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Is Aristotle the Forefather of Informal Logic?

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Abstract
I argue that Aristotle takes a 'natural language semantics' approach to logic, which is consistent with the general attitudes one finds in informal logic today. Although his position is complex, Aristotle emphasizes the intensional rather than the extensional side of argument evaluation. He does not take a truth-functional approach to semantics, but an approach that elucidates the illative mechanism through an understanding of natures. This comes close to what informal logicians insist on. The informal logic movement was, to a very large extent, a Canadian initiative, prominently featuring authors such as Johnson, Blair, Govier, and many others.

Résumé
Dans cet article, je soutiens qu'Aristote utilise une approche de la logique que l'on retrouve chez les praticiens de la logique informelle d'aujourd'hui. Même si sa position est complexe, Aristote privilégie des interprétations intensionnelles plutôt qu'extensionnelles de sa logique syllogistique. Il n'utilise pas les fonctions de vérité, mais adopte une version de la sémantique qui accentue le rôle du langage naturel qui ouvre, pour ainsi dire, une fenêtre sur la réalité métaphysique. Le mouvement de la logique informelle fut, en grande partie, une initiative canadienne représentée par des auteurs bien connus tels Johnson, Blair, Govier et plusieurs autres.

> The rise of modern formal logic following the work of Frege and Russell brought with it a recognition of the many serious limitations of Aristotle's logic; today, very few would try to maintain that it is adequate as a basis for understanding science, mathematics, or even everyday reasoning.
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> *The Stanford Encyclopedia of Philosophy* (Smith, 2020)

1. Introduction

Bertrand Russell reports: "Aristotelian doctrines [in logic] are wholly false, with the exception of the formal theory of the syllogism, which is unimportant" (Russell, 2004, p. 194). This is perhaps an inadvertent moment of spleen — an opinion that

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few contemporary logicians would ever admit to in writing. Still, it seems to me that one sometimes encounters similarly unfair criticisms of informal logic. This is to be expected, perhaps, because both Aristotle and informal logicians evince a primary concern with what I am going to call 'natural language semantics.' I will argue that this preoccupation is a basic feature of both Aristotle's logic and informal logic.

Contemporary informal logic was initiated in Canada by scholars such as Ralph Johnson and Anthony J. Blair at the University of Windsor and is now a thriving discipline in its own right (Leo Groarke, 2020). Gilbert Ryle uses the term "informal logic" in passing, but his brief 1953 discussion is mostly about how "Formal Logic" is opposed to "general philosophy" (Ryle, 1964, pp. 111–129). Johnson may very well have been the first contemporary scholar who began using the term "informal logic" to designate a unique, alternative approach to logic that focuses on the evaluation of ordinary arguments in natural language. According to a now old-fashioned way of thinking, one can also distinguish between 'formal logic,' which deals with structure, and 'material logic,' which deals with meaning. As I discuss below, however, I am not going to insist here on any hard-and-fast distinction between these different ways of construing the study of logic.

This article investigates a possible link between Aristotelian logic and the contemporary discipline of informal logic. I am not going to argue that Aristotle's logic covers exactly the same ground in exactly the same way. Nor will I argue that every informal logician is an Aristotelian, although I will suggest, conversely, that every working Aristotelian is, in effect, an informal logician. The main point is that Aristotle's overall orientation to logic dovetails with the general approach of informal logicians today. And, properly so, because what I am calling 'natural language semantics' has perennial value.

In Aristotle's view, logic is mostly a tool (an *organon*) to evaluate individual arguments. He does have a carefully worked out mathematical formalism — the syllogistic as discussed in the *Prior Analytics*, for example. He uses abstract symbols with generalized meanings, suggests a method of proof, articulates rules of inference, and takes a specific approach to translations from natural language. I do not believe, however, that he aims to articulate a complete foundation for logic in mathematics (or a complete foundation for mathematics in logic) in the same way that modern formal logicians do. What makes his approach akin to informal logic is the way it emphasizes the semantic (or lexical) dimension of natural languages. Logic is, as he understands it, a way to rationally infer, connect, support, undermine, and communicate the sorts of claims expressed in natural language words and expressions. This is the ultimate goal. But some explanation is in order.

