Some Topics on Teaching Logic
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Ideally, a well-educated person must know many things about logic: from propositional calculus to fallacies, through syllogisms and their history. Those among us who make a living teaching logic to high school and college students may have a hard time trying to meet all these requirements, given the limited amount of time and the abundance of teaching materials available. I propose to simplify our work by trying to teach logic as a technique based on argumentative devices, something like Cicero’s *Topics*. This approach allows us to give cohesion to the syllabus, to illuminate its contents with the practice, and to prepare the student for more advanced courses. In this paper, I will present some considerations to defend my proposal without discussing the details of the implementation.

**Logic as teaching topics**

In a document that can be considered as programmatic for the *Workshop for Teaching Logic*, at the National University of Mexico, Alejandro Herrera and his colleagues have outlined some of the goals of a formal education in logic that have to be covered by the training programs (Herrera et al. 1998). In two following articles, Raymundo Morado has specified a little better these goals (Morado 1999) and has indicated some places to find materials appropriate to achieve them (Morado 2000). However, it is clear that Morado is rather interested in formal logics, and particularly in alternative non-classical systems. On the other hand, Ariel Campirán has emphasized in the same workshop some *informal* aspects of Herrera’s program that do not seem to appear in the projects proposed by Morado, namely, "the knowledge, abilities and attitudes" necessary to develop "critical thinking" (Campirán 2000).

From a superficial comparison between the two approaches, I have the impression that the projects of Morado and Campirán develop two opposite tendencies of the program of Herrera and his colleagues. In fact, the disagreement leads easily to mutual scorn. This is not the case, I believe, of Morado and Campirán. Morado recognizes that the integration of these two aspects are necessary in the logical education of a bachelor in arts; and Campirán

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includes the education in formal logic as part of the formation of critical thinking. Their approaches, nevertheless, exemplify two tendencies easily prone to be rival.

Morado and Campirán discuss in their articles plans and programs (or at least indications for plans and programs) for training instructors at different levels: Morado is clearly interested in the formation of masters and doctors in philosophy, while Campirán is rather concerned about the critical formation of students in many different fields. However, both assume that the formation in logical abilities has already begun before the entrance to graduate schools, and that the instructors, in both cases, are "professional philosophers", graduates from some Department of Philosophy. This fact makes it harder to reconcile their programs. On the one hand, the graduate program proposed by Morado specifically mentions the art of the argument, as a requirement for the logical formation of the instructor, but there is nothing in his program for masters and doctorate in logic resembling the formation provided by the art of controversy, and Campirán's programs assume that the instructors (masters or doctors in philosophy) not only know thoroughly this art, but also that they are able to teach it to a non-philosophical public. Again, the programs proposed by Morado do not indicate when and how the philosopher-instructor has acquired this formation at graduate school.

The difficulties I have indicated seem to indicate, I think, a precise moment of the formation of the student, high school and college logic, and to a less defined phase in the formation of the instructor, the graduate school of philosophy. Morado and Campirán have precise indications of their objectives at a graduate level, although they are divergent, and they seem to assume that something has been done already at the high school and college level, but what exactly has been done is not altogether clear. It seems to me that the kind of formation one expects from the student determines the education given to the instructor, and it is advisable to begin to think about the curriculum from the most basic level. For these reasons I want to concentrate in the logical education at high school and college levels, hoping that the suggestions that I propose at this level may help to define better the objectives and programs at graduate schools, especially in philosophy.

What we have at hand is an apparently enormous task: to teach, at the same time, the basics of two apparently divergent branches of knowledge to students without previous knowledge of the matter and in an extremely limited amount of time. There is another difficulty: we are trying to teach these two areas of knowledge as two complementary aspects of the same discipline. In other words, our task seems to be to unify, for the student, the two tendencies represented by Morado and Campirán, formal logic and critical thinking, and to integrate them in an effective practice.
Given this challenge, some people may suggest that we should get back to teach Aristotelian syllogistics in a first course of logic. Although I think that this is a bad idea, I believe that the arguments advanced on its behalf are worth of consideration. They can be summarized as follows: on the one hand, the students inclined to science could find something interesting in the study of the “formal” properties of syllogisms, and on the other hand, the literary inclined students could find syllogisms closer to natural language than mathematical logic, and perhaps they could tolerate them. But I do not think that syllogisms are a good choice. Syllogistics represent only a very limited fragment of first order logic; and besides, perhaps more importantly, it is very difficult to adapt them to the context of a real argumentation. Ideally, we should choose something similar: formal enough to introduce the student to symbolic logic, and practical enough to use it in the development of critical abilities in a natural language.

