

Dialectic and the first principles of demonstration in Aristotle¹

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I. The Syllogism (*sullogismos*) is defined by Aristotle in several places, out of which the two most important ones are in the *Prior Analytics* and the *Topics*. Here is the definition from the *Prior Analytics*:

“A deduction is a discourse (*logos*) in which, certain things being stated, something other than what is stated follows of necessity from their being so.”²

Aristotle classifies syllogisms identifying three main types: demonstration (*sullogismos epistemonikon, apodeixis*), dialectical syllogism (*sullogismos dialektikos*) and contentious (*sullogismos eristikos*) (or sophistical) syllogism. These can differ by purpose³ or by the kind of premise (*protaseis*) they entail. Here are the definitions Aristotle gives to the demonstration and dialectical syllogism in his *Topics*:

“It is a demonstration, when the premisses from which the deduction starts are true and primitive, or are such that our knowledge of them has originally come through premisses which are primitive and true”⁴

The premisses of demonstration are:

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² *Prior Analytics* I, 1, 24b19-20. Tr. A. J. Jenkinson. Also: *Topics* I, 1, 100a25-26.

³ For difference in purpose see *Posterior Analytics* I, 2, 71b18-20; *Topics* I, 2; *Sophistical Refutations* 11, 171b25-27.

⁴ *Topics* I, 1, 100a26-29. Tr. W. A. Pickard-Cambridge.

“it is necessary for demonstrative understanding in particular to depend on things which are true and primitive and immediate and more familiar than and prior to and explanatory of the conclusions”⁵

II. Having in mind the fact that one cannot have scientific knowledge without demonstration and that the principles of demonstration should be indemonstrable, there appears a problem: how can one reach or discover the “starting-points” (*archai*) of science (*episteme*)? Aristotle already identified this problem in chapter 3 of *Posterior Analytics* I:

“Now some think that because you must understand the primitives there is no understanding at all; others that there is, but that there are demonstrations of everything. Neither of these views is either true or necessary.”⁶

These two groups maintain that to define demonstration and its premises the way Aristotle does involves either infinite regress or circularity in demonstration. Against the first of these objections, Aristotle says that not all-true knowledge is reached by demonstration and demonstration needs to stop at some point, and these limits of demonstrations need to be non-demonstrable. In addition, he adds that there is also a principle of understanding, in other words of grasping the true knowledge of principles. This is the *nous* that is discussed in *Posterior Analytics* II, 19.

Against the second group, Aristotle says that with the use of circular demonstration, we can prove anything, and we will arrive at some point to admit that the same thing is in the same time anterior and posterior to itself.

III. We will try to see to what extent a dialectical interpretation of Aristotle’s first principles of science is possible. This dialectical

⁵ *Posterior Analytics* I, 2, 71b20-22. Tr. by Jonathan Barnes. A dialectical premise is called *endoxa*: “those opinions are reputable which are accepted by everyone or by the majority or by the wise – i.e. by all, or by the majority, or by the most notable and reputable of them” (*Topics* I, 1, 1009b20-22).

⁶ *Posterior Analytics* I, 3, 72b5-7. Tr. by Jonathan Barnes.

interpretation of Aristotle's philosophical method has its origin in the important paper of G.E.L. Owen, *Tithenai ta phainomena*⁷. In this paper, G.E.L. Owen offered a solution to the discrepancy between Aristotle's methodological recommendations and his actually employed method. The most important passages in Aristotle's work that justify a dialectical approach are the following two:

“For the study of philosophical sciences it is useful, because the ability to puzzle on both sides of a subject will make us detect more easily the truth and error about the several points that arise. It has a further use in relation to the principles used in the several sciences. For it is impossible to discuss them at all from the principles proper to the particular science at hand, seeing that the principles are primitive in relation to everything else: it is through reputable opinions about them that these have to be discussed, and this task belongs properly, or most appropriately, to dialectic; for dialectic is a process of criticism wherein lies the path to the principles of all inquiries.”⁸

“We must, as in all other cases, set the phenomena before us and, after first discussing the difficulties, go on to prove, if possible, the truth of all the reputable opinions about these affections, or, failing this, of the greater number and the most authoritative; for if we both resolve the difficulties and leave the reputable opinions undisturbed, we shall have proved the case sufficiently.”⁹

IV. In what follows we will try to see to what extent Aristotle is dialectical when one is to understand his approach on the first principles. This is to be done mainly in relation to *Posterior Analytics* II, 19 (where he speaks about *nous*) and the first book of *Topics* (the parts about dialectical induction). Aristotle begins the 19th chapter of *Posterior Analytics* II stating his usual methodology (as seen above in the fragment from the *Nicomachean Ethics* VII, 1) by identifying the puzzles (*aporiai*):

⁷ G. E. L. Owen, “*Tithenai ta phainomena*.” in S. Mansion (ed.), *Aristote et les problèmes de méthode*. Louvain: Presses Universitaires de Louvain, 1961.

