

Unlearned Knowledge: Aristotle on How We Come to Know Principles

PRELIMINARY DRAFT VERSION, WITHOUT FOOTNOTES

At the beginning of the *Posterior Analytics*, Aristotle says that “all learning and all rational teaching arises from previously existing knowledge”. How, then, can we have any knowledge? If all our knowledge is acquired by learning that depends on previously existing knowledge, then we would have an infinite regress of still prior knowledge, with the result that we cannot learn anything without having learned something else first. If we reject this possibility, then the only one that remains is that we have some knowledge that we did not learn. This might happen in two ways: either we have some knowledge that we never acquired at all, or we have some knowledge that we acquired but without learning it. We would have knowledge that we never acquired if there was never a time at which we did not have it (which would entail, of course, that we were born with it). Plato held that we do have such knowledge, and indeed that all the genuine knowledge that we have is innate in this way. Aristotle, however, denies that we have innate knowledge (for instance at *An. Post.* II.19, 100a10). Since he nevertheless does think that we have knowledge, he must think that we have some knowledge which we did not acquire by learning. In fact, he does present such a view in *Posterior Analytics* II.19, where he claims that our knowledge of the principles (ἀρχαί) of sciences comes to us through perception and induction and that the state of knowledge of them is “intelligence” or “thought” (νοῦς). Aristotle says explicitly that in this process the mind is passive; therefore, it is reasonable for us to regard it as not being a kind of learning (or at any rate as a kind of rational learning). Thus, Aristotle’s overall position is consistent.

This brief summary skips lightly over any number of controversial points, takes others for granted, and defends nothing. I do think, however, that it is correct in outline. In the rest of this paper, I want to expand one detail of it. Aristotle says that in *An. Post.* II.19, his subject will be, “concerning the principles, how they become recognized (γνώριμοι) and what the state is that recognizes them” (99b17-18). This is exactly what we should expect him to discuss at this point in the treatise. He has argued that demonstrations are possible only if there are propositions which cannot themselves be demonstrated but can serve as the premises for demonstrations, and he has argued at some length that there must be such indemonstrable propositions. What he has not done is explain how such propositions (which he calls ἀρχαί, ‘starting-points’ or ‘principles’) come to be known. These principles, since they are premises of demonstrations, must be propositions. However, what we actually find in II.19 appears to be an account of how we come to possess certain universal concepts. It appears, then, either that Aristotle is answering the wrong question or that he has somehow failed to realize that there is a difference between possessing a concept and knowing that a proposition is true. Is Aristotle badly confused, or is there more to II.19 than at first appears?

I think that the materials for an answer are available in the *Posterior Analytics*, with a little supplementation from the *Metaphysics* and *De Anima*. What I shall try to show is that Aristotle does in fact

distinguish between knowledge of the indemonstrable first premises of demonstrations and knowledge of universals. The former is a kind of science (ἐπιστήμη), but it is undemonstrated science; the latter, and only the latter, is “thought” (νοῦς). Moreover, although these are distinct, I shall try to suggest that Aristotle thought νοῦς could have provided the basis for indemonstrable science.

Let me add a short prefatory remark. Despite certain important differences, Aristotle’s views on knowledge are very close to Plato’s. He rejects separated forms and innate knowledge, but he thinks there are forms and thinks that they do come to exist in our minds as well as in perceptible objects. He regards them as the true objects of science, and he follows Plato in denying that there can be any science of what is perceptible and changeable: science is only of what must be as it is. It is, I think, a good idea to keep this in mind when trying to understand the point of Aristotle’s polemics. He spends by far the largest part of his argument explaining those points in which he differs from Plato, often not bothering to note the many points in which he does not. To a large extent, Aristotle presents his views as modifications internal to Platonism.

