Aristotle's Reform of Paideia

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ABSTRACT: *Ancient Greek education featured the pedagogical exercise of dialectic, in which a student defended a thesis against rigorous questioning by an instructor. Aristophanes' Clouds, as well as Plato and Aristotle, criticize the practice for promoting intellectual skepticism, moral cynicism, and an eristic spirit - the desire to win in argument rather than seek the truth. I suggest Aristotle's logic is meant to reform the practice of dialectic. In the first part of my paper, I defend the thesis that Aristotle's syllogistic is an art of substantive reasoning against the contemporary view that it is a science of abstract argument forms. First, I show that Aristotle's exclusive distinction between art and science makes syllogistic a techne for the higher forms of knowledge, science and practical wisdom. Then I argue that Aristotle's treatment of demonstrative and dialectical syllogisms provides rigorous standards for reasoning in science and public debate. In particular I discuss a) the requirement that a demonstration use verifiable premises whose middle term points out a cause for the predicate applying to the conclusion; b) how his analysis of valid syllogisms with a "wholly or partly false" universal premise applies to dialectical syllogisms.*

Aristotle's logic is a major achievement of Greek *paideia*, valued and preserved continuously even in dark ages following its commitment to writing. Here I look at its role in reforming Greek education. The mission of Greek paideia, Aristotle argues in the *Politics*, is to enable members of a community to discuss with each other serious matters of common interest requiring joint decisionmaking and action. A political organization requires "a method of deciding what is demanded by the public interest and what is just in men's private dealings" (*Politics* 1328b2ff).(1) He also stresses the essential function of education to promote the intellectual excellence of the student. A distinctive feature of Greek education in Plato's Academy and Aristotle's Lyceum was *dialectic* – an intellectual exercise in which a student took a position on an issue and defended it against rigorous questioning from an instructor or another student. The origin of dialectic is Socrates elenctic mode of inquiry. Socrates asked a willing or unwilling citizen to put forward a definition of an ethical notion, such as justice, then engaged in a cunning and often baffling conversation with him. By a circuitous route the colloquy ended with the student making an admission inconsistent with his original postulate. To Socrates the beneficial result of the

citizen's embarrassment was his interlocutor coming to know his own state of ignorance; but often, as Plato acknowledged, a citizen would be silenced but not convinced. Sometimes a person so discomfited would even become a misologist, a hater of argument, impatient with reasoned discourse.

In Aristophanes *Clouds* the course of study in Socrates fictional academy exhibits two other dangers:

1. Students were taught to argue on both sides of an issue, so they could impress others with their acuteness, and win arguments whatever the topic or their position. This readily led to skepticism and cynicism in intellectual pursuits.
2. Students were instructed in how to make the worse case appear the better, so they could get away with wrongdoing and triumph in law cases. This encouraged moral skepticism, weakened traditional values, and eroded the student's character.

Plato and Aristotle both inveigh against the intellectual vice of eristic, the spirit of competition that led clever reasoners to seek to win in argument, rather than seek the truth. Consequently, the famous one on one pedagogy failed sometimes to have the desirable results modern education tends to attribute to it.

I will now argue that Aristotle develops his logic in order to combat the intellectual and moral shortcomings of traditional dialectic. In his *Organon* he inaugurates a disciplined mode of reasoning in which interlocutors could reach important truths about the subject of their discussion without detriment to their moral integrity. In maintaining that Aristotle's logic, *Prior Analytics* in particular, is concerned with substantive reasoning, I oppose the contemporary view that it is a formal science dealing with abstract syllogistic forms of argument, initiated by the great Polish logician Jan Lukasiewicz.(2) In the first part of my paper I defend the thesis that Aristotle's syllogistic is a *techne* of theoretical and practical reasoning.

1. Aristotle's Syllogistic *techne*.

Consider the following syllogism:

> All animals are mortal. All humans are animals. Therefore, all humans are mortal.

