

“None of the Arts that Gives Proofs about Some Nature is Interrogative”: Questions and Aristotle’s Concept of Science

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Modern interpreters have often regarded Aristotle’s *Posterior Analytics* as a mystery, or even a bit of an embarrassment. In his treatises on natural science and ethics, Aristotle is constantly concerned to review the opinions of his predecessors and of people in general; where appropriate, he also takes note of experiential observations, some of them highly specialized. However, the traditional view of the *Posterior Analytics* is that it advances an almost Cartesian picture of sciences as deductive systems founded on intuitively evident first premises. How are these to be reconciled?

One reconciliation is to hold that the *Posterior Analytics* is not about scientific method but instead treats science in some other way: for instance, as Jonathan Barnes argues (Barnes 1981), about scientific pedagogy. Another possibility is to agree that the *Posterior Analytics* and the methodology of the treatises conflict but to explain this developmentally, as Irwin 1988 does. Others have looked in more subtle ways for methodological links between the *Analytics* and the treatis-

es (Lennox 1987, 1994, Ferejohn 1991) or aggressively defended the innatist position (Kahn 1981). However, for modern interpreters, these approaches still leave a critical question unanswered: if Aristotle did think that sciences should have deductive structures, and if he knew (as *An. Post.* I.3 shows he did) that deductive systems must rest on first principles not themselves justified by deduction, then what alternative account of the justification of first principles did he have to offer?

Beginning with the work of G. E. L. Owen (Owen 1960, 1961), an answer to this question has been elaborated, principally by that is now nearly a matter of orthodoxy¹. In outline, it is that Aristotle thought the principles could be established by ‘dialectic’. which is (in Irwin’s words) ‘a method of arguing from common beliefs’, and where these common beliefs are a collection of views held by certain classes of people. Irwin in particular argues that Aristotle came to believe a kind of dialectical argument could accomplish the task of establishing the principles of sciences after having rejected what Irwin regards as the ‘pseudo-performance’ of ‘cognition by νοῦς’ to which Aristotle appeals in *Posterior Analytics* II.19. This picture of Aristotle’s method as dialectical rests on several proof texts, most critically *Topics* I.2 and *Nicomachean Ethics* VII.1, 1145b2-7, and on the observation that Aristotle often begins the treatment of a subject with a survey of the views about it generally held or held by earlier philosophers. I have argued elsewhere that this type of interpretation rests on a conception of dialectic that is at best misleading and on unsustainable readings of certain critical texts.² Rather than repeat those criticisms here, I want to explore a question that arises if they are sound. For Plato, dialectic was the philosopher’s method of inquiry. Aristotle, by contrast, treats dialectical and philosophical arguments as they were disjoint and explicitly says that dialectic cannot be a part of science. What has brought about this change, and

¹There are dissenters: see D. W. Hamlyn 1990 and Smith 1993, 1994, 1999.

²See Smith 1993 and Smith 1997, Introduction, 52-55.

what conception—or conceptions—of dialectic underlie each philosopher’s opinions?

In brief, I shall argue that Aristotle and Plato agree on the nature of dialectic up to a point and that it is a difference in epistemology that leads to their different views of its relationship to philosophy or science. Both philosophers think of dialectic as a matter of question and answer. Plato holds that we have innate knowledge of the Forms, which are the true objects of science, and that we acquire wisdom by recovering this knowledge already within us. This leads not only to the notion that questioning can both teach and discover the truth but also to the method of Division, which both Plato and Aristotle treat as central to the philosopher’s activity. Aristotle denies that we have any innate knowledge and holds that we acquire all the knowledge we have through experience. He also believes, on the basis of some rather sophisticated logical theorizing, that the indemonstrable principles on which a science rests can be extracted from a collection of truths about its subject matter. Finally, he has a dim view of the prospects for armchair science based on *a priori* theorizing, evidently because he has disillusionsed by seeing it practiced. As a result of all this, question-and-answer exchange has no particular role in the philosopher’s method according to Aristotle.

For Plato, the asking and answering of questions was the very lifeblood of philosophical activity, which he conceived of as essentially a form of conversation (he even characterizes thought as a dialogue of the soul with itself). For Aristotle’s philosopher, the accumulation of facts from experience is much more important than the participation in dialectical exchanges, and questioning therefore takes on a far more restricted utility. Collecting the opinions of others is an important first step in any inquiry, since an analysis of the inconsistencies and problems in the received views (a process Aristotle calls *διαπορεύειν*, ‘puzzling through’) will bring to the fore where the problems lie. However, the asking of questions plays no role at all in establishing the finished stages of philo-

sophical inquiry: “None of the arts that proves concerning any nature asks questions” (οὐδεμία τέχνη τῶν δεικνυουσῶν τινα φύσιν ἐρωτητική ἐστίν: *Soph. El.* 172a15-16).

1 Innate Knowledge, Forms, and Philosophical Method in Plato

For Plato, the existence of separated, suprasensible Forms was both attested to by, and necessary to explain, our cognitive abilities. In (*Phaedo* 74a-75d), he argues as follows. We often judge two sticks or stones to be equal or unequal, yet we have never perceived any two sticks, stones, or anything else that were truly equal: all the so-called ‘equals’ we have encountered were only approximations, falling short of equality itself. Whence, then, came the knowledge of this equality itself with which we are comparing these many approximately-equals? It cannot have come through perception, for we have never perceived such a thing. Neither can its object be a perceptible object, for all that we perceive is always subject to change, whereas our knowledge of the equal itself is knowledge of something which is always just what it is and nothing else. Instead, there must *be* an equal itself apart from the perceptible world. Moreover, since we cannot have acquired a knowledge of it through perception in this life, that knowledge must have been *innate* in us.

This argument takes our ability to understand the word ‘equal’ as a given and concludes that this understanding can only be explained on the suppositions both that the equal itself exists separately from the entire sensible realm and that we have innate knowledge of it. Generalizing this to other notions besides equality gives us Plato’s theory of forms. We should take note here of a critical difference between Plato’s concerns and the basic position of modern epistemology. Since the time of Descartes, philosophical epistemology has been motivated by the goal of responding to skeptical

claims that we do not have knowledge. By contrast, Plato takes our knowledge of such things as equality for granted and asks how it is that we could have it. Answering the epistemological skeptic is not a major concern for him. I shall argue below that the same is true of Aristotle, and indeed that Aristotle’s views have been distorted by a failure to realize this.

If the Forms are the objects of knowledge, and if the knowledge of Forms cannot be acquired from experience, then teaching cannot be a matter of imparting knowledge to those who do not have it: that would be, in the words of *Republic* VII, “like putting sight into blind eyes” (518c). Instead, teaching can only be a matter of reminding, of getting us to recall the knowledge already in our souls. This reminding, for Plato, is brought about by questioning in the right way.

2 Plato’s Answer to Meno’s Challenge

Plato argues for this picture of knowledge as recalling in the *Meno*, where Socrates is challenged by Meno with the following puzzle:

And how, Socrates, will you seek something when you don’t know at all what it is?

For which one of the things that you don’t know will you set up as the thin you are seeking? And even if you did come across it as much as possible, how would you

know that this is that thing which you didn’t know?(*Meno* 80d2-5)

Meno’s puzzle is about inquiry, not pedagogy: Meno’s dilemma is that inquiry is either pointless or impossible. In response, Socrates says, in effect, that we already know everything, having acquired that knowledge in a prior existence, and that it only needs to be brought out through a process of reminding. As evidence for this, he undertakes to lead one of Meno’s slaves, a man³ who has never

³Despite the almost ubiquitous characterization of him as a ‘slave boy’ in the secondary literature, he is only identified as a slave, not also as a child. The word παῖς, ‘boy’, is quite commonly used to mean ‘slave’ (as indeed

studied geometry, to recognition of the answer to a geometrical problem, using only questions. Socrates claims that he does nothing but ask the slave to answer according to his own opinions. Using this technique, he first shows the slave that his initial beliefs about the problem are false; then, when the slave has become perplexed and no longer believes he knows the answer, he elicits from him answers to a series of simple questions that end in his assent (with understanding) to the proposition “the square on the diagonal of a square is double that square”. Socrates concludes that the slave really possessed this knowledge all along, or otherwise he would not have been able to answer Socrates’ questions. Moreover, since he did not acquire these opinions in his present life, the slave must always have had them, and thus must always have existed. Socrates concludes:

Socrates: So, if at that time when he was not a man, there were true opinions in him which, when awakened by questioning, become knowledge, then his soul will already have learned through all of time.