Undemonstrated Science

In *Posterior Analytics* I.3, Aristotle gives a familiar argument against two sets of unnamed opponents concerning the possibility of proof. One group, he says, denied that science is possible on the grounds that (1) only what is demonstrated is known and (2) demonstration is deduction from premises already known. These premises lead quickly to a dilemma: either there are always further premises behind the premises of every proof, in which case there is no beginning to the proof and nothing is known; or, at some point premises come to a stop and there are no more premises behind some premises, in which case we will have come to a stop at unprovable and hence, by (1), unknown premises, thus again we do not have a proof. The other group of opponents accepted (1) and (2) but sought to avoid the dilemma by supposing that the regress could go in a circle, so that every premise also is a conclusion and everything is proved. Aristotle dismisses this second position as logically incoherent: in effect, he says, it treats “If P then P” as a proof of P, which is absurd. He has a higher opinion of the first opponents, agreeing with them that if the regress of premises did go on forever then there would be no knowledge. However, Aristotle says, it does not go on forever. Instead, every such regress eventually comes to a stop, and the premises at which it comes to a stop are indemonstrable (as his opponents held) but nevertheless known. Thus, Aristotle rejects premise (1) above:

We say that neither is all knowledge demonstrative, but rather the knowledge of those without middles is indemonstrable (τὴν τῶν ἀμέσων ἀναπόδεικτον) (and it is evident that this must be so: for if one must know the prior things, i.e. the premises of the demonstration, and the middles eventually come to a stop, then these must be undemonstrated). We say that these are like this, then, and we say also that there is not only knowledge but also a certain principle of knowledge by means of which we recognize terms (ἀρχὴν ἐπιστήμης εἶναι τινά φαμεν, ἧ τοὺς ὄρους γνωρίζομεν). (*An. Post.* I.3, 72b18-25)

Aristotle’s position, then, is that there is some knowledge that is not demonstrative knowledge. Since he thinks that his anonymous opponents are right about regresses of premises but nevertheless thinks that we do have knowledge, he could hardly say anything else. However, that is not all that this passage says. First, he brings in the notion of an ‘unmiddled’ premise here and says, not just that some propositions or other are known without demonstration, but that specifically those he calls ‘unmiddled’ are so known. Second, he refers to these middles ‘coming to a stop eventually’ and gives this as a reason why these ‘unmiddleds’ premises are undemonstrated. Third, throughout this section the word he uses for knowledge is ἐπιστήμη, ‘science’, his term for the particular type of knowledge he is principally concerned with in the *Posterior Analytics*. It seems clear, then, that Aristotle thinks there must be ἐπιστήμη of the premises of a demonstration and that sometimes ἐπιστήμη is undemonstrated (and indeed indemonstrable). He has in fact already prepared us for this possibility in I.2. Following his definition of ἐπιστήμη as “knowing the cause why something must necessarily be as it is”, he then says, “Whether there is also another way of having science (ἕτερος τοῦ ἐπίστασθαι τρόπος) we shall discuss later, but we do say that it is knowing through demonstration (δί’ ἀποδείξεως εἰδέναι)” (71b16-17).

There is one further point in the passage from *An. Post.* I.3. After asserting that there is ‘undemonstrated science’ of unmiddled propositions, Aristotle continues: “We say (λέγομεν) that these are like this, then, and we say (καὶ ... φάμεν) that there is not only science but also a certain principle of science by means of which we recognize terms (ἧ τούτους ὄρους γνωρίζομεν)”. This quite clearly introduces something in addition to undemonstrated science and assigns it a function not previously mentioned. Aristotle refers to a “principle of science” elsewhere (I.33, 88b36; II.19, 100b15) and says that it is νοῦς. Based on our passage from I.3, “undemonstrated science” and νοῦς appear to be distinct. This is also the natural conclusion to draw from the passage in I.33. Speaking of “what is so but could be otherwise”, Aristotle says that the cognition of such things

... is neither νοῦς (by νοῦς I mean the principle of science) nor undemonstrated science (this is believing an unmiddled premise). (88b35-37)

Although some commentators take ‘nor’ here to be ‘i.e.’, so that Aristotle is talking about νοῦς throughout, it seems plain that he is again distinguishing it from undemonstrated science. As in I.3, he associates undemonstrated science with unmiddled premises.