In my view, the common defect of most methods of teaching logic at an elementary level (Aristotelian syllogisms, truth tables, or fallacies as formal defects in reasoning) is that they severe the *argumentative structures* from the *dialogical context* in which they naturally occur. This diagnosis is not new, for there is something like this, for instance, in the studies of Chaim Perelman (1958) and Stephen Toulmin (1969), and more recently, of Charles Willard (1989), Douglas Walton (1997), and Jaakko Hintikka (2001). However, it seems to me that it has been hardly noticed that in most of the new proposals there is a call (perhaps involuntary) for renewing the education in logic by restating an almost completely extinct approach: logic as training in argumentative *techniques*, something like Aristotle or Cicero’s *Topics*, reintroducing the natural argumentative context of these techniques. It seems to me that if we consider the education in logic at high school and college as the teaching of a series of *argumentative topics*, of ways to produce arguments in defined contexts, we could reach the goals that I have mentioned and solve, at least partially, the difficulties that I have tried to indicate.

How dialectical education looked like in the Ancient world has been relatively forgotten, largely by the scarceness of the sources, but mainly by an apparent decay of classical studies. Eleonore Stump (1982, 1989) has reconstructed partially the evolution of the education of dialectic from Antiquity to the Middle Ages, centered around Cicero, Boethius, and Aristotle’s *Topics*. In her opinion, the teaching of the topics of Aristotle underwent a gradual transformation from its conception as a series of heuristic rules for a determined type of discussion to its codification in *consequentiae formales* during the late Middle Ages. The details of this transformation are not as important for my purposes as the attempt of reconstruction of the Ciceronian theory, that seems to lie right in the middle of this transformation (see specially Stump 1988).
Although Cicero says that his brief treatise on the topics is devised to summarize Aristotle’s *Topics* for a friend, it is clear very soon that it is in fact something very different. Aristotelian dialectic was a technique designed to refute a statement based on the assumption that all categorical statements can be reduced to four types of predication: thus, whenever we make a statement we try to express the definition, the *genus*, a property, or an accident of the subject. These goals are achieved by the use of *topics*, rules that describe or define these four types of predication. The task consisted, then, in trying to identify the type of predication assumed by the proponent and to show that it had been misused or confused. The topics helped to organize strategies to carry out this task (cf. Stump 1989, 58). The theory of the categorical syllogisms seems to derive from the study of the topics, as Aristotle noticed that some rules of inference work independently of the predicables. This way, dialectical topics and the theory of the syllogisms seem to be firmly tied to a peculiar argumentative practice. And it is also very likely that the theory of "fallacies" of the *Sophistical Refutations* depends on the practice of dialectical refutation outlined in the *Topics*.

By contrast, Cicero’s theory has a wider purpose. First, Cicero clearly identifies the two aims later attributed to dialectic in all the tradition, that is to say, *the discovery* (*inventio*) and *the evaluation* (*iudicatia*) of arguments (*Topica* II 6), which do not seem to be quite explicit in Aristotle. Moreover, Cicero alludes to a classic distinction between topics *intrinsic* and *extrinsic* to the matter in discussion (*Topica* II 8). This distinction does not occur in the *Topics*, which by definition deals exclusively with topics *intrinsic* to the subject matter, but in Aristotle’s *Rhetoric* (I.15, 1371a20). Even the label is almost the same: *topoi atechnoi*. Interestingly, the Ciceronian paradigm of extrinsic topics is the argument *ad auctoritatem*, which in Aristotle’s case includes not only appealing to laws and testimonies, but also to oaths and confessions made under torture. So, apparently, by Cicero’s times the practice of *dialectic* had already been severed from the narrow practice of dialectic as taught by Aristotle, and mixed up with rhetorical themes. As a consequence, unlike Aristotle’s *Topics*, Cicero’s treatise seems to be more general in its intentions. The theory of the predicables does not seem to play a decisive role, and the technique by which the arguments can be found is not very well defined. By contrast, Cicero’s treatise includes many interesting topics from a *critical* or *informal* point of view: they include not only definitions, which seem the primary target of Aristotelian topics: there are also etymologies (VIII 35), analogies and induction (X 41-44) and causal arguments (XVI 68-XVIII 71).

More interesting still is that Cicero includes a relatively long discussion of “the topic proper of dialecticians”, which is the series of arguments “by antecedents, consequents, and contradictories”. I emphasize *the singular* in "topic", because Cicero explicitly states that
“the topic is unique as far as the finding of arguments, although the way to do it is triple.” The unique topic seems to be an argument based on a material implication, and Cicero shows that there are three ways to obtain the same conclusion from it: modus ponens, modus tollens, and some variations of disjunctive syllogism, including a form of dilemma (Topica XIII 53-57). This passage is historically very important for, thanks to Boethius’ commentary, it allowed the Renaissance of dialectic in the twelfth century until the development of the medieval theory of consequentiae formales, which can be regarded as a primitive form of propositional calculus. “From these modes [Cicero insists], innumerable conclusions are derived, which contain almost the whole of dialectic.” This “dialectic” is, apparently, the “formal logic” of his time.

