

# Knowing in Aristotle Part 1: *Epistēmē*, *Nous*, and Non-Rational Cognitive States

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## 1. Introduction

“All humans by nature desire to know [*eidenai*].” The justly famous opening to Aristotle’s *Metaphysics* brings out how central knowledge is to Aristotle’s understanding of human existence. For him, contemplating the truth is the ultimate goal of human life. Indeed, it is not just best for humans. Understanding (*noēsis*), in its most perfect form, is the one activity Aristotle thinks we can suitably apply to his first cause and unmoved mover, Aristotle’s God (*Met* Λ 7; cf. *Met* A 2; *NE* X 8). This opening sentence also brings out the complexity in Aristotle’s views on knowledge. In A 1-2, Aristotle leverages the claim that humans recognize the intrinsic value of cognition, independent of its usefulness, to argue that we should pursue wisdom, understood as knowledge of the first causes of being. Yet Aristotle’s initial evidence does not come from the results of scientific inquiry or rational calculation. Instead, it comes from perception, from the fact that we love sight because it “enables us to cognize [*gnorizein*] most fully and makes clear many differences.” (980a26-27, trans. Reeve with modifications) We appreciate what seeing shows us about the world, even when we are not trying to achieve any practical goal. For Aristotle, all the senses are ways of being in touch with reality that can be described as *gnōsis*, cognition in a broad sense (e.g. *GA* I 23, 731a30-b4).<sup>1</sup> As David Bronstein argues, Aristotle takes *gnōsis* to be factive: if you have *gnōsis* of something you are getting it right.<sup>2</sup> At the same time, Aristotle thinks only rational states, as opposed to perceptual ones, involve conviction (*pistis*), a commitment to the truth of what you cognize.<sup>3</sup>

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<sup>1</sup> I use “cognition” instead of “knowledge” since the term is less determinate, which fits Aristotle’s application of *gnōsis* to perception, which he does not take to entail belief or involve affirming the truth of something in the way that rational states of believing and knowing do (*NE* VI 2; cf. Fine 2014, 189). If knowledge is taken in a rather broad sense, on which the toddler knows the firetruck is red or the falcon knows the location of its prey, it may be appropriate. (cf. Bronstein 2016, 18, esp. fn. 33).

Aristotle never attempts to give a definition of the more generic verbs of knowing he employs such as *gignōskein* (cognate with the noun *gnōsis*) and *eidenai*, possibly because there is nothing better known that could be used to define them (cf. Williamson’s knowledge-first approach [2000]) or because he does not think they have a univocal definition. Aristotle does more often use *gignōskō* generically to include perception. See Bronstein 2016, 16-21 for further discussion.

<sup>2</sup> Bronstein 2016, 17-18, especially fn. 26; contra Gail Fine 2010, 148-152.

<sup>3</sup> Aristotle’s use of *gnōsis* draws on Plato’s *Republic*, which applies *gnōsis* not just to *epistēmē* (there restricted to understanding of forms) but also to the *dianoia* (thought) of mathematicians who lack understanding of first principles (527b4-7) and even to the way the philosopher who returns to the Cave grasps the images on the wall (520c3-5). Whitney Schwab plausibly argues that this grasp of an image can only be a *doxa* (opinion) and so Plato is willing to apply *gnōsis* even to expert opinion (Schwab 2016, section 6.4).

Aristotle's most general description of what all the various types of cognition have in common is his characterization in *De Anima (DA)* II 5 of both perception (*aisthēsis*) and understanding (*noēsis*) as special ways that a cognitive power takes on forms. On Aristotle's view of reality, forms make things what they are. They either make something to be an individual thing of a given kind (substantial form) or they make an individual substance be a certain way, i.e. have certain definite qualities, quantities, relations etc. (accidental forms). Matter, the other component in Aristotle's metaphysical account of the constitution of natural things, is what takes on these forms. In changes of substance, matter takes on new forms through the destruction of its previous form. When copper and tin are combined to form bronze, their forms cease to be and are replaced by the new form of the composite (cf. *Gen et Corr.* I 8-9). In changes of accident, the persisting substance takes on a new accidental form, replacing the previous one: Socrates loses the form of paleness when he tans.

Perceiving and understanding, however, involve a special sort of non-destructive alteration. Aristotle claims that in cognition, our cognitive powers take on the form of what they cognize (e.g. the form of red or human or horse) but in a way that does not damage their own form or negatively affect their capacities (my experience of seeing a red horse does not interfere with my status as a substance with the form of human or with my ability to see other colors). This change is a fulfillment of the cognizer's power, one that does not impede the capacity or destroy what was there before. For Aristotle, cognition is a way of expanding your being. You take on what it is to be something else without losing what you are.

Aristotle's claim about form possession is explicitly about perception and understanding, which he takes to be the fundamental types of non-rational and rational cognition, respectively. Nevertheless, it applies, *mutatis mutandis*, to the other types of true cognition, all of which are rooted in these activities. As Aristotle lays out in *DA* III 6, more complex intellectual activities that achieve the truth (*alētheuein*), such as opinion (*doxa*), when it is true, and scientific knowledge (*epistēmē*), which is always true, do so by appropriately combining and separating forms that our cognitive powers have previously received. We achieve truth when the combination or separation of forms in our minds matches the way that they are combined or separated in the world (*Met* E 4; ⊕ 10). In true opinion, we correctly match forms that happen to go together—"this human" and "standing"—or are separated—"this human" and "sitting" (cf. *Cat* 4-5). Scientific knowledge (*epistēmē*) goes further and tracks necessary connections between forms and essences (the form of "triangle" is necessarily combined with "interior angles equal to two rights" and separated from

the form “circular”).<sup>4</sup> Aristotle, like Plato, thinks that we gain knowledge through forms. They differ not on the centrality of forms, but on the degree to which these forms are present in things. Since Aristotle takes *pragmata* (things) to fully exemplify forms and to be defined by their forms, he can hold that really knowing these things through their forms.