Meno: So it seems.

Socrates: So then, if the truth of things is always in our soul, then our soul is immortal. So whoever does not actually know now—that is, who does not recall—must be brave and try to inquire—that is, be reminded?

(*Meno* 86a6-b5)

Socrates’ gloss of ‘inquire’ (ζητεῖν) with ‘be reminded’ shows that the subject here is really the right way to pursue philosophical inquiry, not simply pedagogy. Since the entire exchange was

‘boy’ was in the American south under slavery). Manuscripts of the dialogue identify this character as ‘Meno’s boy’ (παῖς Μένωνος), and Socrates so addresses him (85b5-6). This was the standard way of referring to a slave (male or female). If we do take παῖς in that phrase to mean ‘child’, then the meaning becomes ‘Meno’s child’, i.e. Meno’s offspring, which is obviously not what is meant: the sense is ‘Meno’s slave’. He enters the dialogue when Socrates asks Meno to call ‘one of these many attendants of yours’ (82a8-b1: τῶν πολλῶν ἀκολούθων τουτωνὶ τῶν σαυτοῦ ἕνα). All that we are actually told about his status is that he is Greek, speaks Greek, and was born in Meno’s household.

prompted by an argument from Meno to the effect that we cannot learn anything we do not already know, that is to be expected.

In the *Phaedo*, Plato alludes to this episode in terms that make it explicit that ‘reminding’ is a matter of asking questions in a certain way:

When people are being questioned, if you do the questioning well, then they will on their own state everything as it is; yet if knowledge and correct reason were not actually present in them, they would not be able to do that. (*Phaedo* 73a1-6)

Unfortunately, Plato does not tell us, either in the *Meno* or the *Phaedo*, what this correct way of questioning must be. Let me offer an attempt at filling that gap.

2.1 Dialectic and Refutation

Whatever the right way of questioning is, Throughout his works, Plato associates the term ‘dialectic’ with the activity of the philosopher. Just what he means by it may change from dialogue to dialogue (Robinson suggested that we might almost take it to mean “the method of philosophy, whatever that turns out to be”). However, some generalizations are reasonably secure. To begin with, dialectic is concerned with questioning. This can be grounded in the history of the term before Plato. Aristotle named Zeno of Elea as the founder of dialectic, and both Aristotle and Plato regarded Socrates’ characteristic style of interrogating people as dialectical. Two things these practices share are that they are matters of arguing by asking questions and that they aim at refutation (though in Zeno’s case, the questions may be answered for a notional respondent by the arguer himself).

Now, refutation may clear the ground for further investigations or inspire a desire to learn, but

it is not very promising as the whole of a method of philosophical inquiry: if all that you do is refute, how can you ever build anything up? Plato puts exactly this criticism into Meno’s mouth:

Socrates, even before I met you, I heard that you were just confused yourself and made others confused as well. And now, as it seems to me, you are bewitching me and charming me and enchanting me into the middle of a confusion. If I may joke a little, you seem to me, both in appearance and other ways, very much like the flat torpedo-fish in the sea: it too is full of numbness and makes anyone who touches it numb. I think you have just now done that to me. I am truly numb in soul and speech, and I can’t answer you. However, I have given many speeches about virtue, thousands of times, in front of many people—and done it quite well, as far as I’m concerned, yet now I can’t even say what it is at all. (*Meno* 79e7-80b7)

Making allowances for Meno’s wounded pride and Plato’s ironic humor, there is a serious point here. If all that Socrates can do with his refutations is leave people confused, of what benefit is it? Socrates’ answer to this, through his conversation with the slave, is twofold. First, he says that even if all he does is refute people and thereby leave them confused, he does not injure them but rather benefits them, since it is always better to know one is ignorant than to believe falsely that one knows (84a-c).

Socrates does not stop, however, with this defense of his practice of refuting people and leaving them confused. He also claims that the slave already has knowledge in him about the question at hand, and he undertakes to show this by asking him questions to help him recover that knowledge. These questions, however, do not involve any refutation. Thus, we have dialectic without refutation: it still relies on question and answer and rests on the opinions of another, but the questions

are intended to awaken dormant knowledge rather than to expose unacknowledged ignorance.

In effect, the *Meno* expands the notion of dialectic beyond the practice of refutation ubiquitous in the early dialogues to obtain a positive method. This new kind of correct questioning is dialectical because it rests on questioning and expects respondents to answer in accordance with their own opinions, but it has positive, not merely negative, effects. Its end result is newly awakened knowledge. But what would a method of inquiry by asking questions look like?

2.2 Questions and the Method of Division

The simplest description of Socrates' method in his conversation with Meno's slave (*Meno* 82b-85b) is that he asks very simple questions and shows how a hard but unanswerable question can be replaced by a series of simple questions. At the beginning of the exchange, he asks the slave simple questions that determine that the slave knows what a square is and can understand how to compute the area of a square. Then, he poses one more question that the slave takes to be equally simple: “How long is the side of the double square?” The slave answers confidently but incorrectly, and Socrates refutes his answer by showing him that it leads to results that are (to him) obviously incorrect. This is repeated for the slave's other attempts, and finally he gives up and says he does not know. It is at this point that Socrates turns from refuting to ‘correct questioning’. He asks short and easy questions, mostly admitting of simple yes/no answers: “If we add three more like squares around this one, is the result a square?” “If we draw a line through this square from corner to corner, does it divide the square into two equal halves?” “Do these four lines, from corner to corner in each of these four squares, form a square?” Proceeding in this way, he leads the slave to the recognition of the correct answer to the initial question: the side of the double square is the diagonal of the square.

In this example, it is hard not to suppose that Plato is relying on his audience being aware that the question “How long is the side of the double square?” is especially difficult to answer in the way the slave tries to answer it. Since the two are incommensurable, the relationship between them is, in Greek mathematical terminology, ἄρροητόν—literally, ‘unsayable’.

One lesson that might be taken from this example is that it is easier to choose among alternatives than to come up with a substantive answer. If we are able to replace large questions of the form “What is X?” to questions of the form “Is X Y, or is it Z?”, we may find them more tractable. We may also find it easier to deal with questions that admit of yes/no answers rather than requiring more substantive responses. To oversimplify, Meno’s slave can get nowhere with “What is the side of the double square?”, but he does quite well with “Is this square on the four-foot line the double of the square on the two-foot line?”

Now, in the *Sophist* and *Statesman*, Plato introduces a method of ‘Division’ as the way to discover the essences of things. Division is a method for finding the definition of a thing. We begin by locating our subject X in a general class or γένος. We then divide this genus into two—or perhaps into three or four or more, but let us ignore that here—and ask ourselves, “Into which part of the Division does X fall?” Having answered this, we then divide that part again, choose one of the parts, and so on, until we have reached X all by itself. For instance, a Divider trying to determine the definition of ‘human’ begins by locating it in the genus ‘animal’, then divides this into mortal and immortal animals, and finally asks: is a human mortal or immortal? The divider chooses ‘mortal’, and the division proceeds from there.

