On Perception's Role in Aristotle's Epistemology

On Perception's Role in Aristotle's Epistemology

A dissertation presented
by
Marc Gasser
to
The Department of Philosophy

in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy
in the subject of
Philosophy

Harvard University
Cambridge, Massachusetts
April 2015

Dissertation Advisor: Professor Russell Jones Marc Gasser

On Perception's Role in Aristotle's Epistemology

Abstract

Aristotle thinks all our knowledge comes from perception. Yet he doesn't say much about the sense in which our knowledge might be *based on* or *derived from* the things we perceive. So what exactly does perception contribute to the more advanced cognitive states that make up our intellectual lives, and how should we understand the nature of its contribution?

I argue that perception contributes to these more advanced states by putting us in touch with particular things in a way that's responsive to the universals governing their behavior: perceptible particulars possess certain features because they instantiate certain universals, and perception allows us to discriminate these features and experience them as action-guiding aspects of our environment. So for instance, a patient might exhibit feverish features because she instantiates malarial disease, and a doctor might perceive these feverish features and experience them as soliciting some course of action—as soliciting *that the patient be leeched*, say.

I explain how perception, so understood, can serve as a basis for the development of a perceptually driven form of practical knowledge (*ἐμπειρία*); roughly, the form of knowledge possessed by a doctor who knows how to cure a range of patients but could not explain why or how her treatments work. I then explain how such practical knowledge can itself serve as a basis for the theoretically sophisticated grasp of universals Aristotle takes as his cognitive ideal.

Contents

Preface

Overview

Aristotle often seems to downplay perception's role in our cognitive life. He characterizes our capacity to perceive as a capacity we share with all animals, and which yields a form of knowledge far removed from the sort of scientific understanding he takes as his cognitive ideal—as he puts it in the *Metaphysics*, "to perceive is common to all, and therefore easy, and no mark of wisdom" (982a11-12). Such dismissive remarks make good sense if we consider Aristotle views on scientific understanding: scientific understanding is supposed to allow us to demonstrate why certain things must be as they are, and perception, as Aristotle emphasizes, never tells us *why* things are a certain way, and never presents anything to us as a *necessary* fact. Given these limitations, it's natural to think that Aristotle must have attributed any significant epistemic achievement to some other, non-perceptual cognitive capacity—perhaps a form of rational intuition, or at least some capacity related to a distinctively human form of rational thought.

Yet Aristotle also seems to assign perception a critical role in our learning. He often claims that all our knowledge ultimately comes from perception—a claim which (I'll be arguing) plays a key role in distinguishing his epistemology from

recollection theories he sought to dismiss. He also claims that the premises of scientific demonstrations whose conclusions conflict with perceptual evidence should be given up. So perception serves both as a basis for the development of more advanced forms of knowledge, and an authority against which such knowledge should be assessed.

It also plays a key role in Aristotle's own scientific practice. Consider for instance Aristotle's description of bears:[1]

> The bear is omnivorous. It eats fruit, and climbs up trees thanks to its nimble body. It also eats vegetables, and it will break up a bee hive to get at the honey. It eats crabs and ants, too, and is carnivorous. The bear is so powerful it will attack not only deer but also wild boars, if it can take them unawares, and even bulls. After coming to close quarters with a bull the bear lies on its back, facing the animal, and, when the bull tries to charge, it grabs the bull's horns with its front paws, fastens its teeth into its shoulder, and drags it down to the ground. For a short time it can walk erect on its hind legs. All the flesh it eats it first allows to rot. (*HA* 594b6-16)

It seems implausible that someone dedicated to such careful, detailed observations of animal life would seek to downplay perception's contribution to our learning.

My aim in this dissertation is to provide an interpretation of perception's role in Aristotle's epistemology. I hope to show that there's a good way to reconcile the strong distinction Aristotle draws between perception and scientific understanding with the thought that perception provides the basis for all our more

[1] Translation adapted from Thompson's.

advanced cognitive states. In broad outline, I argue that perception contributes to these more advanced states by putting us in touch with particular things in a way that's responsive to the universals governing their behavior: perceptible particulars possess certain features because they instantiate certain universals, and perception allows us to discriminate these features and experience them as action-guiding aspects of our environment. I then explain how perception, so understood, can serve as a basis for the development of a perceptually-driven form of practical knowledge (*ἐμπειρία*), and how such practical knowledge can itself serve as a basis for the theoretically sophisticated grasp of universals Aristotle takes as his cognitive ideal.

I begin, in chapter one, with an account of the sort of scientific understanding that constitutes this cognitive ideal. Scientific understanding, for Aristotle, is the cognitive state possessed by someone with an expert theoretical grasp on some body of knowledge. To understand some domain scientifically (on the reading I defend) is to know how to demonstrate the truths belonging to that domain from their most basic explanatory grounds, where these grounds are expressed in the *first principles* proper to the domain in question, and the demonstrations that proceed from them presented in a regimented syllogistic system. I argue that, in an Aristotelian context, questions about the "epistemic import" or "epistemic role" of various cognitive states should be understood as questions about the relation these states bear to such scientific understanding, and not as questions about the justification or warrant for any of our beliefs. I then show how confusion about the role and nature of scientific understanding has led to some common misinterpretations of Aristotelian epistemology, many of which hold *ἐπιστήμη* as the sole locus of epistemic justification.

In chapter two I examine Aristotle's account of perception as a *starting-point* for all our learning. Aristotle explains in *APo* A18 that we can only learn things by demonstration, induction, and perception. It's clear from elsewhere that, of these three, perception is the only source of knowledge which isn't itself based on some knowledge we already possess. I argue that perception is a "source" of knowledge, at a minimum, in the sense that it supplies the *content* from which more advanced forms of knowledge are derived. This is a common interpretation, but it's often assumed much too quickly. For many of the texts invoked in its defense are compatible with a highly deflationary take on perception's role: perception can *occasion* the development of more advanced cognitive states (and even be a *sine qua non* for this development) without there being any interesting connection between the contents we perceive and those we grasp in the states perception brings about. In fact, Aristotle was familiar with a Platonic view of this very sort. The fact that he dismisses it is good evidence that he endorsed a more robust conception of our perceptual beginnings.

How, then, do we develop a state of understanding from these perceptual beginnings? Aristotle tells us that we develop our understanding by *induction*, a form of cognitive development he describes in some detail at *APo* B19 and *Met* A1. Yet Aristotle's account is notoriously difficult to understand, and on the whole commentators have found implausible the claim that induction alone would allow us to achieve the sort of theoretical expertise scientific understanding requires. In chapter three I argue that this is a mistake: there's good sense to be made of Aristotle's account of our inductive progress, and good sense to be made of the claim that induction would yield the kind of understanding Aristotle takes as his cognitive ideal. As part of this argument I clarify the relation perception bears to

the more advanced cognitive states involved in our inductive learning process, in particular the relationship between perception, memory and *ἐμπειρία*, and the relationship between *ἐμπειρία* and scientific understanding. One upshot is that practical knowledge plays a critical role in the development of our theoretical understanding. Perception is the capacity that makes the development of this practical knowledge possible.

In chapter four I focus more closely on perception's role in this inductive learning process, and in particular on Aristotle's claim that perception is *of universals* despite having particular objects—a claim which (I argue) is meant to explain perception's contribution to our cognitive development. Perception's particularity is usually understood as a formal restriction on the *scope* of perceptual knowledge: perception is a cognitive state we bear towards *tokens*, while *types* are only grasped by more advanced states. On this sort of view, perception is "of universals" in a very thin sense, insofar as the tokens we perceive *instantiate* various types (types we don't *really* grasp perceptually).

I defend a different account of perception's particular and universal aspects. As I read Aristotle, the sense in which we perceive *particulars* has to do with the *manner* in which perception puts us in touch with its objects—perception always depends on the presence of its objects, and never tells us about any *causal* relation between them. In perceiving particulars we also perceive *universals*: the things we perceive possess certain features *because* they instantiate certain universals, and perception allows us to discriminate these features and experience them as action-guiding aspects of our environment. I argue that such an account makes good sense of the role Aristotle ascribes to perception in his epistemological and psychological works, and explains how perception's universal character contributes to our

cognitive development.

I end, in chapter five, by considering the significance such an interpretation has for our understanding of perception's role in the ethical domain. I focus in particular on the relation between perception and practical wisdom (*φρόνησις*); a relation often invoked by commentators who find in Aristotle a rejection of the view that general moral rules could play any significant role in governing ethical behavior. For such commentators, Aristotle thinks what we should do is always, ultimately, a matter of what we should do *in the particular situation we're in*. Thus ethics, unlike other disciplines, is not a subject that admits of scientific understanding: universals are the proper objects of scientific understanding, while virtuous behavior is irreducibly particular.

I don't think Aristotle's remarks about perception in the *Ethics* support such a particularist view. In this chapter I argue that Aristotle assigns no *special* role to ethical perception: the importance perception has in guiding our behavior and coping with the many particular situations we face is no different in the ethical domain than it is in domains like carpentry or medicine. In all these cases Aristotle emphasizes that perception is an indispensable source of practical knowledge, and that it provides a grasp of particulars that's hard to achieve by theoretical means. And in all these cases it might be right to characterize the skilled practitioner as someone who simply *sees* what's to be done in the particular situations she faces. But in none should we infer that universal rules governing the practice are not to be found, or that the things we perceive are not coherent or determinate enough to be treated in the context of a theoretical science. Indeed, there is good evidence that Aristotle *did* think that ethics, though less exact than geometry or empirical disciplines, would admit of a certain sort of scientific

treatment.

Acknowledgments

Aristotle tells us that we should try and repay those who have studied philosophy with us, though no amount of money or honor could ever be payment enough (*EN* 1164b). It's in this Sisyphean spirit that I'd like to thank the many people who have helped me throughout my dissertation, and on the academic path that preceded it. Rusty Jones, Alison Simmons, Gisela Striker, and Mary Louise Gill were excellent advisors, and provided many helpful corrections and comments on my writing (any remaining mistakes are my own). Thanks especially to Rusty, whose advising went well beyond philosophical matters, and to Gisela, whose suggestions shaped my thinking in countless ways. Thanks also to David Bronstein and David Charles, for their numerous and substantive comments on my work, and to Ben Morison and Hendrik Lorenz, for many helpful discussions during a semester spent at Princeton.

While at Harvard I was surrounded by generous and thoughtful colleagues. I want to thank Doug Kremm and Kate Vredenburgh in particular, for the many hours spent studying together, and for listening to me talk too much about Aristotelian epistemology. Thanks also to the members of the M&E Workshop, who had to suffer through very rough versions of various dissertation chapters, and whose helpful comments greatly contributed to their development. Most of all, thanks to Patricia Marechal, for so many insightful discussions, and for the truest form of friendship.

Ancient philosophy would be far less rewarding were it not done alongside the classicists and philosophers I met at the Harvard-Princeton-Toronto-Yale reading

group. Thanks especially to Sukaina Hirji, for being such an excellent friend and interlocutor, and for making the discipline a better one by being part of it.

I was lucky enough to have had many great teachers before ever considering graduate work in philosophy. I am particularly grateful to my high school teachers Pierre-André Jacquet and François Rochat, who got me interested early on, and to Dan Brudney, Kevin Davey, and Martha Nussbaum, who found their own ways to kindle that interest during my undergraduate years at the University of Chicago.

Finally, thanks to my parents, who taught me the value of academic work, and always encouraged me in my studies. And—last but above all—thanks to my partner Amanda, for her support, for her perspective, and for making it all worthwhile.

If you retrieved this dissertation from Harvard's archives, please excuse the horrendous formatting—*curatio fecit, ut id facerem*.

1
Aristotelian Epistemology

In what follows I'll be providing some background on Aristotle's epistemology. I'll begin with an account of *ἐπιστήμη*—a key cognitive state for Aristotle, and the sort of intellectual accomplishment against which (I'll argue) perception's epistemic import should be measured. I'll then try to spell out more carefully how we should understand questions about "epistemic import" in an Aristotelian context, and argue that many commentators have mistakenly read modern epistemological concerns into Aristotle's text.

My aim here isn't just to set the record straight: discussing these mistakes will bring out some of the key assumptions governing Aristotle's discussion of our cognitive lives, assumptions which must be kept in mind by anyone seeking to properly assess perception's role in Aristotelian epistemology.

1.1 *Aristotle on understanding*

A large portion of Aristotle's epistemological writings concerns a certain kind of ideal cognitive state—very roughly, the state possessed by someone with an expert theoretical grasp on some systematized body of knowledge. An expert astronomer, for instance, is someone who knows all astronomical facts, and

understands why these facts must obtain and what astronomical facts they might serve to explain. An expert astronomer also knows how to *prove* all this within a regimented deductive system, by providing explanatory demonstrations for all truths that admit of explanation, and recognizing those that don't as explanatory primitives. It's unclear whether Aristotle thought anyone had fully achieved this kind of mastery—not for nothing am I calling it an ideal.

The sort of cognitive state I just sketched is what Aristotle calls *ἐπιστήμη*, variously rendered "scientific knowledge," "science," or "understanding." The range of translations should already suggest that commentators have faced some difficulties in spelling out exactly what this state is supposed to be, and how Aristotle conceives of its relation to other, less sophisticated cognitive attitudes. A full exposition of these disagreements would take us too far afield, so the following exposition will have to be somewhat dogmatic.

When Aristotle uses *ἐπιστήμη* in a technical context, he typically has in mind the sort of state described in *APo* A2:

> [1] We think we understand something *simpliciter*, and not in the sophistical, incidental manner, when we think we know of the explanation why something is the case, that it is its explanation, and also [know] that it's impossible for it to be otherwise.
>
> *Ἐπίστασθαι δὲ οἰόμεθ' ἕκαστον ἁπλῶς, ἀλλὰ μὴ τὸν σοφιστικὸν τρόπον τὸν κατὰ συμβεβηκός, ὅταν τήν τ' αἰτίαν οἰώμεθα γινώσκειν δι' ἣν τὸ πρᾶγμά ἐστιν, ὅτι ἐκείνου αἰτία ἐστί, καὶ μὴ ἐνδέχεσθαι τοῦτ' ἄλλως ἔχειν*.[2] (71b9-12)

A few things are clear from this passage. First, *ἐπιστήμη* is a state which is

[2]Following Barnes (1993: 90) in taking the final clause as dependent on *γινώσκειν* (on the alternative reading, we might understand something necessary without recognizing it as such). The rest of my comments in this section should make clear why this reading gives the better sense, but (as Barnes notes) there's already some evidence in its favor at 71b15, where Aristotle *infers* from his definition that if we understand something, it can't be otherwise. Aristotle's inference would be redundant if it was already part of the definition that the objects of understanding are necessary facts. On the reading suggested here the inference rests on the fact that "know" is veridical.

closely connected with a grasp of *explanations* (*αἰτίαι*): we have *ἐπιστήμη* when we know the explanation *why* something holds. Second, *ἐπιστήμη* is a state we bear towards facts we grasp as *necessary*: we have *ἐπιστήμη* when we know of something that it *must* hold. Finally, Aristotle's definition presupposes a kind of knowledge different from *ἐπιστήμη*: to *ἐπίστασθαι X* is to *γιγνώσκειν* or *γνωρίζειν* why *X* must be the case.[3] This other kind of knowledge is supposed to be knowledge in a *generic* sense—Aristotle is invoking an ordinary cognitive state to define an extraordinary form of theoretical expertise.

Already we have good reasons to render *ἐπιστήμη* "understanding," as I've done in the translation above. For knowledge (whether scientific or not) is a state commonly associated with *justification* or *evidence* rather than *explanation*. And we can certainly *know* things without having any idea how to *explain* them—in fact on Aristotle's view understanding is a state we develop only once we already know all the facts pertinent to some scientific domain.[4] So in what follows I'll be using "understanding" or "scientific understanding" for *ἐπιστήμη simpliciter*, in the sense at play in the passage above, and I'll reserve "knowledge" for knowledge in a generic sense, on which we can *know* things without grasping their explanation or recognizing their necessity.[5] On the translation I'm adopting understanding is a kind of knowledge, but not all knowledge qualifies as

[3] For formulations of the definition with *γνωρίζειν*, see the parallel passages at *Phys* A1 184a12 or *Met* A3 983a26.

[4] See for instance *APo* B2 on knowing the fact that something holds (*τὸ ὅτι*) before seeking the reason why it does (*τὸ διότι*).

[5] Aristotle sometimes uses *εἰδέναι* as a synonym for either *γιγνώσκειν*, or (more specifically) *ἐπίστασθαι*. I'll be using "know" for *εἰδέναι*—in context it's usually clear whether or not the relevant sort of knowledge is understanding. I'll also be using "grasp" or "know" for *ἔχειν*, when used to denote a cognitive attitude (on this usage to grasp something is to know it, not to *come to know it*). For a more detailed defense of this translation of knowledge terms, see Burnyeat (1981) or Barnes (1993: 89–93).

understanding.[6]

In passage [1] Aristotle focuses on (what we might call) *propositional* understanding, that is, understanding as a state an individual might bear towards the particular *truths* belonging to some scientific domain. Thinking of understanding this way makes possible the sort of demonstrative account Aristotle offers in the rest of *APo* A2:

> [2] We'll say later whether there is another kind of understanding; we do claim here that there is knowing through demonstration. By "demonstration" I mean a scientific deduction, and by "scientific" [deduction] I mean [the sort of deduction] by possessing which we understand [something]. So if to understand is what we've posited it to be [in 71b9-12], demonstrative understanding must be from [premises] that are true, primitive, and immediate, and better known than, prior to, and explanatory of their conclusion; for it's in this way that the principles will be appropriate to what's being proved. There can be a *deduction* even when these conditions aren't met, but no *demonstration*, for it won't produce understanding.
>
> Εἰ μὲν οὖν καὶ ἕτερος ἔστι τοῦ ἐπίστασθαι τρόπος, ὕστερον ἐροῦμεν, φαμὲν δὲ καὶ δι' ἀποδείξεως εἰδέναι. ἀπόδειξιν δὲ λέγω συλλογισμὸν ἐπιστημονικόν· ἐπιστημονικὸν δὲ λέγω καθ' ὃν τῷ ἔχειν αὐτὸν ἐπιστάμεθα. εἰ τοίνυν ἐστὶ τὸ ἐπίστασθαι οἷον ἔθεμεν, ἀνάγκη καὶ τὴν ἀποδεικτικὴν ἐπιστήμην ἐξ ἀληθῶν τ' εἶναι καὶ πρώτων καὶ ἀμέσων καὶ γνωριμωτέρων καὶ προτέρων καὶ αἰτίων τοῦ συμπεράσματος· οὕτω γὰρ ἔσονται καὶ αἱ ἀρχαὶ οἰκεῖαι τοῦ δεικνυμένου. συλλογισμὸς μὲν γὰρ ἔσται καὶ ἄνευ τούτων, ἀπόδειξις δ' οὐκ ἔσται· οὐ γὰρ ποιήσει ἐπιστήμην. (71b16-25)

On Aristotle's view, then, a demonstration is a deduction that provides the person who grasps it with *understanding* of its conclusion: we understand the things we can demonstrate. To count as a demonstration, a deduction must begin

[6] There are some issues with this translation, too. First off, *ἐπιστήμη* can denote a systematized domain of *truths*, rather than the state of the person who understands this domain (just as we use "knowledge" to denote both the state of a person and the content she grasps when in that state—in this regard the translation I am rejecting does fare better). Second, Aristotle doesn't think *incidental*, *non-simpliciter* understanding (or *ἐπιστήμη ὅτι*, understanding *that*) requires any knowledge of explanations (cf. *APo* A13). But presumably, in English, we must grasp some sort of explanation to understand *that* something is the case. Still, with these caveats in mind, "understanding" seems to me the best we can do. (In some cases, I will use "science" to denote the body of explanatorily-connected truths grasped by someone with understanding.)

from premises which are true, primitive, and immediate, where the last two conditions mark a form of absolute *explanatory* priority within some scientific domain.[7] Aristotle adds that demonstrative premises must be better known than, prior to, and explanatory of their conclusions, where all these relations are again supposed to track an objective explanatory order.[8] Though he doesn't make the point clearly here, Aristotle conceives of demonstrations as chains of explanatory syllogisms, and strictly speaking these last three requirements should be read as requirements on the *syllogisms* that appear in the context of a demonstration, rather than requirements on demonstration itself. The upshot is that the premise pairs in each of the syllogisms appearing in a demonstration will have to *explain* the syllogism's conclusion—that is, the middle term *B* in the premise pair *AaB*, *BaC* will have to explain why *AaC*, the middle term *C* in the premise pair *AaC*, *CaD* will have to explain why *AaD*, and so on for all syllogisms in a deduction linking an indemonstrable premise *AaB* to some demonstrated conclusion *AaX* (for some term *X*).[9] The explanatorily basic, indemonstrable premises from which our demonstrations begin are *first principles* (ἀρχαὶ); statements expressing the

[7] To require that the first premises be *primitives* (πρῶτα) is to require that our understanding of these premises not depend on our understanding of further, explanatorily prior premises. To require that the first premises be *immediate*, or *unmiddled things* (ἄμεσα) is to require that they not have an explanatory "middle term," that is, given some premise *AaC*, that there be no term *B* such that *AaB* and *BaC* where *B* explains why *AaC*. Both requirements can be seen as consequences of the fact that demonstrations must begin from premises which don't themselves admit of demonstration—and in fact Aristotle often uses "primitive," "immediate" and "indemonstrable" (ἀναπόδεικτον) interchangeably (cf. for instance 71b27, 72a7, 72b20, 75b39, and throughout the *Analytics*). From here on I'll generally be following Aristotle in ignoring these subtle distinctions and speaking only of *explanatory* priority. (I'll also be giving a more thorough defense of this sort of assimilation in what follows.)

[8] I'll have more to say about the "better known than" (γνωριμώτερον) and "prior to" (πρότερον) relations below. The latter is just the comparative analogue to the "primitive" absolute mentioned above.

[9] Explanation here is an asymmetric and transitive relation (cf. also *APo* A3), and demonstrations proceed by syllogisms in *Barbara* (at least in the ideal, paradigmatic case). For the sense in which a *term* might explain a demonstrative conclusion, see below, fn43.

essence of the natural kinds definitive of some scientific domain. So for instance, "human beings are rational animals" might count as a zoological first principle, and "triangles are three-sided rectilinear figures" as a geometrical one, if indeed these aren't explained by any further zoological or geometrical truths.[10]

This axiomatic treatment of scientific understanding gives us a clear picture of what it takes to understand the propositions that make up some scientific domain: begin with the truths in this domain that can't be explained, and derive those that can through a series explanatory syllogisms meeting the conditions outlined above. But this shouldn't obscure the fact that an understanding of some *domain* of truths is required for any *propositional* understanding of truths in that domain. For while we can understand specific propositions by demonstrating them, our ability to do so depends on a prior understanding of the domain of which these propositions are part.

To see why, consider what it would take for us to understand the conclusion of some demonstration—for instance, the fact that planets don't twinkle. As Aristotle tells us in [1], this will require knowledge of the reason *why* planets don't twinkle, and knowledge that it's *necessary* that planets not twinkle, and, as Aristotle tells us in [2], we know both of these things when we grasp a demonstration meeting certain formal requirements. Here is the relevant demonstration

[10] In fact Aristotle thinks there are three kinds of first principles: *axioms* (ἀξιώματα), *definitions* (ὁρισμοί), and *suppositions* (ὑποθέσεις), where the latter two are types of *posits* (θέσεις). Definitions are the sorts of indemonstrable statements described in the main text, and axioms are (roughly) the sorts of things anyone must assume to demonstrate anything whatsoever, like basic logical laws. Aristotle's discussion of suppositions is hard to follow—he seems to think of suppositions as existential statements corresponding to some definition (e.g. the statement *that* human beings are rational animals, where this is contrasted with a definition expressing what it is to be a human being), but it's clear from elsewhere that definitions have existential import (*APo* B7 92b17-19) and are expressed in subject-predicate form (*APo* B3 90b3-4). In what follows I'll often be speaking as though all first principles are definitions. As Barnes notes (1993: 107), Aristotle himself typically speaks this way.

in this case:[11]

[AaB] Non-twinkling belongs to everything near the earth

[BaC] Near the earth belongs to every planet

[AaC] So non-twinkling belongs to every planet

It's clear enough how this syllogism would yield knowledge of the reason why planets don't twinkle: the explanatory middle term here is "near the earth," and so anyone who recognizes it as a middle term will recognize that planets don't twinkle *because* they're near the earth. It's perhaps a little less clear how this syllogism would establish that it *must* be the case that planets not twinkle—but the general thought is that attributes featured in demonstrated propositions will involve some reference to the *essence* of their subject, and that they've been shown to be attributes the subject *must* have if it really is to be the kind of subject it is. So in the example above, the thought would be that if a celestial body *really is* a planet, then it must be near the earth, and so must not twinkle (since no celestial body near the earth twinkles, which I'm treating here as a demonstrated truth).[12]

Note, however, that the syllogism above only supplies us with *understanding* of the fact that planets don't twinkle on the condition that we grasp it *as part*

[11] To simplify things I'm assuming here that the minor premise is an astronomical first principle, and the major premise something that has already been demonstrated—so that the following explanatory syllogism does indeed complete a demonstration meeting the requirements presented in [2].

[12] Aristotle would say that non-twinkling belongs to every planet *in itself* (καθ' αὑτό; cf. *APo* A4), because it follows from essential planetary attributes. It should be clear that Aristotle's "in itself" predication isn't our modern notion of necessity—there are many things we would count as necessary today which don't follow from any claims about the essence of their subject (e.g. Socrates is necessarily the only member of {Socrates}). So we shouldn't be thinking of demonstrated propositions as having an implicit □ operator. (Note also that even though Aristotle thinks everything we can understand is necessary (in the sense I've just sketched), the conclusions of demonstrations are *not* of the form "A belongs to every B *in itself*" or "A *must* belong to every B." Demonstrative conclusions are universal affirmative statements—grasping a demonstration in the right sort of way makes clear their necessity.)

of a demonstration, that is, on the condition that we recognize the middle term as providing the explanation for the syllogism's conclusion, the minor premise as expressing an essential fact about its subject, and the major premise as something that was itself demonstrated from astronomical first principles. Naturally someone could grasp the demonstration without recognizing the theoretical role played by its premises (or by the terms within its premises), but on Aristotle's view such a person wouldn't *understand* its conclusion: she might see that the conclusion is *true*, but wouldn't know why it must be so.[13]

So a demonstration yields *understanding* of its conclusion only for someone who grasps it in a *theoretically-sensitive* manner, as a deduction meeting the requirements presented in [2]. And it's clear that this sort of grasp is possible only for someone who understands the scientific *domain* pertinent to the demonstrated conclusion. For in order to see that a deduction is in fact a demonstration, one has to recognize its initial premises as explanatorily primitive first principles, and all the middle terms appearing in the demonstration's series of syllogistic inferences as *explanations* for their conclusion. But this is possible only for someone who knows all the truths in the relevant scientific domain, and all the explanatory relations between them—that is, someone who *understands* the relevant scientific domain. In the demonstration above, for instance, we will understand why planets don't twinkle only if we recognize the minor premise as an astronomical first principle. So we have to know that *no astronomical fact* explains why planets are

[13]She would, in other words, find herself in much the same position as someone inferring that planets are near from the fact that they don't twinkle, and that things that don't twinkle are near (i.e. switching the A and B terms in the syllogism above). As Aristotle explains in *APo* A13, this person only understands her conclusion in a derivative sense (she only has ἐπιστήμη ὅτι, not ἐπιστήμη τὸ διότι), because she doesn't grasp the explanation *why* planets are near, even though her inference does allow her to grasp full well *that* they are near. See also Kosman (1973: 283–284) on this point.

near the earth. So we have to know all astronomical facts, and everything these facts explain. The demonstrative account of scientific understanding therefore *presupposes* an understanding of the scientific domain to which the demonstrated propositions belong.

Two caveats. First, the required understanding of one's domain may well (for all Aristotle says) be *de dicto* rather than *de re*. That is, an expert might know that nothing explains her primitives without knowing, of each fact in her domain of expertise, that that fact doesn't explain her primitives. But even on this *de dicto* reading, it's clear that some degree of understanding of one's domain's explanatory structure would be required. Second, Aristotle clearly allows that we could provide imperfect definitions based on an incomplete set of facts (see e.g. *DA* A1 402b22-403a2). So even if, in the ideal case, we would have *all* the domain-specific facts at our disposal, we *can* achieve some degree of astronomical understanding based on an incomplete set of astronomical facts (or with all the facts but an incomplete grasp of their explanatory relations, e.g. an understanding why *planets* move as they do without the corresponding understanding of the motions of comets and other celestial bodies). In fact it's quite plausible that any complete understanding of some domain would be developed on the basis of approximate forms of understanding of this sort. The key point remains: any degree of understanding of some specific proposition will require an understanding of that proposition's explanatory role in the domain in which it appears.

In this regard, Aristotle's approach to scientific understanding is similar to Plato's.[14] In the *Theaetetus*, for instance, it's agreed that someone who *knows*

[14] A similarity also noted by Burnyeat (1981: 135–136).

how to spell "Theaetetus" but thinks "Theodorus" must start with a τ does not in fact *understand* (*ἐπίστασθαι*) the first syllable of either name (207e5-208a5). It's further agreed that this argument can be repeated for each of the syllables in Theaetetus' name, so that even someone who knows the ordering of each of its letters (and grasps why this ordering must proceed as it does) would nonetheless fail to *understand* its spelling if she could not also spell similar names like "Theodorus." In other words, someone must understand *spelling* before she can properly be said to understand the spelling of any specific word, even if she is correct about that specific word's spelling, and grasps why it must be spelled as it is.[15] As with Aristotle, an account of what it takes to understand the spelling of specific words could surely be given—but it would assume a prior understanding of *grammar*, an art applicable to words of any sort.

Aristotle's emphasis on scientific domains rather than their propositional parts is also consistent with his treatment of understanding as a special kind of intellectual virtue. Just as moral virtues like courage or generosity, Aristotle thinks of understanding as an excellent state or disposition (a *ἕξις*) we might develop in our souls. In the moral case, the virtuous person has a disposition to choose or be motivated to act in certain ways when facing certain circumstances. In the intellectual case, the virtuous person has a disposition to explain a range of facts by demonstrating them—in the ideal case, by demonstrating them from their most basic explanatory grounds.[16] Now, it's true, of course, that a morally

[15] At *Philebus* 18c7-d2 Socrates says that the god who invented letters saw that "none of us could gain any knowledge of a single one of them, taken by itself, without understanding them all," and called "the one link that somehow unifies them all" the art of literacy (*γραμματικὴ τέχνη*).

[16] Aristotle characterizes understanding as a "disposition to demonstrate (*ἕξις ἀποδεικτική*)" at *EN* Z3 1139b31-32, and moral virtue as a "disposition to choose (*ἕξις προαιρετική*)" at *EN* B2 1106b36 (cf. also *EE* B10 1227b5-11).

virtuous person will *know* what to do in a range of situations, and why to do it; and likewise an intellectually virtuous person will *know* a range of propositions pertinent to some domain, and why these propositions must hold. But this propositional knowledge is best seen as a *manifestation* of their respective virtues; and these virtues best conceived as relations borne towards some theoretical or practical *domain*, rather than particular facts within that domain, which we might grasp in isolation from each other.[17]

Exegetical considerations aside, this seems to me the right thing to say about theoretical expertise. A geometer's expertise doesn't lie in her knowledge of geometrical axioms and theorems, or even in her knowing a list of proofs connecting the two, but rather in her knowing *how to prove things*, and perhaps also in her grasping the theoretical connections between geometrical results that aren't obviously related. Naturally an expert geometer will know all sorts of propositions, but specifying the propositions she knows is a poor way to describe her geometrical understanding.

So here are the main points so far. Aristotle's epistemology focuses a good deal on an ideal cognitive state called ἐπιστήμη, or scientific understanding. This ideal state should be distinguished from *knowledge*, at least in the modern sense of the term, since notions like *justification* or *evidence* are absent from Aristotle's discussion—in fact on Aristotle's view we only develop understanding once we

[17] To be clear, I'm not denying here that we might spell out an expert geometer's understanding as knowledge of all geometrical propositions, knowledge that geometrical propositions *p*, *q*, *r*, and so on are explanatorily basic, that proposition *p* can be used to demonstrate further geometrical propositions *a*, *b*, and so on, that *a* and *b* hold (and must hold) because of the middle terms in such demonstrations, etc. Maybe, on some conception of what it takes to know propositions, our understanding of some domain is just the knowledge of some very long list of propositions. My point here is only that this isn't a good way to make sense of Aristotle's account of scientific understanding.

already *know* all the facts relevant to some scientific domain. In *APo* A2, Aristotle tells us that we understand something when we know why it must be the case, and explains that a certain kind of explanatory demonstration can yield such understanding. But this demonstrative account of scientific understanding shouldn't mislead us into thinking that *propositions* are the sole or primary objects of understanding. For one has to recognize the theoretical role played by a demonstration's premises to deduce anything in a way that will actually yield understanding, and *this* requires a systematic grasp of an entire scientific domain. An expert's scientific understanding is thus best conceived as a systematic understanding of some *domain* of explanatorily-connected facts—an understanding that *manifests* itself whenever an expert demonstrates why some particular truth must hold through the kind of argument Aristotle presents in the opening chapters of *APo*.

Now, you might be wondering at this point whether Aristotle has anything to say about *epistemology*, if notions like justification or evidence don't play any interesting role in his discussion of scientific understanding. I'll be addressing a broader version of this worry below, before discussing some recent interpretations which do read justificatory concerns into Aristotle's text. I think these interpretations go wrong in an illuminating way, so it'll be useful to review them before addressing more interesting questions concerning perception's epistemic status.

1.2 *Aristotle & modern epistemology*

Before asking what epistemic role perception might play for Aristotle, let me take a step back and explain in a bit more detail what I mean by the terms *epistemic*

and *epistemological* in this context. For there's a range of questions many consider central to the modern-day discipline of epistemology which Aristotle simply doesn't address, and so without further explanation the very idea that Aristotle ever developed anything like an *epistemology* may seem rather misguided.