Aristotle takes cognition to be factive because he thinks its various types involve this special kind of form reception. Since they are caused by the forms that our cognitive powers receive, our cognitive states are true. This does not, however, mean that they are all true in the same way. Aristotle is explicitly committed to the view that some things are truer, insofar as they cause the truth of other things (e.g. *Met* a 1, 993b19–31; *APo.* 100b11-12). We will consider what he means more below, but we can start by noting two key dimensions that are relevant to how true Aristotle takes a cognitive state to be. First, in accordance with his general methodology (*DA* II 4 415a17-21), Aristotle takes the features of our cognitive activities to be largely determined by their objects. Entities that are themselves stable and have unified essences, such as primary substances or mathematical objects, can be known in a more stable and unified way than entities that are one or have essences only in a very qualified ways, such as heaps or shadows. We know more truly entities whose being causes and explain the being of other things: “what is most true is what causes all derivative things to be true.” (993b26-27, trans. Reeve) This is why Aristotle thinks the understanding of the first principles of reality is what is most true (993b28-29) and why he thinks that substances, primary beings, are truer objects of knowledge than their accidents (e.g. *this color* or *this size*), which depend on these substances for their being (*Met* Z 1).

Differences in truth also come from the different ways that we cognitively take on forms. Aristotle thinks our rational powers do this in a much more impressive way than perception: “for in comparison to being wise (*to phronein*), participating in touch and taste seems like nothing at all, but in comparison to plant or stone it seems a wondrous thing.” (*GA* I 23 731a35-b2, trans. Reeve with modifications) For Aristotle, oysters perceive their food’s tactile qualities, taking on its

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<sup>4</sup> There are some complications that arise from negative truths, but these, for Aristotle, are posterior and less important than positive truths (*Met* E 4, © 10), since they are less precise and get at being less than affirmative claims (e.g. *Cat.* 7, 8b9-13). Even cases of practical and productive knowledge involve combining or separating forms appropriately. Practical wisdom (*phronēsis*) correctly grasps which ethically relevant forms (e.g. the fine, the just, the courageous) are realizable in my actions and then guides me in actively bringing these forms into being in my circumstances. Similarly, craft or expertise (*technē*) allows artists to see which of the forms relevant to their art can be combined or separated, given the matter with which they are working and their circumstances. There are also some cognitive activities, such as recollection (*Mem.* 2) or employing images (*DA* III 7) whose function is primarily to assist other cognitive activities that actually attain the truth. For Aristotle, recollection is a cognitive process we use to help us get back to some previously grasped truth, while we employ the images of *phantasia* to help us deliberate better and more successfully achieve practical truths (see Cohoe 2016, section 4, 345-348, for discussion). These activities enable the successful contemplation of forms or the true combination or separation of forms but do not themselves consist in it. However, they are all ancillary for Aristotle and not included in his lists of ways of getting at the truth (*DA* III 3 and *NE* VI 2).

tangible forms in a cognitive way. They do so, however, without grasping clearly all the relevant forms which touch can reveal, since their reception of tangible forms is much less exact (*akribes*) than that of humans or other beings with more precise and developed organs (*DA* II 9 421a17-27; cf. *GA* V 1 780b15-17; V 2 781a14-b22; *Met* A 1, 980a20-27) Even the detailed perception of human sight or touch is a less perfect reception of form than understanding, since perception is restricted to the particular and only covers certain ranges of qualities. I feel the heat of the oven, but this reception of form is much more limited than the way in which the scientist who masters an understanding of thermodynamics and nuclear fusion grasps the intelligible form of the sun's heat. *Nous* (and the *epistēmē* based on it) is *saphēs*, "distinct," and *dēlos*, "clear," in a way that perception is not. This is not only because of the objects it considers, but also because of the way in which it takes on its objects: as forms grasped in a universal way that reveals their explanatory connections to other forms.<sup>5</sup>

Aristotle does not think complete exactness or clarity are attainable in every sort of inquiry. Indeed, one of his epistemology's most distinctive features is its insistence on considering both the objects and the goal (*telos*) of a given cognitive activity before considering which epistemic standards are appropriate (cf. *NE* I 3, 1094b14-27). As we will see more fully below, Aristotle recognizes various true and excellent states depending on the domain and the goal. Some of these are unqualifiedly true and excellent, while others are true and excellent in a more limited sense. Aristotle chooses his technical vocabulary in conversation with earlier philosophical usages of these terms: for example, Plato's discussions of *epistēmē* in the *Meno*, *Republic*, and *Theatetus* and the uses of *nous* in Anaxagoras, Parmenides, and Plato's *Phaedo*, *Republic*, and *Timaeus*. Nevertheless, Aristotle adjusts the meanings of these terms in accordance with his overall vision of reality. While Aristotle appeals to common usage of key terms like *sophia*, wisdom, and *technē*, craft, (*NE* VI 4, 1140a18-21; VI 7, 1141a9-16; *Met* A 1), the account he develops is normative, not descriptive. His accounts of epistemic states are set up to establish what the excellences themselves are, not how these terms are used in ordinary language.<sup>6</sup>

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<sup>5</sup> See Kelsey forthcoming for discussion of this.

<sup>6</sup> In this sense Aristotle's epistemology has some features of what Robert Pasnau calls idealized epistemology (2013). Aristotle is interested in how we reach these ideals and attain excellent epistemic states (e.g. *APo* II 19, *Met* A 1-2; *DA* III 4-6), however, I take him to be less interested in beliefs that fall short of the ideal or departures from it than Pasnau does in his 2017 discussion (e.g. 8-9).