The method of Division thus takes exactly the same approach to questioning as Socrates did in talking to Meno’s slave: it replaces a large substantive question with simpler choices between alternatives. We may not know just what to do if asked “What is a sophist?”, but we can do better

with “Is a sophist a kind of hunter?” To take a more serious example, it will be easier to respond to “Is a human terrestrial or aquatic?” than to respond to “What is a human?” The method of Division, I am proposing, is the systematic reduction of large and substantive questions to small questions that ask for choices among alternatives.

Though it has been disputed, I think it is clear that Plato thought Division was genuinely a method for the pursuit of philosophical inquiry. For one thing, a concern with answering a question of the form “What is X?” is at the center of most of Plato’s dialogues, from the *Euthyphro*’s question “What is piety?” to the *Republic*’s “What is justice?” to the *Sophist*’s “What is a sophist?”. Such questions are answered by definitions, and Division aims at finding definitions. External testimony also confirms the preoccupation of the early Academy with finding definitions.

Support can also be drawn from Aristotle’s *Topics*. Especially in its eighth Book, Aristotle clearly takes for granted that his audience is familiar with a stylized form of debate governed by a number of rules. Each debate takes place between an answerer, who seeks to maintain some thesis, and a questioner, who seeks to refute it, i.e., to lead the answerer to concessions from which its contradictory can be concluded. The questioner is allowed only to ask questions that can be answered by ‘yes’ or ‘no’; the answerer is only to respond affirmatively or negatively (though questioners are allowed to reject questions as ill-formed if, for instance, they implicitly ask many questions). Evidently, the principal subject-matter of these debates is definitions. This is evident in the classification of all predications into four types: those giving the genus of something, those giving its definition, those giving its ‘peculiar property’ (*proprium*, ἴδιον), and those giving an accident or incidental property (συμβεβηκός). As Aristotle notes (I.5, 102b27-35), this entire classification system revolves around definitions. Moreover, this system is the principle of organization of *Topics* II-VI, which discuss arguments about each of the predicables in turn. Whatever else we may

conclude about the *Topics*, its focus is clearly arguments about definitions.

I will simply take it for granted that members of Plato’s Academy engaged in a formalized kind of disputation by question and answer concerned primarily with definitions and that the *Topics* is intended primarily for these exchanges. To speculate a little further, these disputations might plausibly have been based on the premise that knowledge of the natures of things, being already present in us from birth, could be brought to light by an appropriate form of questioning. Debate, for Plato, was a form of scientific research. There are other reasons for supposing that Plato took philosophical inquiry to be closely, or even indissolubly, linked to debate and dialectical exchange. His expressions of distrust of writing in the *Phaedrus*, the *Statesman*, and the *Seventh Letter* are motivated in part by the view that only in an exchange between two persons is real philosophy possible.

3 Aristotle’s Criticism of Division

Aristotle rarely mentions Division except to criticize it, and his criticism is severe: he complains that as a method of proof, it fails since it is little more than begging the question. As he puts it in *An. Post. II.4*:

Nor is the route through divisions deduced, as was said in the analysis concerning the figures. For nowhere does it happen that this fact must be given that these things are; rather, it is like the person arguing inductively, who also does not demonstrate. For the conclusion should not be put as a question or be as a result of someone conceding it; instead, it should be necessary for it to be given that these are, even if the answerer denies it. “Is a human an animal or inanimate?” If he picks “animal”, it still has not

been deduced. Next: “Every animal is terrestrial or aquatic.” He picks terrestrial, and that man is the combination, terrestrial animal, does not necessarily follow from what was said, but he assumes this as well. It makes no difference whether one does this with many cases or with a few, for it is the same thing. (91b12-23)

Aristotle’s criticism, broadly speaking, is that each step in a Division depends on an answerer’s choice or concession. At no time is the next step something which ‘must be given that these [i.e. prior steps] are’, that is, a conclusion which follows from prior steps (the phrase Aristotle uses here is taken from his definition of a ‘deduction’ or ‘syllogism’ (συλλογισμός): see *An. Pr.* I.2, *Topics* I.1, *S.E.* 1. Now, it might be objected against Aristotle that this criticism supposes that Division was intended as a mode of proof in the first place, something which (it will be urged) it need not be. Division, according to this objection, is a method of discovery for definitions, not a technique for proving them. Indeed, the objection continues, since Aristotle himself does not think that definitions in general can be proved, and since he proposes something very reminiscent of Division in *An. Post.* II.13 as a means for finding definitions, his criticism of Platonic Division is grossly unfair. Division and deduction simply aim at different results, and to complain that Division does not deduce is therefore no more sensible than to complain that deduction cannot be used to discover definitions.

I believe that this objection does not recognize how deep Aristotle’s criticism goes. What he is doing is rejecting not just Plato’s view on how to find definitions but also Plato’s conception of how to pursue philosophical wisdom, and ultimately Plato’s conception of what philosophical wisdom consists in. From this perspective, his criticisms are, I shall argue, right on the mark.

We must first see what Aristotle advances as an alternative to the Platonic picture. This is most forcefully presented in *An. Pr.* I.30 where, having finished his presentation of what he regards as

the universal theory of valid argument, he announces that what he has given us is nothing less than the one true method of inquiry:

The way is the same for everything: for philosophy as well as for any art or study whatever. That is: we must collect what belongs to each thing and what it belongs to, have as many of these available as possible, and investigate them through the three terms, establishing in this way, refuting in that (according to truth, from what has been demonstrated to belong according to truth, in dialectical deductions from premises according to opinion. ... For this reason, the principles of each science are to be provided by experience. ... thus, if the facts that obtain about anything are grasped, it is already ours to bring demonstration readily to light. For if nothing that truly is the case has been left out of the *historia*, we will be able to find the demonstration of everything that has a demonstration; and for that of which there is no demonstration, we will be able to make that evident.(46a3-30)

There is no mistaking the sweep of this declaration. Furthermore, Aristotle quite clearly intends it to supplant Plato's own method. He follows this passage immediately with a criticism of Division that repeats the main points found in *An. Post.* II.5. The “route of division through genera”, he says, is only “a certain small part” of this one true method, and on its own it is only a kind of extended begging the question (46b2-19), . Moreover, its partisans failed to understand even the limited usefulness that it does have. Thus, Aristotle claims, the little that is valuable about Division is already subsumed under his own grander method, and the proponents of Division did not understand the power of their own method.

What, then, is this method with which Aristotle compares Division? We might suppose that it is some better method of finding definitions. However, definitions are the goal of Division because, for Plato, definitions express the content of the philosopher’s knowledge: Division is Plato’s road to wisdom. Aristotle rejects this view and maintains instead that the philosopher’s knowledge—science, *ἐπιστήμη*—consists in the possession of *demonstrations* (*ἀποδείξεις*). Science, he tells us in *An. Post.* I.2, is knowing the reason why something must be so, and we have such knowledge when we possess a demonstration of it, which is a deduction of it from premises giving its cause or explanation. A deduction (*συλλογισμός*) is simply a valid argument, that is, an argument with the property that its conclusion is necessarily true if its premises are. Now, Aristotle’s fundamental complaint against Division is that nothing is ever necessitated by what has gone before. What a Division cannot do, then, is explain why anything must be the case. Aristotle’s complaint is not simply with the method of Division but with the underlying supposition that science or philosophical wisdom can be expressed in definitions.

But Aristotle’s criticisms of Division have as their background a comparison of Division with his own alternative method. What precisely is that method, and how is it able to accomplish what Division cannot?

One further element of Aristotelian theory makes this method possible. Aristotle believes that a relatively simple theory can be given that accounts for absolutely all valid arguments. Since his method is unintelligible apart from that theory, we need to pause for a look at it.