2. The Beginning of the Informal Logic Movement

Johnson describes his own experience of the beginning of the informal logic movement:

> I had finished Ph.D. course work at Notre Dame with emphasis on mathematical/formal logic. They wanted someone to help update logic instruction. …
> When I took over the teaching of that logic course in 1966, I used Copi's

Symbolic Logic, a text that focused largely on artificial arguments. … I taught my students the various techniques for determining whether or not an argument is valid. … [which] is a function of its logical form. … My experience in teaching that course was that student response … was one of polite toleration at best. … After several years of teaching, … [I received] a sample of a chapter from Howard Kahane's new text — *Logic and Contemporary Rhetoric*. I remember reading the Preface and being struck by the following passage: "… In class a few years back, … a student asked in disgust how anything he'd learned all semester long had any bearing whatever on President Johnson's decision to escalate again in Vietnam. … He wanted what most students today want, a course relevant to everyday reasoning, a course relevant to the arguments they hear and read about race, pollution, poverty, sex, atomic warfare, the population explosion, and all the other problems faced by the human race in the second half of the twentieth century." Kahane's experience strongly echoed my own. … I wrote to my colleague, Tony Blair … asking him if he would be interested in teaching [informal logic]. … He said he was. In 1971–72, Blair and I each taught a section of Applied Logic. (Johnson, 2012, pp. 5–6)

The rest, we could say, is history.

I don't think I am saying anything original in identifying a primary focus on natural language arguments as the salient feature of what has come to be known today as 'informal logic.' Dale Jacquette helpfully suggests that the difference between formal and informal logic in pedagogical contexts lies in the latter's recourse to ordinary, non-specialized language (Jacquette, 2007, p. 131). That seems largely correct, although how one divvies up the study of logic in university philosophy departments does not seem terribly important to the philosophical point I want to make here.

Johnson and Blair, in a 1980s piece, include a list of prevailing attitudes among practitioners in the discipline: "a focus on the actual natural language arguments used in public discourse"; "a dissatisfaction with formal logic as the vehicle for teaching skill in argument evaluation and argument formation"; and "a desire to provide a complete theory of reasoning that goes beyond formal deductive and inductive logic" (Johnson & Blair, 2014, p. 11).

There are many reasons why anyone with wide interests in argumentation could be attracted to Aristotle. His corpus includes advice about debating techniques, oratory, dialectic, scientific demonstration, probabilistic reasoning, analogy, modal logic, moral reasoning, fallacies, and so on. I will not collect all the diverse references here (which would take a very long time). One of the hallmarks of Aristotle's far-flung style is the interconnected but scattered nature of many of his comments. A common problem in Aristotelian exegesis is the tendency to latch on to a few key passages (that one is in agreement with) and to attribute the philosophical position they outline to Aristotle as a whole. This is hazardous because Aristotle spends a great deal of time explaining *other* people's opinions. It is not always easy to discern which views are his own. The best guide to Aristotle's mature thought is wide reading. Suffice it to say here that he discusses a very wide range of concerns in many different texts. This leaves us with many resources for in-depth investigation of informal logic and reasoning in general.

Here is Johnson mentioning Aristotle as one of the forerunners of informal logic:

> In a sense, informal logic is a new enterprise, and in another sense it is an old one. Its roots can be traced back to Aristotle's non-formal logical works, such as *Topics* and *De Sophistiis Elenchis*. Here Aristotle is still engaged in a project related to what takes place in the *Prior Analytics* but with a different focus, closer to what we might call everyday reasoning and argumentation, as opposed to the more scientific sort discussed in *Prior* and *Posterior Analytics*. (Johnson, 1996, p. 228)

This is mostly correct as far as it goes, but I want to go further. It undersells, it seems to me, the link between Aristotle and informal logic. I will argue that Aristotle's overall approach to logic — even in the formal bits (including the syllogistic and scientific demonstration, for example) — is pretty much the same set of attitudes most informal logicians take to their task today. Informal logicians need not be Aristotelians, of course, but the way they think about logic is very close to the way Aristotle thinks about logic.

Johnson goes on to quote Trudy Govier:

> To speak of *informal* logic is not to contradict oneself but to acknowledge what should be obvious: that the understanding of natural arguments requires substantive knowledge and insights not captured in the axiomatized rules of formal logic. The informal fallacies, historically a central topic for informal logic, involve mistakes in reasoning which are relatively common, but neither formal nor informally characterizable in any useful way. (Johnson, 1996, p. 228; Govier, 1987, p. 204)

Aristotle discusses fallacies, notably in *Sophistical Refutations*. Obviously, we cannot make sense of something like the fallacy of equivocation (which he discusses) without understanding the meanings of the misused words (cf. *Sophistical Refutations* 4.165b23ff). Except that Aristotle's 'informal attitude' is not limited to fallacy theory. It is not as if there are two Aristotles: a formal Aristotle preoccupied with syllogisms and science and a different, informal Aristotle preoccupied with fallacies and rhetoric. No, I want to suggest that it is the same Aristotle throughout, who repeatedly puts on display 'a semantic attitude' very similar to Govier and her informal logic colleagues. This is precisely why Russell is so impatient with Aristotle: Russell is committed to a mathematization of logic that is foreign to Aristotle. Even Aristotle's formal syllogistic is not mathematical in a way that Russell wants. But more on this below.