## 2. Non-Rational Cognitive States

### a. Perception (*aisthēsis*)

Aristotle proceeds by looking at the different types of cognitive powers we have and the different activities they enable. While Aristotle does characterize perception as providing a sort of *gnōsis* (cognition), he makes a sharp divide between perceptual or non-rational cognition, which humans and animals share, and the excellences of reason, which animals lack. Before turning to the key terms he uses for rational thought, we should start with an overview of the sorts of cognitive states Aristotle takes to be available to non-human animals. Aristotle defines animals (*ta zōa*) as creatures that have the power of *aisthēsis*, perception (*DA* II 2-3). A creature counts as having the power of perception as long as it has one of the five senses which Aristotle recognizes. Aristotle thinks that differences in the perceptual organs of animals lead to variations in how exact and discerning their sense-powers are, with human doing well on sight and touch, but not on smell (*DA* II 9, 421a9-22; *Sens* I 436b18-437a17). Despite this qualification, he takes perception of perceptibles specific to one sense, such as colors, odors, and sounds, to be generally true (at least within the range of accuracy the animal's sense-organ allow for; II 6 and III 3, 427b11-13). By contrast, perception of objects common to many senses, such as shapes, sizes, and movements, can be mistaken even in good conditions (II 6).<sup>7</sup> Aristotle's views on the truth of perception are informed by his model of cognitive form reception. Our perceptual organs are structured to receive certain forms "in accord with the account [*logos*]:" colors in the case of the eye and sounds for the ear (*DA* II 12, 424a22-24). While they receive these forms in a reliable way, things that are perceived incidentally, but do not, as such, cause sensation, e.g. Socrates or Bucephalus (as opposed to Socrates' skin color or Bucephalus' height) are also often false (II 6). While Aristotle says that the perceptions of proper perceptibles is true (*alēthēs*), he denies that perception involve *πίστις* (conviction) (*DA* III 3, 428a18-24; 427b16-27). Since perception is caused in the right way, it puts the perceiver in contact with reality. The vision and hearing of animals tracks the colors and sounds in the objects they cognize. However, perception, unlike rational states, does not specifically assert or deny the truth of something (*NE* VI 3 1139b14-15). Perception is in accord with the account (*logos*) but it does not give us what the account is in the way that reason does (*NE* I 13).

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<sup>7</sup> For discussion see Johnstone 2015, Johnstone forthcoming, Corcilius forthcoming.

In addition to perception, animals also have *phantasia*, the power of appearance or imagination.<sup>8</sup> For Aristotle, perception is limited to objects that are currently present to the perceiver. *Phantasia* involves reproducing, combining, and separating perceptible forms that the perceiver has previously experienced, based on principles of similarity, dissimilarity, and association (*DA* III 3, cf. *Mem*). This allows creatures to employ cognition of things that are not immediately present (e.g. the squirrel can be motivated by the appearance of a nut even when not actually perceiving the nut). Appearances of things as pleasant or painful then motivate animals to pursue or avoid things (*DA* III 6-7; 9-11). Since *phantasia* takes things previously perceived and combines them in various ways it is often misleading and so is not, on Aristotle's view, a reliable cognitive source (*DA* III 3). Animals see shapes and colors and move themselves around on the basis of their cognitions, but this does not involve forming beliefs such as "I should move in this way because of what my perceptions are telling me." Instead, it involves moving in response to the desirability of an appearance.<sup>9</sup> What's distinctive about reason is its ability to make judgements about what we should believe. Rational activity involves a recognized commitment to the truth of something and thus involves *pistis* (conviction), unlike perceiving.

b. Experience (*empeiria*)

The ability to store perceptions enables further cognitive powers, memory (*mnēmē*) and experience (*empeiria*). For Aristotle, those animals that learn do so through combining memories into something unified: "experience [*empeiria*] comes to be from memory of the same thing happening many times. For many memories are an experience [*empeiria*] which is one in number."<sup>10</sup> (*Met* A 1, 980b27-29) An experience, in Aristotle's technical sense, is not just a matter of repeatedly going through similar instances. Rather, it involves putting together different instances of something into a genuine whole that can inform action consistently. Indeed, he claims that *empeiria* is more practically useful and accurate than possessing universal knowledge of something while lacking sufficient exposure to its particular instances (*Met* A 1, 981a12-22, *NE* VI 7, 1141b14-22). At the same time, Aristotle insists that *empeiria* is not itself rational and is not truly universal. The person with *empeiria* consistently and safely grasps the "that," seeing that

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<sup>8</sup> Aristotle initially claim that only certain animals, namely those with more developed powers of perception and self-motion possess the power of φαντασία (*DA* III 3, 428a6-11). Later, however, he mentions an indefinite sort of φαντασία in lower animals that are also capable of indefinite motion (*DA* 3.11, 433b31-434a5). For discussion see Lorenz 2006, 138-47 and Johansen 2012, 217-18.

<sup>9</sup> See Moss forthcoming for further discussion.

<sup>10</sup> In this passage, Aristotle seems to be using memory (*mnēmē*) in a broader sense than in his *On Memory* where it is restricted to remembering something as *past*, as opposed to recalling something but not insofar as it is past.

something is the case, whereas the person with *epistēmē* also grasps the “why,” the explanatory connections that account for something being the case (*APo* I 1, 981a28-30).

This mixture of qualities has led to ongoing debate on exactly what *empeiria* involves. Particularists offer readings on which the person with *empeiria* has the ability to spot similarities between different particular cases but does not employ universal concepts or generalizations. The experienced person sees that this piece of turkey is similar to that piece of chicken, which is healthy, and so judges that this piece of turkey is also healthy. *Empeiria* enables one to discern whether two particular cases are the same or different, but always through comparing particular cases without making a more universal claim.<sup>11</sup> The challenge for such interpretations is to explain how *empeiria* can allow someone to have a reliable power of discernment without ever employing any more general considerations.