For instance, it's common nowadays to characterize (first-order) epistemology as a discipline that's fundamentally concerned with determining what one should believe, or what one is *justified* in believing. Attempts to answer this question often begin by setting down some basic epistemic good, and using this good to define an overarching epistemic goal—to take a simple example, you might think that true beliefs have epistemic value, false beliefs epistemic disvalue, and that our overarching epistemic goal is to acquire true beliefs and avoid false ones.[18] Epistemic norms like justification can then be derived on the basis of this overarching goal: you might claim that beliefs are *justified* when they're the result of some sufficiently truth-conducive belief-forming process—that is, when they're the result of some belief-forming process that tends to promote our overarching goal of acquiring true beliefs while avoiding false ones (e.g. because the process generally yields a high enough ratio of true to false beliefs).

It seems clear to me that this general framework is quite far removed from Aristotle's. I don't just mean that Aristotle would disagree with the specifics of this example, though as a matter of fact he would surely resist the thought that acquiring true beliefs while avoiding false ones is a key mark of epistemic progress.[19] The differences begin already with the thought that we should be

[18] Not *everyone* thinks this is the right approach, though it is very common. For a survey of the many views that might be framed this way see Berker (2013).

[19] Aristotle thinks the proper mark of intellectual advance is a grasp of *causes*, rather than the indiscriminate improvement of our ratio of true to false beliefs (*Met* A1 981b10ff).

seeking to promote some overarching goal defined using basic units of epistemic value and disvalue (e.g. true and false beliefs, in the example above), and that norms like justification might be derived on the basis of this goal.

I think Aristotle would deny both of these points. Concerning the latter, recall that Aristotle's epistemic ideal of scientific understanding isn't meant to determine what we are or aren't *justified* in believing. It's true, of course, that we're justified in believing the conclusions of scientific demonstrations. But on Aristotle's view we *knew* these conclusions were true before we ever learned how to demonstrate them.[20] Thus we shouldn't expect Aristotle's views on ἐπιστήμη to tell us anything about the *general* notion of justification, or other commonplace epistemic norms applied outside the scientific context.

Nor is Aristotle's epistemic ideal *defined* using basic units of epistemic value and disvalue. It is possible to develop an *approximate* or *partial* understanding of some domain. But scientific understanding isn't a mere accumulation of discrete pieces of independently-valuable partial "understandings," for instance, an accumulation of pieces of knowledge like "it's necessary that planets not twinkle because they're near the earth" or "it's necessary that the angles of a triangle sum to two right angles because triangles are three-sided rectilinear figures." Scientific understanding does involve a grasp of propositions like these, but it's critical that the propositions be grasped *as part of some domain*—an expert must not only understand a range of isolated astronomical or geometrical facts, but also grasp

[20] In this respect the relationship between prescientific knowledge and scientific understanding is similar to the relationship between our knowledge that $1+1=2$ and the knowledge we acquire once we derive this fact within a formal mathematical system: clearly we're *justified* in believing that $1+1=2$ before we come up with an axiom system in which it can be derived, and scientific understanding is no more a prerequisite for the justification of scientific claims than the development of some formalism for the justification of mathematical ones.

their place in astronomical and geometrical science. Aristotle's epistemic ideal is thus a domain-relative one, and not something we can define purely on the basis of an understanding of propositions grasped in isolation from each other.[21]

So when I talk about Aristotle's *epistemology*, I shouldn't be taken to suggest that Aristotle has a theory that would allow us to assess degrees of justification for various beliefs, or some story to tell about how our epistemic norms might be derived from basic units of epistemic value.[22] By "Aristotle's epistemology," I only mean Aristotle's discussion of the various cognitive states that make up our intellectual lives, how these cognitive states are related to each other, and what sort of contribution they make to the development of our scientific understanding of some domain (where this contribution need not be some quantifiable measure of epistemic value).

Thus when I talk about the role *perception* plays in Aristotle's epistemology, I'm not assuming from the start that perception is a source of *justification* or *warrant* for some of our beliefs about the world, or indeed that we should think of its contribution in justificatory terms. All I'm assuming is that perception is a key cognitive state for Aristotle, and that it's related in interesting ways to other, more advanced states Aristotle describes in his works (states like *μνήμη*, *ἐμπειρία*, and scientific understanding). My main aim is to describe the relations between these states, and explain what these relations reveal about Aristotle's views concerning perception's contribution to human cognition.

[21] I leave it open here whether we could define scientific understanding as an accumulation of pieces of understanding grasped as part of some domain. This is already a significant departure from the common approach depicted above, on which certain cognitive states are taken to have value or disvalue *on their own*, regardless of their relation to other cognitive states.

[22] Nothing I've said so far precludes this from being the case. My claim is only that it isn't something we can assume *without argument*, because there's no straightforward correspondence between commonplace epistemic norms and what Aristotle has to say about scientific understanding.

1.3 *Justification and epistemic priority*

I've argued so far that we should be careful when approaching Aristotle's epistemology: his concerns aren't always our own, and epistemic norms like justification don't easily map onto any significant part of his discussion of scientific understanding. I bring this up not just to avoid anachronism, but also because I think confusion on some of these points has led to some common misinterpretations of Aristotle's views.

For instance, many commentators have portrayed Aristotle as a certain sort of rational foundationalist, who thinks that all our understanding is *justified* on the basis of scientific first principles, and that these first principles are themselves justified by some non-inferential form of rational intuition (*νοῦς*) and nothing else. It's usually admitted from the start that experience and observation play an important role for Aristotle, and are in some way responsible for our coming to develop the rational intuition in question. But on the foundationalist reading, only rational intuition is *epistemically* relevant—experience and observation might be good ways to occasion a flash of rational insight, but (the story goes) they provide no *justification* in and of themselves. Irwin is a characteristic example of this kind of take on Aristotle's epistemology:[23]

> In claiming that the principles are known through themselves, Aristotle cannot simply mean that nothing else is needed to justify them within the demonstrative system; he must also mean that nothing else is needed to justify them at all. (1988: 132)
>
> Experience and familiarity with appearances are useful to us as a way of approaching first principles; they may be psychologically indispensable as ways to form the right intuitions. But they form no part of the justification

[23] But see also Bayer (1997: 136–141), Frede (1996), Le Blond (1939: 136), Lee (1935: 120–122), and Ross (1995: 53–54) for similar views. (Not everyone holds Irwin's view for Irwin's reasons, but these authors all exhibit a similar way of thinking about Aristotelian epistemology.)

> of first principles. When we come to have the right intuition we are aware of the principle as self-evident, with no external justification. That is its real nature, and that is what we grasp after we have used ordinary methods of inquiry. The acquisition of *nous* is not meant to be magical, entirely independent of inquiry. Nor, however, is it simply a summary of the inquiry, or a conclusion that depends on the inquiry for its warrant. (1988: 136)

Irwin's Aristotle thinks that ordinary methods of inquiry, useful though they may be as heuristics or psychological aids, are too limited to provide the sort of justification first principles require. It's clear from other parts of Irwin's argument that these ordinary methods of inquiry are meant to encompass not only observation and empirical inquiry, but also dialectical methods, and indeed any form of inquiry that relies on any sort of inference (1988: 141). So on this sort of view, Aristotle thinks that *no argument whatsoever* could ever justify our grasp of first principles. What's left as a source of justification? A form of rational intuition whose nature is left largely unexplained except insofar as it (rather conveniently) provides just the right sort of justification for scientific first principles—that is, justification that doesn't rely on any inference or argument whatsoever.

I think that this sort of reading is a mistake, but let me begin with some common ground. It's certainly true, as Irwin notes (1988: 125–129), that Aristotle rejects the suggestion that demonstrations might proceed in a circle, or that they might regress *ad infinitum*: he thinks first principles are the demonstrative bedrock from which we derive the rest of our scientific understanding, and he thinks we must have some non-demonstrative grasp of these bedrock principles (cf. *APo* A3). So it's certainly true that Aristotelian first principles are *indemonstrable*—this is just a definitional point about first principles—and so it's true that they won't admit of whatever form of justification a scientific demonstration is

meant to provide.

The problem is that Irwin claims, much more strongly, that principles don't admit of *any kind of justification whatsoever*.[24] And it's not clear at all why denying first principles the kind of justification demonstrations provide would prevent us from arguing for them in some other, non-demonstrative manner. Recall that demonstrations must meet a stringent set of requirements—so can't we have some sort of justification for the claim that all humans are rational animals, even if we can't *demonstrate* it?

As far as I can tell, Irwin's reason for denying any such justification stems from a peculiar reading of Aristotle's demand that the premises of explanatory syllogisms be "prior to" their conclusion. Here's the relevant passage:[25]

[24]Note that Irwin's translation is generally misleading—he renders *ἐπιστήμη* "knowledge," and thinks "justification" plays a key role in Aristotle's view, even though (as I've noted above) Aristotle doesn't think all our knowledge qualifies as *ἐπιστήμη*, and would clearly allow some form of justification (in our modern sense) outside the context of scientific demonstrations. This sort of translation makes Irwin's view sound more plausible than it should: if the things we know = the things we *ἐπίστασθαι* = our justified true beliefs, and if our grasp of first principles is a justificatory bedrock for *ἐπιστήμη*, then we might naturally think our grasp of principles couldn't be justified by any belief whatsoever. But this line of thought is no good if we know things we don't *ἐπίστασθαι*.

[25]Barnes repunctuates (removing the comma after *αἴτια*) and reads the *προγινωσκόμενα* clause as a further argument for the priority requirement (1993: 96). Barnes' worry here is that saying that something is "better known" is quite different from saying that it's "known beforehand," since Aristotle is quite clear that we might *know* (though not *understand*) demonstrated conclusions before we learn the "better known" premises from which they're derived. But his solution is grammatically awkward, and in any case I don't see why the repunctuated alternative fares any better: we might learn *posterior* things before learning the *prior* premises from which they're derived. A more straightforward solution is to take the *προ* as tracking precedence in the objective *explanatory* order, rather than the *temporal* order in which a beginner would learn things (*contra* Ross (1949: 54)). On this reading, to be "known beforehand" is to be known beforehand *by an expert demonstrator*, that is, to be "better known" *simpliciter*, which is just to be closer (in the explanatory order) to primitive first principles. This is consistent with Aristotle's claim that one must know primitives "beforehand" for demonstrations to yield understanding (*ἀνάγκη* […] *προγινώσκειν τὰ πρῶτα*, 72a27-28): surely this is not marking temporal priority for someone without any prior knowledge whatsoever, since first principles, for Aristotle, are the things we would typically learn *last*. The sense at play here is rather the one on which an expert would be required to know what units are (and that units exist) before starting a demonstration involving such units (cf. 71a6ff). See also *Met* A9 992b24ff for a similar use of *προγιγνώσκειν* (and in Plato,

> [3] They [=the premises] must be explanations and better known and prior—explanations because we only understand something when we know its explanation, prior since they are explanations, and known beforehand not only in the sense that we get what they mean, but also that we know them to be the case.
>
> *αἴτιά τε καὶ γνωριμώτερα δεῖ εἶναι καὶ πρότερα, αἴτια μὲν ὅτι τότε ἐπιστάμεθα ὅταν τὴν αἰτίαν εἰδῶμεν, καὶ πρότερα, εἴπερ αἴτια, καὶ προγινωσκόμενα οὐ μόνον τὸν ἕτερον τρόπον τῷ ξυνιέναι, ἀλλὰ καὶ τῷ εἰδέναι ὅτι ἔστιν*. (71b29-33)

The priority at play in this passage is *epistemic* priority, where *p* is epistemically prior to *q* when we can know *p* without knowing *q* but not vice versa.[26] Irwin claims that Aristotle's notion of epistemic priority won't always track the sort of *explanatory* priority that plays a prominent role in his discussion of scientific understanding—on Irwin's view, *p* can be explanatorily prior to *q* without being epistemically prior to *q*.[27] His argument for this claim isn't based on anything Aristotle says, but rather on the possibility of a certain sort of inference to the best explanation: you might think it justifiable to infer *q* if you know *p* and think that *q* is the best explanation for *p*. If you do, Irwin argues, *q* will be explanatorily prior to *p*, but both propositions will be "simultaneous in our knowledge, with neither prior or posterior to the other" (1988: 125).[28] Irwin concludes that first principles must not only be *explanatorily* primitive, but also *epistemically* primitive—which on his view means they must not depend for their warrant on any distinct knowledge we might use to infer them.

But there's overwhelming evidence that Aristotle didn't think of epistemic

see *Theaetetus* 203d1-5).

[26]See *Met* Δ11 1018b30-34, passage [5] below.

[27]See also note 24 (1988: 530–531), where Irwin argues that *APo* A3 is primarily concerned with epistemic priority *as opposed* to explanatory priority.

[28]It's not clear why *p* wouldn't in fact be prior to *q*: surely we can know *p* without knowing anything about what might explain it, and so in particular without knowing *q*. And this would be sufficient to secure Irwin's conclusion, since the explanatory and epistemic orders would be opposite (*p* would be epistemically prior, but explanatorily posterior to *q*).

priority this way. First off, in passage [3] itself, Aristotle claims that priority *follows* from the requirements that premises explain their conclusions (*πρότερα εἴπερ αἴτια*, 71b31). Moreover, the seven lines following passage [3] make plain that premises can be prior (and "better known") in two different senses, and that the sense of priority on which first principles are primitive does match the demonstrative order of explanation:

> [4] Things are prior and better known in two ways; for it isn't the same to be prior by nature and prior in relation to us, nor to be better known and better known to us. I call prior and better known in relation to us items which are nearer to perception, prior and better known *simpliciter* items which are further away. What is most universal is furthest away, and the particulars are nearest—these are opposite to each other.
>
> *πρότερα δ' ἐστὶ καὶ γνωριμώτερα διχῶς· οὐ γὰρ ταὐτὸν πρότερον τῇ φύσει καὶ πρὸς ἡμᾶς πρότερον, οὐδὲ γνωριμώτερον καὶ ἡμῖν γνωριμώτερον. λέγω δὲ πρὸς ἡμᾶς μὲν πρότερα καὶ γνωριμώτερα τὰ ἐγγύτερον τῆς αἰσθήσεως, ἁπλῶς δὲ πρότερα καὶ γνωριμώτερα τὰ πορρώτερον. ἔστι δὲ πορρωτάτω μὲν τὰ καθόλου μάλιστα, ἐγγυτάτω δὲ τὰ καθ' ἕκαστα· καὶ ἀντίκειται ταῦτ' ἀλλήλοις.* (71b33-72a5)

So things are supposed to be prior when they're better known, and in passage [3] Aristotle clearly means prior and better known *simpliciter*, that is, according to some natural, objective order, and not according to the order in which a *we*, as beginners, might go about learning things.[29] But this objective order is *precisely* the order explanatory demonstrations are meant to preserve. So the kind of priority proper to first principles must track explanatory priority—things are prior and better known when they're closer to the fundamental explanatory grounds for some scientific domain.

[29] It's clear that Aristotle has this sense in mind because he often portrays first principles as the things farthest from perception and most universal (see for instance, *Top* Z4, *Met* A9 992b24ff, *Met* Z3 1029b3ff, *Phys* A1), and (as is clear from passage [2]) the premises of demonstrations are closer to these principles than their conclusions.

More evidence can be found in the *Metaphysics* passage spelling out the notion of epistemic priority Aristotle invokes in his demonstrative theory:[30]

> [5] Things are called prior in another sense, on which what's prior in knowledge [i.e. what's "epistemically" prior] is [treated] as if it were also prior *simpliciter*. Of these the things prior in formula are different from those prior in perception, for in formula universals are prior, and in perception particulars.
>
> ἄλλον δὲ τρόπον τὸ τῇ γνώσει πρότερον ὡς καὶ ἁπλῶς πρότερον. τούτων δὲ ἄλλως τὰ κατὰ τὸν λόγον καὶ τὰ κατὰ τὴν αἴσθησιν. κατὰ μὲν γὰρ τὸν λόγον τὰ καθόλου πρότερα κατὰ δὲ τὴν αἴσθησιν τὰ καθ' ἕκαστα· (Δ11 1018b30-34)

Here too, Aristotle distinguishes *two* senses of epistemic priority: epistemic priority in formula and epistemic priority in perception. This distinction is plainly meant to mirror the distinction (in [4]) between things prior by nature and things prior to us: in both cases, universals are prior in one sense (in formula, by nature), and particulars in another (in perception, to us). And again, since Aristotle often emphasizes that first principles must be universals and not particulars, and that they're the things farthest removed from perception, he must have the former sense of epistemic priority in mind when discussing principles in *APo* A2—that is, the sense on which things that are epistemically prior (or posterior) will *also* be explanatorily prior (or posterior).

To say that *p* is epistemically prior to *q*, then, is to say that our knowledge of *p* doesn't depend on our knowledge of *q*. If the knowledge in question is *understanding*, then epistemic priority tracks explanatory priority: *p* can't be prior to *q* if *q* is part of the *explanation* why *p*, for then our understanding of *p* would depend on our understanding of *q*. If the knowledge in question is

[30] It's a bit later, at Δ11 1019a1ff, that Aristotle indicates that all senses of priority are cases in which certain things can be without others, but not vice versa; so that, in the epistemic case presented here, it would be possible for some knowledge to exist in a subject without some other knowledge existing in that subject, but not vice versa.

knowledge of a different sort, then epistemic priority need not track explanatory priority: our knowing *p* might depend on our perceiving *q*, even if it turns out that *p* explains *q*. There's ample evidence that only the former sense of priority applies to first principles.

If this is right, there's little reason to hold anything like Irwin's reading. For his reading relies on a special notion of epistemic priority ("justification," as he renders it) which doesn't always coincide with the sort of explanatory priority that plays a central role in Aristotle's demonstrative theory—the thought is that first principles are not just *explanatory* primitives, but *justificatory* primitives, too, and that they must be grounded in a flash of rational insight since they don't admit of inferential justification.

I've argued we should resist the very first move: there's no evidence that Aristotle thought of first principles as epistemic primitives in a sense that wouldn't coincide with their being indemonstrable explanatory primitives. It's quite clear that Aristotle employs two (and *only* two) senses of epistemic priority, one applicable to scientific understanding, and one applicable to non-scientific knowledge. On the former first principles are epistemic primitives, on the latter they are not (on the latter, the knowledge we get from *perception* is primitive—but more on this below). Irwin elides this distinction when he presents epistemic priority as an absolute justificatory relation, applicable in scientific and non-scientific contexts alike. If the distinction is kept in mind there's little motivation left for reading Aristotle as anything like a rational foundationalist.[31]

The moral here is that a general story about which of our beliefs are or aren't

[31] At least little motivation to be found in the passages on the basis of which Irwin develops his interpretation of Aristotle's epistemology. There are other arguments for reading Aristotle as a certain kind of rationalist which I'll be considering below (section 3).

justified isn't easily extracted from Aristotle's theory of scientific understanding.[32] In particular, epistemic priority should not be thought of as a justificatory relation: demonstrative conclusions need not be *justified* on the basis of epistemically prior premises, and first principles *can* be justifiably inferred, despite being epistemic primitives—at least on a common way of talking about justification today. We should therefore resist interpretations that would discount perception's contribution to our knowledge on this basis.

1.4 *Understanding and conviction*

Even once we set aside justificatory concerns, however, it may seem that Aristotle relies on certain epistemic norms to describe the *strength* of our belief in scientific conclusions and their principles, and does so in a manner that would have implications for our beliefs outside the scientific context. Consider for instance this passage:

> [6] For something always holds better of that because of which it holds, for instance, that because of which we love is better loved. So since we know and are convinced of [some conclusion] because of the primitives, we know and are better convinced of these [primitives], because it's because of them that we know and are convinced of posterior things. [...]
>
> Anyone who's going to have understanding through demonstration must not only know the principles better and be better convinced of them than what's demonstrated—there must also be nothing more convincing or better known for him among the opposites of the principles (from which there will be a deduction of the contrary mistake), since anyone who understands [some conclusion] *simpliciter* cannot be convinced [otherwise].
>
> *αἰεὶ γὰρ δι' ὃ ὑπάρχει ἕκαστον, ἐκείνῳ μᾶλλον ὑπάρχει, οἷον δι' ὃ φιλοῦμεν, ἐκεῖνο φίλον μᾶλλον. ὥστ' εἴπερ ἴσμεν διὰ τὰ πρῶτα καὶ πιστεύομεν, κἀκεῖνα ἴσμεν τε καὶ πιστεύομεν μᾶλλον, ὅτι δι' ἐκεῖνα καὶ τὰ ὕστερα.* [...] *τὸν δὲ μέλλοντα ἕξειν τὴν ἐπιστήμην τὴν δι' ἀποδείξεως οὐ μόνον δεῖ τὰς ἀρχὰς μᾶλλον γνωρίζειν καὶ μᾶλλον αὐταῖς πιστεύειν ἢ τῷ δεικνυμένῳ, ἀλλὰ μηδ' ἄλλο*

[32] A moral Burnyeat (1981: 136) and Kahn (1981: 386–387) are right to defend.

> *αὐτῷ πιστότερον εἶναι μηδὲ γνωριμώτερον τῶν ἀντικειμένων ταῖς ἀρχαῖς ἐξ ὧν ἔσται συλλογισμὸς ὁ τῆς ἐναντίας ἀπάτης, εἴπερ δεῖ τὸν ἐπιστάμενον ἁπλῶς ἀμετάπειστον εἶναι.* (*APo* 72a29-b4)

Aristotle's remarks here make it seem as though first principles should not only be explanatory primitives, and grasped by an expert as such, but moreover that they should be the things an expert is most *certain* about—to the point where nothing could convince him of their falsity.

Now, [6] only explicitly tells us what the strength of our *scientific* beliefs ought to be: strongest in the case of first principles, and less and less strong as we move down the explanatory tree formed by their demonstrative consequences.[33] But the sort of "conviction" (*πίστις*) at play here is something that doesn't *only* apply to the truths we can demonstrate—we can be better or worse convinced of all sorts of particular, contingent things.[34] So when Aristotle says that an expert is *ἀμετάπειστος*, it's natural enough to think of him as endorsing a general norm according to which we should be more confident about principles than we are about *any other belief*. And if this is right, one might think that Aristotle's account of scientific understanding would at least tell us something about our justification

[33] Aristotle doesn't say that the order of convincingness extends for all demonstrative conclusions (and not just first principles), but clearly the principle on which his remarks are based would apply generally: since *all* demonstrated conclusions hold because of their premises, we will always have to be better convinced of these prior premises, even when they're not the primitive first principles of which we are *best* convinced.

[34] Aristotle uses *πίστις* to refer both to a cognitive state (a conviction, or a strongly held belief), and to the factors contributing to the development of such a state—so that, for instance, an argument or a speaker's character might count as types of *πίστις* (sometimes the argument's *subject matter* is the *πίστις*; cf. Grimaldi (1957)). For the first sense, see e.g. *APo* 90b14 and *DA* 428a20, or, in its more common verbal form (as in passage [6]), *Rhet* 1356a6, *Rhet* 1366a11, and *passim*. For the second, see e.g. *Rhet* 1354a15 or *Rhet* 1355a4-5. To say that *X* ought to be *πιστότερον* to us than *Y* (or that we should *πιστεύειν X* more or better than *Y*) is, roughly, to say that our belief in *X* ought to be held more strongly than our belief in *Y*.

for *degrees* of belief if not our justification for belief *tout court*.[35]

In fact I don't think Aristotle's views on conviction should be taken this way. First, note that Aristotle thinks that perception and experience constitute the "most authoritative" forms of knowledge concerning particulars (cf. *Met* A1 981a13ff, 981b11). So our confidence in beliefs about *particulars* (e.g. "Callias is tall," "Socrates is standing next to me") is presumably something we ought to base on our observations, rather than anything we might infer from the conclusions of scientific demonstrations. Moreover, Aristotle is quite emphatic that principles should be given up when they conflict with what we perceive:[36]

> [7] [The followers of Empedocles and Democritus], because of their love of these [principles], fall into the attitude of men who undertake the defense of a position in argument. For holding their principles as truth, they submit to everything that follows, as though some principles did not require to be judged from their results, and above all from their end! And that end, which in the case of productive understanding is the product, in the case of our understanding of nature is the phenomena, which are always and authoritatively given by perception.
>
> Οἱ δὲ διὰ τὴν τούτων φιλίαν ταὐτὸ ποιεῖν ἐοίκασι τοῖς τὰς θέσεις ἐν τοῖς λόγοις διαφυλάττουσιν· ἅπαν γὰρ ὑπομένουσι τὸ συμβαῖνον ὡς ἀληθεῖς ἔχοντες ἀρχάς, ὥσπερ οὐκ ἐνίας δέον κρίνειν ἐκ τῶν ἀποβαινόντων, καὶ μάλιστα ἐκ τοῦ τέλους. Τέλος δὲ τῆς μὲν ποιητικῆς ἐπιστήμης τὸ ἔργον, τῆς δὲ φυσικῆς τὸ φαινόμενον ἀεὶ κυρίως κατὰ τὴν αἴσθησιν. (*DC* 306a11-17)

If there's any general norm at play in this passage, it clearly isn't one that would preclude someone with a grasp of principles from abandoning them in the face of conflicting phenomena. In a similar vein, Aristotle tells us in the *GA* that:

> [8] This is what seems to hold for the generation of bees, both from argument and from the things that are thought to be their characteristics. These characteristics haven't yet been sufficiently grasped, and if some day

[35]The stronger conclusion follows if believing is just having a sufficiently strong degree of belief, as some contemporary philosophers (e.g. Weatherson (2005)) seem to think.

[36]The translation here is adapted from Stocks'.

they are, we should then be better convinced by perception than arguments, and by arguments only if what they show agrees with the phenomena.

Ἐκ μὲν οὖν τοῦ λόγου τὰ περὶ τὴν γένεσιν τῶν μελιττῶν τοῦτον ἔχειν φαίνεται τὸν τρόπον καὶ ἐκ τῶν συμβαίνειν δοκούντων περὶ αὐτάς· οὐ μὴν εἴληπταί γε τὰ συμβαίνοντα ἱκανῶς, ἀλλ' ἐάν ποτε ληφθῇ τότε τῇ αἰσθήσει μᾶλλον τῶν λόγων πιστευτέον, καὶ τοῖς λόγοις ἐὰν ὁμολογούμενα δεικνύωσι τοῖς φαινομένοις. (*GA* 760b27-33)

Passages like these certainly don't suggest that scientific principles are premises we should be *absolutely* certain about, or believe whatever their consequence—our real source of confidence seems to be our senses, and scientific arguments only seem to be worth believing to the extent that they recover our observations.[37] But what then are we to make of Aristotle's insistence that a scientific expert be unmovable in his conviction (ἀμετάπειστος)?

A look at related passages in the *Topics* will help. For in the *Topics* Aristotle often affirms that someone with understanding cannot be convinced out of her conclusions, but always qualifies his claim by saying that an understander cannot be so convinced *by argument* (ὑπὸ λόγου).[38] This is significant because not all our *beliefs* are arrived at by argument; in particular, *perceptual* beliefs are not inferred from anything else (as passage [8] already suggests—but more evidence for this will be provided in section 2.1). So one way to reconcile passage [6] with Aristotle's remarks in [7] and [8] is this: to be convinced of something, in the sense at play in [6], is to be convinced of it by *mere argument*, that is, by

[37] See also *DM* 698a11-14, where Aristotle emphasizes that universal explanations must always accommodate (or "fit") the particular phenomena they explain.

[38] This is true of all but one occurrence of the term, which appears eleven times, and always in connection with the state of understanding (that the ἐπιστήμων is ἀμετάπειστος seems to be a stock example—see 130b16, 133b29ff, 134a1ff, 134a35ff, 134b16). Apart from these occurrences, the term only appears three times in the Aristotelian corpus: in passage [6], in the *Metaphysics* (where necessity is said to be ἀμετάπειστόν τι, because it's contrary to the movement that follows choice and reasoning (ἐναντίον γὰρ τῇ κατὰ τὴν προαίρεσιν κινήσει καὶ κατὰ τὸν λογισμόν, *Met* Δ5 1015a32-33)), and in the *Magna Moralia* (where it's suggested that an *opinion* might resemble understanding if it's very firmly held and ἀμετάπειστον, *MM* 1201b6).

an argument that does not rest on new *evidence*. Since perception isn't a mere argument in this sense, an understander can be ἀμετάπειστος and nonetheless revise his principles on the basis of conflicting phenomena.

In other words, scientific expertise doesn't require *fanaticism*. To be *best convinced* of principles isn't to believe principles no matter what, but rather to believe that, *holding the evidence fixed*, one's principles are more secure than their demonstrative consequences or any competing principle or argument that would defeat them. New *evidence* (and arguments *based* on new evidence) might force scientific experts to revise their principles—the various sorts of refutation surveyed in the *Rhetoric* will not.

The moral is by now familiar: a general norm concerning conviction or degrees of belief isn't easily extracted from Aristotle's theory of scientific understanding. In particular, the claim that experts should be "better convinced" of first principles than any of their consequences (and *unmovable* in their conviction) should not be taken to imply that first principles should be believed more strongly than anything else. For as I've argued, the sort of conviction at play here only reflects a resistance to *counterargument*, not a resistance to new perceptual evidence, which Aristotle clearly thinks we should not seek to resist. This already suggests a critical role for perception as our one non-inferential source of evidence about the world. But a full appreciation of this point will require a more detailed examination of Aristotle's account of our learning, to which I'll now turn.

2
Perception As a Starting Point

I argued above (section 1.3) against a rationalist interpretation of Aristotle's epistemology which stemmed from reading his notion of epistemic priority as a general form of justification. But one might worry that this argument merely sidesteps a critical issue: perhaps we needn't assign *νοῦς* any justificatory role in Irwin's sense, but first principles are still supposed to be *indemonstrable*, and so they won't admit of whatever form of warrant demonstrations are supposed to provide. And Aristotle never gives an account of the sort of argument one might make *for* first principles. So what *is* our source of warrant for first principles, if not *νοῦς*?

I've phrased this challenge in terms of "warrant" for principles, but this shouldn't be taken to reflect any special concern with justification or degrees of belief as we understand these notions today. The broader worry is that saying that all our knowledge begins with perception, as Aristotle often does, doesn't yet explain the nature of perception's contribution to this knowledge, and is compatible with an extremely deflationary take on perception's relation to more advanced cognitive states. For instance, there's a very real sense in which some amount of caffeine is necessary for me to even begin forming a cogent thought.

But surely caffeine isn't part of the explanation *why* my thoughts are cogent (if indeed they are) or even why my thoughts have the contents they do—caffeine might provide the *stimulus* required to form thoughts in the right sort of way, but its psychoactive properties won't themselves supply any specific content to the thoughts it helps bring about.

Likewise, granting that we can't acquire scientific understanding without perceiving certain things (or that our scientific understanding somehow *depends on* or *comes from* perception) doesn't imply that perception makes any significant contribution to the content of this understanding. Perception could simply cause the development of our understanding in the same way coffee causes the development of good ideas—by bringing about the right sort of state without itself being part of the explanation why that state has the content it does, or whether or not the state is any good.

When Aristotle calls perception a starting point for our knowledge, he has in mind a more significant role than this. Or so I'll be arguing in this section, once I've offered some background on Aristotelian learning and explained in a bit more detail the contrast I wish to draw between purely causal, coffee-like factors and capacities that make a *significant* contribution to our knowledge.

2.1 *Aristotle on learning*

Aristotle announces in the opening lines of *APo* that "all intellectual [διανοητικὴ] teaching and learning proceed from preexisting knowledge [ἐκ προϋπαρχούσης γίνεται γνώσεως]" (71a1-2). When he speaks of *intellectual* teaching and learning in this passage, Aristotle means to emphasize that certain forms of learning don't involve *thought*, and therefore won't require any preexisting knowledge

from which they might proceed.[39] It turns out (as I'll shortly be making clear) that *perceptual* learning is the only form of learning that falls outside the scope of this "preexisting knowledge" requirement: perception is the only source of knowledge that doesn't depend on our already having some knowledge at our disposal.

The sense in which the preexisting knowledge is "at our disposal," or such that we can "proceed" from it to further knowledge is, unfortunately, never spelled out in much detail. At times, Aristotle seems to think that we are proceeding from a *state* with certain contents to a state with different contents, or to a different state with the same contents.[40] At others, he seems to think that certain *propositions* (or *terms* featured within propositions) proceed from others, regardless of whether or not this is grasped by anyone.[41] The Greek itself is open to a range of different interpretations; for all Aristotle is saying is that something (a state, or proposition, or term) is, or comes to be, *from* (ἐκ) something else.

This sort of promiscuity is common in Aristotle's epistemological writings. For Aristotle doesn't draw a strong distinction between the grasp of various *concepts* corresponding to terms in syllogistic propositions and the grasp of the

[39]Mignucci (1975: 2–3) identifies three different uses of διανοητικός: in opposition to ἦθος, or as marking a distinction within the cognitive realm, either between discursive and non-discursive thought (διάνοια vs νοῦς) or between thought-involving cognitive states and sensation (διανοητικός vs αἰσθητικός). He offers some textual reasons to read it in this latter sense here; I'll add some philosophical motivation for this reading in what follows.

[40]For states with different contents, see for instance *APo* 71a8-9 (induction proceeds *from* particular cases to something universal), for different states with the same content, see for instance *APo* 71a24ff (understanding something *simpliciter* proceeds from understanding that same thing universally).