⁸ *Topics* I, 2, 101a34-101b4. Tr. W. A. Pickard-Cambridge.

⁹ *Nicomachean Ethics* VII, 1, 1145b1-8, tr. W.D. Ross, rev. J.O. Urmson.

“as for the principles – how they become familiar and what is the state that becomes familiar with them – that will be clear from what follows, when we have first set down the puzzles”¹⁰

He then enumerates the puzzles he has in mind¹¹:

1. whether it is the same thing as demonstration or not;
2. whether only one of them is a kind of science and the other some other type of knowledge;
3. whether knowledge pre-exists in us and are not noticed or knowledge is acquired at a later stage.

Next, Aristotle tries to answer the third problem by avoiding the solution of Plato that we have innate knowledge of ideas and by some method (as the dialectic) we get to remember them. However, the alternative is false, because there is no basis for learning. Rather, Aristotle says, that human beings have a capacity to grasp the first principles of science: *nous*. This capacity is presented inside an Aristotelian model of knowledge-levels, starting with perception and finishing with *nous*. The model presented here is mostly the same with the one presented at the beginning of *Metaphysics* (I, 1) and it has the following components:

1. perception (*aisthesis*): “and this (capacity) evidently belongs to all animals; for they have a connate discriminatory capacity, which is called perception”;
2. memory (*mneme*): “for some perceivers, it is possible to grasp it (knowledge) in their minds. And when many such things come about, then a difference comes about, so that some come to have an account from the retention of such things, and others do not. So from perception comes memory”;
3. experience (*empeiria*): “and from memory (when it occurs often in connection with the same thing, experience; for memories that are many in number form a single experience”.

¹⁰ *Posterior Analytics* II, 19, 99b17-19. Tr. Jonathan Barnes.

¹¹ I follow here the reading provided by the Romanian translation provided by Mircea Florian. *Posterior Analytics* II, 19, 99b21-25.

4. art (*techne*) and science (*episteme*): “And from experience, or from the whole universal that has come to rest in the soul (the one apart from the many, whatever is one and the same in all those things), there comes a principle of skill and of understanding – of skill if it deals with how things come about, of understanding if it deals with what is the case.”¹²

So this is the way we acquire knowledge: starting from perception and reaching the state of knowing provided by science and the related faculty: *nous*. Aristotle further explains that knowledge of the universal comes about by induction (*epagoge*): perceiving particular men, we can reach the species of man and then of animal and so on, because perception retains a primitive universal. Next, Aristotle answers the other two questions:

“Since of the intellectual states by which we grasp truth some are always true and some admit falsehood (e.g. opinion and reasoning – whereas understanding and comprehension are always true), and no kind other than comprehension is more precise than understanding, and the principles of demonstrations are more familiar, and all understanding involves an account – there will be no understanding of the principles; and since it is not possible for anything to be truer than understanding, except comprehension, there will be comprehension of the principles – both if we inquire from these facts and because demonstration is not a principle of demonstration so that understanding is not a principle of understanding either – so if we have no other true kind apart from understanding, comprehension will be the principle of understanding.”

This fragment can be read as follows. “Understanding” should be understood as “scientific knowledge”, or knowledge that comes about from demonstration. “Comprehension” should be understood as “knowledge by *nous*”. This clarifies the fact that knowledge by *nous* is different from

¹² *Posterior Analytics* II, 19,99b26-100a9. In *Metaphysics* I, 1 981b14-24 the difference is more clear and Aristotle explains how the apparition of science is made possible when all the arts were invented and leisure was possible.

demonstration and it is not the same type of knowledge that is implied by the use of demonstration (i.e. scientific). Now the question arises: how can we interpret the things said by Aristotle dialectically? For the first part, we can observe that he proceeds somewhat dialectically by enumerating the puzzles and then trying to solve them. A question arises: what about the extraction of the universal by induction?

The fragment is the following:

“when one of the undifferentiated things makes a stand, there is a primitive universal in the mind (for though one perceives the particular, perception is of the universal – e.g. of man but not of Callias the man); again a stand is made in these, until what has no parts and is universal stands – e.g. such and such an animal stands, until animal does, and in this a stand is made in the same way. Thus it is clear that it is necessary for us to become familiar with the primitives by induction; for perception too instils the universal in this way.”¹³

V. So induction proceeds like this: individual man – man – animal – ... – substance. This view is coherent with the Aristotelian categories considered as highest genera. The account of induction in the first book of the *Topics* seems to be similar to that mentioned here. In the 12th chapter, we read the following:

“induction is a passage from particulars to universals (...). Induction is more convincing and clear: it is more readily learnt by the use of senses.”¹⁴

In the following chapter, Aristotle speaks about the instruments of dialectic (*organa*)¹⁵:

1. securing propositions;
2. the ability to discern homonymy;
3. finding the differences between things;
4. finding the likeness in things;

¹³ *Posterior Analytics* II, 19, 100a15-100b5. Tr. Jonathan Barnes

¹⁴ *Topics* I, 12, 105a13-17. Tr. W. A. Pickard-Cambridge.