Universalist interpretations, by contrast, grant that the person with *empeiria* does employ a general concept, but uphold Aristotle’s insistence that *empeiria* is not properly universal by identifying ways in which such a person’s grasp is deficient or limited. Some versions of this view hold that *empeiria* involves generalizations that may be too broad or narrow.<sup>12</sup> The challenge for these readings is to explain why Aristotle insists that *empeiria* works so well if the generalizations it employs are faulty. P.S. Hasper and J. Yurdin offer a recent account that avoids this problem by allowing the person with *empeiria* to have knowledge of general facts. Without *epistēmē*, however, experienced people lack an account of what makes these meats healthy and so cannot explain why eating all these things will contribute to health. This reading explains why Aristotle thinks *empeiria* is useful, but it is in danger of making *empeiria* too rational and too general to be a power that Aristotle thinks non-rational animals can share in at least a little bit (*smikron*) (*Met A* 980b27). Overall, Aristotle’s notion of *empeiria* has some affinities with Ernest Sosa’s notion of animal knowledge insofar as *empeiria* provides you with true and safe beliefs, since they are formed in a way that is not easily mistaken, but the process by which *empeiria* operates does not give you reflective support or uncover the explanatory connections underlying your actions.<sup>13</sup>

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<sup>11</sup> For versions of this reading, see Charles 2000 and W.D. Ross 1924.

<sup>12</sup> e.g. Bolton 1991; Modrak 1987.

<sup>13</sup> E.g. Sosa 2011, chapter 2, though, again, noting that *empeiria* does not imply belief. Thanks to Ted Poston for suggesting this connection to me.

### 3. Rational Cognitive States

#### a. Opinion (*doxa*) and belief (*hupolēpsis*)

*Empeiria* is the most powerful and impressive cognitive achievement that non-human animals share in. Aristotle then notes how humans go further:

Now, the other [animals] live by appearances and by memories and share to a small extent in experience. Humankind, on the other hand, also lives by craft knowledge [*technē*] and by reasonings [*logismoi*]. (980b25-28)

Our use of reason, in our doing, our making, and our understanding, is what distinguishes human lives from animal ones. It is at this stage that we move from cognitive states of the perceptive soul to states of the part of the soul that has reason (τό λόγον ἔχον, *NE* VI 1; cf. I 7 and I 13; *DA* II 2-3). In *NE* VI 3, Aristotle identifies five distinct excellences of human reason, all of which involve “grasping truth through some sort of affirmation or denial” (ἀληθεύει τῷ καταφάναι ἢ ἀποφάναι) (1139b15-16)

Before examining these, we should note that Aristotle does not take them to be the only five states of the part of the soul which has reason. He explicitly contrasts them with two other states of reason, *doxa* and *hupolēpsis*, which can be false. When you are in either of these cognitive states, you may be getting to the truth or you may not. As Jessica Moss and Whitney Schwab argue (2019), for Aristotle (as for Plato), *doxa* is not belief in the generic sense used by many contemporary philosophers. Aristotle denies that you can have *doxa* and *epistēmē* about something at the same time (*APo* 89a38–39). Indeed, Aristotle insists that *epistēmē* is about what is universal and must be the case, whereas *doxa* characteristically concerns what can be otherwise and what may be true or false. (*APo* 88b30–89a3). For Aristotle, *doxa* is, nevertheless, a state of our rational part because it involves taking something to be true.<sup>14</sup> If you have *doxa* about something you must be persuaded that it is true. Aristotle insists that this sort of persuasion (*peithō*) entails reason (*logos*) and so does not apply to non-human animals. (*DA* III 3, 428a22-24) People with *doxa* have conviction (*pistis*) that something is true, but lack a universal and necessary grounding for their opinions.

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<sup>14</sup> Aristotle notes that when we “form an opinion [*doxazein*] that something is terrible or fearful, we are immediately affected” while, in the case of imagination (*phantasia*), our experience of the terrible or fearful images is like observing such things in a picture. (*DA* III 3, 427b20-27) Because *phantasia* does not require taking the image appearing to you to be true, it does not have the effect that *doxa* does. Aristotle notes that “conviction [*pistis*] follows *doxa*” (*DA* III 3, 428a20) and Aristotle insists that *doxa* involves “a sort of affirmation.” (*NE* VI 9, 1142b11-14)



In some cases, this is because *doxa* is the best we can achieve. Some features of the world, such as the weather at a given time, are unstable and changeable in a way that prevents me from having a full rational understanding of them. I can have a *doxa* about the temperature outside, based on the weather forecast and what conditions were like when I entered the building an hour ago, but my opinion, even if true, does not count as real understanding because there is too much variability and uncertainty in the object of my belief (the weather at *t<sub>i</sub>*). In such cases, epistemically virtuous agents recognize that their opinions do not amount to *epistēmē*, scientific knowledge or proper understanding (*APo* I 33, 89a5-11). Aristotle also sometimes uses *doxa*, however, for cases where someone has mere opinions about things that can, in fact, be properly understood.<sup>15</sup>

*Hupolēpsis*, conceiving or taking to be true, is the other rational state Aristotle contrasts with the five excellences of reason. As Moss and Schwab argue (2019), this term is used more broadly than *doxa*. Aristotle sometimes treats it as the genus of taking something to be true, making it closer to “belief” in the generic sense used by contemporary philosophers than *doxa*. In *DA* III 3, Aristotle presents *epistēmē* (scientific knowledge), *doxa*, and *phronēsis* (practical wisdom) as *differentiae* of *hupolēpsis*. *Hupolēpsis* serves as the generic kind that all these different sorts of rational commitment fall under.<sup>16</sup> Because *hupolēpsis* is generic it covers both true and false beliefs and so is not an excellence of reason. For Aristotle, good states of reason must consistently and reliably achieve truth.