[41]For propositions, see for instance the requirements on demonstration presented in [2], where Aristotle tells us that demonstrative conclusions must follow *from* premises that are better known, explanatory, etc. For terms, see for instance *APo* A4 73a34ff, where Aristotle claims the essence of triangle is *from* line, and the essence of line *from* point. In both cases, the "from" relation reflects an objective order independent of anyone's grasp of the relevant propositions or terms.

propositions in which such terms appear: a description how a certain grasp of some concept might arise, for Aristotle, is also a description how a certain grasp of propositions involving the concept in question might arise.[42] For instance, someone might be said to understand *human being*, or, equivalently, to understand the definition "human beings are rational animals," where these are simply two different ways of saying that this person displays the kind of zoological expertise described in section 1.1 with respect to human beings. Moreover, if such an expert is in fact understanding things correctly, her grasp of explanations will reflect an objective explanatory order—so the fact that her *grasp* of propositions or terms "follows from" her grasp of other propositions or terms entails the existence of an actual explanatory ordering between the facts corresponding to the propositions or terms in question.[43]

For someone with scientific understanding, then, the "from" relation between states corresponds to the "from" relation between propositions grasped in these states, and *this* relation corresponds to the objective relation between facts corresponding to the propositions in question. It's important to note, however, that

[42]See Barnes (1993: 271), Kahn (1981: 393–395), or Modrak (1987: 164) for a more thorough exposition of this view. It's hard to find a parallel for this usage in English, but it does exist in other languages—for instance in French, where an assertion like "je connais l'être humain," can be heard as entailing a range of propositional knowledge, e.g. "je sais que les êtres humains sont des animaux," "je sais que les êtres humains sont rationnels," and so on (and likewise for "je *comprends* l'être humain," as an expression of understanding).

[43]The claim that middle terms are explanatory of demonstrative conclusions is a good example of Aristotle's protean usage. The thought here is certainly not that certain purely linguistic items count as explanations—the explanation why planets don't twinkle is that they are *in fact* near the earth, and has nothing linguistic about it (as Barnes (1993: 89–90) rightly emphasizes). Note also that the explanatory relation is something that holds between two *facts* (planets are near, planets don't twinkle), and not just between two *properties* (proximity, non-twinkling), though Aristotle often uses the latter formulation. To say that some conclusion is explained by a middle term, then, is to say that the fact corresponding to the demonstrated conclusion is explained by the fact that the object denoted by the conclusion's subject term possesses the property denoted by the demonstration's middle term. But I'll spare you such formulations in what follows.

just as Aristotle distinguishes epistemic priority *to us* from epistemic priority *simpliciter*, so too does he (implicitly) distinguish the "from" relation as it holds *to us* and as it holds *by nature*: knowledge displayed by an expert will proceed from knowledge that is prior *by nature*, and so correspond to the objective explanatory order, while for the rest of us knowledge will proceed from whatever happens to be prior *to us*. And what's prior to us, for Aristotle, is something that might vary from person to person, and for the same person from one stage of her learning to the next (*Top* Z4 141b36ff).

So when Aristotle says that all our intellectual learning is based on preexisting knowledge, he doesn't just mean that, within the context of an axiomatized science, we will begin with first principles and proceed by inferring explanatorily posterior conclusions *from* first principles. The requirement holds quite generally, for scientific and nonscientific knowledge alike. And for the non-expert, the sort of knowledge on which our learning depends will generally *not* be the knowledge which is objectively prior—for as Aristotle explains, the learning process involves *making* what's prior by nature prior to us:

> [9] For learning proceeds in this way for all, namely, through that which is less known by nature to that which is more known [by nature]: and just as in practical matters our function is to make what's actually good good for each, [proceeding] from what's good for each, so too [in theoretical matters our function is] to make things better known by nature better known to ourselves, [proceeding] from what's better known to ourselves. And the things better known and primitive to some are often better known [by nature] to a very small extent, and bear little or no relation to what is. But one still has to try, starting from things barely known [by nature] but known to oneself, to come to know things that are actually known, passing (as was said) via the things [we do know].
>
> *ἡ γὰρ μάθησις οὕτω γίγνεται πᾶσι διὰ τῶν ἧττον γνωρίμων φύσει εἰς τὰ γνώριμα μᾶλλον· καὶ τοῦτο ἔργον ἐστίν, ὥσπερ ἐν ταῖς πράξεσι τὸ ποιῆσαι ἐκ τῶν ἑκάστῳ ἀγαθῶν τὰ ὅλως ἀγαθὰ ἑκάστῳ ἀγαθά, οὕτως ἐκ τῶν αὐτῷ*

> γνωριμωτέρων τὰ τῇ φύσει γνώριμα αὐτῷ γνώριμα. τὰ δ' ἑκάστοις γνώριμα καὶ πρῶτα πολλάκις ἠρέμα ἐστὶ γνώριμα, καὶ μικρὸν ἢ οὐθὲν ἔχει τοῦ ὄντος· ἀλλ' ὅμως ἐκ τῶν φαύλως μὲν γνωστῶν αὐτῷ δὲ γνωστῶν τὰ ὅλως γνωστὰ γνῶναι πειρατέον, μεταβαίνοντας, ὥσπερ εἴρηται, διὰ τούτων αὐτῶν. (*Met* Z3 1029b3-12)

Our goal as learners, then, is to make what's better known by nature better known to us, which is the state someone finds herself in once she's achieved the sort of understanding of a domain discussed in our previous section. Once we're in this state, the "from" relation corresponding to our inferences will mirror an objective explanatory order—but to achieve such an ideal cognitive state we must all begin *from* whatever knowledge we currently have at our disposal, and this will of course depend on the things we've experienced, the arguments and teachers to which we've been exposed, and so on.

The specifics of the prescientific learning process, then, inevitably depend on the specifics of our situation. Still, Aristotle thinks there are only three general ways in which we learn things: by demonstration, by induction (ἐπαγωγῇ), and by perception.[44] Now, it's worth emphasizing that Aristotle treats these modes of learning quite differently—in particular, he doesn't seek an analogue of his formal demonstrative theory for perceptual or inductive learning. In the case of perception this is simply because perceptual knowledge isn't *derived* or *inferred* from any preexisting knowledge (as will become clear in what follows). In the case of induction, it's presumably because many *different* sorts of arguments or argumentative tools might contribute to our inductive progress: to say that we learn by induction isn't to say that we learn via some specific mode of argument, but rather that we learn in a way that takes us from a grasp of particulars to a grasp

[44] Cf. *APo* A18, passage [10] below.

of some universal to which these particulars belong, whatever the argumentative means.[45] So for instance, when Aristotle says that we must learn first principles *dialectically* (*Top* A2 101a37-b4), this is not meant to *conflict* with the claim that we learn first principles by *induction* (*APo* B19 100b4).[46] For induction is a form of cognitive development whose achievement may well involve dialectical methods—far from competing with dialectic, inductive progress is something we can *realize* dialectically, or to which dialectical arguments can at least *contribute* in a significant manner.

What I've said so far leaves open a number of different interpretations concerning the *use* being made of preexisting knowledge in non-perceptual learning. If induction isn't a specific kind of argumentative form, we can't analyze the "from" relation proper to inductive learning as a merely logical relation that might hold between the premises and conclusion of some argument—there is no general theory of prescientific knowledge to mirror the demonstrative theory of scientific understanding. Aristotle makes clear, however, that there is supposed to be *some* form of dependence between perception, induction, and demonstrative understanding:[47]

[45] Confusion on this point has led to a good deal of interpretive puzzlement. I suspect the source of confusion is that Aristotle sometimes seems to present induction as a specific argumentative method, on par with (and perhaps to be *contrasted* with) dialectical, rhetorical, or demonstrative ones (consider for instance *Met* A9 992b30-3, where induction is contrasted with demonstration and "learning by definition"). I'll be examining the key texts more closely below (section 3.4) as part of a broader treatment of induction and its relationship to inductive arguments. For now, note that Aristotle explicitly affirms that there is no uniform method or procedure to inquire into first principles at *DA* A1 402a10-19, and that the kind of learning involved in such inquiry *must* be inductive in nature, since it's neither perceptual or demonstrative (the only two alternatives). In this I agree with McKirahan (1983: 12–13) and Engberg-Pedersen (1979).

[46] *Contra* Bolton (1991: 15–17), Lee (1935: 122–123), Ross (1995: 55), and a number of commentators.

[47] See also, in a similar vein, *APo* A31 87b39-88a5. For perception's essential role in our cognitive development, see e.g. *Met* A1 980a26-27 or *Sens* 437a2-3.

> [10] It's also clear that if some perception is missing, some understanding must be missing as well—the understanding it's impossible to get since we learn either by induction or by demonstration, and demonstration is from universals and induction from particulars, and it's impossible to think about universals except by induction (since the things we talk about by abstraction can also be made known to us by induction—that some things are said of each kind (even if they aren't separable) insofar as each is a such-and-such) and impossible to induce without perception. For it's perception that's of particulars—for it isn't possible to get understanding of these [particulars]. For [one can't get understanding] from universals without induction nor from induction without perception.
>
> Φανερὸν δὲ καὶ ὅτι, εἴ τις αἴσθησις ἐκλέλοιπεν, ἀνάγκη καὶ ἐπιστήμην τινὰ ἐκλελοιπέναι, ἣν ἀδύνατον λαβεῖν, εἴπερ μανθάνομεν ἢ ἐπαγωγῇ ἢ ἀποδείξει, ἔστι δ' ἡ μὲν ἀπόδειξις ἐκ τῶν καθόλου, ἡ δ' ἐπαγωγὴ ἐκ τῶν κατὰ μέρος, ἀδύνατον δὲ τὰ καθόλου θεωρῆσαι μὴ δι' ἐπαγωγῆς (ἐπεὶ καὶ τὰ ἐξ ἀφαιρέσεως λεγόμενα ἔσται δι' ἐπαγωγῆς γνώριμα ποιεῖν, ὅτι ὑπάρχει ἑκάστῳ γένει ἔνια, καὶ εἰ μὴ χωριστά ἐστιν, ᾗ τοιονδὶ ἕκαστον), ἐπαχθῆναι δὲ μὴ ἔχοντας αἴσθησιν ἀδύνατον. τῶν γὰρ καθ' ἕκαστον ἡ αἴσθησις· οὐ γὰρ ἐνδέχεται λαβεῖν αὐτῶν τὴν ἐπιστήμην· οὔτε γὰρ ἐκ τῶν καθόλου ἄνευ ἐπαγωγῆς, οὔτε δι' ἐπαγωγῆς ἄνευ τῆς αἰσθήσεως. (*APo* A18 81a38-b9)

In broad terms, then, Aristotle thinks that perception puts us in touch with particulars, induction takes us from these particulars to universals, and demonstration then uses universals to provide us with scientific understanding. If we fail to perceive certain things we will lack a grasp of certain particulars, and induction will therefore fail to yield a grasp of the universals necessary to demonstrate scientific conclusions and thereby develop our understanding.

The general picture so far, then, is one on which all our learning belongs to one of three modes: *perceptual* learning, which has particular objects, and upon which all other forms of learning depend; *inductive* learning, which represents an advance from our grasp of particulars to a grasp of universals (where this advance need not rest on some specific kind of inference); and *demonstrative* learning, which brings about scientific understanding through the sort of syllogis-

tic deduction presented in [2].[48] The latter two sorts of learning both proceed *from* preexisting knowledge, provided (respectively) by perception and induction, where the *from* relation is not a merely logical relation between premises in some form of argument.

I'll now take a closer look at the sort of dependence this relation is supposed to track, and what it tells us about perception's role as a cognitive state from which all other forms of knowledge are meant to proceed.

2.2 *Perception as a starting-point*

It may seem like passage [10] establishes, at the very least, that perception supplies the *content* from which our understanding is ultimately derived: we perceive particulars, these particulars instantiate certain universals, and we come to grasp the universals they instantiate inductively, before demonstrating things about them and understanding them scientifically. But in fact Aristotle's remarks are compatible with a much more deflationary take on perception's role in our learning. For all Aristotle is saying is that it's impossible to engage in the inductive learning process without perceiving certain things, and impossible to demonstrate anything without inducing others. He does *not* claim here that there is any connection between the *content* of our perceptions and the *content*

[48] As I argued in our previous section, demonstrative learning doesn't involve the development of beliefs or knowledge with new *contents*, but rather the development of a new mode of apprehension of contents we already grasped in some less sophisticated manner. Note that, somewhat confusingly, demonstrative *methods* can also be useful in bringing about inductive learning, as Aristotle explains in *APo* B8. So demonstrative arguments, aside from their typical use in the sort of demonstrative learning that happens in a scientific context, can contribute to *inductive* learning, too. When they do so their role is similar to that of dialectic (*Top* A2) or the method of division (*APo* B13): they serve as an argumentative tool which promotes the sort of cognitive development proper to a certain sort of learning. (As I read Aristotle's remarks at *Met* A9 992b30-3, *definition* can also serve as a form of argument that would bring about inductive learning.)

of the scientific understanding our perceptions enable us to achieve—in particular, passage [10] is compatible with a view on which the universals we learn about are not inferred on the basis of their perceived instances, but grasped in some independent, non-inferential way.[49]

I'm not just being overdelicate here: Aristotle was writing in a context where denying any significant connection between the contents of perception and the contents of understanding was a live option. Plato, for instance, is someone who might agree with everything Aristotle has to say about perception being necessary for the development of more advanced forms of knowledge, and yet deny that the *content* belonging to these more advanced states is something we could *derive* from reflecting on (or inducing from) the things we perceive.

Indeed, Socrates often suggests that certain perceptions lead us to *recollect* explanatory forms, or at least bring these forms to mind in a manner that invites the sort of investigation conducive to the development of *ἐπιστήμη*. But he makes it quite clear that any resulting *ἐπιστήμη* will be something quite distinct from the perceptions that occasion its development, and that we shouldn't think of it as something *derived* from our perceptions. Here's a representative passage:[50]

> Socrates: Don't we further agree that when understanding comes about in this way, it is recollection? What way do I mean? Like this: when someone sees or hears or in some other way perceives one thing and not only knows that thing but also thinks of another thing, of which the understanding is not the same but different, are we not right to say that he recollects the [second] thing, the thought of which he grasps?
> Simmias: How do you mean?
> Socrates: Things of this sort: surely, an understanding of human beings is different from an understanding of lyres.

[49] As Hamlyn is right to point out (1976: 168–169).

[50] The translation here is adapted from Grube's. I've stuck with the translations of cognitive states I use for Aristotle, though it's not clear that Plato is always using *ἐπιστήμη* in Aristotle's technical sense.

SIMMIAS: Of course.
SOCRATES: Well, you know what happens to lovers: whenever they see a lyre, a garment or anything else that their beloved is accustomed to use, they know the lyre, and grasp in their mind the form of the boy to whom it belongs. This is recollection, just as someone, on seeing Simmias, often recollects Cebes, and there are thousands of other such occurrences.

Ἆρ' οὖν καὶ τόδε ὁμολογοῦμεν, ὅταν ἐπιστήμη παραγίγνηται τρόπῳ τοιούτῳ, ἀνάμνησιν εἶναι; λέγω δὲ τίνα τρόπον; τόνδε. ἐάν τίς τι ἕτερον ἢ ἰδὼν ἢ ἀκούσας ἤ τινα ἄλλην αἴσθησιν λαβὼν μὴ μόνον ἐκεῖνο γνῷ, ἀλλὰ καὶ ἕτερον ἐννοήσῃ οὗ μὴ ἡ αὐτὴ ἐπιστήμη ἀλλ' ἄλλη, ἆρα οὐχὶ τοῦτο δικαίως λέγομεν ὅτι ἀνεμνήσθη, οὗ τὴν ἔννοιαν ἔλαβεν;
Πῶς λέγεις;
Οἷον τὰ τοιάδε· ἄλλη που ἐπιστήμη ἀνθρώπου καὶ λύρας.
Πῶς γὰρ οὔ;
Οὐκοῦν οἶσθα ὅτι οἱ ἐρασταί, ὅταν ἴδωσιν λύραν ἢ ἱμάτιον ἢ ἄλλο τι οἷς τὰ παιδικὰ αὐτῶν εἴωθε χρῆσθαι, πάσχουσι τοῦτο· ἔγνωσάν τε τὴν λύραν καὶ ἐν τῇ διανοίᾳ ἔλαβον τὸ εἶδος τοῦ παιδὸς οὗ ἦν ἡ λύρα; τοῦτο δέ ἐστιν ἀνάμνησις· ὥσπερ γε καὶ Σιμμίαν τις ἰδὼν πολλάκις Κέβητος ἀνεμνήσθη, καὶ ἄλλα που μυρία τοιαῦτ' ἂν εἴη. (*Phaedo* 73c4-d10)

For Plato, then, recollection is a process that doesn't require any significant connection between the contents of the perception prompting the recollection and the sort of understanding that results from it: we can see a human being and recollect another human being, but we can also perceive a lyre and recollect a human being, or, as Socrates suggests later on (74c1), perceive unequal sticks or stones and recollect the Equal, which is a quite different sort of entity (among other reasons because it isn't unequal).[51]

Still, it's clear that Plato thinks that certain perceptions are necessary *prerequi-*

[51]There may still be some *minimal* connection between the things we perceive and the ones we understand, since Socrates seems to think that our perceiving things as both *F* and *not-F* leads us to recollect *the F* (and not *the G* or *the H* or just any other form). But Socrates is notoriously cagey about the relationship between *F* things and *the F*: beautiful things participate in or share in or bear *some sort* of relationship to the Beautiful, but he resists committing himself to any position concerning the nature of this relationship (*Phaedo* 100cd). Thus Socrates' stance on perception's role in our learning doesn't *depend* on any particular position concerning the connection between forms, which are the proper objects understanding, and their participants, which are the proper objects of perception.

sites to our understanding, and that they serve an important role in *promoting* our recollection. Socrates and Simmias agree to this later in the *Phaedo* (74e9-75a8), but there's also ample evidence in other dialogues: diagrams are instrumental in bringing about recollection in the *Meno*,[52] and though recollection isn't mentioned by name, it's agreed at *Republic* 523a-524b that certain perceptions "summon the intellect" (*παρακαλοῦντα τὴν νόησιν*, 523b1) and play a key role in the guardians' learning to "rise up out of becoming and grasp being" (525b5-6).[53] In none of these cases does perception produce understanding by providing the basic contents from which our more advanced cognitive states are derived—we don't develop an understanding of some domain *based* on the domain-specific things we perceive. Perception merely serves to awaken an intellectual capacity, and it's this awakened capacity that grasps (or recollects) the proper objects of understanding.

All of this suggests a rather deflationary take on perception's role in our learning: perception might be an important causal factor in our coming to understand things, but its contribution is indirect, serving only as a means of summoning an intellectual faculty capable of recollecting the sorts of things we might understand. In fact, Socrates emphasizes that the sorts of perceptions that are prone to awaken our intellect are precisely the *confusing* ones: it's *because* we perceive things as both big and small, light and heavy, or equal and unequal that we're led to consider *what the big is* or *what the small is* (*Republic* 523c-524d). So perception doesn't contribute to our learning by providing a strong foothold in

[52]See e.g. *Meno* 81e. Cebes also notes that diagrams can prompt recollection at *Phaedo* 73ab.

[53]I won't examine how this sort of picture coheres with Plato's discussion of perception in *Theaetetus* 184-187. My main point here is that such a deflationary take on perception was a serious Academic position, and I take it that's already established by the fact that Plato takes it seriously in a number of his dialogues.

reality, or by providing an inferential starting-point for the formation of certain beliefs. Perceptual contents are an *inadequate* source of understanding, and it's their inadequacy that serves to prompt our recollection.

On this sort of view, then, perception plays a role similar to the one I ascribed to coffee at the start of this section. It's a prerequisite for the development of scientific understanding, but doesn't supply the content from which our understanding is derived. So despite often being cited as an example of Aristotle's empiricism,[54] the claim that all our learning begins with perception is quite compatible (for all the evidence I've presented so far) with a view on which perception merely acts as a coffee-like stimulant in our cognitive development. More advanced cognitive states would still proceed *from* preexisting perceptual knowledge, but only in the sense that they *counterfactually* or *causally* depend on our perceiving certain things.[55]

I've argued so far that Aristotle's claims about perception's critical role as a starting-point for our learning aren't sufficient to establish it as a *significant* source of prescientific knowledge. The main point was simply that perception might be a *sine qua non* for the development of our understanding without being any part of the explanation why this understanding has the content it does, or why its perceptual origins make it a valuable cognitive state. Aristotle would have been familiar with such a deflationary position, and so any interpretation of perception's epistemic role going beyond it would have to be argued for on other grounds. I'll present such an argument in what follows.

[54]See for instance Bayer (1997: 109), Kahn (1981: 386), or McKirahan (1992: 254)

[55]Frede apparently has this kind of dependence in mind when he claims that Aristotelian understanding is "based causally and not epistemically on perception and experience" (1996: 173). But (as I'll be arguing in what follows) such a reading cannot be reconciled with the use Aristotle makes of perception in his account of our cognitive development.

2.3 *Perception and our epistemic ascent*

The best evidence that Aristotle does *not* hold the sort of deflationary stance outlined above is found in his account of our cognitive development in *APo* B19 and *Met* A1. I'll be examining this account in more detail in our next section—for now, it's sufficient to note its key points, namely, that definitional first principles are grasped by *νοῦς*, and that we come to understand first principles noetically by progressing through a series of cognitive states which start with perception and memory (*μνήμη*), and develop into experience (*ἐμπειρία*), an unnamed state in which "the whole universal has come to rest in the soul" (100a6-8), and, finally, *νοῦς* of first principles.[56] Such a noetic grasp of first principles is supposed to form the basis for our scientific understanding of the domain of which they're part: to have *νοῦς* of the definitions of human being and other animals just is to understand zoology scientifically (cf. p.30).[57]

Now, as I've argued, the fact that our learning begins with perception and develops from there through a series of more advanced cognitive states doesn't yet guarantee that perception has any significant contribution to make to our

[56]It's hard to say even this much without being somewhat dogmatic—in fact it's controversial whether experience and the state in which we grasp universals should really be distinguished, and whether induction is supposed to lead us all the way to first principles. I'll be discussing these issues in more detail in our next section, along with a number of further puzzles concerning the role Aristotle intends his account to fulfill.

[57]For Aristotle, *νοῦς* is a form of "indemonstrable understanding" (*APo* A3 72b19-20). Of course when he says this he can't mean "understanding" in the sense discussed in [2] (on that sense "indemonstrable understanding" is a contradiction in terms, since understanding is precisely what we have when we possess a demonstration). I think Barnes (1993: 106–107) is right to treat this as a merely terminological matter: either we revise our notion of *ἐπιστήμη* to include the grasp we have on definitions, or we simply give this kind of knowledge a different name (as Aristotle does a few lines later). I leave *νοῦς* untranslated because most common translations of the term (e.g. "intellect," or "intuition") already suggest an interpretation of the role the state plays in Aristotle's epistemology—an interpretation that should be argued for, and that I think we should in fact resist.

understanding (except insofar as it gets the learning process started). But there's good evidence that Aristotle thought it did have such a contribution to make. The first piece of evidence is the manner in which Aristotle frames his account of our cognitive development, as an alternative to a certain kind of innatist position:

> [11] [One might wonder] whether the states [which grasp first principles], not being present in us, come about in us or rather are present in us without its being noticed. If we have such states, that's absurd—for then we'd have pieces of knowledge more exact than demonstrations without its being noticed. But if we acquire them without having had them earlier, how would we come to know and learn except through some preexisting knowledge? For that's impossible, as I said about demonstration. It's clear, then, both that we cannot possess these states and also that they cannot come about in us when we are ignorant and possess no state at all.
>
> *πότερον οὐκ ἐνοῦσαι αἱ ἕξεις ἐγγίνονται ἢ ἐνοῦσαι λελήθασιν. εἰ μὲν δὴ ἔχομεν αὐτάς, ἄτοπον· συμβαίνει γὰρ ἀκριβεστέρας ἔχοντας γνώσεις ἀποδείξεως λανθάνειν. εἰ δὲ λαμβάνομεν μὴ ἔχοντες πρότερον, πῶς ἂν γνωρίζοιμεν καὶ μανθάνοιμεν ἐκ μὴ προϋπαρχούσης γνώσεως; ἀδύνατον γάρ, ὥσπερ καὶ ἐπὶ τῆς ἀποδείξεως ἐλέγομεν. φανερὸν τοίνυν ὅτι οὔτ' ἔχειν οἷόν τε, οὔτ' ἀγνοοῦσι καὶ μηδεμίαν ἕξουσιν ἕξιν ἐγγίγνεσθαι.* (*APo* B19 99b25-32)

The kind of view being rejected here is one on which the states grasping first principles are present in our souls in a latent form, and come to be known by some sort of recognition process that makes them manifest—a form of Platonic recollection, say.[58] Aristotle finds it absurd to think that we have some latent understanding of principles, and concludes that these principles must be derived on the basis of some less exact form of preexisting knowledge.[59] And since all

[58] I won't take a position here on whether Aristotle's account is a direct response to Plato's theory of recollection—it's enough for my argument that he is dealing with a Platonic problem, and seeking an alternative to its common Platonic response. For more on the relationship between *APo* B19 and Plato's views, see Adamson (2010).

[59] Aristotle's notion of exactness (*ἀκρίβεια*), as it appears here, can be taken as a rough analogue to his notion of priority—a piece of knowledge is more exact than another if it's closer to first principles (so that knowledge of first principles is most exact). This is also the term used by Plato to characterize the kind of geometrical knowledge Meno's slave might acquire after some practice on his own (*Meno* 85cd).

non-perceptual knowledge must itself be based on some preexisting knowledge (cf. section 2.1), Aristotle concludes that

> [12] we must possess some sort of capacity, but not one which will be more valuable than these states [which know first principles] in respect of exactness. And this certainly seems to be the case for all animals: they have an innate discriminatory capacity called perception.
>
> *ἀνάγκη ἄρα ἔχειν μέν τινα δύναμιν, μὴ τοιαύτην δ' ἔχειν ἢ ἔσται τούτων τιμιωτέρα κατ' ἀκρίβειαν. φαίνεται δὲ τοῦτό γε πᾶσιν ὑπάρχον τοῖς ζῴοις. ἔχει γὰρ δύναμιν σύμφυτον κριτικήν, ἣν καλοῦσιν αἴσθησιν·* (*APo* B19 99b32-35)

Aristotle's argument here is somewhat condensed, for presumably we would have wanted him to identify some preexisting *knowledge* or *state* rather than a preexisting capacity. But the general thought is clear: perception is a capacity that normally gives rise to certain states in a perceiving subject, and these states are meant to constitute the basic form of knowledge Aristotle's account requires.

Naturally perception itself doesn't yield an understanding of first principles—we perceive particulars, while scientific understanding deals with universals (*APo* A31 87b33-35), and we never perceive anything *as* necessary, or *as* explanatory of some given phenomenon (*APo* B7 92b2-3). We therefore need some process to take us from our perceptions to a noetic grasp of first principles; the process Aristotle goes on to describe in the rest of the chapter, and which he eventually identifies as induction (100b4). Still, the inductive learning process *depends* on perception, and the dependence at play here, I claim, is not merely counterfactual.

To see why, recall that Aristotle thinks of his account as an alternative to Platonic innatism—the view that our understanding is latent within us, and can be made manifest by a recollection-like process. And recall that Platonic innatism is *compatible* with the view that the development of scientific understanding is

sparked by some of our perceptions. Indeed, I've argued that Plato holds precisely such a view. So insofar as Aristotle's developmental story is going to challenge the sort of innatist portrayed in [11], perception *must* be more than a mechanism to summon our intellectual capacities, and advanced forms of knowledge must depend on perception in a more-than-counterfactual manner.[60]

Further evidence of perception's significance can be found in a later part of Aristotle's account of our cognitive development. After comparing our learning process to soldiers making successive "stands" in a rout, Aristotle tells us that

> [13] when one of the undifferentiated things makes a stand, there is for the first time a universal in the soul; for although you perceive particulars, perception is of universals—e.g. of human being, not of Callias-the-human-being.
>
> στάντος γὰρ τῶν ἀδιαφόρων ἑνός, πρῶτον μὲν ἐν τῇ ψυχῇ καθόλου (καὶ γὰρ αἰσθάνεται μὲν τὸ καθ' ἕκαστον, ἡ δ' αἴσθησις τοῦ καθόλου ἐστίν, οἷον ἀνθρώπου, ἀλλ' οὐ Καλλίου ἀνθρώπου)· (*APo* B19 100a15-b1)

There's some controversy concerning what exactly the "undifferentiated things" mentioned in this passage are supposed to be.[61] But it's clear from the explicative γὰρ that perception's being "of universals" is supposed to *explain* their taking a stand in our soul, and since Aristotle describes our learning as a sequence of

[60]Plato was well-aware of the *causal* dependence of certain forms of knowledge on some of our cognitive capacities—he simply thinks accounts of how these capacities develop do not, on their own, constitute an adequate explanation how we learn things: Socrates expresses his dissatisfaction with a certain class of explanations couched in terms quite similar to Aristotle's own ("do we think with our blood, or air, or fire, or none of these, and does the brain provide our senses of hearing and sight and smell, from which come memory and opinion, and from memory and opinion which has become stable, comes understanding?" *Phaedo* 96b, adapted from Grube's translation). Thus Aristotle cannot merely be reiterating these explanations *as causal stories*; he must have a different take on the dependence between perception, memory, and other forms of knowledge, if indeed his developmental account is going to pose any challenge to the sort of innatist view someone like Socrates would have endorsed.

[61]I'll be arguing below that they're *infimae species*; universals which can't be differentiated into further species.

stands of this sort, it's clear that perception plays a key role in the development of our understanding.

This passage also shows that the *content* of our perceptions is closely linked to the content of our understanding: we come to understand the definition of human being by perceiving *human beings* like Callias, in virtue of the fact that perception, despite having the particular Callias as its object, is nonetheless "of human being." I'll have more to say about what this perception of universals entails—for now, I just want to note that the universals being perceived are the very ones that might eventually be *understood*, and not mere shadows of these universals grasped in a realm of becoming (cf. *Republic* 525b).

Unlike Plato, then, Aristotle *does* think the relationship between the things we perceive and our eventual knowledge of the universals these things instantiate affects perception's role in our learning. As he explains in a related passage in the *De Anima*,

> [14] Since nothing apart from perceptible magnitudes, as it seems, exists separately, intelligible things are in perceptible forms—both the things spoken of in abstraction and the affections and qualities of perceptible things. And this is why if we didn't perceive anything we wouldn't learn or grasp anything.
>
> *ἐπεὶ δὲ οὐδὲ πρᾶγμα οὐθὲν ἔστι παρὰ τὰ μεγέθη, ὡς δοκεῖ, τὰ αἰσθητὰ κεχωρισμένον, ἐν τοῖς εἴδεσι τοῖς αἰσθητοῖς τὰ νοητά ἐστι, τά τε ἐν ἀφαιρέσει λεγόμενα καὶ ὅσα τῶν αἰσθητῶν ἕξεις καὶ πάθη. καὶ διὰ τοῦτο οὔτε μὴ αἰσθανόμενος μηθὲν οὐθὲν ἂν μάθοι οὐδὲ ξυνείη* (*DA* Γ8 432a3-8)

So Aristotle thinks that intelligible things exist *in* perceptible forms, and that this metaphysical picture explains the dependence between perceptual knowledge and the rest of our learning.[62]

[62] As Hicks notes, when Aristotle mentions *τῶν αἰσθητῶν ἕξεις καὶ πάθη*, he has in mind a certain categorization of accidents that are predicated of substance (cf. Hicks (1965: 546) for a number of passages reflecting this usage).

I take it this is sufficient to establish that Aristotle thought of perception as more than a (Plato-style) *causal* basis for more advanced forms of knowledge: he is not merely claiming that our learning begins from perception, but also, more strongly, that there's an important connection between the things we perceive and those we might understand scientifically, and that this connection should inform an account of our prescientific learning.

Let me end by emphasizing that when I say that Aristotle thinks of perception as more than a *merely* causal basis for other cognitive states, I shouldn't be taken to suggest that he doesn't think of our cognitive development in causal terms. It's quite plain from his discussion in *APo* B19 that he does: his explanation how we come to know definitional first principles proceeds by describing how various concepts arise in our souls, and how the cognitive states necessary for their acquisition are caused (under good circumstances) by other, more basic cognitive states.

However one shouldn't conclude from Aristotle's psychological emphasis that his account of our cognitive development is epistemically uninteresting, or such that it couldn't in principle tell us about our *reasons* or *warrant* for believing first principles.[63] To say of someone that they have medical ἐμπειρία (say) is to claim that they possess a *virtuous* intellectual disposition—someone with ἐμπειρία can rightly be said to *know* something. An explanation how her knowledge comes about can be seen, in part, as an explanation how a range of justified beliefs come to be formed in her soul. I've argued that this sort of formulation doesn't fit well with Aristotle's epistemological framework, but my point here is that the states involved in our intellectual development shouldn't be thought of as

[63] As Frede seems to think (1996: 171–173).

"purely psychological" states divorced from some independent realm of epistemic reasons: one should keep distinct *causal* accounts of perception's role in our cognitive development from *merely causal* accounts of the sort Plato seems to have entertained.

Aristotle often emphasizes perception's role as a starting-point for our learning: perception is the capacity that yields the sort of knowledge upon which all our other knowledge somehow depends. I've argued in this section that the dependence in question is a nontrivial one, and that the perceptual basis for our scientific understanding plays an important role in Aristotle's account of our learning. In particular, I've argued that Aristotle thinks of perception not merely as a *sine qua non* for the development of more advanced forms of knowledge, but also believes that the *content* grasped by someone possessing these more advanced states is based on the *content* she has antecedently perceived. Maybe you suspected this all along—but as I've tried to show, it isn't something *Aristotle* took for granted, and it isn't *obvious* that he endorsed such a view.

Still, this is a modest conclusion. I haven't yet said anything about how we should understand the sort of dependence Aristotle posits between perception and more advanced cognitive states, or what the connection is between perceptual content and the sorts of things grasped by a scientific expert. Doing so will be my aim in the following few sections—beginning with a discussion of the scope and role of inductive learning, before turning to perception's contribution to this inductive process.