4 Deduction and Aristotle’s Philosophical Method

Aristotle thinks that every sentence with a truth value is one of two types: either an affirmation affirming some predicate of some subject, or a denial that denies some predicate of some subject. Affirmations and denials may be further subdivided into those with individual subjects (‘Socrates is human’) and those with universal or general subjects (‘Greeks are human’); those with general subjects may be further divided according as the predicate is affirmed or denied of all of the subject (‘All Greeks are humans’, ‘No Greeks are humans’) or of part of it (‘Some Greeks are humans’). His logical theory (which we may conveniently call the ‘syllogistic’) is then the theory of inference for sentences of these types. Very roughly, Aristotle’s logic is the ‘traditional’ logic of the syllogism.

It will be convenient to introduce some notation here. I represent the four types of general sentence as follows:

A holds of every B (Every B is A) AaB

A holds of no B (No B is A) AeB

A holds of some B (Some B is A) AiB

A does not hold of every B (Not every B is A) AoB

In *An. Pr.* I.1-7, Aristotle studies the valid inferences involving pairs of these sentences that share one term. This theory is the principal basis of his well-deserved reputation as one of the greatest logicians of history; since it has been thoroughly studied (see Lukasiewicz 1957, Patzig 1968), I will only note a few points here. First, Aristotle proves that all the valid syllogistic arguments can be ‘reduced’ to these four (I give the medieval mnemonic names for each):

$AaB, BaC \vdash AaC$ (*Barbara*)

$AeB, BaC \vdash AeC$ (*Celarent*)

$AaB, BiC \vdash AiC$ (Darii)

$AeB, BiC \vdash AoC$ (Ferio)

Second, Aristotle knows that these results follow from what he has proved:

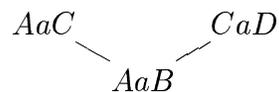
1. A universal affirmative conclusion can only be deduced from the form *Barbara*.
2. A universal negative conclusion can only be deduced through one of these three forms:

$AeB, BaC \vdash AeC$ (*Celarent*)

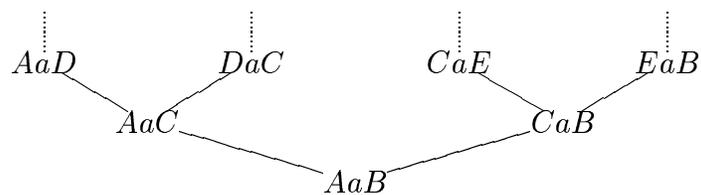
$AaB, AeC \vdash AeC$ (*Camestres*)

$AeB, AaC \vdash AeC$ (*Cesare*)

Now, suppose that we are seeking a proof for a universal affirmative proposition AaB . Since *Barbara* is the only syllogistic form with an a conclusion, our proof must end with an inference like this:



If we continue our regress by looking for true premises from which each of AaC, CaB , can be deduced, we will in each case have to find another pair of true a propositions, e.g.:

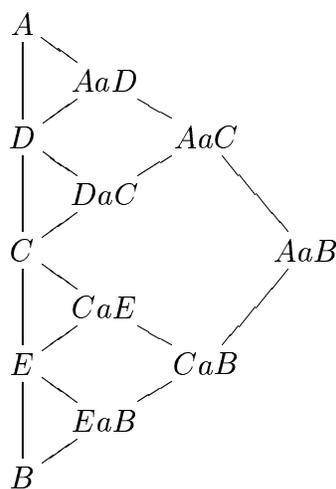


Aristotle explores the properties of such regresses in detail in *An. Post.* I. 19-22. To explain his results, it will be clearer to use diagrams representing the relationships of the terms in the propositions rather than the propositions themselves. I represent an a proposition AaB as a graph

in which A is above B and an e proposition AeB by joining two terms with a line marked with e :

$$AaB : \begin{array}{c} A \\ | \\ B \end{array} \quad AeB : \quad A \text{---} e \text{---} B$$

The term-chain graph for the regress for AaB depicted previously then looks like this (with annotations to the right showing the correspondence with the previous representation):



As this diagram shows, each stage of the regress requires the introduction of a new term *between* the terms of one of the premises reached at the preceding stage. For instance, term D is between A and C , the terms of premise AaC . This term then serves as the middle term in a proof of that premise. The regress can continue as long as another term can be found between two adjacent terms at the last stage of the regress. We may call this process ‘packing’ the interval, following Aristotle.⁴ Conversely, if there is no such term, then the regress comes to a stop at that point. A premise for which this happens is ‘unmiddled’ (ἀμεσος)⁵. Such an unmiddled proposition cannot be deduced, in Aristotle’s logic, from *any other true propositions*.

⁴The Greek verb is καταπυκνοῦν, ‘pack full’ or ‘thicken’; he uses it only once, at *An. Post.* I.14, 79a30.

⁵I prefer to avoid the potentially misleading but traditional translation ‘immediate’

The last point is crucial: in a system governed by Aristotle’s logic, there can be true propositions which cannot be deduced from any other true propositions whatever. This is a reflection of the very weak character of Aristotelian entailment. Under classical propositional logic, for instance, no proposition can have this property (any proposition p is logically equivalent to $p \vee p$, $p \& p$, and infinitely many other propositions; so, if p is true, then so are infinitely many other propositions from which it can be deduced). By contrast, consider the set

$$\{AaB, BaC, AaC, AiC, CiA, AiB, BiA, BiC, CiA\}$$

All the propositions in this set can be deduced from the two propositions AaB and BaA ; in fact, the set is simply the deductive closure of $\{AaB, BaC\}$. However, neither of these two propositions can be deduced from any combination of the remaining propositions. Consequently, each of these two sets is deductively closed:

$$\{AaB, AaC, AiC, CiA, AiB, BiA, BiC, CiA\}$$

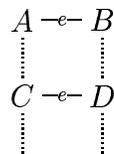
$$\{BaC, AaC, AiC, CiA, AiB, BiA, BiC, CiA\}$$

For Aristotle, of course, these are not facts merely about syllogistic systems, since he thought (and indeed thought that he could prove⁶) that the syllogistic was the correct theory of inference

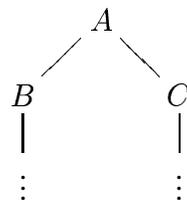
⁶I will not try to argue for this claim here, but the relevant texts are these: (1) at 40b17-22, when he has finished his account of the syllogistic, he says that he has shown that all ‘arguments in the figures’ (i.e. two-premise syllogisms in the traditional sense) are ‘completed’ by the first-figure forms *Barbara* and *Celarent*. He then continues, ‘But that every deduction absolutely speaking is like this (ἀπλῶς πᾶς συλλογισμὸς οὕτως ἔξει) will be clear when it has been proved that all come about through one of the figures’. This is followed by an argument beginning with the claim that any proof must prove some predicate either to belong or not to belong to some subject and concluding that this must employ arguments ‘in the figures’. (2) At 46b38-47a9 he summarizes what he has achieved and what remains to be done of his project. The final phase will be showing ‘how we can analyze existing deductions into the aforementioned figures’, and indeed what Aristotle discusses in the rest of *An. Pr.* is how to turn various types of argument into figured

absolutely speaking.