¹⁵ *Topics* I, 13, 105a23-25.

The most interesting of these four is the last, since it relates to induction¹⁶. This is what Aristotle says about it:

“Likeness should be studied, first, in the case of things belonging to different genera, the formula being: as one is to one thing, so is another to another (e.g. as knowledge stands to the object of knowledge, so is perception related to the object of perception), or: as one is in one thing, so is another in another (e.g. as sight is in the eye, so is intellect in the soul (...)). Practice is more especially needed in regard to terms that are far apart; for in the case of the rest, we shall be more easily able to see the points of likeness. We should also look at things which belong to the same genus, to see if any identical attribute belongs to them all, e.g. to a man and a horse and a dog; for in so far as they have any identical attribute, in so far they are alike.”¹⁷

To observe the relation between the analogy between the perception-object of perception and knowledge-object of knowledge and linking them as Aristotle did in the last chapter of *Posterior Analytics* should take some skill in dialectics. One skilled in dialectics can observe the fact that there are more types of true knowledge. Aristotle states more clearly the uses of finding the likeness in things:

“It is useful for inductive arguments, because by means of induction of particulars in cases that are alike that we claim to induce the universal; (...) It is useful for the rendering of definitions because, if we are able to see what is the same in each individual case of it, we shall be at no loss when we define it; for the common predicates that which is most definitely predicated in that the things is is likely to be the genus. (...) If, then, we render as the genus what is common to all cases, we shall get the credit of defining not inappropriately. Definition-mongers too nearly always render them in this way; for they declare the unit to be the principle of number, and the point the principle of line.”¹⁸

¹⁶ Cf. with Plato's *synagoge* in the *Sophist*.

¹⁷ *Topics* I, 17. Tr. W. A. Pickard-Cambridge.

¹⁸ *Topics* I, 18, 108b10-30. Tr. W. A. Pickard-Cambridge.

It is highly probable that a “definition-monger”, to use Aristotle’s words, would say (in the case of *Posterior Analytics* II, 19) “comprehension is the principle of understanding”. So now, it seems, that these fragments, taken out from the first book of the *Topics*, have the explanative force to shed some light on the way Aristotle views the knowledge of the first principles and justify to some extent a dialectical approach to the first principles of science.

VI. One last interesting aspect can be observed in *On generation and corruption*. Here Aristotle states:

“Lack of experience diminishes our power of taking a comprehensive view of the admitted facts. Hence those who dwell in intimate association with nature and its phenomena are more able to lay down principles such as to admit a wide and coherent development; while those whom devotion to abstract discussions has rendered unobservant of the facts are too ready to dogmatize on the basis of a few observations”¹⁹

Here we should have in mind that Aristotle refers to the *endoxa*, which are usually gathered from the most authoritative of the experts in a certain domain²⁰, and it seems that he puts more credit in them than in the theoreticians that ignore empirical facts.

Aristotle’s way of reaching the first principles is empirical. However, this does not exclude dialectic. Experience and induction are indispensable for the dialectician who tries to find the *endoxa* that he should employ in a dispute. Aristotle confirms this when speaking about the fact that the last three instruments of dialectic can be reduced to the first: to find the dialectical premisses²¹.

¹⁹ *On generation and corruption* I, 2, 316a5-10. Tr. H. H. Joachim.

²⁰ Experts that usually are more successful than the theoreticians. *Metaphysics* I, 1, 981a21-22.

²¹ *Topics* I, 13, 105a25-26.

Editions of Aristotle works used:

The Complete Works of Aristotle - The Revised Oxford Translation, edited by Jonathan Barnes, Bollingen Series LXXI, Princeton University Press, 1995. All the citations are from this edition.

In addition, I used the following Romanian editions of Aristotle's works:

Aristotel, *Organon* vol.I-II, translation, general introduction, introductions and notes by Mircea Florian, IRI Publishing House, Bucharest, 1997-8.

Aristotel, *Metafizica*, translation, commentary and notes by Andrei Cornea, Humanitas Publishing House, Bucharest, 2001.

Aristotel, *Etica Nicomahică*, translation, introduction, commentary and notes by Stella Petecel, Științifică și Enciclopedică Publishing House, Bucharest, 1988.