#### b. Aristotle’s Terms for Rational Powers

Aristotle recognizes five excellent states (*hexeis*) of reason: *technē*, *phronēsis*, *nous*, *epistēmē*, and *sophia*. They are all ways of getting it right, but Aristotle distinguishes them based on which sorts of truth it is their work (*ergon*) to achieve and the kind of grasp on truth they give us. Before we consider what differentiates these five excellent states, we should first say something about the capacities Aristotle thinks enable us to attain these states.

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<sup>15</sup> Some truths are, properly speaking, objects of scientific knowledge (e.g. “the number of primes is unlimited,” “animals are capable of perceiving things as painful or pleasant,” “the interior angles of a triangle are equal to two right angles”). These can, however, end up being the objects of *doxa* for someone in a deficient cognitive state (*APo* I 33). If I do not know the relevant proofs then my views about triangles, primes, and animals are mere opinions, not scientific knowledge, even if they turn out to be true. When we lack the relevant understanding and merely have the correct opinion about something that is an object of rational understanding (or, even more, when we have a false opinion about something that could be demonstrated), we are also in a state which Aristotle calls *doxa*.

<sup>16</sup> He also characterizes *epistēmē* and *doxa* as kinds of *hupolēpsis* in *APo* I 33, 88b36-89a4 cf. *NE* 1140b31–32; 1142b31–33; *Met. A*, 980b26–81a12.

This is important because Aristotle sometimes uses *nous* for an excellent state, as in *NE* VI 6, but sometimes uses it to refer to the power of reason itself, under which are included all our various intellectual abilities and the intellectual activities that proceed from them. In this sense, *nous* is a power that is responsible not just for our grasp of essences (as I discuss below) but for all our more complex rational activities.<sup>17</sup> All our intellectual activities fall under *nous* in the power sense, a sense that is equivalent to “the part of the soul which has reason [*logos*].” (*NE* I 7 1098a3-4; I 13 1102a27-28; VI 1 1139a1-15). Aristotle then divides *nous* as a power into the *contemplative* power or *nous* in the strict sense and practical *nous*, or the understanding responsible for action. The *nous* relevant to action is “of the practical sort, which rationally calculates for the sake of something, and differs from the theoretical sort in respect of the end.” (III 10, 433a13-15, trans. Reeve) There is only one fundamental intellectual power that humans have, but Aristotle thinks we can usefully distinguish between the aspects of our understanding that concern grasping what things are and the aspects that are used for acting well.<sup>18</sup> Practical *nous*, taken as the power by which we use reason for the sake of action, is equivalent to the rationally calculating power (*to logistikon*).<sup>19</sup> This practical *nous* is also equivalent to the deliberative power (*to bouleutikon*), since, as Aristotle says, “deliberating is the same as rationally calculating.”<sup>20</sup> There are, then, three senses of *nous* as a power: generic, specifically theoretical, and specifically practical.<sup>21</sup>

In *NE* VI 1, Aristotle divides rational states based on the kind of objects they consider, whether they “get a theoretical grasp on those beings whose starting-points do not admit of being otherwise” or grasp things “that do admit of being otherwise.” (1139a6-8, trans. Reeve) On this division, *epistēmē*, *sophia* and the *nous* that is the *hexis* of grasping first principles belong to the theoretical aspect of *nous*, which Aristotle here alternately describes as *to epistēmonikon*, the scientifically knowing part. *Phronēsis* and *technē* and their corresponding activities belong to the practical aspect of *nous*.

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<sup>17</sup> For example, in the *DA* introduces his discussion of *nous* by telling us that it is “about the part of the soul by which the soul knows and judges” (περὶ δὲ τοῦ μορίου τοῦ τῆς ψυχῆς ὃ γινώσκει τε ἢ ψυχῆ καὶ φρονεῖ, 429a9-11). Aristotle then lays out his reasons for thinking that this power, unlike perception, lacks a bodily organ and claims that the power “is actually none of the things that have being before it understands them.” (429a23) He makes clear again that here he is speaking of “what is called the *nous* of the soul (I mean by *nous* that by which the soul thinks [things] through and takes [things] to be true).” (429a21-23). I take *dianoēitai*, thinking things through, and *hupolambaneī*, taking to be true to be used here as representative of all the species of rational thought.

<sup>18</sup> They are one in number but different in being or account (cf. *Met* Z 4 1029b13-1030b13)?

<sup>19</sup> Aristotle here picks up on Plato’s usage in the *Republic*: *NE* VI 1 (1139a7-15) and *DA* III 9, 432b26-27

<sup>20</sup> *NE* VI 1, 1139a12-14; *HA* I 1 488b24; *Pol* I 13 1260a12.

<sup>21</sup> Cf. Gauthier and Jolif, 537. As Gauthier and Jolif note (536), there is also the distinction between productive and receptive *nous*, but this comes up only in the *DA*. I will set it aside, as, on my interpretation, it concerns the causal aspects of *nous* as a power and these differing causal aspects work similarly for all the resulting cognitive states. We can leave them out of our account which focuses on the cognitive states and activities themselves, not on the causes involved in bringing them about.