These two passages are the only places Aristotle explicitly mentions undemonstrated science. However, he has much more to say about νοῦς both in the *Posterior Analytics* and elsewhere. One point that emerges with some consistency is that the objects of νοῦς are not propositions but rather (as I.3 puts it) ‘terms’ (ὄροι): the entities characterized by Aristotelian definitions. This is explicit in I.3. It is also found outside the *Analytics* in *De Anima* III. and *Metaphysics* Θ.10. In the latter place, it is part of an important addition to Aristotle’s account of truth and falsehood. For Aristotle, truth and falsehood are really present only in composition, specifically in the combination of a predicate and a subject. When we think that A is predicated of B, we combine A and B in thought; when we think that A is not predicated of B (is denied of B), we separate A and B thought. Truth is a matter of combining in

thought what is combined in reality and separating in thought what is separated in reality. Thus, when we combine A and B in thought (and think 'A is predicated of B'), our thought is true when A and B are combined in reality and false when they are not. We should remember that A and (typically) B will be universals here and that, for Aristotle, universals are not represented by thoughts in the mind but actually are present in the mind: it is the passive intellect's particular virtue that it can take on the forms of all things because it has no form of its own.

Following this account, Aristotle offers a second account of truth and being (but not falsehood) for 'incomposite' things (ἀσύνθετα) such as the terms which are united or separated in thought in predications. For terms, as opposed to propositions, he says that "touching and saying is true" (1051b24) and that there is no falsehood about them, only ignorance and "not touching":

... and not-knowing (ἀγνοεῖν) is not touching (for it is impossible to be in error about the what it is except incidentally. And likewise, concerning non-compound substances: it is not possible to be in error.

The way in which error is impossible here is similar to the way Aristotle says that the senses cannot err about their proper objects: sight cannot be wrong about red and white and blue, not because it has a special infallibility but because there is no state of error opposed to the state of perceiving any of them. Likewise, we cannot be mistaken in simply conceiving a universal, though we can fail to conceive it and thus be ignorant of it. Aristotle then adds a remarkable detail:

So as for whatever is just what it is to be something and in activity, concerning these things it is not possible to be in error, but only to think (νοεῖν) them or not. But the what it is is sought in their case, whether they are of this sort or not. (1051b30-33)

This passage should remind us how far Aristotle can be from much of contemporary analytic philosophy. The 'incomposites' that he says we cannot be in error about but can only 'touch' (i.e. think of) or fail to contact at all include not only simple sensory qualities like white and red but also the essences of substances, for instance the human essence. Thus, Aristotle believes that what it is to be human is not a composite entity but a simple one, and he believes that it is something which we can either have present to our minds (in which case we think it truly) or be totally ignorant of (in which case we do not think it at all): we cannot make a mistake in thinking it.

We may wonder just how Aristotle could believe such a thing. However, the passages from *Met.* Θ.10 make it quite clear that he *does* believe it. Moreover, the cognitive state that "touches" universals in this case is νοῦς. Is this the same νοῦς that Aristotle appeals to in *An. Post.* II.19 as the principle of science? If so, then his claim there that νοῦς does not admit falsehood appears in a different light: as a quasi-perceptual cognition of universals, νοῦς is always true simply because for it truth consists simply in thinking its objects.

Unmiddled Propositions, the Syllogistic, and Aristotle’s One True Method

I have argued that Aristotle recognizes both a cognitive state that is knowledge of the unmiddled propositions of sciences (‘undemonstrated science’) and a cognitive state that is simply the thinking of universals (νοῦς). His position on demonstration in I.3, in response to those who reject proof and with it knowledge, requires that he show how the former is possible. However, in *An. Post.* II.19, he seems to be concerned instead to explain how the latter arises. We still need to close the gap between νοῦς and undemonstrated science. I have only a somewhat speculative proposal about how that is to be done. The solution I propose is that acquaintance with universals is a matter of degree, a kind of familiarization that can increase over time and with experience, and that this increasing familiarity carries with it an increasing capacity to recognize what is true of the universal ‘in virtue of itself’ (καθ’ αὐτό). The predicates that are true of a universal in virtue of itself are (at least as I shall try to show) precisely those which are true of it ‘unmiddled-ly’ (ἀμέσως): thus, as we become increasingly familiar with a universal, we become increasingly aware of, and indeed convinced by, the unmiddled propositions about it. Since this process of familiarization is a passive process, one that the mind simply undergoes under the action of experience, it is not a kind of rational learning. Thus, there is a way that we can acquire knowledge both of universals (in the sense of acquaintance with them) and of first premises (in the sense of knowing that they are true propositions) that requires neither innate knowledge nor that we are taught the first premises.

