terms of physical effects, see DK 68 A130.

([24]) DK 68 A135 §§63–4, 69 and the context of DK 68 B156 (= Plut. *Adv. Colot.* 4, 1108f–1109a).

([25]) Of our ancient sources, a subjectivist reading is most strongly suggested by Galen's gloss on the quotation at *Elem. Hipp.* 1.2 (= DK 68 A49).

([26]) Perception: DK 68 A135 §64. Belief and other mental states: DK 68 B7; A135 §58; cf. A101.

([27]) DK 68 A112; A101; A135 §69. Some reports suggest that Democritus held the contrary view that *no* perception was true and so was caught in contradiction; but the view they cite as evidence for this only claims that no one class of perceptions has *any greater* claim to truth than any other, which is plainly compatible with them all being equally true.

([28]) In speaking of a 'microstructure' in a Democritean context, I mean a molecular compound, which is a part of something larger. What matters is structure and parthood, not absolute size.

([29]) E.g., *Phd.* 78b4–79e7; *Rep.* V, 475e6–480a13; VI, 509d1–511e3; *Tim.* 27d5–31b3, 51b6–52d1.

([30]) 65a9–b7; 65e6–66a8; 66d7–67b2; 79a1–c8; 83a1–b4; cf. 83d4–e3.

([31]) *Tim.* 43c4–7, 45d1–3, 64b3–c7; *Phlb.* 33d2–34a5; cf. *Tht.* 186b11–c2. In these dialogues Plato seems to be saying that the perceiver is aware not merely of external objects, but of how they affect our body as well. On the bifurcated character of perception that results, see Ganson, 2005: esp. 1–2, 3–4.

([32]) *Tht.*184d4, 185c7–8; cf. 184d7–e7, 185d1–2, e7.

([33]) There are interesting parallels with Aristotle's own theory, although they differ on several points. See section 4.

([34]) Day (1997) offers an extended and detailed critique of this assumption, though the position is anticipated in basic outline by Fine (1988). The following, though, can perhaps be admitted. Because the 'secret doctrine' of the *Theaetetus* is embedded in a discussion of Heracliteanism, the exact nature of the theory is something of a moving target (appropriately enough). The extreme form it ultimately takes in the *Theaetetus* (181d9–182a1), therefore, and which makes it vulnerable to refutation, may not imperil the more moderate version that is first introduced — a view, in fact, that Plato never expressly rejects.

([35]) Socrates twice concedes that the theory might be more defensible if restricted to perceptible properties, especially those with which one is presently interacting (171d9–e3, 179c2–7).

([36]) See the analyses for cold (62a5–b6), hard (62b6–c3), rough (63e10), and smooth (63e10–64a1). Plato also discusses heavy and light, understood in terms of the heft of an object, at length: 62c3–e4.

([37]) Plato offers detailed explanations for why foods taste acrid (65d3), sour (65d4), bitter (65d4–e1), salty (65e1–4), spicy (65e4–66a2), acidic (66a2–b7), and sweet (66b7–c7).

([38]) There are only two types of odour, according to Plato, neither of which has a name, but one is pleasant, the other painful (67a1–6).

([39]) Plato also distinguishes between smooth and rough sounds (67b7) and loud and soft ones (67c1).

([40]) Plato offers explanations for red (68b3–5), golden (68b5–6), purple (68b8–c1), indigo (68c1–2), amber (68c3), gray (68c3–4), yellow (68c4), blue (68c5–6), azure (68c6–7), and green (68c7). For a general discussion of the theory of perception in the *Timaeus*, see Brisson (1997), including the appendix (167–76), which provides a running commentary on the passage on colours.

([41]) *Tht.* 184d3–5, 185a5, c7–8; cf. 185d8.

([42]) Several of these topics—namely, the unity of consciousness, the ability to discriminate qualities from different modalities, and the ability to perceive features common to the different modalities—are developed in somewhat different ways by Aristotle: see section 4; see also Turnbull (1978).

([43]) Most current readings are influenced in one way or another by a trio of papers, originally written in the early 1970s: Burnyeat (1976), Frede (1987), and Cooper (1970). Burnyeat and Frede both take the hard line traced out here, while Cooper explores more moderate, hybrid positions.