### c. Scientific knowledge (*epistēmē*)

We will start with the theoretical excellences of reason, since they are the most proper use of our understanding to achieve its object, truth. In *NE* VI 3, Aristotle begins with *epistēmē*, which is about what is “by necessity” and “eternal” and proceeds through “demonstrations.” (*apodeixeis*) Why does Aristotle put such stringent requirements on this state? He refers us to the *Posterior Analytics* where we see that Aristotle thinks:

We have unqualified scientific knowledge (*epistēmē haplōs*) of each thing when we know the cause through which the thing is as being its cause, and also that this cannot be other than it is. (I 2, 71b9-12, trans. McKirahan with alterations)

Aristotle insists that to be in this excellent state about some truth, it is not enough to know that something is the case (*hoti*) we also know why it is the case (*dia ti*). Further, to have such unqualified scientific knowledge, we need to know not only that there is some cause or explanation for why a thing is or why it has some attribute, we need an explanation which holds consistently, accounting for the thing’s being in a necessary way. Such explanations can only obtain when something’s principles and causes are invariable. That is why Aristotle insists that *epistēmē* must concern universal and necessary things. (*APo* I 33)

While a number of older translations render *epistēmē* as “knowledge,” current consensus takes this to be a poor choice for several reasons. “Knowledge” in English is used too broadly, covering many areas where Aristotle thinks *epistēmē* is impossible to obtain. It is also generally applied to beliefs about particulars just as much as beliefs about universal truths. The two main current contenders for rendering *epistēmē* into English are “scientific knowledge” and “understanding.”<sup>22</sup> “Understanding” is favored by Jonathan Barnes and Myles Burnyeat, inter alios.<sup>23</sup> It is one of the strongest available words for a cognitive achievement in English and brings out a key feature of *epistēmē* in Aristotle: systematicity and interconnectedness. “Understanding,” like “*epistēmē*,” is not primarily about knowing various facts, but about the universal explanatory connections between various truths. This rendering also fits well with the way *epistēmē* is used in Plato’s *Meno* and *Theaetetus*, where there is a similar emphasis on universality and explanation. This term has a couple of weaknesses, though. “Understanding” does not track Aristotle’s privileging of the theoretical over the practical (you can understand how a game or a recipe works,

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<sup>22</sup> One further complication is that “understanding” is also in contention for translating *nous* (the option I in fact prefer, as discussed below), but I will set this aside for now (though note that Burnyeat cheats and while arguing for it as a rendering of *epistēmē* (e.g. 1983) also uses it at times for *nous* and *noein* (2008)).

<sup>23</sup> Barnes 1994, Burnyeat 2012.

just as much as you can understand a geometrical proof) and it can apply to imaginary and non-existent things (you can understand how Sherlock Holmes solved the case).

“Scientific knowledge” is employed by David Bronstein and C.D.C. Reeve, *inter alios*.<sup>24</sup> It brings out clearly the fact that Aristotle is using *epistēmē* as a technical epistemic term, a kind of knowledge with very specific conditions that only covers certain domains. It also fits nicely with the fact that Aristotle himself distinguishes different kinds of *epistēmē* based on which of his three theoretical sciences or philosophies they belong to: natural philosophy or physics, mathematics, and first philosophy or theology (*Met* E 1-2). “Scientific knowledge” also gets at the idea that this is a systematic body of knowledge, as it focuses on the completed state, the science, as opposed to the partial and incomplete grasp of it that many individuals have. For Aristotle, the *epistēmē* itself is the whole body of knowledge, though this body of knowledge is what it is only in a knower and so, in the ideal state he is envisaging, *epistēmē* of a theoretical domain is the same as a successful knower’s grasp of it.<sup>25</sup> The disadvantages of this rendering are that it does less to bring out the connections of Aristotle’s *epistēmē* to earlier usages, especially in Plato’s dialogues, and does not directly get at the idea of grasping a whole interconnected system. I will use “scientific knowledge,” for *epistēmē*, but “understanding” is a reasonable choice as well.<sup>26</sup>

How do we achieve scientific knowledge about something? We use demonstration or proof (*apodeixis*, *APo* I 2), an argument that can be put in the logical form of a syllogism that shows how the truth in question (either about what something is or whether it is) follows of necessity from its cause. However, not all valid arguments with true premises are demonstrative. Demonstrations that yield knowledge must proceed from premises that are “explanatory [*aitia*], better known [*gnōrimōtera*] and prior [*protera*]” in relation to their conclusions. (*APo* I 2 71b30-31) In a completed science, we proceed from the essences or forms that make things what they are to their *per se* attributes. While discovering truths, though, we often move back from attributes to essences. Even when a demonstration proceeds from a universal form to an attribute, Aristotle insists that we only have *epistēmē* when the cause is commensurately universal with its effect. (*APo* II 4) A successful proof that isosceles triangles have interior angles equal to two right angles does not give us scientific knowledge of this fact, because this attribute belongs to triangle as such, not to isosceles, and so it is only once we master the proof of it for triangles as such that we gain *epistēmē*.

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<sup>24</sup> Bronstein 2016; Reeve 2017.

<sup>25</sup> Since Aristotle takes these two aspects of *epistēmē* to amount, in the fully actual case, to one and the same cognition, it is unclear whether we should say that they are different senses, as, for example, Allen does (2015, 49-50).

<sup>26</sup> As long as you also have an appropriate alternate translation for *nous*.

Generally, then, we can say that *epistēmē* consists in cognizing things that cannot be otherwise (*NE* VI 3 and *APo* I 8) through their commensurately universal causes or explanations (*APo* I 2, 4-5). This cognition comes about through having properly ordered demonstrations from better known first principles that hold universally (*APo* I 2-6).<sup>27</sup> Since demonstrations cannot be circular and need starting points, we will have to grasp the first principles of our demonstrations in some other way, a way that renders them better known than their conclusions. This, for Aristotle, is where *nous* comes in, as we will see below. Before we turn to the epistemic state which enables *epistēmē*, we should briefly consider the species of scientific knowledge which Aristotle recognizes.

There are three sorts of theoretical *epistēmē* that Aristotle takes to meet his stringent conditions. The clearest examples of the explanatory structures Aristotle seeks are found in mathematical sciences such as arithmetic and geometry. Ancient Greek mathematics, features the sort of demonstrative structure proceeding from definitions and first principles that the *Posterior Analytics* calls for, with Euclid's *Elements* being the classic example.<sup>28</sup> For Aristotle, mathematicians study continuous quantities that really are in material beings, but they consider these quantities on their own, in isolation from the ways that the material things they belong to are subject to change (*Metaphysics* E 1 and M 3).