3
Perception and Induction

I argued in the previous section that Aristotle doesn't conceive of perception as a mere summoning device for our other cognitive abilities—perception provides the content upon which more sophisticated forms of knowledge are based, and thereby makes a more-than-counterfactual contribution to prescientific learning.

But one might grant this conclusion and nonetheless insist that perception doesn't contribute *much* to the development of scientific understanding: to say that perception isn't merely a *sine qua non* isn't to say that it has any *important* role to play in our learning. And indeed, many of Aristotle's remarks suggest that perception's role would be quite limited. For instance, it's clear from passage [12] that our perceptual capacity is supposed to be something we share with all animals, passage [4] tells us that the things we perceive are those farthest removed from the definitional principles grasped by a scientific expert, and in a number of different places Aristotle *contrasts* perception with the sort of understanding such an expert would possess—as he puts it in the *Metaphysics*, "to perceive is common to all, and therefore easy, and no mark of wisdom" (*Met* A2 982a11-12). This should come as no surprise: Aristotle's conception of scientific understanding requires a form of *theoretical* mastery whose connection with our perceptual knowledge of the

world seems tenuous at best.[64] So it's a natural thought that Aristotle, despite according perception *some* epistemic salience, must have attributed the bulk of our epistemic achievements to some other set of cognitive capacities—perhaps a form of rational intuition, or at least some state related to our distinctively human capacity for rational thought.

In fact I think such a conclusion fails to do justice to the prominent role Aristotle ascribes to perception and perceptually-related capacities, and I'll be presenting a sustained argument to this effect in this section and the next. The argument proceeds outside-in: I'll begin (in this section) by examining Aristotle's views on inductive learning, and then consider (in section 4) perception's place in this inductive learning process. The broader focus is necessary because a proper assessment of perception's epistemic contribution depends on its relation to the more advanced cognitive states involved in the inductive process. It's also necessary because many commentators downplay perception's contribution to our learning on the grounds that induction, taken as a whole, doesn't contribute much to our learning.[65]

In this section I'll be defending a reading of our epistemic ascent to first principles on which induction does play a critical role. For the most part I'll focus on Aristotle's discussion of this ascent in *APo* B19 and *Met* A1, but I'll also consider Aristotle's remarks about induction and its purpose in some of his other works. What I hope to show is that there is good sense to be made of Aristotle's

[64]For one thing, because merely *perceiving* things doesn't allow us to recognize anything as a necessary fact, as Aristotle emphasizes at *APo* B7 92b2-3.

[65]Kahn, for instance, thinks that we can never achieve any grasp of essences by "selecting, combining, or otherwise manipulating simple ideas of sensation," activities he seems to associate with the inductive process, and concludes from this that our *intellect* must be responsible for any such grasp, since perception and induction are insufficient (1981: 407–408). See below for more commentators sympathetic to this line of thought.

claim that induction (and induction alone) provides us with an understanding of scientific first principles, and therefore no reason to ascribe our epistemic progress to certain intellectual faculties that fall outside its scope.

3.1 *Induction and scientific understanding: interpretive challenges*

Recall Aristotle's account of our prescientific ascent to first principles: we begin with perception, proceed through a series of increasingly sophisticated cognitive states, and eventually develop a noetic grasp of the principles from which our scientific conclusions can be demonstrated. Aristotle tells us that our cognitive development will involve universals making successive stands in our soul (e.g. "such-and-such an animal," "animal," and eventually "something partless and universal," 100b1-3), and concludes from this that we learn first principles by induction (ἐπαγωγῇ).[66]

Many commentators have found this account inadequate. For on Aristotle's view scientific understanding requires a grasp of various propositions *in their theoretical role*, either as conclusions explained by the middle term of some demonstrative syllogism, or, in the case of first principles, as indemonstrable premises from which we might begin our explanatory demonstrations. And induction has often been thought too basic a process to yield anything like this: induction (or so the argument goes) allows us to establish certain universal propositions, but doesn't reveal anything about the role these propositions might play in an axiomatized science.

Commentators have addressed this difficulty in one of two ways. Some have

[66]Recall also that a description how "animal" comes to be grasped is also, for Aristotle, a description how certain propositions *about* animals come to be grasped—in particular, to have νοῦς of "animal" is to grasp the definition of animal as an expert zoologist would (cf. section 2.1).

argued that *νοῦς* should be understood both as the state we acquire when we know first principles *and* as the faculty which allows us to move from some inductive conclusion—knowledge that humans are rational animals, say—to the theoretically sensitive grasp we're supposed to reach in the last stage of our intellectual development—knowledge that "humans are rational animals" meets the requirements necessary to count as a biological or zoological first principle.[67] Others have urged a deflationary reading of the chapter, on which Aristotle is only offering a highly elliptical explanation of our acquisition of first principles, and omitting a number of key stages from our complete epistemic ascent.[68] In both cases, the motivating thought is that induction simply couldn't be sufficient to explain how we come to grasp first principles in the right sort of way—and principles of charity quickly lead to the conclusion that Aristotle must be relying on some additional faculties, or explaining something else.

I think this line of thought should be resisted: it fails to do justice to the subtle role induction plays in Aristotle's account, and rests on an overly narrow view of the sort of achievement inductive progress represents. In what follows I'll be defending a more expansive reading of Aristotelian induction, and argue that, properly understood, induction *is* a reasonable answer to the question how we grasp first principles. My argument will have two parts. I'll begin by specifying the role induction is meant to play in the developmental account provided in *APo* B19, as the process responsible for (i) our cognitive advance from perceived particulars to certain universal conclusions we grasp as explanations for our perceptions, and (ii) our cognitive advance from a range of universal conclusions

[67]See e.g. Bayer (1997: 136–141), Kahn (1981: 397–410), Irwin (1988: 134–137), or Le Blond (1939: 136).

[68]See e.g. Bronstein (2012: 52–54), or Kahn (1981: 367–368).

of this sort to a theoretically-sensitive grasp of scientific first principles. I'll then spell out what both forms of progress have in common, and argue that their characterization as forms of *induction* makes good sense in the context of *APo*.[69]

3.2 *The place and role of* APo *B19*

For Aristotle, grasping demonstrations in the right sort of way makes possible an *understanding* why the truths in some domain must hold. An expert astronomer is someone who knows how to demonstrate astronomical phenomena from astronomical first principles, and thereby knows why these phenomena must occur as they do. More generally, someone is in Aristotle's ideal cognitive state (with respect to some domain) when they're disposed to demonstrate, and thereby understand, the facts in that domain that admit of explanation.

Here's an immediate challenge facing such a demonstrative account (a challenge Aristotle himself raises in *APo* A3). If we only understand the things we demonstrate, we won't *understand* indemonstrable first principles. And if we don't understand them—if we only grasp them in some less robust manner, or don't grasp them at all—it's not clear how we could understand what's demonstrated on their basis. So how do we know first principles?

It's clear that Aristotle doesn't think this challenge really threatens the *possibility* of scientific understanding. Despite acknowledging that demanding demonstrations of first principles would yield an explanatory regress, and that such a regress would make scientific understanding impossible (72b5-15), his response

[69]Not all commentators seek to downplay induction's role in Aristotle's account: Barnes (1993: 259–271), Hankinson (2011), and Modrak (1987) all assign it a key role. But these commentators say very little about the development of a grasp of scientific principles *sensitive to their theoretical role*, and so they don't directly address the difficulty raised above.

is simply to insist that we do, in fact, possess scientific understanding, and that we must therefore have a nondemonstrative grasp of principles of some kind or another (72b18-22).

But such insistence doesn't yet answer the *explanatory* challenge implicit in the objection: if the concern was that Aristotle's account failed to *explain* our grasp of definitions, then insisting that we must have such a grasp is no help at all—what we want to know is *how*, on Aristotle's account, we could come to grasp them in the way that makes understanding possible.[70] A satisfactory explanation, moreover, would have to make clear not only how we grasp the *content* of definitional principles, but also how we grasp the principles *as such*. That is, it wouldn't be enough to explain how we come to know certain propositions which happen to express necessary, explanatorily basic facts; Aristotle's account requires an explanation how we recognize definitions *as* necessary and explanatorily primitive. This isn't something Aristotle ever says directly, but there are good reasons, both interpretive and philosophical, to ascribe him such an ambitious view.

On the philosophical side, consider that Aristotle's conception of demonstrative understanding requires a grasp of explanations in their theoretical role: we understand things when we know their explanations and know that their explanations explain them. It's natural to think that this requirement for theoretical sensitivity would extend to the first principles from which demonstrations

[70] Aristotle's other remarks in A3 also fail to address this concern ("we argue in this way; and we also assert that there is not only understanding but also some principle of understanding (*ἀρχή ἐπιστήμης*) by which we know definitions," 72b23-25). The "principle of understanding" in question is later identified as *νοῦς* (A33 88b36, B19 100b15), but aside from giving it a name Aristotle doesn't describe the state any further at this point. (Aristotle makes a similar argument at *EN* Z6, where after ruling out other candidates (*ἐπιστήμη*, *φρόνησις*, *σοφία*) he concludes by elimination that we must have *νοῦς* of first principles (*λείπεται νοῦν εἶναι τῶν ἀρχῶν*, 1141a7).)

begin. To deny this is to claim that we could grasp the explanatory status of any demonstrated truth, yet somehow remain ignorant about the explanatory status of the premises from which our demonstrations begin. And this is implausible: an expert astronomer will surely recognize not only what astronomical first principles explain, but also that they are not themselves explained by further astronomical facts.

There is also a more direct interpretive reason to favor an ambitious interpretation of our grasp of first principles, which is that some of Aristotle's arguments rest on the assumption that we grasp the theoretical role of first principles, and not just their content. Consider for instance the claim that we trust first principles more (*πιστεύομεν μᾶλλον*) than the conclusions derived on their basis. The reason adduced is that "something always holds more (*μᾶλλον ὑπάρχει*) of that because of which it holds—e.g. that because of which we love something is more loved" (72a29-30). Since we trust our scientific conclusions *because* of the principles from which we derive them, Aristotle argues, we will trust the principles more than these conclusions. Whatever one makes of this argument, it's clear that it depends on our grasping principles *as explanatory* of their conclusions—that is, as the things because of which our conclusions hold. If we didn't, we wouldn't trust them more, or at least not for the reason Aristotle gives here.[71]

So Aristotle owes us an account of how a grasp of first principles might be brought about, and, if my argument so far is right, this account would have to

[71] It can't be a brute psychological fact about us that we display a high degree of conviction in principles: Aristotle often emphasizes that principles are the things which are *least* convincing to us, and that it takes a lot of study to develop the conviction a scientific expert would display in her principles (see e.g. *Top* Z4 141b36ff, *Met* A9 992b24ff, or *Met* Z3 1029b3-13). And see also, in a similar vein, the argument that *νοῦς* must grasp first principles because it's the only state *truer* (*ἀληθέστερος*) than our understanding (*APo* 100b11, cf. Lesher (1973: 62–64)).

make clear not only how we come to know the *content* of first principles, but also how we come to recognize their status as explanatory primitives.

3.3 *The place and role of our epistemic ascent*

Such an account is precisely what Aristotle presents in *APo* B19. The chapter is set up as an answer to the questions how first principles come to be known and what the state is which knows them. The second question is set aside until the last few lines of the chapter (100b5-17), where Aristotle argues that *νοῦς* must know first principles because it's the only state truer and more exact than scientific understanding. The point here is purely terminological: *νοῦς* is just the name of the state which grasps first principles, and this conclusion isn't meant to shed any light on the nature or origin of the state.[72] Aristotle's main concern is the first question, about how definitional first principles come to be known, and his response to it will be my focus in what follows.

Before turning to this response, however, I want to raise two preliminary points about its scope. First, one shouldn't expect it to serve as a *guide* to the learning of scientific principles: Aristotle is not seeking to provide some method or inferential procedure which, if carefully followed, would reliably establish beliefs whose contents match those of the first principles proper to some scientific domain. On its own, such an inferential procedure would not explain how we might come to grasp the relevant contents *in the right sort of way*, which (as I've argued) is what Aristotle's account must do. Aristotle's response is thus best conceived as an attempt to explain how we develop theoretically sophisticated

[72] In this respect his response here is similar to the one given in A3 and *EN* Z6. I take Barnes' arguments in favor of such an interpretation to be decisive (1993: 267–70).

cognitive attitudes towards certain universals—and thereby develop a theoretically sophisticated grasp of definitional propositions involving these universals. Such an explanation would answer the challenge raised in *APo* A3, whether or not an inferential path to these definitional propositions is specified.[73]

Second, it's significant that Aristotle frames his account of our cognitive development as an alternative to Platonic innatism (cf. section 2.3). This framing is significant because it already rules out certain deflationary readings of Aristotle's inductive account of our learning. For the kind of Platonic view Aristotle is opposing here seeks to explain how we develop an especially *robust* kind of scientific understanding: recollection isn't just meant to explain how we come to grasp certain basic propositions from which we might go on to learn first principles in some other way—it's supposed to yield the first principles themselves.[74] So what we would expect from Aristotle, in the rest of this chapter, is precisely this sort of account, and not an explanation of how one comes to learn certain basic generalizations from which νοῦς of first principles is then developed by other means. A *partial* account of our learning simply wouldn't constitute a proper response to the kind of innatist portrayed in B19.[75]

[73]See McKirahan (1992: 249) for a similar take on Aristotle's developmental account.

[74]Not everyone would agree that recollection always plays this role for Plato (cf. for instance Bostock (1986: 67–68), though he distinguishes recollection's role in the *Phaedo* from its role in the *Meno*. Fine (2003: 61–65), Nehamas (1985: 20–24) and Scott (1995: chs. 1–2) all take recollection to result in advanced knowledge). For my purposes, however, it's sufficient that *Aristotle* considers the kind of knowledge being retrieved to be knowledge of a sophisticated sort. And I think his emphasis on the exactness of this knowledge is good evidence that he does—recall that Plato also emphasizes exactness when describing the kind of knowledge Meno's slave might acquire after rehearsing his geometry lesson on his own (as noted above, fn59).

[75]One possible response is that Aristotle is only really concerned with the *origins* of our knowledge, and that he distinguishes himself from the innatist already by positing perception, rather than some latent innate knowledge, as the source of our more advanced forms of knowledge (this is what Bronstein (2012: 36) suggests). I'm not convinced by this response. I agree that the perceptual origin of our knowledge is a key part of Aristotle's view, but "perception" is only a satisfactory answer to the question how first principles come to be known if that answer is

Further evidence that Aristotle intends his account as a complete one is provided by the range of cognitive capacities he thinks it must involve:

> [15] Given that perception is present in them, some animals retain what they've perceived, and others don't—and those that don't have no knowledge except what they perceive (either none at all, or none concerning the things they don't retain). But some can still hold [what they perceive] in their soul even after perceiving. When many such things are [retained] there's a further difference: in some reason comes about from the retention of such things, while in others it doesn't.
>
> *ἐνούσης δ' αἰσθήσεως τοῖς μὲν τῶν ζῴων ἐγγίγνεται μονὴ τοῦ αἰσθήματος, τοῖς δ' οὐκ ἐγγίγνεται. ὅσοις μὲν οὖν μὴ ἐγγίγνεται, ἢ ὅλως ἢ περὶ ἃ μὴ ἐγγίγνεται, οὐκ ἔστι τούτοις γνῶσις ἔξω τοῦ αἰσθάνεσθαι· ἐν οἷς δ' ἔνεστιν αἰσθομένοις ἔχειν ἔτι ἐν τῇ ψυχῇ. πολλῶν δὲ τοιούτων γινομένων ἤδη διαφορά τις γίνεται, ὥστε τοῖς μὲν γίνεσθαι λόγον ἐκ τῆς τῶν τοιούτων μονῆς, τοῖς δὲ μή.* (99b36-100a3)

As I read it, this passage offers a classification of animals according to the capacities they're endowed with or which they naturally develop: all animals can perceive, only some of these can remember what they perceive, and fewer still come to reason based on what they remember.[76] In the rest of the chapter Aristotle

accompanied by an account of our development from perception to a properly noetic grasp of first principles. Pointing to the origin of our knowledge of first principles might be enough to *distinguish* one's view from an innatist one, but it isn't enough to provide a plausible alternative to innatism, conceived of as an explanation for a sophisticated sort of learning. Nor would it be sufficient to posit perception as our starting point and go on to describe the preliminary steps of our development: the innatist could happily grant that this preliminary learning happens as Aristotle describes, yet insist that *advanced* learning, which yields a much more robust form of knowledge, requires us to posit some sort of latent innate knowledge, and a recollection mechanism to make it manifest.

[76]Some commentators translate the *λόγος* at 100a2 as "account" rather than "reason", and interpret the last sentence in this passage as a rather condensed description of our cognitive development, where grasping an account is assimilated with grasping a definitional first principle (see for instance Barnes (1993: 262), Bayer (1997: 120), Frede (1996: 169), Hankinson (2011: 46), Modrak (1987: 162), or Tuominen (2010: 123)). An interpretation closer to my own is defended in Bronstein (2012: 40–41), Gregorić and Grgić (2006: 21–23), and Hamlyn (1976: 176–177). Barnes (1993: 262) argues that such an interpretation "cannot be squared with the developmental language of 100a2-3" (i.e. *γίνεσθαι λόγον ἐκ τῆς τῶν τοιούτων μονῆς*). But I find this unconvincing: animals can be classified according to whether or not they *develop* certain capacities as much as whether or not they're born with them (in fact similar language is used at *Met* A1 980a27-29, in

will explain how these capacities make possible certain forms of knowledge—in particular how they make possible *νοῦς* of first principles in animals who can develop an ability to reason.

So Aristotle is trying to explain how we come to develop certain theoretically sophisticated states. His explanation doesn't provide an inferential procedure that would yield definitional first principles—it consists rather in a description of the states involved in the sort of cognitive development that would have scientific understanding as its result. On Aristotle's view, the development in question is *inductive* in nature, and begins with our *perceptual* knowledge—a basic, nonintellectual kind of knowledge available to any animal whatsoever (cf. passage [12]). I'll now turn to Aristotle's account of our ascent from this perceptual knowledge to scientific understanding, paying special attention to the role played by induction.

3.4 *Induction and epistemic ascent in B19*

Here's Aristotle's initial description of our epistemic ascent:

> [16] So from perception there comes memory, as we say, and from repeated memories of the same thing [there comes] experience; for many memories constitute a single experience. And from experience, or [really] from the whole universal which has come to rest in the soul, the one apart from the many, that which is one and the same in all these things, [comes] a principle

a passage which is clearly not meant to summarize our cognitive development). In any case, if Aristotle *were* offering a condensed version of our cognitive development, he'd be omitting some of the intermediate stages he seems keen on emphasizing in other texts, most notably experience. For parallel passages that support my favored reading, see *Met* A1 980a28-b28, which ends by drawing a contrast between nonhuman animals, who live "by appearances and memories" (*ταῖς φαντασίαις καὶ ταῖς μνήμαις*) and human beings, who live "also by craft and by reasonings" (*καὶ τέχνῃ καὶ λογισμοῖς*). The contrast doesn't exactly match the classification in [15], but it does lend some support to the thought that *λόγος* should be taken here as a nonspecific kind of reasoning ability. See also *DA* Γ3 427b11-16, where animals are being classified according to their capacities, and those able to think (*διανοεῖσθαι*, in a quite general sense) are said to have *λόγος*.

> of craft or understanding [i.e. νοῦς]—of craft if it concerns coming-to-be, of understanding if it concerns what is.
>
> Ἐκ μὲν οὖν αἰσθήσεως γίνεται μνήμη, ὥσπερ λέγομεν, ἐκ δὲ μνήμης πολλάκις τοῦ αὐτοῦ γινομένης ἐμπειρία· αἱ γὰρ πολλαὶ μνῆμαι τῷ ἀριθμῷ ἐμπειρία μία ἐστίν. ἐκ δ' ἐμπειρίας ἢ ἐκ παντὸς ἠρεμήσαντος τοῦ καθόλου ἐν τῇ ψυχῇ, τοῦ ἑνὸς παρὰ τὰ πολλά, ὃ ἂν ἐν ἅπασιν ἓν ἐνῇ ἐκείνοις τὸ αὐτό, τέχνης ἀρχὴ καὶ ἐπιστήμης, ἐὰν μὲν περὶ γένεσιν, τέχνης, ἐὰν δὲ περὶ τὸ ὄν, ἐπιστήμης. (100a3-9)

The main interpretive difficulty here concerns the ἢ at 100a6. I've rendered it as progressive rather than epexegetic or disjunctive; that is, I think Aristotle doesn't *assimilate* experience with the stage at which "the whole universal has come to rest in the soul," but rather thinks of these as two different stages on the path to first principles.[77] Such a reading seems to me well supported by *Met* A1, where Aristotle associates the grasp of universals with a certain kind of craft knowledge, and distinguishes this knowledge from that possessed at the stage of experience—as he puts it, "experience is knowledge of particulars, and craft of universals" (981a15-16). I'll be discussing this passage in more detail below—for now I only want to note that such remarks are hard to square with the view that experience would itself be the state in which some universal has come to rest in our soul. If this is right, there is some incentive to think Aristotle is distinguishing four stages prior to our noetic grasp of first principles:[78] perception, memory, experience, and an unnamed stage beyond experience in which the inquiring subject grasps "the whole universal."

[77] I don't know of anyone committed to a disjunctive reading (but see Tuominen (2010: 126–127)). Defenders of the epexegetic reading include Barnes (1993: 264), Le Blond (1939: 129–130), and Ross (1949: 674). Recent proponents of the progressive reading include Bronstein (2012: 44), Charles (2003: 150), Lesher (1973: 59), and McKirahan (1992: 243). I call this reading "progressive" rather than "corrective" to underline that it wouldn't be *false* to claim that a principle of craft or understanding comes from experience—it is simply more *accurate* to say that it comes from the proximate state following experience.

[78] The noetic stage is identified in this passage as a "principle of craft or science," which is in line with the terminology Aristotle uses elsewhere in *APo* (see 72b24, 88b36, and 100b15).

How do we progress from one cognitive stage to the next? Aristotle starts with a rather unhelpful analogy:

> [17] Thus the states [which know first principles] neither inhere [in us] in a determinate form, nor come about from more knowing states, but rather from perception—just as in battle when a rout has occurred, one [soldier] makes a stand, then another does, then another, until a starting-point is reached.[79] And the soul is the sort of thing that can undergo this.
>
> *οὔτε δὴ ἐννυπάρχουσιν ἀφωρισμέναι αἱ ἕξεις, οὔτ' ἀπ' ἄλλων ἕξεων γίνονται γνωστικωτέρων, ἀλλ' ἀπὸ αἰσθήσεως, οἷον ἐν μάχῃ τροπῆς γενομένης ἑνὸς στάντος ἕτερος ἔστη, εἶθ' ἕτερος, ἕως ἐπὶ ἀρχὴν ἦλθεν.* (100a10-14)

Without reading too much into the details of the battle scene, Aristotle seems to be suggesting here that our progress from perception to first principles resembles a rout in which soldiers make successive stands. It's hard to determine what these stands might represent on the basis of this passage alone, but Aristotle elaborates in the next few lines:[80]

> [18] Let's repeat what we've just said, though not clearly. [18a] When one of the undifferentiated things makes a stand, there is for the first time a universal in the soul; for although you perceive particulars, perception is of universals—e.g. of human being, not of Callias-the-human-being. [18b] And again a stand is made among these, until something partless and universal makes a stand—for instance "such-and-such an animal" makes a stand, until "animal" does; and likewise with "animal." [18c] Thus it's clear that we must get to know the primitives by induction; for this is how perception creates universals in us.
>
> *ὃ δ' ἐλέχθη μὲν πάλαι, οὐ σαφῶς δὲ ἐλέχθη, πάλιν εἴπωμεν. στάντος γὰρ τῶν ἀδιαφόρων ἑνός, πρῶτον μὲν ἐν τῇ ψυχῇ καθόλου (καὶ γὰρ αἰσθάνεται μὲν τὸ καθ' ἕκαστον, ἡ δ' αἴσθησις τοῦ καθόλου ἐστίν, οἷον ἀνθρώπου, ἀλλ' οὐ Καλλίου ἀνθρώπου)· πάλιν ἐν τούτοις ἵσταται, ἕως ἂν τὰ ἀμερῆ στῇ καὶ τὰ καθόλου, οἷον τοιονδὶ ζῷον, ἕως ζῷον, καὶ ἐν τούτῳ ὡσαύτως. δῆλον δὴ ὅτι ἡμῖν τὰ πρῶτα ἐπαγωγῇ γνωρίζειν ἀναγκαῖον· καὶ γὰρ ἡ αἴσθησις οὕτω τὸ καθόλου ἐμποιεῖ.* (100a14-b5)

[79] Taking the *ἦλθεν* at 100a13 in an impersonal sense. For a survey of the many possible interpretations of this simile, see Lesher (2010).

[80] I take the *πάλιν* at 100a14 to refer to 100a3-9, rather than anything farther back (cf. Barnes (1993: 265)).

In broad terms, the structure of this passage is this: a first stand occurs when [18a] a universal is first brought about from perception, after which [18b] higher and higher universals successively make their own stands until we reach a universal which is "partless and universal." Aristotle concludes [18c] that we must grasp first principles (which he calls "primitives" here) inductively, because (*γάρ*) it's through induction that perception creates universals in our souls.

A natural thought here would be that the universals perception creates in us just *are* first principles, and that we grasp first principles inductively because a single inductive process takes us straight from perception to *νοῦς* of first principles, and that this is why we grasp first principles inductively. But there are good reasons to reject such an interpretation. For one thing, it wouldn't tell us anything about how induction relates to the various cognitive states Aristotle identified as key steps in our cognitive ascent: if we grasp first principles by a simple induction on our perceptions, why bother mentioning memory, experience, or our post-empiric grasp of a universal? It also seems hard to square this kind of reading with Aristotle's description of various interrelated universals making *successive* stands in our soul—unless all these universal stands are somehow meant to be part of a single inductive process.[81]

In fact I think Aristotle's argument is more subtle than this. He begins (in [18a]) by identifying a first "stand" with the development of a first universal in our soul. When he proceeds (in [18b]) to describe the development of higher

[81] One might also worry about such an interpretation on philosophical grounds. For it makes Aristotle's account rather similar to the kind of innatist view he seeks to reject: recollection is also a process which takes us from certain perceptions to a sophisticated grasp of theoretical notions (e.g. from our perception that two sticks are both equal and unequal to a grasp of the Form of Equality). So at the very least induction would have to be described in more detail if it is really meant as an alternative to the sort of recollection an innatist might posit.

universals in terms of "stands," his point is that the *kind* of process responsible for the first stand is also responsible for subsequent ones. And when he concludes from this (δῆλον δή, in [18c]) that *induction* must be responsible for our grasp of first principles, he's leaving out the key premise that induction is the process responsible for the first stand in our soul—which is precisely the premise he supplies to support (γάρ) his conclusion at the very end of our passage.[82] In short, then, his argument has the following form: some sort of process is responsible for our first grasp of a universal, the same sort of process leads us to grasp higher and higher universals until we reach first principles, so *induction* must lead us to first principles, since induction is the process responsible for our first grasp of a universal.

What we should take away from this is that Aristotle isn't claiming that a *single* induction takes us from perception to first principles. Nor is he inferring, as most commentators assume, that we know first principles inductively from the fact that each "stand" yields an increasingly *general* universal. His claim is rather that the processes responsible for the first and subsequent universal stands in our soul are all *instances* of a certain kind of induction—namely, the kind of induction at play when we first grasp a universal on the basis of our perceptions. We grasp first principles through repeated inductions of this sort, rather than relying on a single inductive step, and this regardless of the relative generality of the universals in question.[83]

[82] I thus disagree with Hamlyn, who denies that the οὕτω at 100b5 refers to induction on the grounds that universals are already said to be present in the soul at the perceptual level, before any induction has taken place (1976: 180–181). Hamlyn fails to consider that one might grasp universals in quite different ways: a universal might be in the perceiver's soul even if she doesn't recognize it as such, and induction might therefore produce a certain *kind* of grasp universals which perception does not. I'll be discussing the grasp in question in more detail below.

[83] See McKirahan (1992: 250) for a similar take on passage [18].

One difficulty with the reading I'm suggesting is that these inductive processes don't seem to have much in common: the first takes us from a grasp of one or more perceived individuals to a grasp of some universal, while subsequent inductions begin already at the level of universals, and take us to further universals. Moreover, the two processes may seem to reflect different sorts of cognitive achievements. For one might think that the development from perception to our very first grasp of some universal happens at a rather basic conceptual level, while progressing through higher universals should involve serious intellectual work, especially if this kind of advance involves a theoretically-sensitive grasp of the relevant universals. Is there any sense to be made of the thought that the same form of progress is responsible for these two developments?

I think we face an interpretive dilemma. If "induction" is just understood as a placeholder for "any cognitive progress from the less to the more general" (Barnes (1993: 267)), then it's clear enough how it might account for both our advance from particular perceptions to certain universal conclusions and our later ascent to further, more general universals. But it's hard to see how "progressing to the more general," on its own, would ever yield a *theoretically-sensitive* grasp of definitions. Assuming we've encountered a number of human beings and come to grasp that human beings are rational animals, for instance, how are we supposed to *induce* that we shouldn't look for a further explanation of this fact, or *induce* that it expresses what it is, essentially, to be a human being? If induction is just a form of progress to the more general, it isn't clear how it could ever tell us this much.

If, on the other hand, "induction" is taken to be a more robust sort of process—the sort of process which might actually yield a theoretically-sensitive grasp of first

principles—then our interpretive challenge is to explain what *sort* of cognitive progress it's meant to represent. For it isn't clear what unifies our progress from perception to universals and our later progress to first principles, or, in Aristotle's terminology, what unifies the first and subsequent universal stands in our souls. And even if these two forms of progress do have something in common, it may seem doubtful that they could count as cases of Aristotelian induction—for induction, one might think, never affords us the grasp of *explanatory priority* required for our epistemic ascent.

I think we should opt for the second horn of this dilemma: the more robust notion of induction can be given a unified account, and some of Aristotle's remarks elsewhere in *APo* suggest that *ἐπαγωγή* can encompass quite sophisticated forms of cognitive progress. Before offering a defense of these claims, however, I want to clarify one last point about the (quite difficult) passage [18].

Aristotle claims in [18a] that "undifferentiated things" (*ἀδιάφορα*) make a stand in our souls. I'll be interpreting these as *infimae species*, which are "undifferentiated things" because one can't differentiate them into further species.[84] A worry that's often raised with this interpretation is that it seems to make Aristotle's account incomplete, assuming from the start that we can grasp universals like "human being" without explaining their development on the basis of what we

[84]Some commentators (e.g. Bronstein (2012: 55)) suggest taking the *ἀδιάφορα* as *individual members* of some species, undifferentiated because they belong to the same species, while others (e.g. Bolton (1991: 6)) identify them with the "confused" (*συγκεχυμένα*) universals of *Phys* A1 184a22, undifferentiated because their features haven't yet been spelled out in detail. One difficulty with the first kind of reading is that it isn't clear how the *next* stand—that by which we reach a higher universal—would be "made among these (*ἐν τούτοις*)" (cf. Hankinson (2011: 48)). For the items among which this stand is made are themselves universals (e.g. "such-and-such an animal" or "animal"), and it's natural to read "these" at 100b1-2 as referring back to the *ἀδιάφορα* which made the first stand. Bolton's alternative makes good sense, but the *Physics* passage on which it rests speaks of moving from the universal to the particular, and this doesn't seem to sit well with the move from *ἀδιάφορα* to higher universals described here.

perceive—for simply stating that perception is somehow "of the universal" isn't saying much. My response to this worry is twofold. First, our perceptual grasp of universals should not be *assimilated* with our grasp of undifferentiated things: the fact that perception is "of universals" features in Aristotle's *explanation* how a grasp of *infimae species* might possibly come about, but it doesn't yield that grasp itself. Second, nothing in B19 prevents the "first stand" from occurring at a stage we reach after we've already undergone a good portion of the cognitive development described in [16]. Indeed, given that one of the key stages in this development is described as that in which some *universal* has come to rest in the soul, I think there is some pressure to identify the first stand with the grasp of a universal we develop *after* having progressed through the stages involving perception, memory, and experience. Aristotle does describe these pre-universal states in other texts, so interpreting the *ἀδιάφορα* as I'm suggesting doesn't make his account incomplete.

So far, then, I've argued that each of the "stands" being described in [18] represents a separate use of induction, and that "induction" here is just the kind of process responsible for the first stand of a universal in our soul. I've further argued that this first stand represents our grasp of some *infima species*, and that it only occurs after we've progressed through three of the four cognitive states prior to a noetic grasp of first principles. I'm now going to consider the sort of progress this first stand represents and what it might have in common with subsequent stands in our soul, before trying to make sense of the claim that these stands should all count as *inductive* forms of cognitive progress.

3.5 *The first stand: perception to craft-knowledge*

The objects of perception, for Aristotle, are particular things in particular places at particular times.[85] But there's nonetheless some sense in which we also perceive the universals to which such particulars belong—as Aristotle notes in passage [18], we don't just perceive Callias, but Callias as the human being he is. Now, perception is clearly not meant to yield an *advanced* grasp of universals—it's not merely by perceiving Callias that we're able to explain a range of anthropological phenomena, or recognize what attributes must belong to any human, or, for that matter, even grasp how the concept "human" operates in common language.[86] Indeed, at the perceptual stage an inquiring subject may not have the concepts necessary to *articulate* what she perceives, much less reason about it. But at the very least the perceiving subject will bear some relation to the universals instantiated by the things she perceives—and this, together with the subject's other cognitive capacities, will allow her to develop a more advanced grasp of universals.[87]

Part of what makes this development possible is our capacity to achieve a form of *experience* on the basis of repeated perceptions of a certain type, retained

[85] See for instance *APo* A31, or *Mem* 449b10-15. The type of perception at play in *APo* is typically not the perception of proper or common sensibles, but rather the sort of "incidental" (*κατὰ συμβεβηκὸς*) perception Aristotle mentions at *DA* B6 418a20-21.