The abstract form of this argument is called by its medieval name, Barbara, because its premises and conclusion are all of the universal affirmative form, "All …are---." Substituting capital letter P for the major term (mortal), M for the middle term (animals)and S for the minor (human) , we obtain the abstract argument form,: All M are P, All S are M. Therefore, All S are P. In *Prior Analytics* Aristotle examines when a conclusion does or does not necessarily follow from two categorical premises containing three such terms, no matter what terms replace the variables.

Applying Aristotle's rules, one can formulate valid arguments and detect arguments which are invalid because the statements are not of the correct linguistic form. Thus Aristotle's logic marks the beginning of formal logical reasoning. His rules of inference are powerful means not only for avoiding fallacies in one's own reasoning but for discovering faults in others'. I do not deny the immense historical importance of Aristotle's formulations of valid and invalid syllogistic inferences. What I dispute is that Aristotle's concern with syllogistic reasoning is directed to distinguishing between valid and invalid syllogistic forms independent of the material content of the premises. Such a view is anachronistic, since Aristotle does not even isolate the theoretical notion of an abstract argument form.

A recent writer, D. Graham, who inclines to the new view, accuses Aristotle of a "theoretical lapse" because his logic does not formulate the notion of an abstract argument form separate from the material content of its statements. "Although the general notion of an argument form…is one of <Aristotle's> signal contributions to the history of logic... and the distinction between matter and form is central in Aristotle's thinking…Aristotle never makes use of what seems to us a natural extension of the matter-form distinction – the distinction of arguments into a formal and a material component."(3) Aristotle's failure to separate an argument form from its material contents indicates he did not make this distinction so central in modern logic. The way Aristotle does distinguish matter and form in a syllogism implies instead that he thought of his syllogistic as an art, a calculus for putting together concrete premises so as to achieve a conclusion. In *Physics* 195a16-19 he speaks of the premises being *matter* for the conclusion. He thinks of a syllogizer using concrete premises as taking matter from which he can attain a new form, the conclusion, much as a builder uses bricks for a house, or a sculptor stone for a statue. Ross, who believes Aristotle thought logic an art, cites his comparison of logic with shoemaking in *Soph. El*. 183a37-184a8, observing that Aristotle's "purely theoretical account of inference provides the artist with rules for his practical behavior".(4)

To categorize the syllogistic as an art does not detract from its intellectual seriousness. In *Metaphysics* I (981a5ff.) Aristotle's account of cognitive progress associates art with science as the first modes of knowledge. Practitioners of both make universal judgments, know the cause of their truth, and are able to teach principles to others. Aristotle makes an exclusive distinction between art and science in *Nic. Eth*.VI on the grounds that an art is always pursued as a means to a further end, while a free science is pursued for its own sake. The medical *techne* has a goal beyond knowledge in the curing of a particular patient. The syllogistic *techne* is a means for higher forms of knowledge, science and practical wisdom. Science uses demonstrative syllogisms, while practical wisdom in ethical deliberation proceeds via practical syllogisms from ethical first principles to the derivation of an act possible for an individual to perform in particular circumstances. Since the *techne* of logic enables an individual to construct syllogisms providing grounds for action and rational certitude, it fits Aristotle's description of an art as productive activity in the sphere of the variable:

> "Art is identical with a state of capacity to make, involving a true course of reasoning. All art is concerned with coming into being, i.e., with contriving and considering how something may come into being which is capable of either of being or not being, and whose origin is in the maker and not in the thing made." (1140a9-13)

Syllogizing for Aristotle is a distinctively human activity sometimes done well, by the scientist and person of practical wisdom, sometimes ill, by the sophist, or not carried on successfully, in the weakwilled or ignorant person.