To give this sketch a little more substance, I must first fill in some of the detail concerning Aristotle’s notion of an unmiddled proposition and the importance of such propositions to his theory of demonstration.

Aristotle thought that he had the correct account of logic. It is the account of “syllogisms” that we find in the *Prior Analytics*. For Aristotle, “syllogisms” are not one type of deductive argument among many but rather the only valid arguments that there are. It is a major thesis of *An. Pr.* I that every valid argument whatsoever can, with appropriate manipulations, be turned into an “argument in the figures”, as Aristotle usually calls what we call categorical syllogisms. This thesis can readily be criticized from the standpoint of modern logic, but let us let Aristotle have it and consider the consequences. One consequence is that the logical properties of deductive systems are identically the logical properties of syllogistic deductive systems. That is by no means a mere detail, since Aristotle’s logic is both much simpler and much weaker than the classical predicate calculus.

Aristotle proves in *An. Pr.* I.4-7 that every figured argument can be “reduced” to an argument relying on just the four first-figure forms *Barbara*, *Celarent*, *Darii*, and *Ferio*, and indeed that the two universal forms *Barbara* and *Celarent* are sufficient. It follows, then, that whatever can be deduced can be deduced using just these two argumentative forms. Given Aristotle’s thesis that his logic is the only possible theory of inference, this greatly simplifies the investigation of the possible forms of demonstration: every demonstration, since it is a deduction, must be or be equivalent to a series of inferences relying on these two forms of argument.

The weak character of Aristotle's logic, by comparison with classical predicate logic, has a still more important consequence. A true proposition is demonstrable only if there are two true premises from which it can be inferred syllogistically. Given the character of syllogistic inferences, this will be possible only if there is some term so related to the terms of the proposition in question that it can serve as middle term for such a deduction from true premises. Now, in Aristotle's logic, it is quite possible for there to be no such true premises for some true propositions: there are true propositions which cannot be deduced from any other set of true propositions. Nothing of the sort can occur in predicate logic, since every proposition is logically equivalent to infinitely many other propositions (consider, for any proposition P, the propositions P&P, P&P&P, etc.).

A true proposition that cannot be deduced from other true propositions is "unmiddled" (ἄμεσος): there is no middle term with which to prove it. Aristotle can thus partition the truths about any subject matter into two classes: those that have middle terms, and hence are derivable from other truths, and those that do not have middle terms, and hence are not derivable from anything else. The unmiddled truths will necessarily be indemonstrable. Since they are indemonstrable, it will not be possible to know them by means of demonstration. On the other hand, since they do not have middle terms, they will serve as end-points to any regress of premises. These circumstances make it possible for Aristotle to do something quite unavailable to a modern foundationalist: he can give a precise characterization of which propositions are principles that does not appeal to any epistemic notion whatever. The principles are principles, not because they have a special property of self-evidence, but because they are necessarily only starting points of deductions and never conclusions. Thus, Aristotle has no need of a special cognitive faculty for discovering what the principles are. If the truths of a science can somehow be collected, then it is possible to determine which ones are unmiddled (and hence necessarily principles) through a relatively mechanical process that Aristotle presents in *An. Pr.* I.27-28. This method begins with a collection of the true propositions about a field of inquiry. We can then determine the demonstration of any given proposition by collecting, for each of its terms, three sets of terms: all those universally true of it, all those it is universally true of, and all those it is inconsistent with. Aristotle's method then instructs us to look for common terms in the two groups of three sets of terms in order to find premises from which our original proposition can be demonstrated. Given that the syllogistic is the one true logic, Aristotle can in fact reasonably claim that his method will find a demonstration if it can be found.