Regresses for e propositions are somewhat more complicated. First, note that if AeB , then no chain descending from A can intersect with any chain descending from B (otherwise, we would have a proof of AiB via *Darapti*. Consequently, for any terms C and D below A and B respectively, we must have CeD :



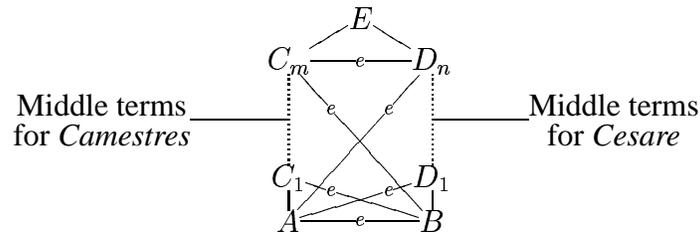
However, two chains ascending above the terms of an e proposition may intersect, as in this configuration:



Now consider how regresses for a universal negative proposition AeB can proceed. A deduction of AeB must have one of three forms: $AeC, CaB \vdash AeB$ (*Celarent*), $CaA, CeB \vdash AeB$ (*Camestres*), or $CeA, CaB \vdash AeB$ (*Cesare*). Each of these uses an a premise with one of the terms A, B as its subject and an e premise containing the other term. A continued regress for the a premise will consist of packing the interval AB . Continuation of the regress for the e premise will again give a and e premises. However, as the following graph shows, any additional middle term

arguments. (3) In *An. Pr.* II.23, 68b8-14, Aristotle says that ‘not only do dialectical and demonstrative deductions come about through these figures, but also rhetorical ones, and absolutely any kind of proof whatsoever from any discipline whatever’ (ἀλλὰ καὶ οἱ ῥητορικοὶ καὶ ἀπλῶς ἤτισοῦν πίστις καὶ ἡ καθ’ ὅποιανοῦν μέθοδον). Whether Aristotle actually succeeds in proving these claims is another issue; the point is that he leaves no room for doubt that he thinks the theory of ‘arguments in the figures’ is the universal theory of valid arguments, without restriction.

will always be either in an ascending chain above A or in an ascending chain above B :



The regress thus produces ascending chains above A and B .

Now, Aristotle argues (*An. Post.* I.22) that every ascending or descending chain is finite, that is, contains only finitely many terms. From this, it follows that every premise regress for an a proposition eventually comes to a stop: an infinite regress would pack infinitely many terms into the interval between its subject and predicate, thus producing both an infinite ascending chain above the subject and an infinite descending chain below the predicate (see *An. Post.* I.20). Now consider regresses for e propositions. As shown above (and by Aristotle in *An. Post.* I.21), any such regress produces ascending chains above both subject and predicate; if every ascending chain is finite, then these must eventually stop⁷.

Consider the terms at the tops of the chains above A and B in a fully packed regress (C_m and D_n in the figure). $C_m e D_n$ will be true but unprovable (in order to prove it we would need to find a term over one of its terms and e -related to the other, but since the regress is packed there is no such term). Therefore, we have found an unmiddled e proposition. There are two ways this might happen: (1) there may be no term over C_m and no term over D_n (in this case, we may call C_m and D_n *highest terms*). (2) there may be some term E over both C_m and D_n such that the intervals $E a C_m$, $E a D_n$ are unmiddled (I will call this an *unmiddled branch*). Aristotle is aware of both

⁷There are some complications in Aristotle’s argument in *An. Post.* I.21. In particular, the text at 82b21-33 seems to be confused and may be corrupt: see Smith 1989 for discussion.

types of case⁸ (*An. Post.* I.15, I.23).

4.1 The Regress Argument of Posterior Analytics I

Aristotle does not argue for these results simply out of a theoretical interest in the properties of his logical system. Instead, he uses them to address a critical problem of the *Posterior Analytics*. The subject of that treatise is a certain kind of knowledge which, for lack of a better translation I shall call ‘science’ (ἐπιστήμη). In *An. Post.* I.2, he first characterizes science as knowing the reason why something must be as it is and then explicates this as possessing a demonstration or proof, where a demonstration is a deduction from premises that give the cause of the conclusion. He then presents a problem. Some people, he says, claim that demonstration is impossible because:

1. The premises of a demonstration must themselves be known scientifically.
2. Only what is demonstrated is known scientifically.

These opponents next ask, “How are the premises of demonstrations known?” and then present a dilemma. Either the premises are scientifically known because they are demonstrated, or they are not. But if they are demonstrated, then they must be demonstrated from others which are known scientifically, and thus, by repeating this step, we get an infinite regress of premises. On the other hand, if they are not demonstrated, then by premise 2 they are not scientifically known. Thus, it seems that scientific knowledge is impossible.

This regress argument is very often taken to be a familiar skeptical argument about the regress of justification. However, Aristotle’s way of seeing it is different in an important way. Instead of

⁸There are some problems with his argument, since in I.15-I.17 he seems at times to assume that case (1) is the only possible case, though he clearly recognizes it as possible in I.23.

asking whether the premises of a given demonstration are justified, we can ask: *are there premises from which these premises could be demonstrated?* Now, in Aristotle’s logical system this is a far more interesting question than it would be in any modern system, since Aristotle’s system allows for the possibility of true propositions which are not logically derivable from any other true propositions. Thus, the answer to this question may in some cases turn out to be ‘no’ because there are no true premises from which the premises can even be deduced. Should this occur, then the regress ‘comes to a stop’ on grounds quite independent of anyone’s epistemic state. Now, the advocates of the regress argument hold that there is no scientific knowledge except by demonstration, and thus they hold that if a regress comes to a stop in this way, then its premises (and consequently everything deduced from them) will not be scientifically known. Aristotle responds by in effect embracing the second horn of the dilemma but deny the opponents’ second premise: he argues that *all* regresses ultimately must come to a stop in just this way. If this is the case, then every true proposition is either itself unmiddled (and thus indemonstrable) or deducible from unmiddled propositions (since reversing a regress gives us a deduction). Since unmiddled propositions are indemonstrable, scientific knowledge of them, if possible at all, must come through some means other than demonstration. Thus, a necessary condition for the possibility of science is the possibility of such a form of knowledge for these propositions. However, if every non-unmiddled proposition can be deduced from unmiddled propositions, then scientific knowledge of the unmiddled propositions would also be *sufficient* for the possibility of science overall. We thus have a precise condition for the possibility of scientific knowledge: it is possible *if and only if* (scientific) knowledge of the indemonstrable premises is possible.

Nothing in this argument appeals to any epistemological notion such as self-evidence or intuitive evidence: the unmiddled propositions are defined solely on the basis of their logical relation-

ships to other truths. In fact, Aristotle thinks that when we begin to acquire scientific knowledge, we will not in general find the principles particularly obvious and may find them less evident than their consequences, or even less evident than falsehoods. Our task in acquiring scientific wisdom is to change our epistemic sensibilities to bring them into line with the way things are by making ourselves see the principles as more evident than anything else. As in the case of moral education, this takes time and is accomplished by a kind of habituation (this parallel is developed in *Metaphysics* Z.3, 1029b3-12).

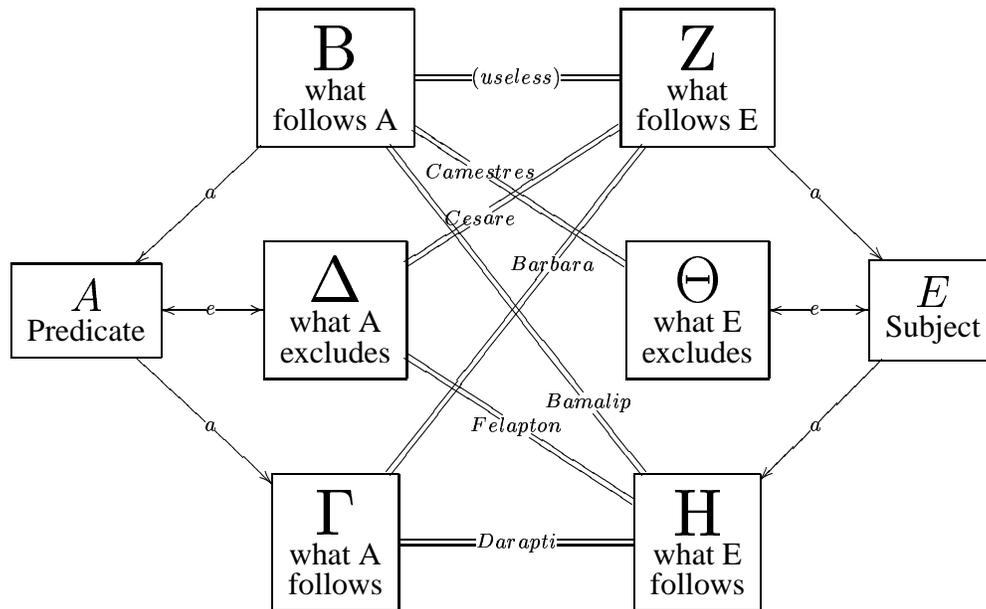
Since Aristotle does not identify the starting points of demonstrations on the basis of epistemology, he can separate two questions: (1) how can we find the principles? (2) how can we come to know the principles?