The last part of the Topics deals with argumentation in general. Cicero mentions different types of investigation in which it is necessary to argue (theoretical and practical questions, discussions about existence or nonexistence, definition, properties; Topica XXI 79-87), and general indications about what topics are more appropriate for each type of argumentation (Topica XXIII 87-90), including the construction of speeches proper to rhetoric (Topica XXIV 90-98). The only thing which does not occur is a section on fallacies, and the absence of categorical syllogisms is worth of attention.

Before concluding my summary of Cicero’s Topics, I want to indicate two interesting details that show very well the evolution of logical education from Aristotle to Cicero. In the dedicatory section, Cicero relates the circumstances of the composition of the treatise. He had suggested to a friend, Trebatius, to secure for himself the assistance of some philosopher if he wanted to know the doctrine of the Aristotelian Topics. As a result, Trebatius told Cicero that the philosopher to whom he went ignored the very existence of the Topics. On this occasion, Cicero decries the negligence of the philosophers who refuse to learn such a healthy doctrine, “not only for the things that are said [in the Topics], but also for the magnificent form of exposition, both in contents and in style”. This comment seems to indicate two things: first, that already in their time philosophers were doing many things except learning the topics; and secondly, Cicero’s praise of Aristotle’s style may suggest that he may have not been reading Aristotle’s Topics, or at least not in the version that has been preserved for us.

Anyway, it seems to me that the structure of Cicero’s Topics exemplifies very well the goals of an introductory course to logic. Obviously, a work like Cicero’s Topics may be inadequate for the demands of the modern reader. I have already mentioned that it lacks a chapter on fallacies. Most of the legal examples turn out to be unintelligible for readers unfamiliar with Roman Law, and they turn out to be practically useless, for their institutions disappeared a long time ago. Moreover, although Cicero offers to us a wider
perspective, he does not tell us exactly the concrete techniques to evaluate or produce the arguments; and no matter how interesting from a historical point of view are his references to Stoic dialectic, the system he presents to us is clearly inferior to classical propositional calculus. Besides, I have never been very fond of myths of Golden Ages, or inclined to nostalgia for past times. However, I believe that the idea of incorporating all these elements into an introductory course of logic is really good.

As a conclusion, I will discuss now the strongest objection that I can think of against this program. A revival of the teaching of the topics may be regarded in some quarters as an apology for “pure rhetoric”, not “hard logic” or logic “strictly speaking”. This objection is an attempt to defend science from literary mischief. However, it is not exclusive of contemporary authors, for it was already advanced by the early modern philosophers (one might think of Locke, for example) against the rhetorical excesses of the humanists of the Renaissance. It might be found even in works of later Scholastics, against whom the humanists were reacting, and I think that we can trace its origins to Plato, in the Ancient World, or to Averroes, during the Middle Ages. Assuming the risk of oversimplification, I want to express here my hypothesis on this matter.

It is very well known that dialectic and rhetoric were fundamental in the education of the ancient Greeks and Romans, whose political institutions promoted the art of advancing and defending one’s own causes, and later it was one of the basic instruments for the transmission of classical culture during the Dark Middle Ages (see, for instance, the illuminating account of Jean Leclercq, 1957). It is until the rediscovery of Aristotle’s *Posterior Analytics* and its Arabic commentaries that two rival tendencies against the old dialectical and rhetorical formation appear: on the one hand, the attempt to transform these “arts” into demonstrative sciences according to the criteria outlined in the *Posterior Analytics*; and on the other, the attempt to banish both disciplines from the academic curriculum, reducing the study of logic to demonstrative syllogisms, again, according to the *Analytics*. Sometimes these tendencies work together. Somehow, they look like are echoes of the Platonic *Gorgias*, condemning sophistical rhetoric for the sake of “philosophical science”, which is also an important ingredient of Latin Averroism, an important inspiration for the development of modern science. In short, I believe that we inherited from the Medieval Arabs the preventions against rhetoric and dialectic, and the fascination for algebra and metaphysics.

However, it seems to me that both tendencies are wrong. The art of controversy cannot be reduced to a science, and it cannot be eliminated from the curriculum. I believe there is an analogy between Einstein’s theory of relativity and the laws of classical physics, on the one hand, and argumentation theory and formal logic on the other: teaching argumentative
strategies may complement the rules of inference and derivation, subsuming them within a wider framework. And to the charges of “restoration” of an outdated approach, it may be helpful to remember that in proposing heliocentrism, Copernicus and Galileo were just renewing an almost forgotten theory, apparently refuted thousands of times, of the order of the universe. This is what I propose to do by adding some topics for teaching logic.
References