([44]) This reading is especially natural if we read the gloss on 'being' (*ousia*) at 186b6, *kai hoti eston*, as 'that is, *what* they are' rather than 'that is, *the fact that* they are', as it is standardly rendered. (McDowell (1973) is an exception: for his defence of the former reading, see 111, cf. 191.) One need not think that some 'rational intuition' of Platonic Forms is intended here, as is sometimes claimed. All that is required is that the being (*ousia*) of things should be understood, as so often, in terms of what something *really is*, its nature or essence. Nothing further need be intimated here about the metaphysics involved, such as that they are Platonic Forms with certain distinctive characteristics. As for how we know them, Plato is quite explicit in this passage that it is *not* through some kind of rational 'vision', but rather *by reasoning:* making comparisons, drawing inferences, and testing (see also *Rep.* X, 602c4–603a9).

([45]) *Tht.* 189e4–190a6; *Soph.* 263e12–264b1.

([46]) *DA* 3.2, 425b17–25; *Somn.* 2, 455a15–22; see section 4. For discussion of the *Charmides* passage and Aristotle's response to it, see Caston, 2002: 768–73, esp. 772–3 and 79.

([47]) The only possible exception Aristotle considers is understanding (*noein*), and even here he insists that if understanding requires representation (*phantasia*)—something he later acknowledges, at least for humans—it will be inseparable from the body and its activities (1.1, 403a7–16). For understanding's dependence on representation, see *DA* 3.7, 431a16–17; 3.8, 432a8–10; *Mem.* 1, 449b31. This will not be true of God, who is nothing but understanding (*Metaph.* 12.7 & 9), or true of the second understanding mentioned in *DA* 3.5. But it is arguable that the latter just is God: for a defence of this reading, see Caston (1999).

([48]) What distinguishes animals from plants: e.g., *DA* 2.2, 413b1–4; *Sens.* 1, 436b10–12; *GA* 1.23, 731a30–b4, though see Lloyd, 1996: ch. 3 on possible exceptions to this rule, like the jellyfish, which Aristotle regards as an animal but without perception (*PA* 4.5, 681a19–20). On the relation to pleasure, desire, and representation to perception: *DA* 2.2, 413b22–3; 2.3, 414b4–5; 3.11, 434a2–3.

([49]) Some have thought that this distinction precludes any other modification or alteration being involved in perception, in particular underlying material changes (*e.g.*, Burnyeat, 1995: 19, 21–2). But Aristotle believes that perceptible objects *as such* produce a material change in the organ when they produce perception, as bright colours do on the moisture in the eye (*GA* 5.1, 779b26–780a7; cf. *DA* 1.1, 403a16–19), even though perceiving is not to be *identified* with the material changes underlying it: each is a distinct type of change. For more detailed discussion, see Caston, 2005: esp. 265–9 and 288–90.

([50]) One naturally thinks of Protagoras here, although there is no explicit mention of him in the text. But Aristotle's criticism is certainly relevant to the theory of perception Plato offers in support of Protagoras in the *Theaetetus*, as part of his 'secret doctrine' (see section 3): an object is only white while it is being perceived as white by someone. Also note that on this theory, the causal interaction of subject and object always generates 'twins'—whiteness and seeing, for example—in contrast with Aristotle's view, where the resulting activity of the power to perceive and the activity of the perceptible object are 'one and the same' (though differing 'in being'). For close comparison of these two texts, see Turnbull (1978).

([51]) *DA* 2.5, 417b19–25; cf. *Sens.* 2, 438b22–3; 6, 445b7–8; *Insomn.* 2, 459a24–5.

([52]) *Metaph.* 4.5, 1010b30–1011a2; cf. *Categ.* 7, 7b35–8a12; 8, 9a28–b9, esp. b5–7. On relatives which are causally prior (or prior 'in nature'), see *Categ.* 12, 14b11–13.

([53]) Colour is not the only thing that is visible either. Phosphorescent objects—for which, Aristotle notes, there is no Greek word—are visible in the dark, although this is not their proper colour. The proper colour of objects is only manifest in the light (418a27–8, 419a1–7).

([54]) The senses: sight (*DA* 2.7, *Sens.* 2; cf. *GA* 5.1); hearing (*DA* 2.8; cf. *GA* 5.2); smell (*DA* 2.9); taste (*DA* 2.10); and touch (*DA* 2.11). There are interesting discussions in the last chapter about whether touch is a single sense, given the different range of qualities it is sensitive to (422b17–33); and whether flesh is the organ of touch or rather a medium, as the other senses have, the organ being deeper within (422b34–423b26).