Aristotle also insists that there can be *epistēmē* about the natural world. For Aristotle, physics or natural science is about substances that have an internal principle of changing and resting (*Phys.* I 1-2; II 1-3; III 1-3). Such beings are inseparable from matter and, because of their nature, subject to change (*Met* E 1-2). This science concerns the internal principles of nature which are invariable, even if the changes individual living things undergo are not entirely consistent and hold "for the most part" as opposed to "always." Natural sciences are then subdivided into branches which examine the various kinds of change (substantial change, change of qualities, growth and decay, change of place etc.) and their principles and causes.

Aristotle's final and most authoritative *epistēmē* is first philosophy, which considers being as such or inseparable and immovable being (*Metaphysics* A 2, Γ 1-2, E 1-2, Z1-2, Λ 1 and 6-10).<sup>29</sup> This is the most demanding science but also the science on which all the others depend.

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<sup>27</sup> When Aristotle is laying out the different excellent states of reason, he characterizes *nous* as grasping the first principles and *epistēmē* as understanding the claims that follow from them and the universal explanatory connections that obtain between them (e.g. *NE* VI 3 and 6; *APo* II 19). But sometimes Aristotle uses *epistēmē* to refer to the combination of both: having a grasp of principles and understanding what follows from them. It is the most convenient name for the state someone is in after successfully mastering a science. For this article, however, I will consistently use *epistēmē* in contrast to and restricted to the demonstrations that reveal the science.

<sup>28</sup> Though written after Aristotle, it largely systematizes a preexisting body of proofs, many of which go back to work done at Plato's academy around the time of Aristotle.

<sup>29</sup> See Menn ms. for overview of *Met*.

The other sciences depend on it in two ways. To begin with, it is the job of first philosophy to articulate and defend general principles about being which all other sciences use but cannot themselves defend, such as the principle of non-contradiction or the axiom that equals added to equals are equal (*Metaphysics* Γ 3-8). Secondly, first philosophy uncovers the most fundamental beings, substances, on which all other kinds of being depend (*Met Z* 1-2). Among substances, first philosophy shows that there are eternal and unchanging substances whose being causes the being of all other entities (*Metaphysics* A 2, Θ 6-10, Λ 1 and 6-10). This gives first philosophy its alternate name: theology (*Metaphysics* A 2; E 2). It is the hardest science but the most divine. We will return to these topics when we consider wisdom (*sophia*).<sup>30</sup>

#### d. Understanding (*nous*)

As we have seen, *epistēmē* does not stand on its own, but can only be the state that it is if we properly grasp the first principles that we use in demonstrations. *Nous* as a *hexis* is this grasp of essences. This state serves as the foundation, not just of *epistēmē*, but of all our rational states. It is, therefore, the first excellence of reason discussed by Aristotle in his *On the Soul* (*DA*). *Nous* in this sense is an excellent state of theoretical reason that consists in comprehending what something is by taking on its form in our mind.<sup>31</sup> In the *APo* and *NE VI*, Aristotle takes this understanding to be the principle of *epistēmē*, scientific knowledge of the causes of things. Aristotle characterizes *nous* as grasping forms but also describes it, in *DA III* 4-6 and *Metaphysics* Θ 10, as being about *pragmata*, things. This is because in grasping the form (e.g. “triangle,” “horse,” “water”) we thereby grasp the thing of which it is the form. Aristotle contrasts this simple grasp of the form with the operations of *dianoia* (discursive thought), which involve combining or separating various things we have understood.<sup>32</sup> Having *nous* of something is closely related to knowing its definition, insofar as understanding forms is the activity by which we come to understand something’s definition.<sup>33</sup> *Nous* can only grasp forms that are unified in the right way: Aristotle rules out *nous* of complex entities such as “goat-stag” or “tan Socrates” because their

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<sup>30</sup> Aristotle also sometimes uses *epistēmē* in a broader sense that includes practical and productive knowledge. We will consider how similar *technē* and *phronēsis* are to *epistēmē* after looking at Aristotle’s characterizations of them.

<sup>31</sup> *DA III* 4 Cf. *Metaphysics* Θ 10, 1051a34-1052a5. Aristotle typically uses the corresponding verb, *noein*, and participle, *noesis*, for the active employment of the excellent state that is *nous*.

<sup>32</sup> Cf. Kosman 2014, 16; cf. Perelmuter 2010, 250.

<sup>33</sup> Thus in some contexts (e.g. *NE VI* 3; *VI* 6) Aristotle treats *nous* as knowing the definition either because he takes this to be implied by grasping the things themselves or because he is not being attentive to the difference between the *pragmata* and the definition. There are, however, contexts in which Aristotle arguably does recognize this difference, especially if we take the indemonstrable *epistēmē* of *APo I* 3 (72b20-24) to be different than *nous*. Bronstein, however, offers a reading on which *nous*= indemonstrable *epistēmē*=knowledge of the essential definition of a subject kind. (2016, 51-7)

being is not sufficiently one.<sup>34</sup> Aristotle, however, shows some flexibility about which sorts of things can be treated as primary and indivisible forms in a given context. Aristotle gives the example of grasping a given length. While the length is a continuous magnitude that can in fact be divided, as long as we are employing it in our understanding we can treat it as a single object with a given form (*DA* III 6).