4.2 The Road to Wisdom

The first question is answered by Aristotle’s one true method. In brief, that method is a procedure for finding middle terms⁹. Aristotle spells it out in detail in *An. Pr.* I.27-29. Let us say that we want to prove some proposition. Since this is *Aristotle’s* system, using Aristotle’s logic, our proposition must have a predicate term *A* and a subject *E*. The method begins with the collection of three lists of terms: those which follow *A* (call this list *B*), those which it follows (list Γ), and those inconsistent with it (list Δ). For instance, if *A* is ‘animal’ and *E* is ‘human’ then *B* will include ‘man’, ‘woman’, ‘Greek’, ‘American senator’; Γ will include ‘mammal’, ‘chordate’, ‘primate’, ‘organism’; and Δ will include ‘petunia’, ‘stone’, ‘integer’. Repeat the process for term *E*, collecting terms that follow it (list *Z*), terms it follows (*H*), and terms it excludes (Θ). When we have compiled these six lists, we can look for a middle term for our original proposition simply

⁹Hence its usual medieval name of *inventio medii*.

by looking for points of intersection between the three *A*-term lists and the three *E*-term lists. What intersections we look for, and what we do with a middle term we find, depend on the kind of proposition we started with. The details are summarized in the following figure:¹⁰



For example, if we started with AaE , the method tells us to look for a common term in the lists Γ and Z . If they have some term X in common, then AaX (by the definition of Γ) and XaE (by the definition of E); from these, AaE follows (*Barbara*). On the other hand, it may be that there is *no* term X common to Γ and Z . Since the method assumes that we have collected *all possible terms* for each of the six classes, this would mean that then there is no middle term to be found and that, consequently, AaE is unmiddled. Aristotle’s one true method, then, allows us not only to find middle terms for propositions that can be demonstrated but also to find that *there are no middle terms* for other propositions, which will consequently be indemonstrable. This depends of course, on the assumption that our six term lists are truly exhaustive. Aristotle recognizes precisely this in

¹⁰A figure similar to this first appears in Philoponus (*In An. Pr. Comm.*, 274). In the Middle Ages, the diagram acquired the name *pons asinorum* (‘bridge of asses’). See Bocheński 1961, pp. 219-221 and plate facing. Though no figure is found in manuscripts of Aristotle, it is quite possible that he had one in mind.

summarizing his results:

if nothing that truly belongs to the things, according to the collected facts (*histori-
a*), then for anything of which there is a demonstration, we will be able to find this
and demonstrate it; and if there is none, then we will be able *to make that evident*¹¹.

(46a24-27, emphasis added)

This collection of facts is, for Aristotle, only possible through experience, as Aristotle says explicitly:

The principles concerning anything are to be provided by experience. I mean, for in-
stance, that the principles of astronomical science are to be provided by astronomical
experience (for when enough phenomena had been obtained, astronomical demon-
strations were found in this way), and so it is similarly for any other art or science
whatsoever. So: if the facts about anything (τὰ ὑπάρχοντα περι ἕκαστον) have been
obtained, then we are already prepared to reveal the demonstrations. (46a17-24)

Once the facts are collected, repeated application of it will organize the truths about any subject
matter into demonstrations, since this will eventually discover not only the unmiddled (and hence
indemonstrable) propositions about it but also the deductions of all other propositions, ultimately
filling these in to produce deductions from indemonstrables.

Aristotle’s stress on the indispensability of experience here reflects a criticism he expresses
elsewhere of those who try to do philosophy without the needed experience of the facts: that: as
he says in *De Gen. et Corr. II*,

¹¹οὐ δὲ μὴ πέφυκεν ἀπόδειξις, τοῦτο ποιεῖν φανερόν. I take the last phrase to mean ‘to make it evident that there
is no demonstration’. Other translators generally take it to mean something like ‘to make that proposition evident’:
presumably, to make evident in some other way a proposition that cannot be demonstrated. However, Aristotle has
said nothing at all about making indemonstrable propositions themselves evident.

Lack of experience is the cause of a diminished ability to survey the agreed facts. This is why those who have made themselves more at home in natural science are more able to suppose principles of the kind that extend to many cases, while those who are, as a result of many arguments, inexperienced with the facts, readily declare something after glimpsing at a few cases. (*De Gen. et Corr.* II, 316a5-10)

This harsh judgment on armchair theorizing is directed at Plato. It is tempting to see here an allusion to Plato's picture in *Phaedo* 99e4-6 of “seeking the truth about things in arguments”. For Aristotle, nothing can come of that but empty words. This sets the stage for the second question: by what means do we acquire an appropriate form of knowledge of exactly these indemonstrables?

5 *Posterior Analytics* II.19: Universals through Perception

Aristotle claims to give us that answer in *Posterior Analytics* II.19, which he says will explain “how the principles become familiar (γνώριμοι) to us”. Before we try to interpret his answer, let us review the background so that we can be certain we understand the question.

Plato thought that our possession of certain concepts proved that we had knowledge that could not have been acquired through perception. In the *Phaedo*, he argues that our ability to judge perceptible objects to be equal or unequal presupposes our acquaintance with the equal itself, something which we could not possibly have experienced through perception. This recalls Meno's argument about learning: how can we recognize what we don't know if we don't already know it? Plato's answer was that we do already know it. Even perception, for Plato, relies on this innate knowledge of Forms. In order to perceive two sticks as (approximately) equal or an object as (roughly) circular, we must call on our innate knowledge of the equal itself and the circle it-

self. Aristotle agrees that we already recognize universals in perception. If he is to avoid Plato's conclusions, he must explain how this is possible without an innate knowledge of Forms. In brief, his answer is that we acquire knowledge of Forms through perception because perception is the impressing of the forms of external objects on our sensibility. Forms are real, though not separable, and as such they have real causal powers, including the power to cause themselves, or copies of themselves, in our minds.

In all of this, neither Aristotle nor Plato is trying to answer skeptical arguments that attempt to undermine knowledge by undermining justification. Their concern is not whether we might be mistaken about what we believe that we know. Instead, it is how to account for the fact that we do have the knowledge which (as they take for granted) we do. Aristotle is not looking for a way in which the principles might be justified. Instead, he is trying to explain how it is possible for us to have the cognition that we do.

Near the beginning of the *Posterior Analytics*, Aristotle The problem II.19 needs to solve is the ‘puzzle in the *Meno*’, as Aristotle calls it near the beginning of the *Posterior Analytics* (): how can we acquire knowledge that we do not already have, if not from previously existing knowledge?

Plato takes it as given that we *do* have knowledge involving universals and argues from this that we must have that knowledge innately. Aristotle's method as presented in the *Prior Analytics* rests on a similar assumption. He takes it for granted that we do acquire knowledge from experience. Even knowledge of particular facts, however, requires that we possess knowledge of universals, since all facts for Aristotle have the structure of predications and only universals can be predicated of anything. How can we acquire these universals, which it appears that we must have even to learn individual facts from experience? We are back with the *Phaedo*'s argument that we must innately know the Forms.