[86] Still, as I'll be arguing below, perception isn't "of universals" merely in the sense that universals like "human being" are somehow *deducible* from basic perceptual data, or because the things we perceive happen to instantiate certain universals. After all, the universal character of our perception is supposed to *explain* how a universal might come to make a stand in our soul, and the fact that universals are in principle deducible from perceptual data does nothing of the sort (more on this and related points in chapter 4).

[87] I'll be discussing perception's universal character in more detail in chapter 4. For now my focus will be on perception's place in our epistemic ascent, and on its connection with memory and experience.

as memories. Experience is a state Aristotle describes in some detail in *Met* A1:[88]

> [19] Animals other [than human beings] live with images and memories, and share a little in experience; but the human race lives by both craft and reasonings. In human beings, experience comes from memories—for many memories of the same thing produce a single experience. Though experience seems to be quite similar to understanding and craft, in fact it's *through* experience that understanding and craft come about in human beings. For as Polus says, "experience makes craft and inexperience luck." And craft comes about when a single universal judgment comes to be from many notions of experience. For to have a judgment that when Callias was ill of this disease this did him good, and similarly in the case of Socrates and in many particular cases, is a matter of experience; but to judge that it has done good to all persons of a certain constitution, marked off in one class, when they were ill of this disease, e.g. to phlegmatic or bilious people when burning with fever, this is a matter of craft.
>
> *τὰ μὲν οὖν ἄλλα ταῖς φαντασίαις ζῇ καὶ ταῖς μνήμαις, ἐμπειρίας δὲ μετέχει μικρόν· τὸ δὲ τῶν ἀνθρώπων γένος καὶ τέχνῃ καὶ λογισμοῖς. γίγνεται δ' ἐκ τῆς μνήμης ἐμπειρία τοῖς ἀνθρώποις· αἱ γὰρ πολλαὶ μνῆμαι τοῦ αὐτοῦ πράγματος μιᾶς ἐμπειρίας δύναμιν ἀποτελοῦσιν. καὶ δοκεῖ σχεδὸν ἐπιστήμῃ καὶ τέχνῃ ὅμοιον εἶναι καὶ ἐμπειρία, ἀποβαίνει δ' ἐπιστήμη καὶ τέχνη διὰ τῆς ἐμπειρίας τοῖς ἀνθρώποις· ἡ μὲν γὰρ ἐμπειρία τέχνην ἐποίησεν, ὡς φησὶ Πῶλος, ἡ δ' ἀπειρία τύχην. γίγνεται δὲ τέχνη ὅταν ἐκ πολλῶν τῆς ἐμπειρίας ἐννοημάτων μία καθόλου γένηται περὶ τῶν ὁμοίων ὑπόληψις. τὸ μὲν γὰρ ἔχειν ὑπόληψιν ὅτι Καλλίᾳ κάμνοντι τηνδὶ τὴν νόσον τοδὶ συνήνεγκε καὶ Σωκράτει καὶ καθ' ἕκαστον οὕτω πολλοῖς, ἐμπειρίας ἐστίν· τὸ δ' ὅτι πᾶσι τοῖς τοιοῖσδε κατ' εἶδος ἓν ἀφορισθεῖσι, κάμνουσι τηνδὶ τὴν νόσον, συνήνεγκεν, οἷον τοῖς φλεγματώδεσιν ἢ χολώδεσι [ἢ] πυρέττουσι καύσῳ, τέχνης.* (980b25-981a12)

An experienced doctor, then, remembers the particular treatments which cured particular patients with particular diseases. On the basis of these past cases, she's able to determine which treatment will be effective given some particular patient with some particular disease. But her diagnoses are always rooted in and directed towards particulars—the experienced doctor doesn't pick a treatment by recognizing that Callias belongs to the type "phlegmatic human being," noting that an instance of "being affected by malarial fever" is present in him, and

[88]I follow Ross' translation, with a few minor modifications.

inferring that "bloodletting with leeches" would be a good treatment. Reasoning of this sort is only available to a physician capable of identifying the explanation for symptoms of some given type independently of any particular case presented to her—and as Aristotle goes on to explain, such an ability is proper to the person who knows the *craft* of medicine (981b6).[89]

So when Aristotle claims, in [16], that experience arises out of "repeated memories of the same thing" and that "many memories constitute a single experience," he is trying to explain how perceptual knowledge, whose objects are particular things in particular places and times, could ever provide a sufficient basis for the sort of reliable behavior displayed by those with experience. His explanation rests in part on the fact that perception is "of universals," even for perceivers who don't yet possess the concepts necessary to *reason* about the universals they perceive. It also rests on the fact that animals endowed with memory can retain their perceptions, and that many memories of the same sort of thing might, in some of these animals, yield the kind of unified, reliable experience described above.[90] Aristotle thinks memory yields this sort of experience by linking past perceptions with a subject's present situation:[91]

> [20] When someone has scientific understanding and perception without actively exercising them, he remembers on the one hand [=in the case of understanding] that he learned or theorized, and on the other [=in the perceptual case] that he heard, or saw, or something like that. For when someone actively engages in remembering, it's in this way that it's always said in their soul that they heard or perceived or thought this before.

[89]For a more detailed account of experience and its relation to craft, see Charles (2003: 151–156).

[90]So, for instance, memories of a certain type of symptom and of some prescribed treatment's effects might constitute a "single experience" of some curing process. An experienced doctor would presumably rely on a number of experiences of this sort.

[91]The translation here is adapted from Sorabji's. I follow a number of commentators in finding *τὰς … ἴσαι* misplaced. See Sorabji (1972: 68–69) for an argument to this effect.

> ὅταν δ' ἄνευ τῶν ἔργων σχῇ τὴν ἐπιστήμην καὶ τὴν αἴσθησιν, οὕτω μέμνηται [τὰς τοῦ τριγώνου ὅτι δύο ὀρθαῖς ἴσαι], τὸ μὲν ὅτι ἔμαθεν ἢ ἐθεώρησεν, τὸ δὲ ὅτι ἤκουσεν ἢ εἶδεν ἤ τι τοιοῦτον· ἀεὶ γὰρ ὅταν ἐνεργῇ κατὰ τὸ μνημονεύειν, οὕτως ἐν τῇ ψυχῇ λέγει, ὅτι πρότερον τοῦτο ἤκουσεν ἢ ᾔσθετο ἢ ἐνόησεν. (*Mem* 449b18-23)

So someone with scientific understanding can bring that understanding to mind (and act on it) by remembering that they were taught something, and thereby remembering the things they were taught. Likewise, someone who has perceived something can bring that perception to mind (and act on it) by remembering that they perceived something, and thereby remembering what they perceived.[92] In both cases, it's "said" in the subject's soul that they perceived or thought the sort of thing they're remembering. Such an announcement need not involve any rational capacity: we can remember a past perception without thinking of it *as a past perception*, and act on the basis of remembered perceptions without recognizing that we do.[93]

Experience involves more than this capacity to remember—but not much more. The experienced person is someone who has internalized some of the connections between her memories and is able to adapt her behavior on the basis of perceptions of a certain type. Experience therefore remains a relatively basic state: the experienced person doesn't yet *reason about* or even *recognize* the connections between her memories as connections between certain types which the remembered individuals instantiate. So though *we* might claim that an experienced doctor knows that all malarial phlegmatics should be leeched,

[92] On Aristotle's usage here we can't *remember* being taught something (or perceiving something) without remembering the content of the teaching (or the content of our perception).

[93] At *Mem* 453a4ff Aristotle draws a contrast between *recollecting* and remembering: only the former is described as a kind of *reasoning* about our experiences—a form of (literal) soul searching (ζήτησίς, 453a12) unavailable to lower, non-deliberative animals.

the doctor herself (*qua* experienced) doesn't think of her patients or treatments in such terms: she simply has an ability to bring to mind the treatment she prescribed other patients, and the positive effects these treatments brought about.

Aristotle emphasizes that the sort of reasoning available to a craft-physician need not make her any more *successful* than an experienced doctor—*reasoning* about diseases and symptoms doesn't necessarily make us any better at curing them. But the craft-physician does differ from an experienced doctor in two significant ways: first, the physician can identify the *explanation* for some successful treatment, while the experienced doctor acts without any explanatory knowledge, and second, the physician can recognize the effects of some *type* of disease in some *type* of patient, while the experienced doctor merely treats symptoms on a particular, case-by-case basis. It may seem good to keep these points distinct, for one could recognize patients as being of a certain type—as "phlegmatics", say—without yet knowing the explanation for the symptoms that phlegmatic people might display. But in fact Aristotle tends to assimilate the two, and often speaks as though grasping universals would make clear certain explanations that invoke the universals in question.[94] So even if an ability to make judgments about types of individuals "marked off in one class" is a criterion for craft-knowledge, as Aristotle suggests in [19], it's really our grasp of *explanations* which makes us wiser and allows us to "know in a truer sense" (μᾶλλον εἰδέναι, 981a31) than someone with mere experience—the main mark of our cognitive progress beyond perception and experience is an *explanatory* form of understanding.

[94] Compare for instance 981a5-7 and 981a16, where craft is associated with universals, with 981a24-28, where craft is associated with explanatory knowledge. See also 981b10-13, where knowledge of particulars is contrasted with explanatory knowledge (rather than *universal* knowledge, as one might have expected).

Aristotle never explains how such understanding might come about, but it doesn't seem too hard to fill out his account: a doctor reliable in her treatment of a range of particular patients might consider whether certain symptoms were common to certain *types* of patients, and whether some *type* of medicine was an effective way to treat them. If this kind of demarcation proves helpful, she might also be led to consider whether some type of disease (malaria, say) might account for the symptoms in question, and explain the medicine's effectiveness. And if she's successful in identifying the relevant disease, she'll have developed the kind of explanatory grasp proper to the craft of medicine. Her progress will consist in identifying some universal ("being malarial") to which feverish phlegmatics, considered as a class, belong, and in seeing that their belonging to this universal explains their symptoms and the effectiveness of certain treatments.[95] It's at this point, as I read Aristotle, that a universal will have "come to rest" (or "made a stand") in the physician's soul. For this is the first time our physician grasps universals *as universals*—the first time she is able to reason about what's "one and the same" in the many patients she encounters and prescribe a general type of treatment for some general type of symptom, recognizing both as such, that is, as Aristotle puts it in passage [16], as "one apart from the many."

A person in this state doesn't yet have *νοῦς* of medical first principles. She doesn't yet know, for instance, whether the diseases she's identified are explanatorily basic or not, nor could she situate any of her explanations in an axiomatic science of medicine. At this point she may not know if such a science is even to be found—it might simply not be possible to organize medical explanations in the

[95]Recall (p.55) that Aristotle's concern here isn't *methodological*, so we shouldn't expect an account of how exactly an experienced doctor might go about identifying the causes of various diseases. The aim is to describe the key states involved in our epistemic ascent.

well-ordered fashion a demonstrative science requires. Still, she has made significant progress in this direction by reflecting on the practical and particular-minded grasp she had at the stage of experience, and which she developed on the basis of a range of (remembered) perceptions. If my reading of B19 is correct, the universal conclusions reached on this basis each represent a separate use of induction.

The point I wish to emphasize here is that the resulting grasp of universals does not simply consist in an ability to form general judgments, or identify some group of individuals as members of a certain class. This is a necessary component of our advance from experience, but it isn't sufficient. For our progress also consists in recognizing the explanatory relations between these universals—someone with the craft of medicine, for instance, won't just grasp that all feverish phlegmatics are cured by being leeched; she will grasp that "feverish phlegmatics" belong to the class of "malarial patients," that their belonging to this class *explains* their fever, and that they would therefore be cured by being leeched. Someone with such a craft could not yet be said to have *νοῦς* of the first principles of the science of medicine, but she would at least have an explanatorily-sensitive grasp of some of the conclusions the science might aim to secure.

So suppose, for now, that it's correct to call this kind of progress *inductive* (I'll be defending this claim later). What does it have in common with the subsequent universal stands in our soul? Once you've grasped certain portions of the science of medicine in the manner described above, how might you learn the basic principles of medical science, and recognize their explanatorily primitive role—and how does the progress from perception to medical craft compare with the progress from medical craft to *νοῦς* of medicine? I'll turn to these points in this next section.

3.6 *Subsequent stands: universals to νοῦς*

Set aside medicine for a while, and suppose you're an astronomer with a craft-like grasp of certain universals. You don't yet grasp astronomical first principles, and so you may not yet know how to produce proper demonstrations of all the astronomical events you've witnessed, but you can still explain some of them, and reason about them in universal terms. You might know, for instance, that shooting-stars are caused by a trail of vapor gleaming through the sky, that comets are caused by a fiery exhalation in the celestial sphere, and that the milky way is caused by a concentration of bright constellations outside the tropics.[96] In each case, you grasp an explanation for a range of perceived phenomena, and can reason about the explanation and the phenomena in general terms, without *perceiving* any one of their instances.

At this stage you only grasp distinct explanations for distinct types of astronomical phenomena. But you might seek some further explanation which would provide a more basic and unified account than the ones you currently have. For instance, you might come to see that the shooting-star's vapor and the comet's fiery exhalation are both instances of *condensation of the air*, and recognize that this condensation explains their behavior. And if you push the search further, you might come to see that the circular motion of the celestial sphere, together with some basic properties of air and fire, can explain this condensation as well as the presence of the Milky Way and a host of other sublunar phenomena. In doing so, you would come to recognize common explanations for a range of phenomena you were already able to explain in a piecemeal manner.

[96] These examples are from *Metr* A4-8.

I claim that the cognitive development at play in this recognition is similar to the one the experienced doctor undergoes when she learns the universal explanation underlying her treatment of a range of particular patients. Consider them side by side. The doctor's progress stems from the recognition that feverish phlegmatics are all malarial, and that this explains their symptoms and the effectiveness of having them leeched. Your progress as an astronomer stems from the recognition that vapor and fiery exhalation are both instances of a certain kind of condensation, and that this explains why they have the effects we observe them to have. In both examples, a universal is identified under which a range of cases are found to fall, and the fact that the cases instantiate the universal is supposed to explain their behavior. Why do vapor and fiery exhalation behave as they do? Because they're both instances of *condensation*. Why does leeching cure this feverish phlegmatic, and this other feverish phlegmatic, and so on? Because all these feverish phlegmatics are *malarial* (or, to put it more conspicuously, because they all instantiate malarial disease). If the medical example is a case of induction, there's good reason to think of your own astronomical progress as a case of induction, too.

Now, it's not yet clear how this kind of progress could yield a *noetic* grasp of first principles. What we have so far is a process which yields a grasp of certain universal explanations, and this alone won't tell us which universals *don't* admit of further explanation.[97] So one might think that even the robust sort of induction

[97]It also hasn't yet been made clear how knowledge of an explanation, or even of a series of explanations, would translate into knowledge of a *demonstration* containing the relevant universal as its middle term. But finding demonstrations is easy once we grasp explanations: if we already know that feverish phlegmatics instantiate malarial disease and that this explains why they should be leeched, for instance, it's a small step to form a demonstration establishing as much ("all feverish phlegmatics are malarials, all malarials should be leeched, so all feverish phlegmatics should be leeched").

I've been describing would have to be supplemented to truly provide a grasp of principles as explanatory primitives.

In fact I think this is unnecessary. To see why, it'll be important to consider a common Aristotelian assumption, namely that we can and should begin our inquiries by gathering all the scientific explananda relevant to some domain. Aristotle makes this point in a number of places, but here is a representative passage from *APr*:[98]

> [21] The situation is the same in any other craft or science [as it is in astronomy]; once it has been grasped what belongs to each thing, at that point we should be prepared to point out the demonstrations. For if nothing that truly belongs to the things has been left out in the collection of observations, we will be in a position to find the demonstration and demonstrate anything that admits of demonstration, and where there cannot be a demonstration, to make this evident.
>
> *ὁμοίως δὲ καὶ περὶ ἄλλην ὁποιανοῦν ἔχει τέχνην τε καὶ ἐπιστήμην· ὥστ' ἐὰν ληφθῇ τὰ ὑπάρχοντα περὶ ἕκαστον, ἡμέτερον ἤδη τὰς ἀποδείξεις ἑτοίμως ἐμφανίζειν. εἰ γὰρ μηδὲν κατὰ τὴν ἱστορίαν παρα λειφθείη τῶν ἀληθῶς ὑπαρχόντων τοῖς πράγμασιν, ἕξομεν περὶ ἅπαντος οὗ μὲν ἔστιν ἀπόδειξις, ταύτην εὑρεῖν καὶ ἀποδεικνύναι, οὗ δὲ μὴ πέφυκεν ἀπόδειξις, τοῦτο ποιεῖν φανερόν.* (46a17-27)

On Aristotle's view, then, our ability to find demonstrations and determine what cannot be demonstrated is dependent on an exhaustive survey of some domain of facts.[99] Once all the domain-specific facts have been gathered, we will have at our disposal all the terms necessary to describe the domain, and be ready to distinguish those attributes that belong to a subject's essence from those which are demonstrated on their basis.[100]

[98] See also *APo* B1 89b29-31, *HA* A6 491a7-14, *PA* B1 646a8-12, or *DA* A1 402b22-403a2.

[99] Aristotle does seem to think that we could provide approximate principles with an incomplete set of facts (*DA* A1 402b22-403a2). But ideally we would have all the facts at our disposal.

[100] Aristotle never explains how we would know we've amassed "all the facts" about some given domain, or how we would know which facts belong to which domain in the first place (which is nontrivial given that at this point in our inquiry we wouldn't have identified the principles definitive

The assumption that we have a comprehensive set of candidate explananda and explanantia at our disposal suggests a way induction could yield a grasp of principles as explanatorily basic. The idea is simply that repeated inductions would eventually reveal all the explanatory connections in the domain under consideration. And if induction repeatedly fails to produce a universal explanation for some fact (that the celestial sphere moves in circular way, say), it will "make evident" (*τοῦτο ποιεῖν φανερόν*, 46a27) its explanatorily primitive status: since we've assumed that we have an exhaustive collection of facts at our disposal, no further observation could possibly serve to explain it. And insofar as induction makes this evident, it will yield an explanatorily-sensitive grasp of the definitional principle expressing the fact in question. Though it won't *prove* its explanatorily basic status, there's a clear sense in which induction will reveal it.[101]

I've argued so far that there's good sense to be made of the claim that we come to know demonstrative first principles (and come to know them in a theoretically-sensitive manner) by induction *if* induction is understood a certain way—roughly, if induction is understood as a form of cognitive progress from a range of particular truths to some universal explanation why all these truths hold. One might object that this is all well and good, but that the kind of progress I've been describing *must* involve more than mere induction. For (the objection goes) what Aristotle calls "induction" is simply too *limited* to provide the right sort of

of any domain). So it's a key assumption here that we be able to engage in this fact-gathering activity at a pretheoretical stage.

[101] One might still want to know, of course, what allows us to establish explanatory priority *correctly* (e.g. to recognize that the presence of malarial disease in a subject explains the effectiveness of leeching, rather than the effectiveness of leeching explaining the presence of malarial disease). Aristotle is silent on this point, but it may be that there is simply nothing one could say about how to identify causes *in any science whatsoever*, because the methods and norms for establishing causal priority are always domain-specific (this is the suggestion advanced by Lennox (2013: 33)).

grasp of universals.

This sort of objection can be motivated in at least three different ways. One might think that Aristotelian induction must always be a move from *particulars* to *universals*, and that it therefore cannot be responsible for the move from *universal* explanations to further, explanatorily prior *universal* explanations. One might, on the other hand, think that induction only establishes general facts, and not the explanatory relations between them. Finally, one might think that even if it does reveal explanatory relations, induction must be a form of progress to some more *general* conclusion, and so couldn't establish explanatory relations between *coextensive* universals, which play an important role in Aristotle's account of scientific understanding.[102] I'll address each of these points in turn in the following section.

3.7 *Induction and explanation*

Let me begin by granting that Aristotle does sometimes use *ἐπαγωγή* and its cognates in a restrictive sense, on which induction does not play the role I've outlined above. For instance, Aristotle seems to treat induction as a certain kind of syllogistic deduction at *APr* B23, and in context it's clear that this deduction is meant to establish the *truth* of certain general claims rather than reveal their explanatory status.[103] So there are passages where Aristotelian induction seems to

[102] Thanks to Ben Morison for bringing this last objection to my attention.

[103] Even in this passage, however, Aristotle is careful to distinguish induction from the sort of syllogistic deduction that *arises* or *issues from* induction (*ἐξ ἐπαγωγῆς*), and this leaves open a range of views concerning the relationship between inductive reasoning and the syllogistic deduction that arises out of it. (Here I am relying on our taking the *καὶ* at 68b15 in the first sentence as linking alternative formulations and marking the second as the more proper one ("induction, or, really, a deduction [arising] from induction, ..." cf. Denniston (1954: 292)) rather than treating the *καὶ* in an explicative sense ("induction, i.e. the deduction [arising] from induction, ..."), as do Smith and Ross. In this I agree with Le Blond (1939: 127).) Moreover, the deduction in question

pick out an inference to some general conclusion on the basis of particular cases, and nothing more—and therefore doesn't play the role I've argued it does in *APo* B19.

But Aristotle also uses ἐπαγωγή in a much broader sense.[104] For instance, when he tells us at *APo* A18 that all our learning comes from perception, demonstration, or induction, he doesn't mean that all nondemonstrative nonperceptual learning is *in every case* the result of generalization. As evidence, consider Aristotle's own example at *APo* A1: he describes someone "inducing" that some triangle has angles equal to two right angles (henceforth, "has 2R") on the basis of his prior knowledge that triangles have 2R and his recognition of the figure in front of him as a triangle (71a21-24). It's hard to see how induction, in this case, involves anything like an inference to some general claim from particular cases—for one thing, note that the conclusion concerns an individual triangle, and not *all* triangles.[105]

Aristotelian induction, then, doesn't always refer to some specific mode of generalization. But one might object that it must nonetheless involve some sort of cognitive advance from *particulars* to *universals*, as Aristotle often emphasizes (cf. for instance *Top* A12 105a13-14), and that this would already disqualify it from

clearly *presupposes* some other form of inductive reasoning: the argument's *premises* (in his example, "longevity belongs to all Cs" and "bilelessness belongs to all and only Cs," for some animal genus C) are precisely the sorts of truths one would grasp inductively. So there's little reason to think that inductive learning would *exclusively* proceed via the deductive inference at play in the sort of syllogistic deduction presented at *APr* B23.

[104]To the best of my knowledge, almost all recent scholarship on Aristotelian induction agrees on this point (see, for instance, Caujolle-Zaslawsky (1987), Charles (2003: 270–272), Engberg-Pedersen (1979), Hamlyn (1976), McKirahan (1983), or Ross (1949: 481–487); and see Hintikka (1980) for a dissenting view).

[105]For more textual evidence of Aristotle's broader usage, consider the sorts of arguments labeled "inductive" at *Met* Θ6 1048a35ff, *Met* I3 1054b33, and *Met* I4 1055a6 and 1055b17. See also Caujolle-Zaslawsky (1987) and Ross (1949: 481–484) for a more extensive survey of Aristotle's multifaceted usage.

playing the role I've suggested above. For example, when an astronomer induces that the shooting-star's vapor and the comet's fiery exhalation are both explained by their being instances of condensation, is she not moving from *universals* ("vapor," "fiery exhalation") to some further *universal* ("condensation")? How is this an advance from particulars to universals?

I think such an objection rests on a mistaken interpretation of Aristotle's use of "particulars" and "universals" in this context. For one thing, Aristotle routinely invokes induction on *types*—indeed, right after defining induction as a passage from particulars to universals, he gives as an example that "if the skilled pilot is the best, and likewise the skilled charioteer, then in general the skilled person is the best at his work" (*Top* A12 105a15-16), and it's clear he's invoking pilots and charioteers as *types* of skilled individuals here.[106] So the particulars from which induction begins and the universals to which it leads aren't meant to pick out specific *logical* categories—induction is not the move from a grasp of *tokens* to a grasp of *types*, or from a set of propositions about individuals to a general proposition about the type to which these individuals belong. The "particulars" and "universals" in question are better understood as descriptions of the *form* of our grasp before and after induction: we begin with some grasp of a range of facts *as particular cases*, that is, without recognizing any unifying feature they share, and we induce such a unifying feature, which we thereby grasp *as a universal*. And this can be done regardless of the logical status of the terms featuring in our pre- and post-inductive knowledge.[107]

[106]See also *Rhet* B20 1393b4-8, for an argument by example (which Aristotle says "has the nature of induction" at 1393a26) that clearly operates on types and not individuals.

[107]See section 4.3 for a more thorough defense of this interpretation of the universal and particular character of cognitive states.

Still, one might wonder whether induction alone could be responsible for our grasp of such unifying features *in their explanatory role*, since in many places it seems to serve a much more basic purpose, yielding a grasp of some general conclusion without telling us anything about what this conclusion might explain. One might think, for instance, that induction is indeed the process responsible for providing all the general *terms* featuring in the comprehensive survey of some domain (cf. p.75), but that it doesn't itself tell us anything about the explanatory relations between these terms.[108]

But I think there are good reasons to interpret induction as yielding an explanatorily-sensitive grasp in *APo*. For in *APo* Aristotle often suggests that grasping *universals* would involve, or at least be very closely linked to, grasping universal *explanations*: someone grasping something καθόλου doesn't merely grasp some general proposition or term, but grasps a universal explanation for a range of particular facts.[109] Consider for instance Aristotle's explanation of perception's contribution to scientific knowledge, at *APo* A31. After explaining why perception doesn't (by itself) yield the kind of knowledge of universals required by scientific understanding, Aristotle describes how perception does contribute to our grasp of universals:[110]

[108]This line of thought is an important motivation for deflationary readings of *APo* B19. Thanks to Gisela Striker for pressing me on this point.

[109]The association of καθόλου knowledge with explanatory knowledge is also at play in *Met* A1, as I mentioned earlier (p.70; see also *Met* A2 982a24-25). This kind of use isn't always tied to universal *knowledge*, either: at *Met* E1 Aristotle claims that the science of an immovable substance would be primary and "universal in this way, by being primitive" (καθόλου οὕτως ὅτι πρώτη, 1026a30-31), and his idea is clearly not that such a science would be general in its subject matter, but rather that it would investigate universals providing unified explanations for a wide range of phenomena (see also *APo* B24 85b23-27, which makes the same point).

[110]The text for this passage is problematic, but not in any way that would affect the use I am making of it here. I follow Barnes' reading of the manuscripts.

> [22] Some features [of problems] are such that if we perceived them, we would not seek; not because we know by seeing, but because we grasp the universal from seeing. For instance, if we saw the glass having been pierced and the light going through it, it'd be plain why it does, too, even if we see separately in each particular [case] but think at a single time that it's such in every case.
>
> *ἔνια γὰρ εἰ ἑωρῶμεν οὐκ ἂν ἐζητοῦμεν, οὐχ ὡς εἰδότες τῷ ὁρᾶν, ἀλλ' ὡς ἔχοντες τὸ καθόλου ἐκ τοῦ ὁρᾶν. οἷον εἰ τὴν ὕαλον τετρυπημένην ἑωρῶμεν καὶ τὸ φῶς διιόν, δῆλον ἂν ἦν καὶ διὰ τί καίει, τῷ ὁρᾶν μὲν χωρὶς ἐφ' ἑκάστης, νοῆσαι δ' ἅμα ὅτι ἐπὶ πασῶν οὕτως.* (*APo* 88a12-17)

The case presented here is an example of our grasping the universal *from* seeing: we see a single pierced piece of glass, and understand why light goes through glass of that type. How exactly this is supposed to work is not something I wish to address here—I only want to draw attention to the fact that our perceiving light going through the glass is supposed to make clear *why* it does, and that this is meant to exemplify our grasping something *universal* from what we see. A similar remark is made later on in *APo* B2, when Aristotle notes that our witnessing a lunar eclipse from the moon would make plain both the fact that and the reason why the eclipse is occurring, because (*γὰρ*) "we'd come to know the universal from perceiving" (90a28-29).[111]

The stronger notion of induction I've been defending naturally follows from the stronger notion of *καθόλου* at play in much of *APo*. Induction is a cognitive advance from *particulars* to *universals*, that is, from a grasp of particular cases to a grasp of something *καθόλου*. And grasping something *καθόλου*, in the context of *APo*, involves the recognition of some universal *as an explanation for a range of particular cases*.[112] Thus induction yields a grasp of some universal explanation

[111] Aristotle never explicitly labels the cases above as instances of induction, but in context it seems clear that they should be taken this way—as Engberg-Pedersen (1979: 309) and Ross (1949: 599) both note. In *APo* Aristotle almost never mentions induction by name.

[112] Induction of this sort is a rather sophisticated process, which will involve the use of our higher

for a range of particular cases, on the basis of our prior grasp of these particular cases.

One last objection. The kind of induction described in B19 seems to involve a rise from the less to the more *general*—recall the progression from "such-and-such an animal," to "animal," to "something partless and universal" (100b1-3). And even if we grant that induction allows us to grasp these more general universals in some explanatory role, this wouldn't account for key cases of explanatory priority. For instance, suppose triangles are essentially three-sided rectilinear figures—so that "triangles are three-sided rectilinear figures" is an explanatorily primitive geometrical principle. One of the properties we would want to explain about triangles is their angular sum, and it's a key part of Aristotle's view that their angular sum be *explained* by their three-sidedness, rather than the other way around. But in this case *all and only* three-sided rectilinear figures have angles equal to two right angles. So how would induction, conceived of as a form of progress through more *general* universals, ever allow us to see the three-sidedness of triangles as explanatorily prior to their angular sum?

I think the best reply here is to deny that the increasing generality of the universals described in B19 is an important part of Aristotle's account. I've already argued above (p.62) that the structure of Aristotle's argument in this

capacities in apprehending explanations. But this doesn't mean that Aristotle ultimately thinks *νοῦς* is the capacity responsible for our grasp of definitions, as those who downplay induction's role would have it. Induction does rely on *νόησις*, but *νόησις* in a generic, nontechnical sense, which need not yield a grasp of *primitive* or even *universal* explanations (for instance, the person adept at *νόησις* is described in *APo* A34 as the one who might quickly realize "that someone is talking to a rich man because he's borrowing from him; or why they are friends (because they're enemies of the same man)," and surely this is not a scientific first principle of any sort). Thus I agree with Lesher (1973: 57–58) that there is an important connection between induction and *νόησις*, but disagree with his conclusion that *νοῦς* (broadly construed) and induction are just two different ways of describing the same activity.

passage doesn't depend on the increasing generality of the universals Aristotle describes. But there's also some philosophical motivation to think generality unimportant. The motivation is simply that it should be possible for an *infima species* to be a first principle: the definition "human beings are rational animals" is presumably a biological (or perhaps zoological) first principle, even though it appears at the lowest rung of the universals mentioned by Aristotle. For what counts as a scientific first principle is determined by some given set of explananda, and we would expect the definitions of various kinds of animals to be explanatorily basic relative to some set of zoological phenomena. If this is correct, the progression through higher genera in B19 may simply reflect a decision to illustrate our inductive progress for an especially broad set of explananda—perhaps the broadest possible set of explananda, if we understand the "partless and universal" things as the basic categories of being.[113]

To sum up, then, there's good reason to think of induction in the context of *APo* in a rather strong sense, as the process by which we move from a grasp of a set of particular facts to a unified explanation thereof. The facts in question need not be expressed in propositions with a specific logical form, and the universals involved in their explanation need not apply more generally, to facts distinct from those whose explanation we sought. But induction in this sense does yield a grasp of something *καθόλου* in precisely the sense in which the term is used in the *APo*, that is, a grasp of some universal which essentially involves its explanatory role.

Aristotle tells us that induction provides us with an understanding of scientific

[113] As Bronstein (2012: 59) and Ross (1949: 678) suggest. A similar response applies to the discussion of our search for features common to a range of particulars at *APo* 97b7-15: it must be, in some cases, that a common feature applies to all and only the particulars who share it, and serves as a definitional universal. So increasing generality can't be a requirement on the sort of method involved in isolating such common features.

first principles. I've argued in this section that he means it: induction is the cognitive development that leads to an explanatorily-sensitive grasp of some universal, and this sort of development is precisely what's needed to develop the noetic understanding of definitions Aristotle's demonstrative theory requires. If this is right, we shouldn't dismiss perception's contribution to our learning on the grounds that it serves (at best) as a preliminary for a very limited epistemic achievement. For induction is the way we learn first principles, and perception (together with the closely associated states of memory and experience) plays a key role in the inductive process.

4
Perceiving Universals

I've argued so far that perception serves as a starting point for inductive learning—not only in the sense that it serves as a *sine qua non* for the development of more advanced cognitive states, but in a stronger sense, too: it provides the *content* upon which these cognitive states are based (section 2). I've further argued that the cognitive states in question shouldn't be considered low-level preliminaries to serious epistemic achievements: induction itself yields the sort of understanding Aristotle takes as his epistemic ideal (section 3).

Aristotle never directly explains what perception contributes to more advanced states, or how we should understand the nature of its contribution. And what he does say often seems rather puzzling. Consider for instance Aristotle's claim, at *APo* B19 100a17-b1, that "although we perceive particulars, perception is of universals—e.g. of human being, not of Callias, the human being." This is puzzling for at least two reasons. The first is just that it's not obvious how to make sense of the thought that perception is "of universals" despite having particular objects, since it's not immediately clear what it might mean for perception to be "of" anything other than its objects.

The second reason for puzzlement reflects a broader interpretive problem.

The broader problem is that *any* perceptual grasp of universals seems hard to reconcile with some of the key features of Aristotle's epistemology. Recall that perception's *basic* character is a central part of the distinction Aristotle seeks to draw between his view and innatism: our ability to understand things scientifically results from our progressive (inductive) development from basic perceptual knowledge to a sophisticated form of theoretical understanding, rather than our access to some special latent knowledge that always existed in our souls (cf. section 2.3). It's important that all animals share the same humble perceptual beginnings, and one of the things that makes perception a humble beginning, Aristotle seems to think, is the particular character of its objects (cf. for instance *Met* A2 982a11-12). This is hard to reconcile with the idea that we perceive *universals* as well as particulars. Perception is supposed to be basic because we *exclusively* perceive particulars, and so it's natural to think that allowing *any* perceptual grasp of universals would undermine the thought that perception is a capacity we share with lower animals.

