Scholarship at UWindsor

May 15th, 9:00 AM - May 17th, 5:00 PM

Commentary on Bohl

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In Response To: Jesse Bohl's *What are we to do about traditional logic?*

For certain purposes, using traditional Aristotelian logic would be like using Roman numerals to do math: Why employ an ancient, unwieldy system when a system is available that is more elegant and easier to use? For example, consider how Aristotelian logic treats singular statements. 'Socrates is a man' becomes the universal affirmative 'everything identical with Socrates is a man' (extensional reading), or 'Socratesness is wholly included in manness' (Bohl's "intensional" reading—cf. 3, 5, 8, n6, n14). Compare this to the natural use of predicate terms and individual constants to form singular statements (*Ms*) in what Professor Bohl usually takes to be "modern logic," i.e., "first order predicate logic" (1).2 Or consider the contortions one must engage in to treat arguments with more than three terms syllogistically; one must creatively translate allegedly 'disguised' categorical statements, construct sorties or chains of syllogisms, and so forth. If Aristotle were alive today, it is hard to believe that even he would use Aristotelian logic in such cases.

In many other kinds of cases the use of Aristotelian logic is simply not an option, assuming that a true logic is desired, which requires a formal system with a rigorous semantics. Bohl says that a reason "one might prefer modern to traditional logic" is that "Aristotelian logic is a weaker formal system than modern logic, because modern logic validates more inferences than does traditional logic" (2). But he rejects this view, ultimately saying that he does not see it "as giving us a reason to choose one logic over the other" (8). He seems to imply that as far as the number and kind of inferences validated goes, it is a toss up between Aristotelian and first-order predicate logic (2, 4, 6). But surely this is false. Consider the distinctive inferences of propositional logic such as Simplification that first-order predicate logic incorporates, or the fact that there is no logic of relations in Aristotelian logic. In Aristotelian logic there is no capability of validating inferences involving numerical adjectives such as 'there are exactly three *F's*, so there are at least two *F's*'. Moreover, first-order predicate logic has shown itself to be remarkably adaptable and extendable— from Russell's Theory of Descriptions and Davidson's proposal about adverbial modification (involving quantification over events) to an extension such as quantified modal logic. As compared to this inherent flexibility and power to provide a unified formal account, Aristotelian logic is, let's face it, pathetic with its catalog of 'immediate inferences' between categorical statements and its twenty-four valid syllogistic patterns.

Much of the rub for Professor Bohl appears to revolve around his claim that, in contrast to first-order predicate logic, "Aristotelian logic allows some universal statements about the allegedly non-existent to be false, some particular statements to be true" (3-4; cf. 1, 7). At first glance, the claim about "modern" logic here may seem correct: such universal statements would all be held to be true in that they are understood to be truth-functional conditionals with

unsatisfiable antecedents (because the objects don't exist), and all such particular statements are false because they make existence claims. However, this is more accurately regarded as belonging to the standard *philosophy* of "modern" logic, and not to first-order predicate logic itself. For example, there is nothing in the logic that prevents the domain from consisting of fictional objects and the existential quantifier from meaning *there exists in fiction*. Bohl himself seems to acknowledge that this is really a philosophical matter in saying that "Anglo-American philosophy's robust sense of reality has lead [*sic*] it to understand existence as continuous, if brief and small, spatial and/or temporal location," and that a more generous, Heideggerean conception would allow a "mode of being" for fictional and mythological objects (7). Moreover, even while maintaining an exclusive spatio-temporal notion of existence, universal and particular statements about fictional objects could be interpreted as statements about other claims—e.g., understanding 'some Greek gods are humanly formed' as (roughly) 'Greek mythology claims that some gods are humanly formed' (cf. Copi 1978: 187). Nothing in first-order predicate logic prevents this statement from being held to be true. Hence I find this criticism puzzling.

Even more puzzling is what Professor Bohl says about Aristotelian logic on this question. It is common to take Aristotle as having "assumed application for *all* the general terms with which he dealt" (Kneale & Kneale 1962: 60); "categorical propositions may be said to presuppose that the classes to which they refer do have members" (Copi 1978: 187). A Grician way of making the point is to say that existence is "conversationally implied" (e.g., Fogelin 1982: 198ff.). Some such interpretation is necessary, for otherwise logical relations in the traditional 'square of opposition' fail. For example, without a presupposition of existence, the relation of subalternation between A and I, and E and O, propositions would fail. And it must be something like presupposition and not overt existential import. For if (e.g.) 'all *A* is *B*' also said 'there are *A*', then 'some *A* is not *B*' would not be the contradictory; rather 'either some *A* is not *B* or there are no *A*' would be the contradictory. So why wouldn't Aristotelian logic simply *fail to apply* to statements like "All unicorns are white" (Bohl's example on 1)? In a somewhat similar way, first-order predicate logic cannot handle fictional or mythological names (e.g., Existential Generalization applies to them), although the slight modifications of free logic allow it to do so (e.g., Sainsbury 1991: ch. 4, sec. 20).