([55]) Perceptible qualities: colour (*Sens.* 3); flavours (*Sens.* 4); odours (*Sens.* 5); sounds (*DA* 2.8; cf. *Sens.* 4). For discussion of tactile qualities, see *DA* 2.11, 423b27–424a15; see also *GC* 2.2 and *PA* 2.2, 648b11–649b8, esp. 648b14–17 (cf. b30–3). On light, darkness, and phosphorescence, see *DA* 2.7. For analogies between the quality spaces of odours and flavours, see also *Sens.* 5, 443b3–16 and *DA* 2.9, 421a26–b3.

([56]) For sense organs in general, see *PA* 2.1, 647a3–33; see also assorted comments on individual sense organs in *HA* 4.8. For discussions of specific sense organs: eyes (*PA* 2.13; *GA* 5.1; cf. *Sens.* 2); ears (*PA* 2.11–12; *GA* 5.2); nostrils (*PA* 2.16); tongue (*PA* 2.17); and flesh (*PA* 2.8, 653b19–33; cf. *DA* 2.11, 422b34–423b26). For a comprehensive examination of Aristotle's discussions of the sense organs and possible implications for his theory of perception, see Johansen (1998).

([57]) For a full defence of this position, see my 'Receiving Form without the Matter: Aristotle on the Transmission of Information' (unpublished).

([58]) *DA* 2.6, 418a12, a15–16; 3.3, 427b12, 428b21–2; 3.6, 430b29–30; *Sens.* 4, 442b8–10; *Metaph.* 4.5, 1010b2–3. But compare *DA* 3.3 428b18–19, where Aristotle seems to qualify this claim: the perception of such perceptibles is 'true, or possesses the least possible amount of falsehood'. For a possible explanation of this apparent exception, see Caston, 1998: 272 n. 56.

([59]) *DA* 2.6, 418a17–20 (cf. a10–11); 3.1, 425a14–20; *Sens.* 1, 437a8–9; 4, 442b4–10; *Mem.* 450a9–12. Apart from number, this list of common objects is quite different, we should note, from the ones Plato speaks of at *Tht.* 185c–186b; see section 3.

([60]) *DA* 2.6, 418a20–4; 3.1, 425a21–27, a30–b3; cf. *An. Pr.* 1.27, 43a33–5.

([61]) For objects intrinsically perceptible to another sense: *DA* 3.1, 425a30–1; cf. a21–4. Other examples: *DA* 2.6, 418a21 (Diares' son); 3.1, 425a24–7 (Cleon's son); *Metaph.* 13.10, 1087a19–20 (the universal colour).

([62]) *DA* 3.1, 425b3; 3.3, 428b19–25. Aristotle notes in the second passage that error is most frequent where common perceptibles are involved, although without further explanation.

([63]) Sometimes this sentence is taken to imply that only the perception of exclusive perceptibles is perception 'strictly speaking' (a mistaken construal of the Greek *kuriôs*), while the other two kinds are called 'perceptions' by an extended use of the term. But in general Aristotle does not tend to legislate that one use of a term is correct and the others incorrect or metaphorical; rather, he standardly acknowledges different uses of terms and notes where one is basic or fundamental or primary (*kuriôs*). Exclusive perceptibles on this reading, then, are *not* the only genuine perceptibles, but rather the *basic* or *fundamental* ones.

([64]) In contrast with dreams and hallucinations, where we do not perceive anything at all (458b33–459a1).

([65]) On Aristotle's use of *krinein* for perceptual discrimination, rather than judgement (as it is sometimes translated), see the landmark article by Ebert (1983).

([66]) Aristotle would thus subscribe to a 'state' view of non-conceptual content, rather than a 'content' view. For a full exploration and defence of these issues, see my 'Aristotle on Perceptual Content' (unpublished).

([67]) It is worth noting in this context that Aristotle emphatically rejects Democritus' reduction of perceptible qualities to quantitative features like shape and extension (*Sens.* 4, 442a29–b26), a criticism that would apply equally to Plato's *Timaeus*.

([68]) For the latter function, see *DA* 3.2, 426b8–427a16; cf. *Somn.* 2, 455a12–22; *Sens.* 6, 448b17–449a20, which constitutes a striking departure from Plato, who argued this function could not be performed by any of the senses, but only by something distinct from all of them (see section 3). For Aristotle's conception of the 'common sense', see Gregoric (2007).

([69]) For close discussion of these passages and a defence of Brentano's activity reading, see Caston 2002.

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