Aristotle’s response to this question is breathtakingly simple: we know the Forms through perception because in reality perception is of universals existing in particulars. There are Forms; there just are no *separated* Forms. The Forms in things have real causal powers, and those powers include the power to affect our sense organs and the power to cause, in us—themselves. Perception, for Aristotle, is the *acquisition* of the form of what is perceived, without its matter. Our intellect is of such a nature that it can acquire the forms of things¹², and thus we are able to acquire knowledge of forms through perception.

Let me try to show that the argument of *An. Post.* II.19 conforms to the picture I have just sketched. Aristotle begins by listing the questions that remain to be answered:

1. Is the knowledge of the ‘unmiddled’ principles the same as, or different from, the knowledge of other truths? [His answer: different.]
2. Is this knowledge scientific knowledge (ἐπιστήμη) or something else? His answer: something else, namely νοῦς.]
3. Does the cognition of the principles “arise in us without already being present” or is it “present unnoticed”? [His answer: it arises without already being present.]

The third question is the crucial one. Its second alternative is just exactly Platonic innatism, which Aristotle dismisses quickly: how could it be that we have such knowledge and fail to notice it, he asks? However, the remaining alternative presents him with a problem. He asks, “How can we recognize them—that is, learn them—if not from previously existing knowledge?” The last phrase clearly recalls the assertion at the beginning of the *Posterior Analytics* that “all teaching and all

¹²In the more elaborate theory of *De Anima* III, the ‘passive intellect’, νοῦς παθητικός, is said to have precisely the capacity to take on all forms because it has no form of its own and is a kind of pure potentiality (429b21-430a2).

rational learning arises from pre-existing knowledge”. If he still accepts that claim, then Aristotle’s only choice is to argue that we can *acquire* some kinds of knowledge without *learning* it, that is, without acquiring it as the result of a rational process.

That is just what he does. Knowledge of forms is caused in us by perception, and perception is not a rational process but rather one in which the mind is a passive recipient. Perception, he says, is “an inborn capacity of judging” (δύναμις σύμφοτος κριτική) which brings the universals into us from the very beginning. “Though what we perceive is indeed particulars, perception is of the universal, e.g. of man, not of the man Kallias” (100a16-18). Repeated perception then leads to the recognition of higher and higher universals through the following process:

1. When we perceive, the forms (more precisely the *infimae species*) of external objects impress themselves on our minds.
2. Repeated perception stabilizes this recognition (the universal ‘comes to rest’ in the soul)
3. This process is repeated at the level of higher universals (genera)

It is intrinsic to this process that we acquire cognition of universals organized as a hierarchy. This process would lead to the recognition, not simply of universals, but also of the relationships among them: what follows what, what is followed by what, what excludes what. Thus, the materials for the classification required by Aristotle’s One True Method are already available in the deliverances of perception. Since that method is capable not only of finding the premises from which to prove anything that can be proved but also of discovering which truths are not susceptible of proof and thus are principles, Aristotle can explain how all of science arises from perception.

With this interpretation in mind, we can make better sense of some otherwise baffling parts of II.19. To begin with, we can get a much more straightforward account of the three progressive

stages of cognition in 100a3-9 (memory arises from perception, experience from repeated memories of the same thing, and finally principles from experience). Here is his account of the critical third stage:

From perception, then, arises memory, as we say; and from memory of the same thing occurring many times arises experience: memories many in number are a single experience. And from experience or from every universal that has come to rest in the soul (from the one besides the many that is same one thing present in all of them) comes the starting point of art and science: of art if it concerns coming to be, of science if it concerns being¹³. (100a3-9)

Repeated perception gives rise to experience, then. Is it *repeated* experience that gives rise to universals? Aristotle does not say that, and when he repeats his view a few lines later he says that we get universals from perception or repeated perception: experience is not a stage on the way to perception of the universal. Thus, what gives rise to experience *also* gives rise to universals. Aristotle does not limit this to repeated perception of sensory universals. Instead, repeated recognition of universals leads to recognition of the next higher universals—that, at any rate, seems to be the plain meaning of 100a15-b3: first man, then some species of animal, then animal, and so on.

What is this ‘coming to a stop’? Here, Aristotle offers us a simile that has generally perplexed rather than helped interpreters:

As in a battle when a rout has occurred, if one man stops, another stops, then another,

¹³ἐκ δ’ ἐμπειρίας ἢ ἐκ παντὸς ἡρεμήσαντος τοῦ καθόλου ἐν τῇ ψυχῇ, τοῦ ἐνὸς παρὰ τὰ πολλά, ὃ ἂν ἐν ἅπασιν ἐν ἐνῇ ἐκείνοις τὸ αὐτό, τέχνης ἀρχὴ καὶ ἐπιστήμης, εἰ μὲν περὶ γένεσιν, τέχνης, εἰ δὲ περὶ τὸ ὄν, ἐπιστήμης. Translators usually take παντὸς ἡρεμήσαντος τοῦ καθόλου to mean something like ‘from the whole universal having come to rest in the soul’. But we get a much better sense if we read it as ‘from every universal that has come to rest in the soul’

until it comes to the beginning. The soul is from the beginning of such a nature as to be able to undergo this.(100a12-14)

Philoponus rather liberally fleshes out Aristotle’s image as follows:

Suppose, as an example in words, a hundred men engaged in war with enemies; turning, they disperse, and then the army breaks up. Next, one of those fleeing, getting up his courage, turns back from flight and stands to face the enemy. Then another of those fleeing, seeing him standing, comes to him to help him. And when each of those fleeing has done this, then the hundred too stand again in the battle that had just recently perished(John Philoponus, *In An. Post.* 436.23-31)

Though this is, to say the least, a florid elaboration, the commentary tradition follows it in spirit. But what point could Aristotle possibly be making with it? Philoponus thinks that it concerns a sort of valiant effort by the rational part of the soul to make a stand against the corrupting influence of the emotions:

For when the irrational parts of the soul—I mean spirit and appetite—have dominated the rational soul, the result is that the knowledge of the universal that is in it is corrupted. Then, when from perceiving one perception is inscribed in the imagination, and next another such, and thus when many perceptions are brought in together, many memories arise...

But absolutely nothing in Aristotle’s text concerns the emotions, and in any event Philoponus seems to be presupposing that knowledge of the universal is *already* present in the soul, which is exactly what Aristotle denies. Apart from that, the image of one brave soldier turning the tide in battle has no evident relevance to the point under discussion: are we to suppose that it is the

bravery of individual perceptions, or individual experiences, that somehow turns the tide against a rout of—what?

Most recent commentators have despaired of finding an answer. McKirahan, for instance, says, ‘this [simile] does nothing to make the ideas clearer’ (McKirahan 1992, p. 244). Barnes, finding no reasonable sense in talk of a ‘beginning’, emends the text, reading ἀλκῆν rather than the ἀρχήν found in all the sources: “until a position of strength is reached” (Barnes 1994, p. 265).¹⁴.

But there is no need to go to such lengths. Aristotle does not say that, as a result of the soldiers coming to a stop, the rout is turned and the battle saved. He does not even say that one soldier stops and turns to face the enemy. All he says is that one stops, then another, then another. There is a familiar phenomenon that fits this description. Suppose that people are running in a line and that the first person stops: in that case, the next in line will stop, and the next, and so on ‘until it comes to the beginning’, i.e. the other end of the line. The lead runner’s stopping is sufficient to

¹⁴Interestingly, the phrase ἀλκῆν δυσάμενος occurs in Philoponus’ explication of the image.

bring the whole line to a stop because each person’s halting causes the halting of the next in line¹⁵.

Especially when perceived from a distance, this can produce a striking visual effect.