Aristotle makes grand claims for this method: "The road is the same for all, concerning both philosophy and any art or study whatsoever," he says (46a3-4). All that is required, in addition to following the method of analysis Aristotle has spelled out, is that our inventory of the truths about the subject in question (he calls this a ἱστορία: 46a24) leave nothing out. If that is accomplished, then "we will be able to find the demonstration of everything of which there is a demonstration and demonstrate it; and for that which is not of a nature to have a demonstration, we will be able to make this evident" (46a25-27). I take the last phrase of this to mean "make it evident that the proposition in question is indemonstrable", i.e. a principle.

Aristotle’s method is thus a method for the discovery of the principles of sciences. This discovery is a matter of analyzing a body of available truths, not a matter of discovering new truths. The truths themselves, including the principles, are to be provided by experience: “The principles [of each science] are to be provided by experience concerning each. I mean, for instance, that the principles of astronomical science are to be provided by astronomical experience” (46a17-20). Part of what this means is evident from Aristotle’s method itself. Given a collection of truths about astronomy, garnered from astronomical experience, that method will allow us to tell which truths are unmiddled and which derivable. This does not yet explain how it is that experience is able to provide us with these truths. However, it does permit an important sharpening of the question how science is possible. By Aristotle’s method, every truth of a science is either middled and derivable from unmiddled truths or unmiddled and therefore indemonstrable. For truths that are middled, science will consist precisely in possessing their demonstrations. For truths that are unmiddled, since they are indemonstrable, some further account must be given. Whatever that further account may be, it will be both necessary and sufficient for answering the question how science is possible.

The Road to the Principles

It is against this background that we must understand Aristotle’s use of the term ‘unmiddled’ in the *Posterior Analytics*. A major goal of *Posterior Analytics* I is to show that every regress of premises of the type imagined by Aristotle’s unnamed opponents in I.3 eventually “comes to a stop” in unmiddled premises. His argument for this is contained principally in I.19-23 and draws very heavily on the syllogistic—indeed, if we attempt to remove these arguments from the syllogistic framework, they become nonsense. I have argued elsewhere that these uses of results concerning the syllogistic were probably the main reason why Aristotle developed the theory as contained in the *Prior Analytics*: the theory of validity is, for him, the theory of the structures of demonstrations, and he believes that that theory can show, on what we can plausibly call proof-theoretic grounds, that all sciences contain indemonstrable principles. Furthermore, this same theory yields the method presented in *An. Pr.* I.27-28, a method of which Aristotle proudly announces, “The road is the same both concerning philosophy and concerning any art and study whatsoever” (46a3-4). This is echoed in his remarks in *An. Post.* I.23, following the completion of his long argument that regresses of premises always “come to a stop”:

And it is obvious that when A belongs to B, if there is some middle then it is possible to prove that A belongs to B, and the elements of this will be such and as many as there are middles: for the unmiddled premises are elements, either all of them or the universal ones. But if there is not a middle, then there is no longer a demonstration, but instead the road up to the principles (ἡ ἐπὶ τὰς ἀρχὰς ὁδός) is this one. (84b19-24)

The reference to the “road up to the principles” is an allusion to Plato. Aristotle recalls with approval that “Plato used to puzzle about this and inquire whether the road was from the principles or to the

principles, as in the racecourse from the judges to the boundary or back again" (1095a32-b1). On the most likely interpretation, the road from the principles is the process of demonstration, which takes principles as premises, and the road to the principles would be a procedure for finding principles. With a little speculation, we may perhaps identify these with the processes of reasoning associated with the third and fourth parts of the divided line in the image of *Republic VI*: the road from the principles is reasoning to conclusions from assumed premises, while the road to the principles is the philosopher's ascent to the principles themselves (510c1-511d5). In claiming to have found, in his syllogistically-grounded method, a way to the principles of all philosophy, art, and study, Aristotle is thus claiming to have found the method of philosophy. This is confirmed by the fact that, following his grand declaration of the scope of his method in *An. Pr.* I.30, Aristotle turns to a criticism of the method of Division (I.31), which he says is only "a certain small part" (46a31-32) of the one true method. Plato puts Division forward as the method of philosophy itself in the *Sophist*. Aristotle's criticism, coming as it does immediately after his presentation of his own method, makes it clear that what he is putting forward is not simply a convenient heuristic for finding arguments but nothing less than the way to philosophical wisdom.