My aim in this section is to make sense of Aristotle's remarks about perception's role in our learning. I'll argue that there's a sensible and illuminating way to reconcile the claim that we perceive universals with the claim that perception is an unsophisticated animal capacity that puts us in touch with particulars. I'll do so by defending an interpretation of perception's particular and universal aspects on which these aspects are not mutually exclusive: perception is particular in the sense that we perceive things *as they are at some time and place*, and universal in the sense that universals *determine* some of the features to which we're perceptually responsive at that time and place. I'll end by examining some of the consequences such an interpretation has for our broader understanding of

Aristotelian epistemology.

4.1 *Perception and psychological theory*

Before considering perception's role in our inductive learning process, I want to address a potential interpretive concern. For you might object that the real problem, for Aristotle, isn't our perception of *universals*, but rather our perception of universals that aren't *essentially sensible* universals. Indeed, Aristotle tells us in the *De Anima* that perception involves our assimilating our senses in some way to the perceptible qualities of physical objects—qualities like color, or hardness, or motion. So it's natural to think that Aristotelian perception must involve *some* universals from the start, since the qualities we perceive are all formal characteristics of perceived objects (or of the *surfaces* of these objects, for colors—cf. *Sens* 439b12-14), and therefore universals. And so it may seem that the key problem in explaining perception's contribution to more advanced states isn't how we might perceive *universals*, but rather how we might get from perceptible qualities like color, hardness or motion to universals like "human being."[114]

I think this worry rests on an overly restrictive reading of Aristotle's psychological theory. The motivating thought is that we only *really* perceive what Aristotle calls *essential* perceptible qualities (proper objects of some sense, like color, or flavor, or of multiple senses, like motion), and that the things Aristotle calls *incidental* or *non-essential* perceptibles (e.g. "Callias" or "the son of Diares") are not *really* or at least not *directly* perceived. Since these incidental perceptibles are not really perceived, we have to explain how we might become aware of

[114]This line of thought motivates Barnes' complaint that making sense of our perception "of human being" would require "an account, which Aristotle nowhere gives, of how such concepts as *man* are derived from the data of perception" (1993: 266).

Callias when encountering a pale humanoid shape in front of us.

I don't think this is the right way to take Aristotle's theory of perception. Aristotle doesn't say much about incidental perception, but what he does say clearly suggests that incidental perceptibles are perfectly good, full-blooded objects of perception:[115]

> [23] What is meant by the incidental perceptible may be illustrated if we suppose that the white thing before you is Diares' son. It's incidentally that you perceive this thing [=Diares' son], for it's incidental to the white thing that it be the thing you perceive.[116]
>
> *κατὰ συμβεβηκὸς δὲ λέγεται αἰσθητόν, οἷον εἰ τὸ λευκὸν εἴη Διάρους υἱός· κατὰ συμβεβηκὸς γὰρ τούτου αἰσθάνεται, ὅτι τῷ λευκῷ συμβέβηκε τοῦτο, οὗ αἰσθάνεται·* (*DA* 418a20-23)

> [24] We perceive incidentally [when we perceive] of Cleon's son not that he is Cleon's son, but that he's white—and white holds incidentally of Cleon's son.
>
> *κατὰ συμβεβηκὸς ᾐσθανόμεθα, οἷον τὸν Κλέωνος υἱὸν οὐχ ὅτι Κλέωνος υἱός, ἀλλ' ὅτι λευκός· τούτῳ δὲ συμβέβηκεν υἱῷ Κλέωνος εἶναι.* (*DA* 425a25-27)

> [25] Then comes the perception of what's incidental: and at this point error may come in. As to the whiteness of an object [perception] is never mistaken, but it may be mistaken as to whether the white object is this thing or something else.
>
> *δεύτερον δὲ τοῦ συμβεβηκέναι ταῦτα· καὶ ἐνταῦθα ἤδη ἐνδέχεται διαψεύδεσθαι· ὅτι μὲν γὰρ λευκόν, οὐ ψεύδεται, εἰ δὲ τοῦτο τὸ λευκὸν ἢ ἄλλο τι, ψεύδεται.* (*DA* 428b19-22)

> [26] But, as the perception by sight of the proper object of sight is infallibly true, whereas in the question whether the white object is a man or not, perception by sight is not always true, so is it with immaterial objects.
>
> *ἀλλ' ὥσπερ τὸ ὁρᾶν τοῦ ἰδίου ἀληθές, εἰ δ' ἄνθρωπος τὸ λευκὸν ἢ μή, οὐκ ἀληθὲς ἀεί, οὕτως ἔχει ὅσα ἄνευ ὕλης.* (*DA* 430b29-31)

[115]The translations here are based on Hicks'.

[116]Taking *τοῦτο* and *τούτου* as antecedents of *οὗ*. See Hicks (1965: 363) for a defense of this reading.

It's never suggested here that we don't *actually* perceive incidental perceptibles, or that incidental perception is at bottom just the perception of essentially perceptible qualities exhibited by some object. Aristotle seems to think perception is more liable to *error* when its objects are incidental—but this already implies that incidental perceptibles are indeed perceived, just as their essentially perceptible counterparts.[117]

The claim that certain perceptibles are incidental is better read as a claim about incidental *predication*: when we perceive Callias or Cleon's son, we don't perceive things in the natural predicative order—that is, we perceive that *this pale humanoid thing is Callias* rather than perceiving *that Callias is this pale humanoid thing*.[118] Aristotle thinks predication of this sort is *unnatural* because it predicates Callias of his attributes, which doesn't mirror the natural relation between a substance like Callias and its qualities. Here's a key passage expressing this point:

> [27] Of all the things which exist some are such that they cannot be predicated of anything else truly and universally—e.g. Cleon, or Callias, the particular perceptible thing—but other things may be predicated of them (for each of these is both man and animal); and some things are themselves predicated of others, but nothing prior is predicated of them; and some are predicated of others, and yet others of them—e.g. man of Callias and animal of man. It is clear then that some things are naturally not said of anything; for as a rule each perceptible thing is such that it cannot be predicated of anything, save incidentally—for we sometimes say that that white object is Socrates, or that that which approaches is Callias.
>
> Ἁπάντων δὴ τῶν ὄντων τὰ μέν ἐστι τοιαῦτα ὥστε κατὰ μηδενὸς ἄλλου κατηγορεῖσθαι ἀληθῶς καθόλου (οἷον Κλέων καὶ Καλλίας καὶ τὸ καθ' ἕκαστον καὶ αἰσθητόν), κατὰ δὲ τούτων ἄλλα (καὶ γὰρ ἄνθρωπος καὶ ζῷον ἑκάτερος τούτων ἐστί)· τὰ δ' αὐτὰ μὲν κατ' ἄλλων κατηγορεῖται, κατὰ δὲ τούτων ἄλλα πρότερον οὐ κατηγορεῖται· τὰ δὲ καὶ αὐτὰ ἄλλων καὶ αὐτῶν ἕτερα, οἷον ἄνθρωπος Καλλίου καὶ ἀνθρώπου ζῷον. ὅτι μὲν οὖν ἔνια τῶν ὄντων κατ'

[117]Sometimes Aristotle says perception never errs about essential perceptibles. At *DA* 428b18 he claims (more reasonably) that it "admits the least amount of falsehood."

[118]For a defense of this interpretation, see Cashdollar (1973), or Hicks (1965: 363).

> οὐδενὸς πέφυκε λέγεσθαι, δῆλον· τῶν γὰρ αἰσθητῶν σχεδὸν ἕκαστόν ἐστι τοιοῦτον ὥστε μὴ κατηγορεῖσθαι κατὰ μηδενός, πλὴν ὡς κατὰ συμβεβηκός· φαμὲν γάρ ποτε τὸ λευκὸν ἐκεῖνο Σωκράτην εἶναι καὶ τὸ προσιὸν Καλλίαν. (*APr* 43a25-36)

Cleon and Callias, then, are paradigmatic substances: it's natural to say of them that they're animals (or human, or pale), but unnatural to say of anything else that it's Callias or Cleon—in particular, unnatural to say of some pale approaching thing that it's Callias. The sort of predication at play in such a statement is *incidental*. Callias is an incidental perceptible because perception makes us aware of him and his qualities in their unnatural order—that is, as though Callias were a *quality* of some pale approaching thing.

But Aristotle unambiguously identifies Callias and his qualities as *perceptible* things. So the sort of incidence at play here does not threaten Callias' status as a perceptible, and Aristotle's remarks on incidental perceptibles therefore give us no special reason to expect an explanation how we could come to perceive Callias on the basis of his sensible qualities. As I read it, the claim that we perceive things in an unnatural order is just a further expression of Aristotle's view that our learning begins with things that are better known (or prior) *to us*: our learning begins with perception, and our perceptual experiences make us aware of essentially sensible qualities first, even though they are in fact last according to the natural order. Our cognitive development beyond these perceptual beginnings will involve a recognition that these sensible qualities are in fact predicated of certain substances, rather than the other way around (cf. section 2.1). But both the sensible qualities and their bearers are things we become aware of perceptually.

If this is right, there is no special problem about perceiving incidentals that would stem from Aristotle's psychological theory. But even if it isn't, the question

how we perceive universals is clearly *orthogonal* to any distinction between essential and incidental perceptibles. For in Aristotle's own example, we perceive of *Callias* that he's a human being—and for Aristotle Callias is *already* an incidental perceptible. So whatever we might want to say about the sense in which Callias is or is not *really* or *essentially* perceived, it's a further mystery what our perceiving Callias has to do with our perceiving the universal "human being," and how our perceptual grasp of this universal contributes to our cognitive development.

4.2 *Perceiving and perceiving that*

Recall Aristotle's invocation of perception in his description of our epistemic ascent to scientific principles:

> [28] When one of the undifferentiated things makes a stand, there is for the first time a universal in the soul; for although you perceive particulars, perception is of universals—e.g. of human being, not of Callias-the-human-being. And again a stand is made among these, until something partless and universal makes a stand—for instance "such-and-such an animal" makes a stand, until "animal" does; and likewise with "animal." Thus it's clear that we must get to know the primitives by induction; for this is how perception creates universals in us.
>
> *στάντος γὰρ τῶν ἀδιαφόρων ἑνός, πρῶτον μὲν ἐν τῇ ψυχῇ καθόλου (καὶ γὰρ αἰσθάνεται μὲν τὸ καθ' ἕκαστον, ἡ δ' αἴσθησις τοῦ καθόλου ἐστίν, οἷον ἀνθρώπου, ἀλλ' οὐ Καλλίου ἀνθρώπου)· πάλιν ἐν τούτοις ἵσταται, ἕως ἂν τὰ ἀμερῆ στῇ καὶ τὰ καθόλου, οἷον τοιονδὶ ζῷον, ἕως ζῷον, καὶ ἐν τούτῳ ὡσαύτως. δῆλον δὴ ὅτι ἡμῖν τὰ πρῶτα ἐπαγωγῇ γνωρίζειν ἀναγκαῖον· καὶ γὰρ ἡ αἴσθησις οὕτω τὸ καθόλου ἐμποιεῖ.* (*APo* B19 100a15-b5)

I argued above that universals make "stands" in our souls when we grasp them in their explanatory role (cf. section 3.5), and that repeated stands of this sort yield the sort of explanatorily-sensitive grasp of definitional principles Aristotle's demonstrative theory requires (cf. section 3.6).

What I want to focus on now is that Aristotle suggests here that perception's being *of universals* is what makes the first universal stand possible (cf. p.44). That is, even though we only perceive particulars like Callias, perception serves as an *adequate* starting point for our cognitive development because it *also* provides us with some sort of grasp of universals like "human being." So our perceptual grasp of these universals is supposed to *explain* how it is that universals eventually "make a stand" in our souls.

But how would seeing Callias tell us anything about the universal "human being"? And why this universal rather than universals like "Athenian," or "rich," which Callias also instantiates? One straightforward solution rests on a distinction between the *things* we perceive from the *propositional contents* of our perceptions. This distinction, as I'm using it here, is meant to reflect a common way Aristotle has of talking about perception—for Aristotle as for us, we can perceive some object *X* (i.e. have *αἴσθησις* X), and also perceive *that* something is the case (*αἴσθησις ὅτι p*, where *p* (typically) has the form "X is F"). As with other cognitive states, Aristotle thinks these two forms of perception are closely linked: when you perceive some X you also perceive *that X is F* for some F.

So one might think (and this is the straightforward solution) that Aristotle's claim simply focuses on different *aspects* of our perceptions: we only ever perceive particular things, but we perceive *that* this or that particular thing is of a certain *type*, and so types will always have to feature in what I'm calling the propositional content of our perceptions: when you stare at the sunset you perceive a particular—*the sun*—but you also perceive a universal—you perceive that the sun *is red*.

This sort of account has to be filled out carefully. We wouldn't want to claim that when we perceive Callias, we *judge* or *believe* that Callias is a human

being—recall that perception is supposed to be a capacity we share with other animals. So when we say that universals feature in the "propositional content" of our perceptions, we shouldn't take this to imply that any subject who perceives that Callias is human must thereby possess the *concept* "human being". The idea is just that a full expression of the contents of our perceptions will involve universal terms, even if we don't possess the concepts necessary to articulate these universals ourselves. So on this sort of view if you take your one-year-old to the zoo, it's right to say that she saw the otters building a waterslide, even if she hasn't yet developed the concept "waterslide-building." It would also be right to say that a *giraffe* saw the otters building a waterslide, even if giraffes (let's assume) can't develop concepts at all.

On the straightforward solution, then, your one-year-old had a perception "of waterslide-building" when she was at the zoo—and all this means is that universals would be required if *we* (who do have the waterslide concepts) were to express what it is this one-year-old perceived at the zoo.

I agree with the key point motivating the straightforward solution: the propositional contents of Aristotelian perceptions are quite rich, and their full expression will involve universal terms.[119] But I don't think this is the right way to interpret Aristotle's claim that perception is "of universals." There are both philosophical and interpretive reasons to resist such an interpretation.

On the philosophical side, note that on this view perception's being "of universals" merely reflects something about the logical status of items featuring in our perceptual contents. It tells us nothing about what *relation* the perceiver

[119]This is true even for the most basic forms of perception: Aristotle tells us that when we perceive a color we have a perception *that* something is colored (ὅτι χρῶμα, *DA* 418a15).

bears to this content, or *how* she grasps the universals that form part of it. And if that's right, it's hard to see how perception's being "of universals" could *explain* anything about our cognitive development, which is what Aristotle tells us in passage [28]. If the perceiver need not possess the concepts necessary to articulate the propositional contents she perceives, then saying that *types* must feature in these contents won't explain anything about our cognitive development. (The straightforward solution also does not tell us *which* universals we have perception "of" when we perceive some token instantiating many types.)

More importantly, though, I don't think facts about the logical status of perceptual objects and perceptual propositional contents capture the distinction Aristotle draws between particular and universal states. The straightforward solution assumes that when Aristotle says we grasp particulars or universals, he's telling us something about the *scope* of our cognitive states: in the perceptual case he's telling us that we perceive certain things, and that these things are *tokens* rather than *types*. That's just what it means (on this view) to say that we perceive *particulars*. I'll show in what follows that this does not sit well with the contrast Aristotle draws between particular and universal states elsewhere in his works.

4.3 *Particular and universal states*

Aristotle discusses perception's particular character in some detail in *APo* A31, as part of an explanation why we can't understand things by perceiving them. Here's the first part of his argument:

> [29] You can't understand anything through perception. For even if perception is of what is such-and-such and not of what is this so-and-so, you must still perceive a this so-and-so at a place and at a time. It's impossible to perceive what's universal and in every case, for that's not a this at a

certain time ([if it were] it wouldn't be a *universal*, since we call universal what's always and everywhere). Thus since demonstrations are universal and universals impossible to perceive, it's clear it isn't possible to understand anything through perception.

Οὐδὲ δι' αἰσθήσεως ἔστιν ἐπίστασθαι. εἰ γὰρ καὶ ἔστιν ἡ αἴσθησις τοῦ τοιοῦδε καὶ μὴ τοῦδέ τινος, ἀλλ' αἰσθάνεσθαί γε ἀναγκαῖον τόδε τι καὶ ποὺ καὶ νῦν. τὸ δὲ καθόλου καὶ ἐπὶ πᾶσιν ἀδύνατον αἰσθάνεσθαι· οὐ γὰρ τόδε οὐδὲ νῦν· οὐ γὰρ ἂν ἦν καθόλου· τὸ γὰρ ἀεὶ καὶ πανταχοῦ καθόλου φαμὲν εἶναι. ἐπεὶ οὖν αἱ μὲν ἀποδείξεις καθόλου, ταῦτα δ' οὐκ ἔστιν αἰσθάνεσθαι, φανερὸν ὅτι οὐδ' ἐπίστασθαι δι' αἰσθήσεως ἔστιν. (*APo* A31 87b28-35)

Aristotle begins his argument in this passage by echoing the thought voiced in passage [28], namely that perception is "of what is such-and-such," but that we nonetheless perceive "this so-and-sos" at some definite time and place.[120]

The fact that we perceive "this so-and-sos," or *particulars*, is supposed to disqualify the things we perceive from being universals, since, as Aristotle puts it, universals exist "always and everywhere." Now Aristotle doesn't mean by this that universals exist *independently* of their perishable instances, or that universals are *always* instantiated: we can *understand* eclipses even if they don't occur always and everywhere, and, conversely, Aristotle thinks some *particulars* are eternal and unchanging, like the sun.[121]

So the point here must be, not that universals are literally always and everywhere, but rather that we can only understand phenomena that are *eternally recurring*, and that scientific demonstrations primarily explain general, unchanging facts about these eternally-recurring phenomena. This is a point familiar from *APo* A8, where Aristotle argues that "there is no demonstration of perishable

[120]I'm assuming here that Aristotle is using "what is such-and-such" (*τὸ τοιόνδε*) and "this so-and-so" (*τόδε τι*) interchangeably with "universal" and "particular" respectively. This isn't always the case, but it's the only natural reading in context—note for instance that Aristotle names *particulars* as objects of perception a bit later on at 87b38 and 88a4.

[121]In fact he thinks that at least one particular is eternal and unchanging and *everywhere*, namely *οὐρανός* (*DC* A9 278b3-7).

things [...] because nothing holds of them universally, but only at some time and in some way" (75b24-26).

Thus it's not because we only perceive *tokens* that it's impossible to perceive universals. The reason we can't perceive universals is that our perception is always tied to a specific time and place, and that it therefore can't tell us about universals *universally*, that is, as the sorts of entities responsible for a range of eternally-recurring phenomena. In other words, Aristotle's argument in [28] isn't based on the logical status of the sorts of things we perceive or understand, but rather on the *manner* perception and understanding put us in touch with their objects: perception only tells us about things *as they are* here and now, understanding about things *as they are* always and everywhere.

We get a further illustration of perception's limitations in the next few lines:

> [30] Rather, it's plain that even if it *were* possible to perceive that triangles have angles equal to two right angles, we'd seek a demonstration, and not, as some say, already understand it. For we must perceive particulars, but understanding is by knowing the universal.
>
> *ἀλλὰ δῆλον ὅτι καὶ εἰ ἦν αἰσθάνεσθαι τὸ τρίγωνον ὅτι δυσὶν ὀρθαῖς ἴσας ἔχει τὰς γωνίας, ἐζητοῦμεν ἂν ἀπόδειξιν καὶ οὐχ ὥσπερ φασί τινες ἠπιστάμεθα.* (*APo* A31 87b35-37)

Aristotle is asking us to suppose that we could perceive that triangles have 2R, and noting that even this wouldn't yield the kind of knowledge we have when we grasp a demonstration. Again, the reason invoked is that perception has particular objects, while understanding is reached by knowing universals.

The point of the counterfactual here, I take it, is not that it's impossible to perceive triangles, and thus, *a fortiori*, impossible to perceive that triangles have 2R. For the assumption isn't just that we can perceive triangles, but that we can perceive *that triangles have 2R*. And the thought is that even if we somehow

perceived this, we still wouldn't understand it, because we would still be perceiving particulars.

It seems clear, in this counterfactual scenario, that we're perceiving a *general* claim about *all triangles*. And this is good evidence that Aristotle can't just be saying that our perception of triangles is particular because it only tells us about tokens and doesn't tell us about *all* triangles, or because it doesn't really involve the *type triangle*, as the straightforward solution would have it. For his thought here is that *even if* we perceived a general fact about all triangles, perception would still be particular, and therefore wouldn't yield understanding on its own.

So what I think Aristotle is telling us here is, again, something about the *manner* in which perception puts us in touch with its objects. His point is that merely *perceiving* that all triangles have 2R wouldn't tell us what the *connection* is between being a triangle and having 2R, and that understanding the universal *triangle* requires some grasp of this connection.

We can get a better sense of Aristotle's meaning here by reading [30] together with a related passage in *APo* A5:

> [31] Even if you prove of every triangle, either by one or by different demonstrations, that each has two right angles—separately of the equilateral and the scalene and the isosceles—you do not yet know of triangles that they have two right angles, except in the sophistical way; nor do you know it of triangles universally, not even if there are no triangles aside from these. For you do not know it of triangles as triangles, nor even of every triangle, except in number—not of every triangle according to the form [triangle], even if there is no triangle of which you do not know it.
>
> *οὐδ' ἄν τις δείξῃ καθ' ἕκαστον τὸ τρίγωνον ἀποδείξει ἢ μιᾷ ἢ ἑτέρᾳ ὅτι δύο ὀρθὰς ἔχει ἕκαστον, τὸ ἰσόπλευρον χωρὶς καὶ τὸ σκαληνὲς καὶ τὸ ἰσοσκελές, οὔπω οἶδε τὸ τρίγωνον ὅτι δύο ὀρθαῖς, εἰ μὴ τὸν σοφιστικὸν τρόπον, οὐδὲ καθ' ὅλου τριγώνου, οὐδ' εἰ μηδὲν ἔστι παρὰ ταῦτα τρίγωνον ἕτερον. οὐ γὰρ ᾗ τρίγωνον οἶδεν, οὐδὲ πᾶν τρίγωνον, ἀλλ' ᾗ κατ' ἀριθμόν· κατ' εἶδος δ' οὐ πᾶν, καὶ εἰ μηδὲν ἔστιν ὃ οὐκ οἶδεν.* (*APo* A5 74a25-32)

Aristotle makes an even stronger claim here: even if we can *prove* of each and every species of triangle that it has 2R, we won't thereby know that triangles have 2R *universally*. What's missing is the realization that these species of triangles are *exhaustive* of their genus, and that it's *because* they belong to the genus *triangle* (or "according to the *form* triangle") that they have 2R.

I think something similar is at play in the perceptual case. In the scenario we're being asked to consider, perception might tell us, of each and every triangle, that this triangle has 2R (supposing, for instance, that there are just ten triangles, and they're all in front of us, and we can just see their angular sum). Even then, perception won't tell us *that these are all the triangles*, or that it's precisely *because* they're triangles that they have 2R. Perception therefore fails to yield knowledge of the *universal* triangle insofar as it only tells us *of the triangles we're currently perceiving* that they have 2R, and doesn't tell us that anything we might come to recognize as a triangle in the future will also have to have 2R. Again, I suggest that this is because perception is a capacity whose exercise depends on the presence of its objects, and that this is what it means for it to be about particulars.

Aristotle's discussion of our knowledge of eclipses provides further evidence of relationship between universality and explanatory connections:

> [32] This is why even if we were on the moon and saw the earth's screening, we wouldn't know the *explanation* of eclipses. For we'd perceive that it's now eclipsed, but not generally why; for perception isn't of the universal.
>
> διὸ καὶ εἰ ἐπὶ τῆς σελήνης ὄντες ἑωρῶμεν ἀντιφράττουσαν τὴν γῆν, οὐκ ἂν ᾔδειμεν τὴν αἰτίαν τῆς ἐκλείψεως. ᾐσθανόμεθα γὰρ ἂν ὅτι νῦν ἐκλείπει, καὶ οὐ διότι ὅλως· οὐ γὰρ ἦν τοῦ καθόλου αἴσθησις. (*APo* A31 87b39-88a2)

Perception fails to tell us about the universal "eclipse" not because its objects are always particular eclipse *tokens*, but because, on its own, it would never reveal

that the earth's screening the sun *explains* why this and all future eclipses occur as they do.[122] It's in this sense that perception is particular, and therefore incapable of supplying us with scientific understanding.[123]

I've argued in this section that the particularity and universality of various cognitive states has to do with the *manner* by which they put us in touch with their objects, rather than any facts about the logical status of the objects or contents grasped in these states. When Aristotle argues that we never perceive universals, he doesn't simply point out that we don't perceive general facts, or that we perceive tokens and not types. Instead, he emphasizes that we only perceive things *as they are at some time and place*, and that on its own this will never yield knowledge of the universal causal connections governing eternally-recurring phenomena.[124]

This is good evidence that perception's particularity doesn't have to do with its restricted *scope*, as the straightforward solution suggests. And I think this shouldn't really be a surprising result. It's clear from Aristotle's psychological works that perception is supposed to be a capacity whose exercise is realized in a *material* process, when some perceptible object acts on a perceiver's sense-organs.

[122]The case is a bit confusing, since Aristotle thinks an eclipse is a "loss of light on the moon," and of course we wouldn't witness *that* from the moon itself (or at least not in the way it's seen from the earth).

[123]It's worth noting that, for Aristotle, perception can yield scientific understanding when combined with prior background knowledge. A little later in *APo* A31 he describes a case where we perceive the porous internal structure of glass, and immediately grasp that its porosity explains why light shines through it—not just in the particular piece of glass we perceive, but for *all* pieces of glass of its sort (88a12-17, cf. p.81). So someone who already understands some of the properties of glass materials (e.g. that glass is internally homogeneous) might understand its interactions with light in a quite general way the moment she sees a single piece's structure. The claim that perception doesn't yield understanding is a claim about perception *considered on its own*.

[124]It might *follow* from this that we never perceive general facts, or, on some conception of what tokens are, it might follow that we only perceive tokens. My point is just that this isn't what Aristotle *means* when he calls certain states particular or universal.

Aristotle often identifies perceptible objects as those that occupy space and subsist in matter, and sometimes uses this fact to *infer* that we perceive particulars (see e.g. *DC* A7 275b5-11, or *DC* A9 278a10-11). So it's natural to read the claim that we perceive particulars as closely connected to the *process* by which we perceive things: we perceive through a *material* process, which is necessarily always tied to some specific time and place, and therefore only perceive *particulars*, that is, only perceive things as they appear to us at some time and place.

In the next section I'll defend an interpretation of our perception "of universals" that's compatible with such a restriction.

4.4 *Particular perception and the perception of universals*

When Aristotle claims that perception is "of universals," he must mean that perceivers bear some sort of relation to the universals instantiated by the things they perceive. Recall that our perceptual relation to universals is supposed to explain some portion of our cognitive development: it's because perception is "of universals" that universals can "make a stand" in our souls (passage [28]).

As we've seen from the A31 passages, perception alone doesn't afford us any theoretical *understanding* of universals—it doesn't afford us any knowledge of the causal relations between universals, or any grasp of universals as they are "always and everywhere." It seems clear that perception alone doesn't provide any *conceptual* grasp of universals, either, if this means a grasp of universals we can use in inferential reasoning, or a grasp of universals that allows us to *express* the sorts of things we perceive in general terms. For recall that perception here is supposed to be a capacity available to animals and infants, neither of which can engage in inferential reasoning or express what they perceive.

I think we can get some idea of the grasp of universals perception *does* provide by considering perception's close relation with experience (ἐμπειρία). Recall that experience, for Aristotle, is a non-theoretical state: the experienced person is someone who has developed a unified set of memories and can adapt her behavior on the basis of new perceptions of a certain type, but need not *reason* about what course of action she should take, or *recognize* the case she faces as belonging to a general type she's encountered in the past. For instance, an experienced doctor could reliably determine the right treatment for some type of patient without *knowing* why the remedy is any good, and even without *thinking* of types of remedies or types of patients *as types*. This sort of doctor might know that *Callias should be leeched*, that *Socrates should be leeched*, and so on, without realizing that Callias and Socrates are both *malarial*, and that *malarials* should be leeched, and that they should be leeched *because* they're malarial.

There is a sense in which experience has universal content—*we* might say that this doctor knows something about malarial patients, even if she doesn't think of her patients in those terms. But experience remains a particular state in the sense I've just discussed: the experienced doctor (*qua* experienced) only knows how to deal with the patients in front of her, at some determinate time and place. This is no surprise, since experience, as I argued above (section 3.5), involves little more than our perceptual (and mnemonic) capacities.

What I think Aristotle's discussion of experience suggests is that our perceptual grasp of universals is really a grasp of certain action-guiding or action-soliciting features things have *in virtue* of instantiating various universals. That is, we perceive things in a way that guides our behavior, and our perception is "of universals" because certain universals—e.g. "malaria," or other universals we

come to grasp theoretically on the basis of our experiences when they "make a stand" in our souls—are responsible for the features that guide our behavior.

Take a simple case. When a lion perceives a buffalo, it might perceive the buffalo as something to be snacked on, to be avoided when in groups, and so on, and it perceives the buffalo this way *because* the buffalo is a certain kind of animal, though of course a lion wouldn't recognize that this is the case. What it means for this lion's perception to be *of* the universal buffalo, is for the lion's behavior to be responsive to a range of buffalo-like features—that is, to a range of features the buffalo displays in virtue of being a buffalo.

To put the point more generally, whenever a subject perceives some particular *x*, she might perceive that *x* in a Y-like way—where this just means that there is some universal Y such that this subject's behavior is responsive to features *x* has in virtue of being a Y. Note that this does not imply that the perceiver *believe* that *x* is Y, or even that she *believe* that *x* appears to her in a Y-like manner; much less that she *believe* that Y is a universal.

Nor does it imply anything about the *phenomenology* (or phenomenologically available content) of our perceptions. When a lion has a perception "of" the universal buffalo, its experience is just that there's something there to be snacked on, avoided when in groups, and so on. There's no special fact about the lion's phenomenology that would reveal that this experience is an experience of features the perceived object has *because* it's a buffalo.

So to say that a subject perceives some *x* in a Y-like way (or has a perception *of the universal Y* when perceiving some *x*) is really to say something about the way the subject's behavior is responsive to features *x* has in virtue of its being a Y—even if the perceiver is an animal unable to articulate why or how its perceptions solicit

a course of action.

This kind of responsiveness is something Aristotle often emphasizes when discussing our perceptual capacity and its role in animal behavior. Here are some representative passages:[125]

> [33] A being which has no sensation will be unable when it comes into contact with things to avoid some and seize others. And if this is so, it will be impossible for the animal to survive.
>
> *ἁπτόμενον δέ, εἰ μὴ ἕξει αἴσθησιν, οὐ δυνήσεται τὰ μὲν φεύγειν τὰ δὲ λαβεῖν. εἰ δὲ τοῦτο, ἀδύνατον ἔσται σώζεσθαι τὸ ζῷον.* (*DA* 434b16-18)

> [34] The senses which operate through external media, viz. smelling, hearing, seeing, are found in all animals which possess the faculty of locomotion. To all that possess them they are a means of preservation in order that, guided by antecedent perception, they may both pursue their food, and shun things that are bad or destructive. But in animals which have also intelligence they serve for the attainment of a higher perfection. They bring in tidings of many distinctive qualities of things, from which knowledge of things both speculative and practical is generated in the soul.
>
> *αἱ δὲ διὰ τῶν ἔξωθεν αἰσθήσεις τοῖς πορευτικοῖς αὐτῶν, οἷον ὄσφρησις καὶ ἀκοὴ καὶ ὄψις, πᾶσι μὲν τοῖς ἔχουσι σωτηρίας ἕνεκεν ὑπάρχουσιν, ὅπως διώκωσί τε προαισθανόμενα τὴν τροφὴν καὶ τὰ φαῦλα καὶ τὰ φθαρτικὰ φεύγωσι, τοῖς δὲ καὶ φρονήσεως τυγχάνουσι τοῦ εὖ ἕνεκα· πολλὰς γὰρ εἰσαγγέλλουσι διαφοράς, ἐξ ὧν ἥ τε τῶν νοητῶν ἐγγίνεται φρόνησις καὶ ἡ τῶν πρακτῶν.* (*Sens* 436b18-437a3)

Perception is a means of preservation, then, because it tells us what's to be pursued or avoided. In animals equipped with more advanced cognitive capacities (animals capable of *νόησις*) it's also the basis for more advanced forms of knowledge. I've suggested so far (and I think these passages support this view) that perception provides this basis not by delivering a theoretical or conceptual grasp of universals, but rather by conveying the many "distinctive qualities" things around us have *in virtue* of belonging to various universals.

[125] See also *DA* Γ13 435b19-25. The translation from *DA* is adapted from Hicks', and the translation from *Sens* is Beare's.

How exactly these distinctive qualities are experienced will depend on a range of factors. For instance, a lion might appear to a hunter as *prey* (as something *to be hunted*) and to a buffalo as *predator* (as something *to be avoided*)—both because of features it has in virtue of being a lion. So facts about the perceiver's physical abilities (for instance) will affect how the perceived qualities are experienced. And of course the *situation* of the perceiver will matter—the lion won't appear as a predator to a buffalo in a buffalo gang, and a buffalo might not appear as prey to a lion who's just had a zebra for lunch. Still, insofar as these perceivers are responsive to lion-like features, they're all having perceptions *of* the universal "lion."