Aristotle describes just such a sequence of events a few lines later:

For when some undifferentiated universal¹⁶ has first come to a stop in the soul (it is indeed the particular that is perceived, but perception is of the universal, e.g. of man, not of the man Kallias), it comes to a stop again in these, so long as¹⁷ the things without parts—the universals—come to a stop (e.g. such-and-such animal so long as¹⁸

¹⁵Barnes notes that a similar figure of speech occurs twice in the pseudo-Aristotelian *Problems*. As it happens, the point it is used to illustrate there fits B19 rather well. Here are the texts:

τῶν δὲ κατὰ φύσιν ἐχόντων ὅταν στή πρὸς ἓν ἡ διάνοια καὶ μὴ μεταβάλλῃ πολλαχῆ, ἴσταται καὶ τὰ ἄλλα ὅσα περὶ τὸν τόπον, ὧν ἡρέμησις ὁ ὕπνος ἐστίν. ἑνὸς γὰρ κυρίου στάντος, ὥσπερ ἐν τροπῇ, καὶ τὰ ἄλλα μέρη ἴστασθαι πέφυκεν. 917a28-32

... when the thought stops at one thing and is not changed in all ways, whatever others are about the place also stop, and the calming of them is sleep. For when one governing part stops, as in a rout, then the other parts are also naturally disposed to stop.

ἐναυθα δὲ μένει διὰ τὸ παχύτατον εἶναι τὸν περὶ τὴν γῆν ἀέρα τοῦ χειμῶνος. ταχὺ δὲ συνίσταται καὶ ὁ ἄλλος διὰ τὸ ἔχειν ἀρχὴν καὶ ἔρεισμα, ὃ δέξεται καὶ ἀθροίσει τὸ προσιὸν καθάπερ ὄρθρος· ὥσπερ γὰρ ἐν τροπῇ ἑνὸς ἀντιστάντος καὶ οἱ ἄλλοι μένουσιν, οὕτω καὶ ἐπὶ τοῦ ἀέρος. διὸ ταχὺ καὶ ἐξαίφνης ἐνίοτε γίνεται καὶ ἐπινέφελα. *Prob.* 941a8-14

But there, it remains because the air nearer the earth is the thickest of the storm. And the other also contracts quickly because it has a starting point or fixed point, which receives and collects what comes to it, as the dawn: for just as, in a rout, when one has taken a stand, the others also stand fast, so is it with the air.

The point in the first passage occurs in an explanation why some people are made sleepy by reading: the proposed answer is that reading makes thought come to a stop, and as a result the associated parts also come to a stop because thought is the governing part (τὸ κύριον): the image is thus that of a military unit halting when its commander halts. In the second passage, what is being explained is a phenomenon of condensation of air, which the writer thinks happens more quickly once a ‘starting point or fixed point’ has been established. Here we do find a reference to a first soldier ‘taking a stand’ (ἑνὸς ἀντιστάντος: the verb literally means ‘stand against’ or ‘stand up to’), following which the others do so as well. But if we consider the point being explained, it is the simple fact of having come to a stop that seems to be important. Evidently, air moving towards (προσιὸν) some already established collecting point is supposed to be more quickly collected by it. This would be illustrated by a group of soldiers coming quickly to a stop because the one in front stopped. Neither of these passages is by Aristotle, of course. They do, however, give us some idea how Aristotle’s figure of speech might be understood. What they have in common is the picture of a group of moving individuals coming to a stop because one of them has come to a stop. If we turn now to II.19, we see that that is almost all there is to what Aristotle says there.

¹⁶Translators generally suppose that the genitive absolute stops at ἑνὸς and that πρῶτον...καθόλου is a verbless clause; I take the whole phrase as the genitive absolute.

¹⁷ἕως ἄν with subjunctive can mean either ‘so long as’ or ‘until’; other translators generally opt for the latter.

¹⁸The sense of ἕως here must be the same as before if this is to be an example.

animal), and likewise in this¹⁹. 100a15-3

‘Undifferentiated’ universals are universals without differentiae, that is, *infimae species*²⁰. It would make sense to say these are ‘without parts’ because they are not genera with further species. As the soldiers come to a stop one by one, so do the universals, proceeding in order from least to most universal. What comes to be in the soul, then is not simply a collection of universals but universals ordered in a chain.

If I can recognize the universals *A* and *B* and also recognize that *A* is immediately above *B*, then I have all that is needed for knowing that *AaB* is true and that it is unmiddled. If I can recognize that *A* and *B* are immediately below *C* as species below a genus, then I have all that is needed for knowing that *AeB* is true and unmiddled. Thus, the ability to recognize universals and their positions in a chain structure of terms is all that is required for knowledge of the unmiddled premises in which all regresses terminate.

I believe this reading has several advantages. First, Aristotle is then addressing the right problem: the ‘puzzle in the *Meno*’. Plato used this puzzle as an argument for our possession of innate knowledge of Forms, and Aristotle provides us here with an alternative account that avoids precisely what he wants to avoid: he explains how we can acquire knowledge of universals without being born with it and without the existence of separable Forms. Second, and following close upon this, we see that once again, Aristotle’s principal target is Plato’s conception of philosophy and philosophical method. Third, the solution fits closely with Aristotle’s own account of the ‘one road’ for all forms of inquiry.

¹⁹σπάντος γὰρ τῶν ἀδιαφόρων ἐνὸς πρῶτον ἐν μὲν ἐν τῇ ψυχῇ καθόλου (καὶ γὰρ αἰσθάνεται μὲν τὸ καθ’ ἕκαστον, ἢ δ’ αἰσθησις τοῦ καθόλου ἐστίν, οἷον ἀνθρώπου ἀλλ’ οὐ Καλλίου ἀνθρώπου· πάλιν ἐν τούτοις ἴσεται, ἕως ἂν τὰ ἀμερῆ στῆ καὶ τὰ καθόλου, οἷον τοιονδι ζῆον ἕως ζῆον, καὶ ἐν τούτοις ὠσαύτως.

²⁰I am unpersuaded by Bolton’s attempt to give this another, and to my mind a somewhat mysterious, sense.

6 Conclusions

What has now become of questioning, for Aristotle? It has been displaced, along with dialectic, from the central position it held in Plato’s method and relegated to a purely ancillary status, useful perhaps in the preparatory stages of assembling the data for Aristotle’s theory-generating method. “No science that gives proofs about any subject matter asks questions,” says Aristotle in *On Sophistical Refutations* 11,

...but dialectic *is* interrogative; and if it did give proofs, then at any rate it would not make questions out of the first premises, those proper [to the sciences]: for if someone were not to concede these, it would have nothing else from which to argue any more against objections.²¹ (172a15-21)

These are the words of someone who has seen too many dialectical arguments leading nowhere and who has, in consequence, become disenchanted with the notion that argument alone can establish anything significant. Reversing Plato’s choice in the *Phaedo* (99d-e), Aristotle turned away from λόγοι towards looking directly at the things themselves, taking experience as the ultimate source of knowledge.

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²¹ ὥστ’ οὐδεμία τέχνη τῶν δεικνυουσῶν τινα φύσιν ἐρωτητική ἐστίν· οὐ γὰρ ἔξεστιν ὁποτερονοῦν τῶν μορίων δοῦναι· συλλογισμὸς γὰρ οὐ γίνεται ἐξ ἀμφοῖν· ἡ δὲ διαλεκτικὴ ἐρωτητικὴ ἐστίν, εἰ δ’ ἐδείκνυεν, εἰ καὶ μὴ πάν- τα, ἀλλὰ τά γε πρῶτα καὶ τὰς οἰκείας ἀρχὰς οὐκ ἂν ἠρώτα· μὴ διδόντος γὰρ οὐκ ἂν ἔτι εἶχεν ἐξ ὧν ἔτι δια- λέξεται πρὸς τὴν ἔνστασιν.

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