Against this background, then, we find Aristotle again saying that νοῦς is the principle of science:

Whenever it must be proved [that A belongs to B], one should get that which is the first predicated of B (let this be C), and D likewise [the first predicated] of C; and, going on always in this way, no premise from outside is ever taken or something belonging to A, but instead the middle is packed until they become indivisible and one. It is one when it becomes unmiddled, and the unmiddled premise is one without qualification. As in other cases, the principle is simple (ἀπλοῦν), though this is not the same thing everywhere but is the mina in weight, the semitone in melody, something else in another case, so too in a deduction (συλλογισμῶ) the one is the unmiddled premise, but in demonstration and science it is νοῦς. (84b31-85a12)

This passage treats the unmiddled premise as a kind of element or unit of proof and deduction on the grounds that it has a kind of indivisibility and is necessarily where analysis ends. Aristotle then brings in νοῦς as the principle of science, and it is at first tempting to suppose that he is taking νοῦς to be the cognitive state that knows these unmiddled premises. However, he seems concerned instead to emphasize a difference between unmiddled premises as the elements of proofs and νοῦς: the point of his analogy is to say that, just as the unit in any sphere is something simple and there are different units in different spheres, so the unit in deduction and the unit in 'demonstration and science' are each something simple, but these two are distinct. Thus, the unit in demonstration and proof is something simple that is not the same as an unmiddled premise. In light of Aristotle's views as expressed elsewhere about νοῦς and the cognition of 'incomposites', I suggest that we understand him to mean that the unit in 'demonstration and science' is the *object of* νοῦς, that is, the simple (in the sense of incomposite) universals recognized by it.

Becoming Familiar with Principles

I have tried to show that a consistent picture concerning the principles of demonstrations, νοῦς, and the objects of νοῦς can be recovered from the *Posterior Analytics*. The principles of demonstrations are unmiddled (and therefore indemonstrable) premises. Knowledge of them is undemonstrated science (ἐπιστήμη ἀναπόδεικτος). It is possible to discover which premises are unmiddled through a process of analysis grounded in the theory of inferences (the syllogistic) applied to truths about a subject matter provided to us by experience (ἐμπειρία) of that subject matter. Once we have knowledge of these unmiddled premises, knowledge of any other scientific truth (which is knowledge of the cause why it must be as it is) will consist in the possession of its demonstration, that is, the ability to deduce it from unmiddled premises. Knowledge of the unmiddled premises themselves cannot result from demonstration and instead results from acquaintance with the universals, which come to be in the mind as a result of a process that begins with perception.

There is one point that I still have not addressed. How is it that recognition of universals by νοῦς can lead to knowledge of principles?

Here, what I have to offer is even more speculative than the rest of my proposals. Let me begin by taking note of two points:

(1) Though Aristotle thinks that νοῦς is not susceptible of falsehood, he does not believe that we cannot be mistaken about propositional principles. This is evident from his discussion in *An. Post.* I.16-17 of “error arising from deduction” (ἡ διὰ συλλογισμοῦ γινομένη ἀπάτη, 79b24), that is, false belief that is the result of inferences from premises at least one of which is false. Aristotle begins his discussion by considering cases in which the false belief in question concerns an unmiddled proposition: obviously, then, he believes that we can have such false beliefs.