In delineating the kinds of knowledge in *Nic. Eth*. VI Aristotle names *techne* the first of five "states by virtue of which the soul possesses truth by way of affirmation and denial" (1139ba5-17). This description exactly fits a syllogistic *techne*, which figures out how three terms in two premises may be affirmed or denied so as to yield a conclusion. However Aristotle excludes *techne* from his second list of "those states of mind by which we have truth and are never deceived about things variable or even variable" (1141a2-5). Similarly in the final chapter of *Posterior Analytics* Aristotle links *techne* with *episteme* because both involve knowing universals, but differentiates infallible *episteme* and *nous* from fallible *doxa* and *logismos,* which include *techne* (100a6-9, 200b5-9) Consequently Aristotle holds a clear and coherent position in his various works concerning the knowledge status of the syllogistic: It is by itself a *techne,* and plays an essential role in science and also in dialectic, being the means by which sound demonstrative and dialectical syllogisms are obtained.

2. Demonstrative and Dialectic Syllogisms

Aristotle begins *Prior Analytics* by asserting the aim of the inquiry is *demonstration*, implying that the study of the syllogism is the means toward that goal. Instead of distinguishing an abstract syllogistic form from its material content, in the way of modern logic, Aristotle divides syllogistic premises into *demonstrative* and *dialectic* premises. He differentiates the two by their degree of certainty, and how a thinker actually propounds them. Demonstrative premises are necessarily true propositions known by infallible rational intuition, and always asserted. Dialectical premises, on the other hand, are supposed true without having the mark of certainty, and are either raised for the purpose of questioning or asserted in a dialectical discussion. The distinction between demonstrative and dialectical syllogisms reflects the two kinds of substantive reasoning characterizing the life of theory and the life of action in ethics and politics.

Aristotle makes the main goal of studying the syllogism demonstration, just as he gives priority to the life of theory in *Politics*. He promoted the stringent ideal of a science that organizes the truths of its subject matter through demonstrative syllogisms, so that a reasoner achieves rational certainty. A system of demonstrative syllogisms provides causal explanations of the essences and attributes of substances. This ideal of a science has been very influential in western intellectual history, and is said to have produced the deductive method of Euclidean mathematics. It set a standard of intellectual rigor that inspired sharp and subtle intellects. Although Aristotle's theory of demonstration has been faulted for being too narrow and restrictive for empirical science, Aristotle speaks in *Analytics* of an inferior kind of demonstration whose premises predicate an attribute which belongs naturally but not necessarily to a kind of substance (*Pr. An.* I.13 32b5-23). Since this less strict demonstration has premises "for the most part" true it accommodates findings of empirical science which have a high probability, rather than necessity, yet Aristotle's treatment of it is undeniably cursory.

Aristotle does not separate the formal validity of a demonstrative syllogism from its premises' degree of certainty and their aptness for explaining the conclusion. In a demonstrative syllogism a conclusion is derived from ultimate principles of the science, known to be necessarily true; and its middle term represents a cause for the truth of a conclusion. The syllogism I used earlier is not a demonstrative syllogism even though its premises and conclusion are necessarily true. In it the fact that humans are mortal is explained by humans being animals, since animals is the middle term of the syllogism. Although all animals are mortal, beings other than animals – plants, for example – also have a limited life course. Consequently humans are not mortal merely in virtue of being animals. There is some more ultimate cause for being mortal than being an animal. Aristotle's writings suggest this explanation: Animals are organized material bodies composed of different parts. Organisms composed of different parts are subject to dissolution. Thus all animals, including humans, are mortal because they are organized material bodies. Aristotle warns that one may be deceived in what one takes to be a demonstration because the premises are true, and produce a syllogism with a true conclusion, but the cause cited is not an immediate cause. Another kind of error occurs when a syllogism does not point out a cause at all. Aristotle illustrates it by a syllogism that concludes that the planets are near because they do not twinkle, when the fact that the planets do not twinkle is explained by their being near.