Perceptual solicitations of the sort I've been describing (perceiving things as "to be *φ*-ed") suggest prospective courses of action. A perceiver need not be *motivated* by a soliciting perception: a lion can perceive a buffalo without feeling an urge to hunt it down. But the prospective courses of action the lion's perception suggest nonetheless play a significant role in animal motivation:[126]

> [35] Nor is there in animals other than humans any pleasure connected with these senses [=sight, hearing, smell] except incidentally. For dogs do not take pleasure in the scent of hares, but in the eating of them, but the scent told them the hares were there; nor does the lion take pleasure in the lowing of the ox, but in eating it; but he perceived by the lowing that it was near, and therefore appears to take pleasure in the lowing; and similarly what pleases the lion is not that he sees "a stag or a wild goat," but that he is going to make a meal of it.
>
> *οὐκ ἔστι δὲ οὐδ' ἐν τοῖς ἄλλοις ζῴοις κατὰ ταύτας τὰς αἰσθήσεις ἡδονὴ πλὴν κατὰ συμβεβηκός. οὐδὲ γὰρ ταῖς ὀσμαῖς τῶν λαγωῶν αἱ κύνες χαίρουσιν ἀλλὰ τῇ βρώσει, τὴν δ' αἴσθησιν ἡ ὀσμὴ ἐποίησεν· οὐδ' ὁ λέων τῇ φωνῇ τοῦ βοὸς ἀλλὰ τῇ ἐδωδῇ· ὅτι δ' ἐγγύς ἐστι, διὰ τῆς φωνῆς ᾔσθετο, καὶ χαίρειν δὴ ταύτῃ φαίνεται· ὁμοίως δ' οὐδ' ἰδὼν ἢ [εὑρὼν] ἔλαφον ἢ ἄγριον αἶγα, ἀλλ' ὅτι βορὰν ἕξει.* (*EN* 1118a18-23)

[126]The translation here is based on Urmson's adaptation of Ross.

Aristotle is explaining in this passage why the senses of touch and taste are an especially brutish source of pleasure. His explanation is that nonhuman animals only take pleasure in sights, sounds and smells incidentally: the source of pleasure is not the sight, sound or smell itself, but rather the prospective courses of action that these sensations suggest. So a lion might be pleased when she sees a buffalo—not by the very sight of the buffalo, but by the prospective course of action that such a sight brings about. It's natural to think that pleasures of this sort play an important role in animal motivation, and so it's natural to think that perceptual solicitations, though they need not motivate us, often will.[127]

Consider again our initial example (in passage [28]). When we perceive Callias, we might perceive Callias as someone to have a conversation with, as someone to be treated as a living being, as someone who deserves moral consideration, and so on. If Callias appears to us this way because Callias is *human*, our perception will be a perception *of* the universal human being. And it will be a perception of the universal human being even though its object is Callias as he appears to

[127] I leave it open here whether *φαντασία* is necessary to bring about such perceptual solicitations. Aristotle's discussion of *φαντασία* is difficult to follow. On the one hand, he tells us at *DA* Γ3 431a8-16 that perception leads to (or *is*) a certain form of desire, and thus causes us to pursue or avoid things (see also *Insomn* 459a16-21). On the other, he tells us at *DM* 8 792a17-19 that "affections suitably prepare the organic parts, desire the affections, and *φαντασία* the desire; and *φαντασία* arises through thought [*νόησις*] or through perception," which suggests that *φαντασία* *assists* perception in the process leading, through our desires, to animal locomotion. For my purposes what matters is that *φαντασία* not be conceived as a capacity separate from perception, making its own contribution to our cognitive development, but rather as a capacity that, at most, enables perception to solicit our behavior (Aristotle suggests at *APo* B19 99b36-100a1 that not all animals possess *φαντασία*; see Lorenz (2006: 141) for a discussion of sponges and other stationary animals that may perceive without experiencing solicitations). It's worth emphasizing that Aristotle never mentions *φαντασία* in his account of our inductive development in *APo* B19 and *Met* A1 (though memory does require *φαντασία*; cf. *DA* Γ3 427b19-20). See Lorenz (2006: 124–137) and Scheiter (2012: 253–261) for interpretations that emphasize the role *φαντασία* plays in assisting our essentially perceptual activities. See Wedin (1988) for an argument that *φαντασία* should not count as a cognitive *δύναμις* on par with the other *δυνάμεις* discussed in Aristotle's psychological works.

us here and now—that is, even though what we perceive is the *particular* Callias. If we perceive Callias and other human beings we might develop *experience* of the universal "human being" on the basis of our perceptions: a grasp of human behavior that informs how we deal with the various humans we encounter, but doesn't require us to reason about them as human beings, or to think of humans apart from the ones we face at some particular time and place.

On this interpretation, then, perception can have particular objects and nonetheless be "of universals." This is because perception's *particularity* is what makes it basic, and perception's particularity, as I understand it, doesn't preclude our perceptual grasp of universals: we perceive things as they are at some time and place, and universals determine some of the features to which we're perceptually responsive at that time and place.

Which universals do we perceive? It's clear we won't perceive any type whatsoever: Callias, Socrates and others don't appear to us the way they do in virtue of being "smaller than the Parthenon," say, and there is no form of *experience* we might develop that would specifically concern "malarials with brown hair." But we should nonetheless allow that a wide range of universals might determine the features to which we're perceptually responsive. Aristotle tells us for instance that "children begin by calling all men father and all women mother, but later on distinguish each of these" (*Phys* A1 184b12-14): such children are initially responsive to the universals "father" and "mother," and eventually become responsive to the universals "man" and "woman" (and, we might hope, go on to become responsive to the universal "human being"). It's clear that not all these universals will be of any scientific *interest*, but insofar as they could be studied scientifically—that is, insofar as they do in fact cause features that solicit

perceivers in a manner that would allow them to develop *experience*—they are the sorts of universals we can perceive.[128]

This last example makes clear that, for Aristotle, an important part of our learning will occur prior to the scientific investigation of the universals that underly our behavior. A young Athenian child might treat all bearded people as their father, and eventually learn to treat all bearded people as *men*—all this without yet *reasoning* about what might cause beards. Further scientific investigation might reveal why Athenian males typically grow beards, and show them why their initial behavior was confused.[129] But a good deal of the progress from things clear to them to things clear by nature will have occurred without any such investigation.

I've argued that perception's contribution to our cognitive development should be understood in terms of its action-guiding aspect. Perception allows us to discriminate the many features particulars possess, and respond to the many different ways they appear to us in different situations. In animals who can remember things, repeated perceptions of some type can develop into a certain kind of productive or practical skill—for instance, the *leeching* skill someone with medical experience might possess. Perception's being "of universals" explains this part of our cognitive development by explaining how perception can yield such

[128] I leave it open here how we should understand the causal relation between universals and the features that solicit us. Aristotle never tells us which causal relation he has in mind, and the range of cases he gives suggest many possible options: malaria might be an efficient cause of feverish symptoms, and the three-sidedness of triangles might be a formal cause of their angular sum.

[129] As Aristotle puts it, "what is to us plain and clear at first is [not what is clear by nature, but] rather confused masses, the elements and principles of which become known to us later by analysis" (ἔστι δ' ἡμῖν τὸ πρῶτον δῆλα καὶ σαφῆ τὰ συγκεχυμένα μᾶλλον· ὕστερον δ' ἐκ τούτων γίγνεται γνώριμα τὰ στοιχεῖα καὶ αἱ ἀρχαὶ διαιροῦσι ταῦτα, *Phys* A1 184a21-23). Aristotle presents the progress made by children as a case of progress from things clear to them to things clear by nature at *Phys* A1 184a17 (cf. section 2.1).

experience: some things regularly appear to us some way *because* they belong to some universal, and this explains why we might become reliable in responding to perceptions of some type. For instance, some patients will appear to us in certain ways *because* they're malarial, and this explains why we might become reliable in responding to such patients even if we don't *identify* them as "malarial," and even if we don't know *why* our remedies reliably cure them.

I think this all suggests a picture on which we share a good deal of our cognitive lives with nonhuman animals. We humans can perceive certain things better than other creatures, and once we've developed certain theoretical concepts we can bring these concepts to bear on the things we perceive. But perception, memory, and experience, for Aristotle, are the sorts of things nonrational animals can in principle develop to some degree or another. This marks a key departure from the Platonic innatism Aristotle rejects in *APo* B19, on which perception and experience serve mainly as a means of accessing the sophisticated forms of knowledge that are latent within us. For Aristotle, someone with a broad perceptual repertoire is someone who *knows* something: she knows how to respond in the appropriate way to the particular situations she faces. In doing so, she responds to the very universals we might come to study in a scientific context—even if perception alone will never tell her as much.

5
Perception in Aristotle's Ethics

I've so far been considering perception's role in Aristotle's epistemological works: what perception contributes to the more advanced cognitive states that make up our intellectual lives, and how we should understand talk of epistemic contributions in an Aristotelian context. I've argued that perception contributes to more advanced states by putting us in touch with particular things in a way that's responsive to the universals governing their behavior: perceptible particulars possess certain features because they instantiate certain universals, and perception allows us to discriminate these features and experience them as action-guiding aspects of our environment. Aristotle thinks we can develop a practical grasp of some domain (*ἐμπειρία*) on the basis of this sort of perceptual discrimination, and thinks we can develop a form of causally-sensitive understanding on the basis of our practical experience (*τέχνη* for productive crafts, *ἐπιστήμη* for theoretical science). Perception's universal character makes possible the first steps of this development.

In this chapter I'll be considering what such an interpretation might tell us about the role perception and perceptual knowledge play in Aristotle's ethical works. I'll focus in particular on the relation between perception and practical

wisdom (*φρόνησις*); a relation often invoked by commentators (call them *particularists*) who find in Aristotle a rejection of the view that general moral rules could play any significant role in governing ethical behavior.[130] Particularists conceive of Aristotle's virtuous agent as someone who *sees* what to do in the many particular situations she faces, without reasoning at a more general level about the sorts of behavior that might be required of her, or about how her actions might accord with some conception of the human good. On their view, this is because there *are* no codifiable rules that govern ethical behavior—what we should do is always, ultimately, a matter of what we should do *in the particular situation we're in*. Thus ethics, unlike other disciplines, is not a subject matter Aristotle thought we could understand scientifically: universals are the proper objects of scientific understanding, while virtuous behavior is irreducibly particular.

My main argument will be that Aristotle's remarks about perception in the *Ethics* do not support such a particularist view.[131] More broadly, I'll be arguing that Aristotle assigns no *special* role to ethical perception: the importance perception has in guiding our behavior and coping with the many particular situations we face is no different in the ethical domain than it is in domains like carpentry or medicine. In all these cases Aristotle emphasizes that perception is an indispensable source of practical knowledge, and that it provides a grasp of particulars that's hard to achieve by theoretical means. And in all these cases it might be right to characterize the skilled practitioner as someone who simply *sees* what's to be done in the particular situations she faces. But in none should

[130] I'll be spelling out in more detail what the "rules" are supposed to be and what "significant role" they are denied in what follows.

[131] I'll mostly be focusing on the *EN*, but the main interpretive points I'll be making are consistent with Aristotle's discussion in the *EE* (the bulk of the relevant passages occur in the common books). The references in this chapter are all from the *EN*.

we infer that universal rules governing the practice are not to be found, or that the things we perceive are not coherent or determinate enough to be treated in the context of a theoretical science. Indeed, as I'll try to show, there is good reason to think Aristotle *did* think that ethics, though less exact than geometry or empirical disciplines, would admit of a certain sort of scientific treatment.

If this is right, particularist commentators will have to support their interpretation some other way: Aristotle's remarks about perception and its use by the practically wise do not warrant any special conclusion concerning ethical uncodifiability.

5.1 *Ethics as inexact science*

Aristotle announces at the beginning of the *EN* that he intends his investigation as a study of "fine and just things," and, therefore, as part of the science of politics (1094b14-15).[132] His investigation proceeds in a familiar way: Aristotle offers a definition of the highest human good, and then goes on to discuss what this definition might tell us about how to lead a flourishing human life. On his view the highest human good is the virtuous activity of the soul (1098a16-17), and a flourishing human life is a life in which the soul's distinctively human capacities are exercised well—our capacity for rational thought and deliberation, but also our capacity to develop the sort of virtuous character displayed by the temperate, courageous, generous, and so on (1103a3-10).[133]

Yet Aristotle doesn't say much about exactly what it would take to exercise these virtues. He describes the character virtues in terms of "hitting the mean"

[132] On the connection between Aristotle's ethics and his political science, see Striker (2006).

[133] I sidestep here Aristotle's later discussion of the contemplative life, and how this discussion bears on his account of the human good.

between two extremes, and the intellectual virtues in terms of the sort of deliberation they allow us to engage in—but it's natural to wonder how any of this is supposed to teach us how we should live our lives, or how reading it would make us *better*, as Aristotle claims it should (1103b27-29). Principles of charity quickly lead from this thought to the conclusion that Aristotle didn't consider it *possible* to give any sort of ethical guidance at a general level—that he didn't *omit* a detailed account of what virtue called for in various situations, but that he simply didn't think such an account could be given.

Apart from a concern for charity, two pieces of evidence are usually adduced to support this conclusion. The first is Aristotle's insistence (at 1094b11-27, 1098a25ff, 1104a1ff, and *passim*) that we not expect from ethics the sort of exactness we find in sciences like geometry. He takes this to follow from the nature of the *subject matter* of ethics: it would be absurd to expect mathematical exactness concerning just and unjust actions, just as it would be absurd for geometers to be satisfied with the sort of approximate right angles a carpenter uses in his work. For (as Aristotle explains) we should only ever seek as much exactness as the subject matter we're investigating demands (1094b11-12).

The second piece of evidence is Aristotle's emphasis on the particular perceptual judgments of the virtuous. This emphasis is present in his discussion of character virtues, where he notes that perception is necessary to determine what rules like "hit the mean" might dictate in some given situation (see for instance 1109b14ff and 1126a32ff). It's also present in his discussion of practical wisdom, where Aristotle argues that the virtuous know what to do because of their (perceptually-based) *experience* facing many situations of some type, not

because they've *reasoned* about what, in general, they ought to do (1142a12-30).[134]

Since my concern is primarily with ethical perception, I won't discuss Aristotle's remarks about the subject matter of ethics (and the degree of exactness it calls for) in any great detail. But let me briefly note why we might resist their use as evidence for a special form of ethical uncodifiability.

The main reason (to my mind) is that Aristotle quite explicitly *compares* the sort of inexactness found in ethics to the kind of inexactness found in other domains—domains whose objects *do* admit of theoretical treatment at a general level. Consider for instance the following passage:[135]

> [36] And we must also remember what was said before, and not look for exactness in the same way in all things, but in each class of things such exactness as accords with the subject matter, and so much as is appropriate to the inquiry. For a carpenter and a geometer look for right angles in different ways; the former does so insofar as the right angle is useful for his work, while the latter inquires what it is or what sort of thing it is; for he is a spectator of the truth. We must act in the same way, then, in all other matters as well, that our main task may not be subordinated to secondary issues.
>
> *μεμνῆσθαι δὲ καὶ τῶν προειρημένων χρή, καὶ τὴν ἀκρίβειαν μὴ ὁμοίως ἐν ἅπασιν ἐπιζητεῖν, ἀλλ' ἐν ἑκάστοις κατὰ τὴν ὑποκειμένην ὕλην καὶ ἐπὶ τοσοῦτον ἐφ' ὅσον οἰκεῖον τῇ μεθόδῳ. καὶ γὰρ τέκτων καὶ γεωμέτρης διαφερόντως ἐπιζητοῦσι τὴν ὀρθήν· ὁ μὲν γὰρ ἐφ' ὅσον χρησίμη πρὸς τὸ ἔργον, ὁ δὲ τί ἐστιν ἢ ποῖόν τι· θεατὴς γὰρ τἀληθοῦς. τὸν αὐτὸν δὴ τρόπον καὶ ἐν τοῖς ἄλλοις ποιητέον, ὅπως μὴ τὰ πάρεργα τῶν ἔργων πλείω γίνηται.* (1098a26-33)

This passage makes it clear that disciplines whose subject matter is best treated inexactly might nonetheless deal with objects that *could* be treated exactly: a

[134] This second group of passages is sometimes taken to complement the first. If ethical inexactness is understood as a form indeterminacy inherent in any general ethical rule, it's natural to think that these passages describe the sort of determinate perceptual judgment that can only ever apply to some particular situation. (But ethical inexactness shouldn't be understood this way—or so I'll shortly be arguing.)

[135] Translations from *EN* are based on Urmson's adaptation of Ross in Barnes (1984).

carpenter's healthy disregard for perfect angles does not imply the *impossibility* of treating right angles in an exact geometrical fashion.

What this shows, I think, is that when Aristotle tells us that some subject matter shouldn't be treated exactly, he doesn't mean that there are certain things—the carpenter's angles, the just person's actions, etc—that are such that they simply don't admit of any sort of exact treatment. What he means is that *given the aims of some discipline* (housebuilding, living well) it would be inappropriate to treat the discipline's objects in an overly exact manner. Thus, for someone who wants to know how to live, it may well be a waste of time to seek exact definitions of all the virtues, and an exact demonstrative understanding of the relations between them. But this does not preclude such an investigation for someone who primarily seeks to understand the *truth* about the human good. It also leaves open the possibility that an *inexact* account of the virtues could indeed play an important role in leading a good human life.

This is already more than a particularist can allow. On the particularist view, any general claim about what virtue calls for will, at best, be a summary of the particular moral judgments of the virtuous—there is no theoretical treatment of the virtues on par with the geometrical treatment of right angles, and no use to be made of an inexact account of the virtues. Yet the comparison with carpentry suggests that this kind of treatment *is* possible, if impractical. And a similar thought motivates the warning that precedes his account of the various virtues of character:

> [37] The whole account of actions must be given in outline and not exactly, as we said at the very beginning that the accounts we demand must be in accordance with the subject matter: matters concerned with what to do and what's good for us don't make a stand, any more than matters of health.

> The general account being of this nature, the account of particular cases is yet more lacking in exactness; for they do not fall under any craft or set of rules, but the agents themselves must in each case consider what is appropriate to the occasion, as happens also in the craft of medicine or of navigation.
>
> *πᾶς ὁ περὶ τῶν πρακτῶν λόγος τύπῳ καὶ οὐκ ἀκριβῶς ὀφείλει λέγεσθαι, ὥσπερ καὶ κατ' ἀρχὰς εἴπομεν ὅτι κατὰ τὴν ὕλην οἱ λόγοι ἀπαιτητέοι· τὰ δ' ἐν ταῖς πράξεσι καὶ τὰ συμφέροντα οὐδὲν ἑστηκὸς ἔχει, ὥσπερ οὐδὲ τὰ ὑγιεινά. τοιούτου δ' ὄντος τοῦ καθόλου λόγου, ἔτι μᾶλλον ὁ περὶ τῶν καθ' ἕκαστα λόγος οὐκ ἔχει τἀκριβές· οὔτε γὰρ ὑπὸ τέχνην οὔθ' ὑπὸ παραγγελίαν οὐδεμίαν πίπτει, δεῖ δ' αὐτοὺς ἀεὶ τοὺς πράττοντας τὰ πρὸς τὸν καιρὸν σκοπεῖν, ὥσπερ καὶ ἐπὶ τῆς ἰατρικῆς ἔχει καὶ τῆς κυβερνητικῆς.* (1104a1-10)

Here too, Aristotle compares his investigation of character virtues with medicine and navigation—the very sorts of subjects we *can* come to know in a more exact, craft-like manner.[136] His admonition that we not seek too much exactness in ethical matters should therefore not be taken as an indication that such exactness is *impossible*, or that anything that lacks exactness cannot be treated as a craft. The point is only that we don't need a fully exact science to learn how to live—which, as Aristotle explains a few lines earlier, is what his ethical investigation is meant to teach us (1103b27-28).

So when Aristotle says that "particular cases" don't fall under any craft, he doesn't mean that particular instances of virtuous action are so specific or complex that virtue won't admit of *any* theoretical treatment at a general level.[137] What he means is simply that we shouldn't expect our account of the virtues to proceed with geometrical precision: we can say, with Aristotle, that virtuous actions "hit

[136]The end of our passage already suggests as much, but see *Met* A1 981a7-12 for a more explicit statement in the medical case.

[137]His phrasing clearly suggests that such treatment is possible: to warn that any general account of the virtues will be inexact is to assume that such a general account can be given. Note also that right after this passage Aristotle enjoins us to "give what help we can" despite this inexactness, and then goes on to develop his doctrine of the mean in the context of a broader theory of the role of intermediates in natural science (1104a10ff).

the mean" between two vicious excesses, but we would be ill-advised to try to spell out exactly what this entails for each particular situation some particular agent might face. Ill-advised not because we would be engaging in a *hopeless* task, but because we would be seeking a degree of exactness that isn't warranted by the purpose of our investigation.

Similar pragmatic considerations motivate the limits Aristotle sets on political science. Aristotle thinks that the political scientist seeks to make fellow citizens *good* (1102a9), and, since the human good is an activity of the soul, he thinks the political scientist will have to study the soul. But not too closely:

> [38] The student of politics, then, must study the soul, and must study it with these objects in view, and do so just to the extent which is sufficient for the questions we are discussing; for further exactness is perhaps something more laborious than our purposes require.
>
> *θεωρητέον δὴ καὶ τῷ πολιτικῷ περὶ ψυχῆς, θεωρητέον δὲ τούτων χάριν, καὶ ἐφ' ὅσον ἱκανῶς ἔχει πρὸς τὰ ζητούμενα· τὸ γὰρ ἐπὶ πλεῖον ἐξακριβοῦν ἐργωδέστερον ἴσως ἐστὶ τῶν προκειμένων*. (1102a23-26)

So seeking an overly exact account of the soul is a mistake because it's an *ineffective* way to realize the aims of political science—not because exactness about the soul is impossible as a matter of principle.[138] The limitations on political science don't stem merely from some metaphysical picture of its subject matter.

Admittedly, Aristotle's concerns are not *all* pragmatic. He does think that fine and just actions "exhibit much variety and fluctuation (*πολλὴν ἔχει διαφορὰν καὶ πλάνην*)," and that things good in some circumstance are prone to be bad in others (1094b12ff). So there is a difference in subject matter between ethics and sciences like geometry, whose results are necessary and absolute, and perhaps also

[138] Aristotle's psychological works are good evidence it is not.

between ethics and sciences like medicine, where what counts as *health* is more or less a fixed matter.[139]

But I don't think the variety, fluctuation, and controversy surrounding virtuous action should be taken as evidence for any special form of ethical *uncodifiability*. First, note that our difficulty in theorizing about ethics in an exact manner may lie with our epistemic situation towards virtuous activity as much as it does with virtuous activity itself—the variety and controversy might very well be our own fault. Second, even if we grant that virtuous action is indeterminate in itself, it doesn't follow that it's uncodifiable, or *impossible* to treat scientifically. For Aristotle thinks the generalizations of *any* natural science (e.g. "serpents copulate twining round one another," or "the eggs of birds are perfect when produced," *GA* 718a18, 718b16) admit of exceptions and some degree of variability.[140] So it may be that, for Aristotle, virtuous activity has an especially high *degree* of fluctuation and variety, but this doesn't warrant the view that Aristotle is singling out a special form of uncodifiability proper to the practical domain, and that this uncodifiability would prohibit its treatment in the context of a theoretical science.

I've argued so far that Aristotle's warnings about ethical inexactness don't, on their own, warrant any conclusion concerning ethical uncodifiability. For Aristotle, the degree of exactness proper to some investigation isn't just a function of the phenomena under study—the *purpose* of the investigation is a key factor. So we shouldn't infer that virtuous activity doesn't admit of exact treatment from

[139]For more on these distinctions, see Striker (2006: 129–30).

[140]Variety and fluctuation are therefore not enough to distinguish virtuous activity from the phenomena studied by other sciences—a point Irwin (2000: 105–113) forcefully presses against particularists.

the fact that it shouldn't be treated exactly by anyone who seeks to learn how to live. Aristotle does think generalizations about virtuous activity will admit of a lot of exceptions, and grants that they might be more controversial than generalizations about health or seafaring. But this isn't enough to conclude that virtuous activity cannot be codified—first, because it need not indicate a deficiency in the subject matter (the fault may lie with our epistemic situation), and second, because Aristotle thinks we *can* treat inexact subjects like medicine and navigation theoretically. If there is a difference in the subject matter's indeterminacy, it's a difference in degree rather than a difference in kind.

This conclusion leaves open a number of questions concerning Aristotle's notion of exactness—among others, what relation it bears to the sort of variety and fluctuation attributed to virtuous activity, and whether it should in fact be understood as a reflection of our epistemic limitations or as a metaphysical claim about the "just and fine things" ethics investigates. I won't pursue these questions any further. My main focus in what follows will be the remarks Aristotle makes about the role *perception* plays for a virtuous agent—a different and independent piece of (alleged) evidence for the particularist view.

5.2 *Perception and the character virtues*

As we've seen, Aristotle doesn't seek a characterization of virtuous activity that would provide concrete guidance about how we should act in various particular circumstances—he tells us virtue is a matter of hitting the mean, but doesn't further specify what this might entail. Perception is often invoked as the capacity that *does* tell us how we should act in some specific set of circumstances:[141]

[141] See 1126a31-b11 for a parallel passage.

> [39] But this [=hitting the mean] is no doubt difficult, and especially in particular cases; for it is not easy to determine both how and with whom and on what provocation and how long one should be angry; for we too sometimes praise those who fall short and call them good-tempered, but sometimes we praise those who get angry and call them manly. But the one who deviates little from goodness is not blamed, whether he do so in the direction of the more or of the less—only the one who deviates more widely is blamed, for he doesn't go unnoticed. But up to what point and to what extent one must deviate before becoming blameworthy it is not easy to determine by reasoning, any more than anything else among the things we perceive: such things belong to the particulars, and the discernment rests with perception.
>
> *χαλεπὸν δ' ἴσως τοῦτο, καὶ μάλιστ' ἐν τοῖς καθ' ἕκαστον· οὐ γὰρ ῥᾴδιον διορίσαι καὶ πῶς καὶ τίσι καὶ ἐπὶ ποίοις καὶ πόσον χρόνον ὀργιστέον· καὶ γὰρ ἡμεῖς ὁτὲ μὲν τοὺς ἐλλείποντας ἐπαινοῦμεν καὶ πράους φαμέν, ὁτὲ δὲ τοὺς χαλεπαίνοντας ἀνδρώδεις ἀποκαλοῦντες. ἀλλ' ὁ μὲν μικρὸν τοῦ εὖ παρεκβαίνων οὐ ψέγεται, οὔτ' ἐπὶ τὸ μᾶλλον οὔτ' ἐπὶ τὸ ἧττον, ὁ δὲ πλέον· οὗτος γὰρ οὐ λανθάνει. ὁ δὲ μέχρι τίνος καὶ ἐπὶ πόσον ψεκτὸς οὐ ῥᾴδιον τῷ λόγῳ ἀφορίσαι· οὐδὲ γὰρ ἄλλο οὐδὲν τῶν αἰσθητῶν· τὰ δὲ τοιαῦτα ἐν τοῖς καθ' ἕκαστα, καὶ ἐν τῇ αἰσθήσει ἡ κρίσις.* (1109b14-23)

For Aristotle, those with an even temper hit the mean between excessive anger and excessive meekness. But as he tells us here, there are times when extreme anger is called for, and rightly praised. Determining that one's circumstances call for extreme anger is a mark of virtue, and a form of discernment that's most naturally exercised by perceptual means. This is because the discernment concerns particulars, and particulars (as Aristotle often repeats) are the province of perception.

Particularists take passages like this one to manifest a deeper view concerning the nature of virtuous action. On their view, virtue *just is* correctly perceiving what to do on each occasion. General rules or principles concerning virtuous activity are good only insofar as they *summarize* the perceptual judgments of the virtuous, and in this regard the ethical domain is unique: an expert scientist's understanding of any other domain will be grounded by their knowledge of the

fundamental explanatory grounds proper to that domain, but a virtuous agent's knowledge what to do can only be characterized as a contentless ability to discern the right course of action in any given particular situation.[142]

Thus for particularists there are two ways in which ethics is unlike other domains. The first difference lies in the special form of *authority* attached to the perceptions of the virtuous agent—on the particularist view, perception is supposed to be *prior* to any general principle concerning the virtues, in the sense that it serves as the standard of correctness against which any general principle should be assessed. The second difference is that general moral principles cannot be grasped in a theoretical manner—on the particularist view, there is nothing to our grasp of general moral principles beyond a disposition to correctly discern what to do on some given occasion.

[142]I'm eliding a number of subtle distinctions one might draw between various particularist views. But here are some representative remarks from the key particularists (emphases are the authors'): "the subtleties of a complex ethical situation must be seized in a confrontation with the situation itself, by a faculty that is suited to address it as a complex whole. Prior general formulations lack both the concreteness and the flexibility that is required. They do not contain the particularizing details of the matter at hand, with which decision must grapple; and they are not responsive to what is there, as good decision must be. [...] Principles are authoritative only insofar as they are correct; but they are correct only insofar as they do not err with regard to the particulars." (Nussbaum (1990: 69)); "[Aristotle's] point is that, *in this case*, the universal is nothing over and above the particular instances, in that there is nothing more to grasping the universal than being able to identify instances of the specific sorts that comprise it: there is nothing more to a grasp of what the good life is in general than the ability to produce correct identifications of the virtuous actions that go to constitute happiness. Intuition has no role to play analogous to its role in the theoretical sphere: it is involved in making judgements about individual cases, and if someone is able to do that, nothing more is needed, or indeed possible" (Woods (1986: 160)); "there is no question of *justifying* the virtues by appeal to some conception of the good life, since one's grasp of what that is is manifested in, and does not transcend, the ability to recognize goodness in particular cases" (Woods (1986: 164)); "if having the correct conception of doing well [...] cannot be identified with acceptance of a set of universal rules or principles [...] then there is really nothing for it to be except the capacity to get things right occasion by occasion" (McDowell (1988: 94)); "an external validation of the correctness of a specific ethic would be of enormous significance. If Aristotle really thought he could give such a thing, one would expect him to highlight it. In fact one looks for it in vain [...] rather than giving a criterion that works from outside the ethic that he takes for granted, he says that such things are as the virtuous person determines them" (McDowell (1998: 117)).

I don't think Aristotle's remarks about perception and the character virtues warrant conclusions of this sort. It is true that, for Aristotle, any general principle about some virtue will have to cohere with the virtuous agent's judgments: if courageous warriors deviate from some purported rule of courage (e.g. "always stand your ground in battle"), then the rule should be revised. This is a point Aristotle emphasizes in the case of justice:

> [40] So when the law speaks universally and a case arises on it which is not covered by the universal statement, then it is right, when the legislator fails us and has erred by over-simplicity, to correct the omission—to say what the legislator himself would have said had he been present, and would have put into his law if he had known.
>
> *ὅταν οὖν λέγῃ μὲν ὁ νόμος καθόλου, συμβῇ δ' ἐπὶ τούτου παρὰ τὸ καθόλου, τότε ὀρθῶς ἔχει, ᾗ παραλείπει ὁ νομοθέτης καὶ ἥμαρτεν ἁπλῶς εἰπών, ἐπανορθοῦν τὸ ἐλλειφθέν, ὃ κἂν ὁ νομοθέτης αὐτὸς ἂν εἶπεν ἐκεῖ παρών, καὶ εἰ ἤδει, ἐνομοθέτησεν.* (1137b19-24)

The disposition to deviate from (and correct) the letter of the law when the situation calls for it is singled out as a special kind of virtue (*ἐπιείκεια*). So Aristotle is well aware that laws are imperfect guides, and thinks a virtuous person will recognize this and know how to improve them.

But this does not imply any special sort of priority for ethical perception over general rules of conduct. Recall that Aristotle disapproves of natural scientists and astronomers who cling to their principles in the face of conflicting evidence (cf. especially passages [7] and [8]). Thus the view that perceptual evidence serves as a standard of correctness for principles is one Aristotle holds quite generally, for theoretical domains as well as practical ones. And it's clearly *not* a view that implies a special sort of priority belonging to particulars, since Aristotle explicitly tells us (e.g. in [2]) that universal theoretical principles are prior to the particular

phenomena that can be demonstrated on their basis.[143]

We should therefore resist the move from the claim that particular perceptual judgments serve as a standard of correctness for principles to the conclusion that such judgments are *prior* to any general ethical principle. For on Aristotle's view, our knowledge of particulars can be *grounded* in our understanding of universal principles even if these principles are *vindicated* by our ability to explain a range of particular phenomena on their basis. The requirement that our ethical principles cohere with the perceptual judgments of virtuous agents doesn't itself preclude these principles from being prior (in the order of nature) to the judgments in question.

Nor do Aristotle's remarks about perception's role in telling us (e.g.) how angry we should get support the thought that there is *nothing more* to a grasp of moral principles concerning anger than a disposition to correctly discern how much anger is called for by some given situation. For Aristotle often emphasizes that virtuous agents must know particulars *and* universals, or at least that their behavior is best explained in terms of practical syllogisms with a major, universal premise and a minor, particular one. And it's hard to see how the universal premises in such practical syllogisms could be taken as mere dispositions to discern things the right way.

Consider for instance Aristotle's account of akrasia. It's a key part of this account that the universal premise in the syllogism explaining the akratic agent's

[143]Prior *by nature*, if not *to us* (cf. passage [4]). Aristotle does hold that our perception of particulars is prior *to us*, but again, he thinks this is the case for theoretical sciences as well as practical ones—so there is nothing distinctive about perception's priority to us in the ethical domain. (Note also that Aristotle's paradigmatic demonstrations have universal conclusions—but understanding these conclusions (e.g. why planets don't twinkle) is also supposed to yield particular knowledge (e.g. why Venus doesn't twinkle), as he explains in *APo* A24. So astronomical principles do also ground facts about particular planets, as one would expect.)

behavior represent her *considered* decision or choice (προαίρεσις) what to do—e.g. a decision to withhold from sweets that's the result of deliberation on the basis of her conception of the good.[144] What Aristotle seeks to explain is how an agent who has decided on some course of action, and understands *why* she has decided on this course of action, might nonetheless fail to act in accordance with it. But if the universal "don't eat sweets" premise represents a mere *disposition* to discern that sweets should be avoided, it's hard to see how the problem would even arise: there's nothing puzzling about a disposition to avoid sweets failing on some particular occasion.