(2) Aristotle describes the process of coming to know the principles of demonstrations as a gradual one requiring a kind habituation. In *Met.* Γ, 1029b3-12, he says that the processes of becoming scientifically wise and morally good are each processes of changing our attitudes toward something. In the moral case, we become by making that which is in itself good also seem good to us; in the scientific case, we make ourselves wise by making that which is by nature intelligible or recognizable (γνώριμον) also recognizable to us. We find a clear illustration of what he means in *Met.* A.1-2. The principles of sciences are at first implausible, and even incredible, to us, and certainly seem less convincing than the beliefs about particulars that derive from our experience. In order to become scientifically wise, we must so accustom ourselves to the principles that eventually this is reversed. Thus, to someone unversed in geometry, the notion that the side and diagonal of a square are incommensurable is incredible. However,

We must end up in the opposite and better condition, as the proverb says. as happens in the case of [mathematical sciences] when people learn them. For nothing would be more astonishing to a geometrical man than if the diagonal turned out to be commensurable.

(983a18-21)

Against this background, two points about *An. Post.* II.19 are significant. First, Aristotle says that we come to know universals as a result of a process involving repeated experience. The process begins with perception, which he says (perhaps surprisingly) is of universals, even though what is perceived is particular: “We do perceive a particular, but perception is of a universal, e.g. of man, not of Kallias man” (100a16-b1). Once we have perceived anything, then, there is a “first universal in the soul”. This is a passive process which the mind simply undergoes. Repetition of the process leads to the recognition by the mind of a higher universal—evidently, the proximate genus of the first. Aristotle’s remarks on this score are brief:

Next it comes to a stop in these until the things without partless, i.e. the universals, come to a stop; for instance, this particular kind of animal [comes to a stop] until animal [comes to a stop], and again in the case of that. (100b1-3)

Now, Aristotle thinks the mind is passive in recognizing universals (“the soul happens to be of such a nature as to be able to undergo this”, 100a13-14), and he also thinks that a universal is already present in the mind in perception. What role, then, does repeated experience play? The answer, I believe, is that repetition makes the universal more γνώριμον: more familiar, more intelligible, more recognizable. This is precisely the term he uses at the beginning of II.19 when stating his purpose: he proposes to discuss “how the principles become familiar (γνώριμοι)” (99b17-18) as well as what the condition is that recognizes them (ἡ γνωρίζουσα ἕξις, 99b18). It is difficult to find a translation for γνώριμος that fits equally well in all contexts, but however we translate it, this is the term Aristotle also uses to characterize the difference between those who have scientific knowledge and those who do not: for those who have it, the principles are γνωριώτεροι, more familiar, or recognizable, or intelligible, than anything else. And in fact this is exactly what he says happens with the principles:

It is clear, then, that we must recognize (γνωρίζειν) the first premises by means of induction, for perception also implants (ἐμποιεῖ) the universal in that way. (100b3-5)

Aristotle characterizes induction in a number of ways, but it characteristically involves a movement from many to one, typically from many instances to a universal common to them all. I suggest that what Aristotle means here is that repeated “implantings” of a universal in the mind bring about increasing familiarity with, or recognition of, that universal.

Finally, and most speculatively of all, I suggest that familiarity with a universal brings with it an ability to recognize what is true of that universal in virtue of itself, that is, its essential predicates, those things which are true of it in virtue of it being what it is rather than in virtue of something else (hence I take καθ’ αὐτό as contrasted with κατ’ ἄλλο and read the latter as “in virtue of some other universal”). If we take a final step and identify these essential predicates of a universal with the predicates which are

true of it "without a middle" (so that 'A belongs to B in virtue of itself', 'A belongs to B atomically', 'A belongs to B first', and 'the premise AB is unmiddled' all come to the same thing), then this kind of familiarization would be just what is needed to produce knowledge of the unmiddled premises.

This account supposes that in one way we come to know each principle all at once and in another way we come to know it gradually. Essences, according to Aristotle, are indivisible, and the mind cannot think them without thinking them as they are: thus, any essence can only get into the mind as a whole, not by degrees. Once it is there, however, the mind's degree of familiarity with it can increase as a result of repeated experience, and one's ability to judge correctly about what is true of the universal in virtue of itself can increase in parallel. I see this as a virtue of this account, since Aristotle clearly does think that we get to know the principles of sciences through a gradual process. Thus, there is no conflict between his claim that $\nu\omicron\upsilon\zeta$ is not susceptible of error and his view that upon our first hearing them, we often find the principles of sciences false.

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