Since Aristotle dedicates *Posterior Analytics* to demonstration, scholars concentrate on its place in Aristotle's scheme of knowledge. However, as we have observed, the opening chapter of *Prior Analytics* also singles out dialectical premises, those used in everyday reasoning carried on by members of a community about human affairs. According to Irwin, even the first principles of philosophy are reached through dialectic.(5) Much that Aristotle

says in *Analytics* relates to the dialectical syllogism, the kind of syllogism that occurs in the pedagogical exercises I mentioned at the beginning of this paper. In *Prior Analytics* II.1 Aristotle observes that syllogizing can deceive a reasoner about "things variable and invariable". He warns about "false syllogisms" in which premises wholly or partly false produce a false conclusion, though the argument is formally valid. False syllogisms occur in dialectical syllogisms, due to a universal premise being controversial, such as "All abortion is murder", in our own contemporary debate.

Let me illustrate what Aristotle means by the curious phrase "wholly or partly false". A wholly false premise is one whose contrary is actually true. For example "All abortion is murder" is wholly false if the contrary, "No abortion is murder" is true. "All abortion is murder" is partly false if only some abortions are murder. Wholly or partly false premises are most likely to occur in public discussions of matters of common interest, where a controversial universal premise on ethics or policy is put forward. The following dialectical argument occurring in contemporary debate illustrates Aristotle's caveat:

> All women are oppressed by fathers or husbands. All those oppressed by fathers or spouses are victims of patriarchy. Thus, all women are victims of patriarchy.

The above syllogism is formally valid, but its credibility depends on whether its two premises are true, wholly false, or partly false. In ethical deliberation there is an analogue to the defective middle term that provides a false cause. "It is possible to attain even good by a false syllogism, the middle term being false" (*Nic. Eth*. 1142b23-5). For example, one could conclude rightly that one ought to tell the truth in a particular circumstance, using for middle term, fear of discovery; whereas a valid practical syllogism would cite concern for one's own integrity or respect for truth.

The deceptiveness of syllogistic is insidious, for it is just because the premises do generate a conclusion that one is tempted to believe the argument is a demonstration or plausible dialectical syllogism. Aristotle stresses the moral neutrality of the syllogistic *techne* in his descriptions of sharpwittedness, a trait he attributes to women (*Post. An.* I.34, *Nic. Eth* VI.9). Sharpwittedness enables one to hit immediately on the middle term that explains a fact or the purpose of another's action. He illustrates by the person who discerns that another is addressing a rich man because of a wish to borrow money. Although sharpwittedness often accompanies practical wisdom, Aristotle notes the successful syllogizer may only be clever, not of good character. In order to produce true and good results, as distinguished from success at producing wanted results, principles of science and practical wisdom must inform the construction of syllogisms.

In conclusion Aristotle requires that the premises of demonstration be derived from detailed observation, and excludes random occurrences or anecdotal data. Such verifiable demonstration is the dawn of a scientific methodology, opposing superficial observation and idiosyncratic biases. In dialectic his demand for premises capable of winning general assent excludes radical theses out of touch with the general views of the community and its most respected authorities

These are only some of the principles of substantive reasoning appropriate to the sciences and dialectic Aristotle includes in his *Organon*. The greatness of his achievement in the syllogistic lies in part, I believe, in his recognition that it is not a panacea for unsound argument. He warns that the power of syllogistic is limited, that it can be used to argue fallaciously by a merely clever, weak or unscrupulous reasoner. In stressing that the syllogistic was not a quick fix for the weaknesses of dialectic Aristotle made another signal contribution to Greek paideia. Aristotle's syllogistic is a therapy for self-indulgent sophistry and irresponsible skepticism. His art of logic provided a catharsis of the intellect for Greek education, and may do so also for our own.

NOTES

(1) Aristotle, *The Politics*, translated by Ernest Barker, revised by R.F. Stalley. Oxford: Oxford, 1995, 269.

(2) Jan Lukasiewicz, *Aristotle's Syllogistic*. Oxford: Clarendon, 1957.

(3) Daniel W. Graham, *Aristotle's Two Systems*. Oxford: Clarendon, 1987, 321.

(4) W. David Ross, *Aristotle Prior and Posterior Analytics*. London: Everyman's, 1949, 23-4.

(5) Terence H. Irwin, *Aristotle's First Principles*, Oxford: Clarendon, 1988.