As far as I can determine, Bohl gives two sorts of reasons for holding that Aristotelian logic allows some universal statements about fictional entities to be false and some particular statements to be true. The first reason is a kind of argument from authority. Aristotle draws a distinction between substantial and nonsubstantial predication—the former attributes essential, and the latter contingent or accidental, properties. After reviewing a few scattered but seemingly relevant remarks of Aristotle, Bohl says "[o]ne might then go on to say that propositions about essential properties are true or false regardless of the actual existence, now or ever, of their subjects, while propositions about accidental properties are either true or false or neither" (3). This is apparently

supposed to allow (e.g.) "No centaurs are half human and half horse" to be false and "Some gods are female" to be true (3) since these propositions concern essential properties. But this seems to be a really bad argument: Because Aristotle says certain things that are possibly compatible with a certain view, that view is incorporated into Aristotelian logic, and is an advantage of it over first-order predicate logic. No systematic development or rigorous semantics is presented along these lines. For instance, why are some propositions that ascribe accidental properties neither true nor false? All we get from Bohl is the remark that Aristotle held that this applies to propositions about objects that do not yet exist, and that "one might then generalize" this to "the fictional, mythological etc." (n7). Do fictional or mythological objects have any accidental properties in the first place? It is not easy to see how a pure mental construct could have anything but essential properties. So what is the status of Bohl's example, "All unicorns are white," given that Aristotle himself held that whiteness is an accidental property, at least for "men" (Aristotle: i.5)?

The other reason that Bohl appears to give is "[f]or Aristotle, there are four irreducible intra-sentential relations: complete inclusion (A-form), complete exclusion (E-form), at least partial inclusion (I-form) and at least partial exclusion (O-form)" (5), where this is supposed to be understood intensionally, e.g., "Unicornness is wholly included in whiteness" (8), because this reading "of course. . .allows the problematic inferences to go through" (n14). Perhaps there is something to this incipient semantics—if unicornness is wholly included in whiteness, then surely it is at least partially included (etc.), and maybe whether there are any unicorns or not would have no logical effect. However, understood intensionally, the referents here are either concepts or properties, and in either case the relationships seem backwards. Surely we would want to say that the concept of being white is a component of that of being a unicorn, and not the other way around; otherwise, being white would entail being a unicorn (and I should think that I am one but not the other). The complex property of being a unicorn (a one-horned, white horse) includes that of whiteness; the simple property of whiteness does not include unicornness. In addition, understood intensionally, it is entirely unclear what partial inclusion or exclusion would amount to. Incidentally, if we are forced to extensional readings, then much of Bohl's alleged contrast between Aristotelian and modern logic (or more exactly, their attendant philosophies) on the matter of appealing to sets becomes otiose.

Whatever the path, Professor Bohl seems to arrive at the right conclusions: The aim of logic is not so much to capture "'the' logic of natural language" (10) as it is to construct ideal languages for "both comparison with and contrast to natural language" (9). The principal normative force of logic is a kind of hypothetical imperative of consistency: "If you accept certain inferences, you ought to accept these other inferences as valid." A logical representation is "useful" to the extent that it "replicates in a clearer and/or more systematic way what we already do" in natural language (9). Along these lines, Bohl only alludes to (5-6) what is probably the starkest contrast between how Aristotelian and first-order predicate logic represent natural language: unlike the former

with its categorical representations, the latter takes ordinary language universal and existential quantifications that are not in conditional or conjunctive form as if they were in these forms. Insofar as any such departure in our formalizations is *prima facie* questionable, in particular cases the use of Aristotelian logic may be preferable, so long as it adequately expresses purported validity in the case at hand. Casting these matters as partly decided by student intuitions seems misguided—those intuitions are too easy to manipulate.

Endnotes

1I am grateful to Kenneth Olson for help with this reply. (Title endnote still to be added)

2Bohl says "since grammatically proper names are not logically proper names, they are reasonable read as predicates" (n6). Not only would this not follow, but grammatically proper names, *as successfully used*, function like individual constants in a semantical interpretation in first-order predicate logic—each has a single referent.

References

Aristotle. *Topica et Sophistici Elenchi*. W. D. Ross (Ed.). Oxford University Press, 1958.

Copi, Irving M. (1978). *Introduction to Logic*, 5th Edn. New York: Macmillan.

Fogelin, Robert J. (1982). *Understanding Arguments*, 2nd Edn. New York: Harcourt Brace Jovanovich.

Kneale, William & Kneale, Martha (1962). *The Development of Logic*. Oxford University Press.

Sainsbury, Mark (1991). *Logical Forms*. Oxford: Basil Blackwell.