What should we call such a grasp? There are some advantages to using “comprehension.”<sup>35</sup> In English, this is an achievement that is closely connected to grasping what something is and it can appropriately describe connecting up with simple forms. However, it is often used for low level accomplishments (“basic comprehension” vs. “mastery”) and is very rarely used in English for a power. While “comprehension” is acceptable, in my view the best available option is “understanding.” This is an achievement that is closely connected to grasping what something is and is also one of the strongest available words for a cognitive achievement in English. Using “understanding” and correlates allows us to parallel the noun/verb/object correlates of *nous* and, like *nous*, the noun can be used for a power or a state,

*Nous* is a significant achievement: it involves truly grasping what something is on the basis of induction from unified experiences.<sup>36</sup> Being able to reason and draw inferences or competently apply a concept or representation is not sufficient. In *Phys.* II 1 Aristotle says that the congenitally blind can reason (*sullogisaito*) about colours (193a4-9) but cannot be said at all to actively understand (*noein*) them. This is because their lack of sight prevents them from receiving the form of colors (cf. *DA* II 5) and developing memories that cohere into a unified experience. They do not have what is necessary for reflecting on and comprehending what color itself is. Aristotle would deny that Mary, Frank Jackson’s hypothetical color scientist who has only ever experienced black and white (1982), could understand color. Because her cognitive powers have not taken on the full range of forms of color, she cannot truly understand color, no matter how accurate her

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<sup>34</sup> *DA* III 6; cf. Berti 1978

<sup>35</sup> “Insight” is a basic and foundational achievement that can be applied to both theoretical and practical excellences. However, it is not as clearly connected to what something is as understanding or comprehension (you can understand or comprehend triangle or horse, but you have insight *about* them). This suggests a more indirect process that does not fit as well with the direct model of form reception Aristotle gives in *DA* III 4. “Intellect” and “intellection” are too Latinate and removed from English usage while “thought” and “thinking” are too generic and do not capture *nous* as an excellence or achievement, as “thinking” is not a success verb (cf. Burnyeat 2008, 18-19). “Reason” only works for the noun: “reasoning” is not a good rendering of *noein* as it lacks a non-discursive and too close to calculating or other words associated with the practical domain, making it hard to distinguish *noein* from *dianoesthai* and *logizesthai* (see Cohoe 2019 for further discussion)

<sup>36</sup> This also restricts understanding to real objects. For Aristotle, understanding involves receiving the form of the relevant object and thus is restricted to things that feature in the ontological makeup of the world (so phoenix or goat-stag are not objects of understanding, even if we can have concepts of them).

reasoning about it. She is not in sufficient contact with reality (cf. *Met.* Θ 10) to possess *nous* about color, as she lacks its formal cause.

How complete and perfect, then, does our understanding need to be to count as having *nous*? On David Bronstein's view, we acquire *nous* "of [first principles of science] by explaining from them the kind's demonstrable attributes (in itself accidents). By seeing how the essence of S explains S's demonstrable attributes, the inquirer arrives at *nous* of S's essence." (2016, 248) On Bronstein's view, we only properly comprehend triangle once we see how all the attributes of triangles follow from the essence of triangle. We need to successfully complete a comprehensive scientific inquiry into our object. This is too strong a requirement as Aristotle's own example in *DA* III 6—thinking that the diagonal of a square is incommensurable—suggests.<sup>37</sup> The demonstration of the incommensurability of the diagonal which Aristotle alludes to in *Prior Analytics* I 23 is not particularly complex.<sup>38</sup> It does not require a completed and perfected understanding of either what a square is or what it is to be incommensurable, just certain basic principles of mathematics (for instance, that a number cannot be both odd and even, and certain mathematical propositions concerning the relationship between a line and a square constructed on that line).

We can take onboard much of what Bronstein wants to say, however, by employing Aristotle's distinction between capacity and activity, drawing on Aryeh Kosman's characterization of *nous* as "the ability, dispositional and actualized, to see the true causal nature in the clearly understood particular." (2014, 24) On this interpretation, your initial comprehension of the essence gives you the ability to discern its attributes, but you have *nous* before that ability has been fully activated. You can understand what a triangle is without perfectly comprehending all of its attributes. This is the sort of understanding that is the principal focus of *De Anima* III 4-8, where Aristotle is describing the activity of grasping indivisibles and discussing *nous* as a special kind of reception of form. *Nous* requires more than correct linguistic usage or basic concept acquisition (contra Modrak 1987, 171-2; Wedin 1988, 81; Charles 2000, 139). Understanding has to be right as far as it extends—after all, it is what enables you to recognize an essence's attributes—but it need not be entirely comprehensive. In the passages Bronstein focuses on (*NE* VI 6-7 and *A Po* II 19), by contrast, Aristotle is speaking of *nous* as a grasp on first principles *as first principles*, as the foundation for the comprehensive understanding of reality that constitutes *epistēmē*. This sort of understanding is a superlative cognitive achievement and does involve seeing what follows

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<sup>37</sup> *DA* III 6, 430a30-3.

<sup>38</sup> *Prior Analytics* I 23, 41a21-37. Heath takes this proof to require the Pythagorean theorem, Proposition 47 of book I of Euclid's *Elements*, but it can also be proved using the diagram laid out in the *Meno*. It's the sort of geometry even uneducated servants can do.



from the principles in a comprehensive way. This allows us to accommodate Bronstein's insistence that using the principles help us understand them.<sup>39</sup> We only *fully* grasp the form as a starting point when we see how it explains everything which follows from it. In this way, we can unify the relevant passages while acknowledging their differing emphases.<sup>40</sup>

Together, *nous* and *epistēmē* allow us to grasp reality as it is. The second part of this article goes on to consider Aristotle's practical excellences of reason: *technē*, craft, and *phronēsis*, practical wisdom, and his views on *sophia*, wisdom, and divine cognitive states.

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<sup>39</sup> Cf. Kosman 2014, 23. Myles Burnyeat (2008, 19, 40-43) and Michael Frede (1995 and 1996) go even further by holding that *nous* requires a full comprehension of the interrelationships between all essences.

<sup>40</sup> For consideration of practical *nous* as a state, see the last footnote of the section on *phronēsis*.