Aristotle's remarks about animals also provide some evidence against a purely dispositional take on the practical syllogism's universal premise. Indeed, Aristotle denies that animals can be akratic, on the grounds that they "have no universal beliefs, but only imagination and memory of particulars" (1147b3-5).[145] Yet he was well aware that animals are perfectly able to form the disposition to avoid sweet things on the basis of their perceptions and memories thereof (cf. *Sens* 436b18-437a3, or any of the descriptions of complex animal behavior in his biological works). So the universal belief they are being denied here must be something more than a mere disposition to avoid sweet things when they come across them, as the particularists would have it.

[144]See for instance 1111b13-15, 1146b22-24, 1148a9, or 1151a7. Decision, for Aristotle, is a deliberative desire (ἡ δὲ προαίρεσις ὄρεξις βουλευτική, 1139a23), that is, a desire that results from an agent's deliberation about her ends grounded in her conception of the good (cf. 1113a9-12). There's a good deal of disagreement about how exactly one should understand this desire, what the deliberation involves, and what relation it bears to the desire (see Chamberlain (1984) and McDowell (1998) for some of the difficulties). For my purposes, what matters is that προαίρεσις requires rational thought, as Aristotle often repeats (e.g. at 1112a15-16 or 1139a31ff), and that it be taken to reflect an agent's considered beliefs about what's good for her. That much should be uncontroversial.

[145]This is no surprise, since Aristotle tells us at 1111b8-9 that animals and children cannot make *decisions*.

Now, there's little doubt that, for Aristotle, perception plays a key role in discerning how angry we should be (or how many sweets we should eat) on some particular occasion. And it seems plausible that the kind of belief represented by a practical syllogism's major premise would *manifest itself* in a disposition to discern things in the right sort of way. But I see no reason, based on the passages surveyed so far, to think that there is *nothing more* to such universal moral beliefs than a disposition for proper discernment, or to deny that the thoughtful consideration of universal moral principles could serve any significant purpose for the virtuous agent apart from supplying him with such a disposition. Even in his discussion of anger, Aristotle is careful to say that it's *not easy* (rather than *impossible*) to determine how much anger some situation calls for by reason alone (*οὐ ῥᾴδιον τῷ λόγῳ ἀφορίσαι*, 1109b21).[146] So when Aristotle says that perception is the capacity that tells us how much anger some situation calls for, he isn't *discounting* the possibility that we come to the same conclusion by painstaking reasoning about moral principles. He's just emphasizing that the reasoning would indeed be painstaking, and that it's an unnatural path towards virtuous action.

This seems to me the right thing to say. It's true that a good baker will simply *see* when bread is ready to be taken out of the oven, without having to study chemistry or thermal engineering.[147] But this doesn't mean there is no science underlying baking, or that a team of chemists and engineers couldn't determine, on theoretical grounds, precisely when to take some particular loaf of bread out of its oven (e.g. when the mean volume of its air bubbles reaches

[146] And in the same spirit: *οὐ γὰρ ῥᾴδιον διορίσαι τὸ πῶς καὶ τίσι καὶ ἐπὶ ποίοις καὶ πόσον χρόνον ὀργιστέον*, 1126a32-34; *οὐ ῥᾴδιον τῷ λόγῳ ἀποδοῦναι*, 1126b3.

[147] For this example, cf. 1112b33-1113a2.

3 cubic millimeters), and why this is the right time to take it out. It's just an obviously ineffective way to go about baking bread—our perceptual capacity is much better suited to the requisite discernment than bread science. This leaves open the possibility of an ineffective but exact bread science, which particularists deny. It also leaves open the possibility that considering non-theoretical, inexact rules (e.g. "take the loaf out once it browns a little and rises a finger out of its pan") might serve some helpful purpose, even if such rules are not taken as mere summaries of the decisions a good baker is prone to make.

I've argued so far that Aristotle's invocation of perception in his discussion of the character virtues doesn't support either part of the particularist view: perception doesn't have any special sort of authority over universal principles in the ethical domain, and there's good reason to think (for instance, on the basis of Aristotle's account of akrasia) that our grasp of universal moral principles doesn't simply reduce to a disposition to rightly perceive what our circumstances call for. Aristotle's discussion of anger and other character virtues does emphasize perception's role in helping us grasp particulars, but doesn't prohibit a grasp of universals from playing a key role in the virtuous agent's deliberation.

I'm now going to turn to the discussion of perception's relation to practical wisdom—a relation often advanced as a key piece of evidence for the particularist view. I'll argue for the same conclusion: Aristotle's remarks are consistent with his treatment of perception in theoretical domains, and therefore don't support any special conclusion concerning ethical uncodifiability.

5.3 *Perception and practical wisdom*

Aristotle thinks that an agent counts as virtuous in the strict sense only when he possesses practical wisdom in addition to a virtuous character (1144b14ff).[148] Practical wisdom is an intellectual virtue that (at a minimum) makes it possible for someone with a virtuous character to work out the best way to achieve virtuous ends—for instance, the virtue that reveals to someone who sees a fellow soldier in need of rescue how best to rescue him. In such a scenario, the non-rational character of the virtuous agent supplies him with an end (e.g. to be courageous), and his practical wisdom tells him how to go about realizing that end (e.g. by undertaking in a deft rescue maneuver).[149]

This isn't mere instrumental reasoning. On Aristotle's view, the "things towards" some end are not simply *means* that promote or bring about some distinct product. An agent who seeks to "do well" or "be courageous," in choosing the "things towards" that end, is *doing well* or *being courageous*: he is taking a course of action that *constitutes* a realization of his end.[150] What this looks like will of course vary based on the specific circumstance he finds himself in. It may well be courageous, if a diversion is needed, to rush headlong into battle and draw attention to oneself. In other situations (e.g. when trying to rescue a fellow

[148]I leave it open here whether virtue includes practical wisdom as a component, or merely requires practical wisdom as a necessary condition for its full development. For a defense of the former view, see Irwin (1975), and for a defense of the latter, see Moss (2011).

[149]See for instance 1144a7-9, 1144a20-22, or 1145a5-7. I leave it open whether practical wisdom does *more* than help us realize the goals set by a virtuous character—for instance, whether it might resolve conflicts between competing virtues, or whether it might be used to reflect on one's virtuous ends and the reason why one has them (for an example of the latter view, see Burnyeat (1980)). I leave this open for dialectical reasons: the motivation for particularism is strongest if one interprets practical wisdom in the minimal way I've just described.

[150]See for instance 1094a3-5, and see Irwin (1975: 567–571), McDowell (1998: 108–110), Moss (2011: 241–251), or Wiggins (1980: 224–225) for defenses of (various version of) this interpretation.

soldier) it will simply be rash. The practically wise know how to realize an end because they recognize what it would take to do well on some occasion. They do so by being aware of the salient features of their situation (e.g. that *this wounded soldier* is a salient aspect of the battlefield), and by discerning which course of action would count as a realization of their ends (e.g. discerning that *helping their fellow soldier* is the way to be courageous). So practical wisdom is the virtue that tells us how to realize our virtuous ends virtuously: it alerts us to the morally relevant features of our situation, and provides specific content to our nonspecific ends ("be courageous," "hit the mean," etc).[151]

Aristotle explains that this sort of wisdom requires a good deal of experience with particulars, and characterizes the wise as having an "eye" for what to do (1143b4, 1144a30). Particularists have a good explanation for such remarks: practical wisdom requires perception and experience with particulars because there simply is no way to specify what courage (say) calls for in general terms. Practical wisdom doesn't specify a realization of some end we might have specified by other means—there is something irreducibly particular about what virtues like courage require us to do, which practical wisdom, thanks to its perceptual character, is uniquely suited to discern.

Aristotle's actual discussion of practical wisdom is notoriously challenging. But the key passages in which perception and experience are invoked don't seem to me to warrant any such conclusion. Consider for instance the following:

> [41] Practical wisdom on the other hand is concerned with things human and things about which it is possible to deliberate; for we say this is above all the work of the practically wise, to deliberate well, but no one deliberates

[151]Not all commentators think practical wisdom is responsible for identifying salient features *and* specifying how to realize some end, but let's grant particularists that it does both.

about things that cannot be otherwise, nor about things which lack an end that is a good brought about by action. The unqualifiedly good deliberator is the one capable of aiming in accordance with calculation at the best good for a human being of things attainable by action.

Nor is practical wisdom concerned with universals only—it must also recognize the particulars; for it is practical, and practice is concerned with particulars. This is why some who do not know, and especially those who have experience, are more practical than others who know; for if someone knew that light meats are digestible and wholesome, but did not know which sorts of meats are light, he would not produce health, but he who knows that chicken is wholesome is more likely to produce health.

Now practical wisdom is concerned with action; therefore one should have both, or the latter in preference to the former. Here, too, there must be a controlling kind.

Ἡ δὲ *φρόνησις περὶ τὰ ἀνθρώπινα καὶ περὶ ὧν ἔστι βουλεύσασθαι· τοῦ γὰρ φρονίμου μάλιστα τοῦτ' ἔργον εἶναί φαμεν, τὸ εὖ βουλεύεσθαι, βουλεύεται* δ' *οὐδεὶς περὶ τῶν ἀδυνάτων ἄλλως ἔχειν, οὐδ' ὅσων μὴ τέλος τι ἔστι, καὶ τοῦτο πρακτὸν ἀγαθόν. ὁ* δ' *ἁπλῶς εὔβουλος ὁ τοῦ ἀρίστου ἀνθρώπῳ τῶν πρακτῶν στοχαστικὸς κατὰ τὸν λογισμόν.*

οὐδ' ἐστὶν ἡ φρόνησις τῶν καθόλου μόνον, ἀλλὰ δεῖ καὶ τὰ καθ' ἕκαστα γνωρίζειν· πρακτικὴ γάρ, ἡ δὲ πρᾶξις περὶ τὰ καθ' ἕκαστα. διὸ καὶ ἔνιοι οὐκ εἰδότες ἑτέρων εἰδότων πρακτικώτεροι, καὶ ἐν τοῖς ἄλλοις οἱ ἔμπειροι· εἰ γὰρ εἰδείη ὅτι τὰ κοῦφα εὔπεπτα κρέα καὶ ὑγιεινά, ποῖα δὲ κοῦφα ἀγνοοῖ, οὐ ποιήσει ὑγίειαν, ἀλλ' ὁ εἰδὼς ὅτι τὰ ὀρνίθεια [*κοῦφα καὶ*] *ὑγιεινὰ ποιήσει μᾶλλον.*

ἡ δὲ φρόνησις πρακτική· ὥστε δεῖ ἄμφω ἔχειν, ἢ ταύτην μᾶλλον. εἴη δ' *ἄν τις καὶ ἐνταῦθα ἀρχιτεκτονική.* (1141b8-23)

In this passage Aristotle seeks to contrast practical wisdom from *σοφία*, which he uses here as a synonym for scientific understanding.[152] Scientific understanding is concerned with necessary facts, but is useless when it comes to securing human goods. Practical wisdom, by contrast, is concerned with contingent human affairs—the practically wise are a good deliberators, and have experience with particulars a scientific expert will often lack (e.g. the experience necessary to avoid falling into wells).

[152] *ἡ σοφία ἐστὶ καὶ ἐπιστήμη καὶ νοῦς τῶν τιμιωτάτων τῇ φύσει*, 1141b2-3.

There is no suggestion here that the practically wise grasp *irreducibly* particular facts.[153] Aristotle's point is that someone can know that chicken is healthy and prescribe a healthy diet without knowing *why* chicken is healthy (i.e. because it's a light meat, and all light meats are healthy). Conversely, someone might know the complete theory underlying healthy diets but not be able to prescribe anything because they don't recognize chickens as sources of light meat. This is precisely what Aristotle tells us in *Met* A1, when he claims that "as far as action goes, experience seems in no respect inferior to craft" (*πρὸς μὲν οὖν τὸ πράττειν ἐμπειρία τέχνης οὐδὲν δοκεῖ διαφέρειν*, 981a12-13): an experienced doctor who knows nothing of the causes underlying his patients' symptoms can be just as effective as a theoretically-informed physician.[154] As he goes on to explain in the *Metaphysics*, however, this does *not* preclude our theorizing about the causes underlying the successful practices of the experienced—the fact that experience guides a good doctor's behavior certainly doesn't make a theoretical understanding of medicine *impossible*.

To the contrary, Aristotle suggests that the development of experience with respect to some domain is an *indication* that the domain might be investigated scientifically: the master-worker in some craft is someone with a causal understanding of the procedures implemented by experienced manual workers.[155] This

[153] On one way of reading the claim that "practical wisdom isn't concerned with universals only," practical wisdom is concerned with *both* particulars and universals. Equally plausible is the reading on which practical wisdom *as opposed to scientific understanding* isn't concerned with universals only. (The next passage I'll consider explicitly states that practical wisdom requires a grasp of both universals and particulars.)

[154] Even *better* than the physician, if the physician is inexperienced (*ἀλλὰ καὶ μᾶλλον ἐπιτυγχάνουσιν οἱ ἔμπειροι τῶν ἄνευ τῆς ἐμπειρίας λόγον ἐχόντων*, 981a13-15).

[155] *τοὺς ἀρχιτέκτονας περὶ ἕκαστον τιμιωτέρους καὶ μᾶλλον εἰδέναι νομίζομεν τῶν χειροτεχνῶν καὶ σοφωτέρους, ὅτι τὰς αἰτίας τῶν ποιουμένων ἴσασιν*, *Met* A1 981a30-b2. The term used for the master-worker here (*ἀρχιτέκτων*) might shed some light on Aristotle's rather oblique remark that there must be an *ἀρχιτεκτονική*, or "controlling" kind of practical wisdom. One

point is nicely illustrated by the first few lines of the *Rhetoric*:

> [42] Rhetoric is the counterpart to dialectic. For both concern things that everyone knows in some way, but that don't belong to any science. And that's why everyone, in some way, takes part in both: for everyone, to some extent, scrutinizes and sustains arguments, defends [some], attacks [others]. The many do this either at random, or out of a disposition formed through habit. Since both of these are possible, it's clear that these topics can also be treated systematically—for it's possible to study the cause through which those who succeed through habit or spontaneously [do so], and everyone would agree straightaway that this sort of thing is the function of craft.
>
> Ἡ *ῥητορικὴ ἐστιν ἀντίστροφος τῇ διαλεκτικῇ· ἀμφότεραι γὰρ περὶ τοιούτων τινῶν εἰσιν ἃ κοινὰ τρόπον τινὰ ἁπάντων ἐστὶ γνωρίζειν καὶ οὐδεμιᾶς ἐπιστήμης ἀφωρισμένης· διὸ καὶ πάντες τρόπον τινὰ μετέχουσιν ἀμφοῖν· πάντες γὰρ μέχρι τινὸς καὶ ἐξετάζειν καὶ ὑπέχειν λόγον καὶ ἀπολογεῖσθαι καὶ κατηγορεῖν ἐγχειροῦσιν. τῶν μὲν οὖν πολλῶν οἱ μὲν εἰκῇ ταῦτα δρῶσιν, οἱ δὲ διὰ συνήθειαν ἀπὸ ἕξεως· ἐπεὶ δ' ἀμφοτέρως ἐνδέχεται, δῆλον ὅτι εἴη ἂν αὐτὰ καὶ ὁδῷ ποιεῖν· δι' ὃ γὰρ ἐπιτυγχάνουσιν οἵ τε διὰ συνήθειαν καὶ οἱ ἀπὸ τοῦ αὐτομάτου τὴν αἰτίαν θεωρεῖν ἐνδέχεται, τὸ δὲ τοιοῦτον ἤδη πάντες ἂν ὁμολογήσαιεν τέχνης ἔργον εἶναι.* (*Rhet* 1354a1-11)

So the fact that people succeed at dialectic and rhetoric by nonscientific means (spontaneously, or by some sort of habituation) is a sign that one could investigate the causes underlying their success in the context of a craft. Likewise, the fact that the practically wise have *experience* with chicken meat, I suggest, should be taken as an indication that a scientific understanding of various diets could be developed—an understanding that would have as its object the causes underlying the success of the practically wise. If this is right, practical wisdom's reliance on our experience of particulars is rather poor evidence for particularism.

A similar conclusion can be drawn from another passage invoked as evidence for particularist theses:

---

possible suggestion: the controlling sort of practical wisdom bears the same relation to the non-controlling sort as the master-worker does to a manual laborer—that is, the controlling sort of practical wisdom grasps *why* some way of achieving an end constitutes a way of achieving that end (e.g. grasps *why* rushing headlong into battle is the way to be *courageous*).

[43] What has been said is confirmed by the fact that while young men become geometers and mathematicians and wise in matters like these, it is thought that a young man of practical wisdom cannot be found. The cause is that such wisdom is concerned [not only with universals but] also with particulars, which become familiar from experience, but a young man has no experience, for it is length of time that gives experience; indeed one might ask this question too, why a boy may become a mathematician, but not a wise man or a natural scientist. Is it because the objects of mathematics exist by abstraction, while the first principles of these other subjects come from experience, and because young men have no conviction about the latter but merely use the proper language, while the essence of mathematical objects is plain enough to them?

Again, error in deliberation may be either about the universal or about the particular; we may fail to know either that all water that weighs heavy is bad, or that this water weighs heavy.

That practical wisdom is not understanding is evident; for it is, as has been said, concerned with the ultimate [particular], since the thing to be done is of this nature. It is opposed, then, to *νοῦς*; for *νοῦς* is of the definitions, for which no reason can be given, while practical wisdom is concerned with the ultimate [particular], which is the object not of understanding but of perception—not the perception of qualities peculiar to one sense but a perception akin to that by which we perceive that the ultimate figure is a triangle; for in that direction too there will be a limit. But this is perception more than it is practical wisdom, though perception of another kind.

καὶ διότι γεωμετρικοὶ μὲν νέοι καὶ μαθηματικοὶ γίνονται καὶ σοφοὶ τὰ τοιαῦτα, φρόνιμος δ' οὐ δοκεῖ γίνεσθαι. αἴτιον δ' ὅτι καὶ τῶν καθ' ἕκαστά ἐστιν ἡ φρόνησις, ἃ γίνεται γνώριμα ἐξ ἐμπειρίας, νέος δ' ἔμπειρος οὐκ ἔστιν· πλῆθος γὰρ χρόνου ποιεῖ τὴν ἐμπειρίαν· ἐπεὶ καὶ τοῦτ' ἄν τις σκέψαιτο, διὰ τί δὴ μαθηματικὸς μὲν παῖς γένοιτ' ἄν, σοφὸς δ' ἢ φυσικὸς οὔ. ἢ ὅτι τὰ μὲν δι' ἀφαιρέσεώς ἐστιν, τῶν δ' αἱ ἀρχαὶ ἐξ ἐμπειρίας· καὶ τὰ μὲν οὐ πιστεύουσιν οἱ νέοι ἀλλὰ λέγουσιν, τῶν δὲ τὸ τί ἐστιν οὐκ ἄδηλον;

ἔτι ἡ ἁμαρτία ἢ περὶ τὸ καθόλου ἐν τῷ βουλεύσασθαι ἢ περὶ τὸ καθ' ἕκαστον· ἢ γὰρ ὅτι πάντα τὰ βαρύσταθμα ὕδατα φαῦλα, ἢ ὅτι τοδὶ βαρύσταθμον.

ὅτι δ' ἡ φρόνησις οὐκ ἐπιστήμη, φανερόν· τοῦ γὰρ ἐσχάτου ἐστίν, ὥσπερ εἴρηται· τὸ γὰρ πρακτὸν τοιοῦτον. ἀντίκειται μὲν δὴ τῷ νῷ· ὁ μὲν γὰρ νοῦς τῶν ὅρων, ὧν οὐκ ἔστι λόγος, ἡ δὲ τοῦ ἐσχάτου, οὗ οὐκ ἔστιν ἐπιστήμη ἀλλ' αἴσθησις, οὐχ ἡ τῶν ἰδίων, ἀλλ' οἵᾳ αἰσθανόμεθα ὅτι τὸ [ἐν τοῖς μαθηματικοῖς] ἔσχατον τρίγωνον· στήσεται γὰρ κἀκεῖ. ἀλλ' αὕτη μᾶλλον αἴσθησις ἢ φρόνησις, ἐκείνης δ' ἄλλο εἶδος. (1142a12-30)

Aristotle's aim in this passage is, again, to distinguish practical wisdom from scientific understanding. Key piece of evidence: some kids are good at geometry,

but kids are never *practically wise*—they just haven't *lived* enough to form the sort of experience practical wisdom requires.[156]

But we shouldn't think of the experience in question as *irreducibly* particular. Aristotle explicitly tells us that practical wisdom is concerned both with universals *and* particulars, and explains that deliberative mistakes can stem either from ignorance of the universal ("heavy water is bad") or the particular ("this is heavy water").[157] The thought, presumably, is that someone might drink heavy water either because they fail to recognize it as heavy water or because they don't know that heavy water is bad for them. But general claims about what types of water are good and bad for us are precisely the sorts of claims one might understand in the context of a medical science. So even if we grant that the practically wise don't need a *scientific* understanding of various waters, this passage seems like good evidence that whatever they do know could be understood scientifically.

Nor does the claim that practical wisdom concerns perceptually-grasped "ultimate particulars" preclude a scientific investigation of moral principles. Aristotle is telling us here (as I read him) that perception concerns ultimates particulars just as νοῦς concerns ultimate universals—primitives in the order of learning for perception, and primitives in the order of nature for νοῦς (the same point made in passage [4]). The perception in question is the perception of an *experienced* person—the perception of a geometer who recognizes a three-sided figure as a *triangle*, rather than three extended line-like shapes. As this very example suggests, however, the sorts of things an experienced person perceives *can* be treated in

[156] A geometer's understanding of triangles doesn't depend on *seeing many particular triangles*, while practical wisdom (plausibly enough) is something we develop by facing many particular circumstances, and performing some action in the circumstances we face.

[157] One ms doesn't have the καὶ at a14, but the point about deliberative mistakes remains.

universal terms in the context of a geometrical science.

Recall that this is exactly the path Aristotle thinks our epistemic development takes in other disciplines. A doctor with medical *experience* will know that malarial patients should be bled on essentially *perceptual* grounds—for Aristotle, we can become effective at curing malarials on the basis of the particular symptoms we perceive and remember, without grasping the cause of these symptoms, and without *reasoning* about malarials in general terms. But the fact that we can form such a skill is *explained* by the fact that our particular perceptions are perceptions *of* some universal—that is, that there is some cause underlying the way particular patients appear to us, and the efficacy of various treatments we prescribe them.

I think the perceptions of the practically wise can be understood in similar terms. When the experienced doctor sees a malarial patient, he discerns the relevant symptoms (e.g. fever, paleness, etc), and, thereby, perceives the patient as *someone to be leeched*. He does all this without engaging in any theoretical reasoning about what symptoms are associated with what disease, or how the disease causes the symptoms. When the practically wise sees a wounded fellow soldier, he discerns this soldier as a salient feature of the battlefield, and perceives the soldier as *someone to be rescued*. He does all this without engaging in any theoretical reasoning about what courage *is* or why it counts as a form of human virtue.

In neither case should we conclude that there is no way to understand malaria or courage in universal terms, or that such an understanding would be of no help in curing patients or living a good life. Indeed, even as he tells us we should pay attention to the trained perception of those with experience, Aristotle suggests that such an understanding is possible:

> [44] Therefore [=because practical wisdom is developed over time] we ought to attend to the undemonstrated sayings and opinions of experienced and older people or of people of practical wisdom not less than to demonstrations; for because experience has given them an eye they see aright.
>
> *ὥστε δεῖ προσέχειν τῶν ἐμπείρων καὶ πρεσβυτέρων ἢ φρονίμων ταῖς ἀναποδείκτοις φάσεσι καὶ δόξαις οὐχ ἧττον τῶν ἀποδείξεων· διὰ γὰρ τὸ ἔχειν ἐκ τῆς ἐμπειρίας ὄμμα ὁρῶσιν ὀρθῶς*. (1143b11-14)

We should attend to the undemonstrated sayings and opinions of the practically wise *no less* than we attend to demonstrations. This is as one would expect in the medical case: Aristotle thinks the experienced doctor's prescriptions are just as good as the demonstrated conclusions of medical science. But of course this implies that there *is* (or *could be*) such a thing as medical science—and, by extension, that there could be such a thing as ethical science.

If I'm right about medical experience, then, the possibility of ethical experience should serve as evidence *against* particularism, rather than evidence in its favor. Aristotle's discussion of our epistemic development shows that the domains in which we can form a unified, experience-based skill are precisely those we can understand in scientific terms. As with medicine, so too with ethics.

Aristotle, as I've now argued at length, thinks highly of our perceptual capacities. What we perceive plays an essential role in the development of sophisticated states like experience and scientific understanding. Indeed, as far as ethics and productive crafts go, perception and experience guide us just as well as more advanced cognitive states—and more efficiently. This much is right about the particularist view.

What we should resist is the further thought that there is something irreducibly particular about the subject matter under consideration, or that our

perceptual capacities only serve us so well because our intellectual ones cannot. It may well be right to say that the virtuous simply *see* what their situation calls for, without having to reason about their ends or how to best realize them. And it may well be the case that our perceptual capacities are uniquely well suited for this sort of discernment, and that *living* is the best way to get better at discerning things the right way. It does not follow that virtuous activity doesn't admit of theoretical treatment—all that follows is that seeking a scientific understanding of virtue is a poor way to learn how to live our lives. Aristotle's remarks about perception in the *Ethics* only suggest this more modest and, to my mind, more credible point.

References

Adamson, Peter (2010). "Posterior Analytics II.19: A Dialogue with Plato?" In *Aristotle and the Stoics Reading Plato* (Verity Harte, Mary M. McCabe, Robert W. Sharples, and Anne Sheppard, eds.), 1–19, Institute of Classical Studies.

Barnes, Jonathan (1984). *The Complete Works of Aristotle, Revised Oxford Tranlsation*. Princeton University Press.

Barnes, Jonathan (1993). *Aristotle's Posterior Analytics*. Clarendon Press.

Bayer, Greg (1997). "Coming to Know Principles in *Posterior Analytics* II 19." *Apeiron*, 30, 109–142.

Berker, Selim (2013). "Epistemic Teleology and the Separateness of Propositions." *Philosophical Review*, 122, 337–393.

Bolton, Robert (1991). "Aristotle's Method in Natural Science: *Physics* I." In *Aristotle's Physics: A Collection of Essays* (Lindsay Judson, ed.), 1–29, Clarendon Press.

Bostock, David (1986). *Plato's Phaedo*. Clarendon Press.

Bronstein, David (2012). "The Origin and Aim of Posterior Analytics II.19." *Phronesis*, 57, 29–62.

Burnyeat, Myles (1980). "Aristotle on Learning to Be Good." In *Essays on Aristotle's Ethics* (Amélie Oksenberg Rorty, ed.), 69–92, University of California Press.

Burnyeat, Myles (1981). "Aristotle on Understanding Knowledge." In *Aristotle on Science:* The Posterior Analytics, *Proceedings of the Eighth Symposium Aristotelicum* (Enrico Berti, ed.), 97–139, Editrice Antenore.

Cashdollar, Stanford (1973). "Aristotle's Account of Incidental Perception." *Phronesis*, 18, 156–175.

Caujolle-Zaslawsky, Francoise (1987). "Etude préparatoire à une interprétation du sens aristotélicien d'*ἐπαγωγή*." In *Biologie, logique et métaphysique chez Aristote* (Daniel Devereux and Pierre Pellegrin, eds.), 365–387.

Chamberlain, Charles (1984). "The Meaning of Prohairesis in Aristotle's Ethics." *Transactions of the American Philological Association*, 114, 147–157.

Charles, David (2003). *Aristotle on Meaning and Essence*. Oxford University Press.

Denniston, John D. (1954). *The Greek Particles*, 2nd edition. Oxford University Press.

Engberg-Pedersen, Troels (1979). "More on Aristotelian Epagoge." *Phronesis*, 24, 301–319.

Fine, Gail (2003). *Plato on Knowledge and Forms*. Clarendon Press.

Frede, Michael (1996). "Aristotle's Rationalism." In *Rationality in Greek Thought* (Michael Frede and Gisela Striker, eds.), 157–173, Oxford University Press.

Gregorić, Pavel and Filip Grgić (2006). "Aristotle's Notion of Experience." *Archiv für Geschichte der Philosophie*, 88, 1–30.

Grimaldi, William M. A. (1957). "A Note on the Pisteis in Aristotle's Rhetoric, 1354-1356." *American Journal of Philology*, 78, 188–192.

Hamlyn, David W. (1976). "Aristotelian Epagoge." *Phronesis*, 21, 167–184.

Hankinson, Robert J. (2011). "Avant *nous* le Déluge: Aristotle's Notion of Intellectual Grasp." In *Episteme, etc.* (Benjamin Morison and Katerina Ierodiakonou, eds.), 30–59, Oxford University Press.

Hicks, Robert D. (1965). *Aristotle: De Anima*. Hakkert.

Hintikka, Jaakko (1980). "Aristotelian Induction." *Revue internationalle de philosophie*, 34, 422–439.

Irwin, Terence (1975). "Aristotle on Reason, Desire, and Virtue." *The Journal of Philosophy*, 72, 567–578.

Irwin, Terence (1988). *Aristotle's First Principles*. Clarendon Press.

Irwin, Terence (2000). "Ethics as an Inexact Science." In *Moral Particularism* (Brad Hooker and Margaret Olivia Little, eds.), 100–130, Clarendon Press.

Kahn, Charles (1981). "Aristotle on Understanding Knowledge." In *Aristotle on Science:* The Posterior Analytics*, Proceedings of the Eighth Symposium Aristotelicu* (Enrico Berti, ed.), 385–414, Editrice Antenore.

Kosman, Louis A. (1973). "Understanding, Explanation and Insight in the Posterior Analytics." In *Exegesis and Argument; Phronesis supplementary volume I* (Edward N. Lee, Alexander P. D. Mourelatos, and Richard M. Rorty, eds.), 374–392, Van Gorcum.

Le Blond, Jean-Marie (1939). *Logique et Méthode chez Aristote*. Vrin.

Lee, Henry D. P. (1935). "Geometrical Method and Aristotle's Account of First Principles." *The Classical Quarterly*, 29, 113–124.

Lesher, James H. (1973). "The Meaning of ΝΟΥΣ in the Posterior Analyics." *Phronesis*, 18, 44–68.

Lesher, James H. (2010). "'Just as in Battle': The Simile of the Rout in Aristotle's *Posterior Analytics* II 19." *Ancient Philosophy*, 30, 95–105.

Lorenz, Hendrik (2006). *The Brute Within*. Oxford University Press.

McDowell, John (1988). "Comments on T.H. Irwin's 'Some Aspects of Incontinence'." *The Southern Journal of Philosophy*, 27 (suppl.), 89–102.

McDowell, John (1998). "Some Issues in Aristotle's Moral Psychology." In *Companions to Ancient Thought 4: Ethics* (Stephen Everson, ed.), 107–128, Cambridge University Press.

McKirahan, Richard D. (1983). "Aristotelian Epagoge in Prior Analytics 2.21 and Posterior Analyics 1.1." *Journal of the History of Philosophy*, 21, 1–13.

McKirahan, Richard D. (1992). *Principles and Proofs: Aristotle's Theory of Demonstrative Science*. Princeton University Press.

Mignucci, Mario (1975). *L'Argomentazione Dimostrativa in Aristotele*. Padua.

Modrak, Deborah (1987). *Aristotle: The Power of Perception*. University of Chicago Press.

Moss, Jessica (2011). "'Virtue Makes the Goal Right': Virtue and Phronesis in Aristotle's Ethics." *Phronesis*, 56, 204–261.

Nehamas, Alexander (1985). "Meno's Paradox and Socrates as a Teacher." *Oxford Studies in Ancient Philosophy*, 3, 1–30.

Nussbaum, Martha C. (1990). *Love's Knowledge: Essays on Philosophy and Literature*. Oxford University Press.

Ross, William D. (1949). *Aristotle's Prior and Posterior Analytics*. Clarendon Press.

Ross, William D. (1995). *Aristotle*, 6th edition. Routledge.

Salmieri, Gregory, David Bronstein, David Charles, and James G. Lennox (2013). "Episteme, Demonstration, and Explanation: A Fresh Look at Aristotle's Posterior Analytics." *Metascience*, 23, 1–35, URL http://dx.doi.org/10.1007/s11016-013-9815-1.

Scheiter, Krisanna M. (2012). "Images, Appearances, and *Phantasia* in Aristotle." *Phronesis*, 57, 251–278.

Scott, Dominic (1995). *Recollection and Experience*. Cambridge University Press.

Sorabji, Richard (1972). *Aristotle on Memory*. Brown University Press.

Striker, Gisela (2006). "Aristotle's Ethics as Political Science." In *The Virtuous Life in Greek Ethics* (Burkhard Reis, ed.), 127–141, Cambridge University Press.

Tuominen, Miira (2010). "Back to Posterior Analytics II 19: Aristotle on the Knowledge of Principles." *Apeiron*, 43, 115–144.

Weatherson, Brian (2005). "Can We Do Without Pragmatic Encroachement?" *Philosophical Perspectives*, 19, 417–443.

Wedin, Michael (1988). *Mind and Imagination in Aristote*. Yale University Press.

Wiggins, David (1980). "Deliberation and Practical Reason." In *Essays on Aristotle's Ethics* (Amélie Oksenberg Rorty, ed.), 221–240, University of California Press.

Woods, Michael (1986). "Intuition and Perception in Aristotle's Ethics." *Oxford Studies in Ancient Philosophy*, 4, 145–156.

Index Locorum Aristotelis

Index Locorum Platonicus