David Hitchcock writes, "The name 'informal logic' is somewhat unfortunate. … The research programme of informal logic does not preclude the use of formal methods or appeals to formal logics" (Hitchcock, 2007, p. 101). This seems uncontroversial. If, however, there is no sharp dividing line between formal and informal approaches to argumentation theory, informal logic developed, in the main, as an alternative to formal logic. As Govier argues, the substantive content of natural language claims plays such an important role in everyday reasoning that formal approaches, when they abstract out lexical meanings to produce utterly general

inferences based on abstract truth values, are unable to capture with precision what most ordinary reasoning is about. But this acknowledgement is already there — indeed, I will argue that it comes to the fore in Aristotle. Aristotle is invested in formal logic (the syllogistic) but his overall attitude is not so different than a Johnson and a Govier. And this is a good thing. Scholars tend to separate themselves into groups with Aristotelians over there and informal logicians over here, when, in a case like this, the two groups overlap.

3. Johnson: Manifest Rationality

Before moving on to the more technical part of the article, I want to begin by pointing out that Aristotle's general approach to rhetoric foreshadows the motivating spirit behind the informal logic movement, as best encapsulated, I think, in Johnson' influential book *Manifest Rationality* (Johnson, 2000). Although Johnson's manifesto elicited a good deal of criticism, it captures a basic mindset that still motivates much recent work in informal logic. Johnson argued that we have to add a "dialectical tier" to logic by which he meant that we have to evaluate ordinary language reasoning, not against the backdrop of some perfectly rigorous and definitive mathematical structure, but against the much wider and ambiguous backdrop of ongoing public (and personal) debate.[1] In "The Dialectical Tier Revisited," he explains the original motivation behind his book:

> [In] a world in which there are such deep divisions about vital issues, … I expressed my fear that … logical theorizing remained fettered to an approach to argument in which the ideal remained that of sound argument [i.e., a valid form plus true premises] — a view not attractive in a world of uncertainty and competing allegiances, where proof and refutation are not to be thought of except perhaps among dogmatists. In such a world, we need a theory of argument that gives proper credit to arguments which, if not sound, are yet good, or good enough, and to arguments in which the arguer acknowledges and comes to terms with what I call dialectical obligations. (Johnson, 2019, p. 179)

To meet our dialectical obligations is, more or less, to provide what is needed to persuade a (reasonable) audience. It is not to provide definitive proof, irrefutable evidence, or anything resembling universal assent.

Johnson wants to enlarge logic, then, beyond what he calls FDL — formal deductive logic — to include a much wider swath of discourse. He comments:

> In real life arguments, we often have to go with premises that are not known to be true …; no provision for that in FDL. In real life, good arguments often fall short of validity; no provision for that in FDL. In real life, there are good arguments for and good arguments against a particular proposition or proposal …;

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[1] Johnson acknowledges his debt to previous authors such as Stephen Toulmin, Chaim Perelman, Lucie Olbrechts-Tyteca, Charles Hamblin, Howard Kahane, Michael Scriven, Frans Hendrik Eemeren, and Rob Grootendorst.

no provision for that in FDL. In real life, good arguments typically confront objections and other dialectical material; but no mention of that in FDL. (Johnson, 2019, p. 178)

Although this is not an article on Aristotle's rhetoric, it seems to me that Aristotelian rhetoric is the 'science' designed to deal with this kind of wide-ranging, publicly digestible reasoning that Johnson advocates.

Aristotle writes that rhetoric is

concerned with such things as come, more or less, within the general ken of all men and belong to no definite science. All men make use, more or less, of [rhetoric]; for to a certain extent all men attempt to discuss statements and to maintain them, to defend themselves and to attack others. Ordinary people do this either at random or … from acquired habit. … [But] the subject-matter can plainly be handled systematically. (*Rhetoric* (Roberts) I.1354a1-9)[2]

Aristotle makes fun of Gorgias (and the other Sophists) because they have their students memorize canned arguments on both sides of an issue rather than teaching them the principles of successful persuasion (*Sophistical Refutations* 34.183b36ff). He believes that rhetoric is a serious technical discipline (a τέχνη) and, in sharp contrast to Plato and Socrates, views it as a laudable pursuit and defends it as an important part of any well-rounded curriculum, arguing that it is not rhetorical ability that makes people Sophists (in the negative sense) but underhanded moral purpose (*Rhetoric* I.1.1355b18-19). His epistemological attitude may be more rigid than what we find in modern informal logic but, like Johnson, he calls for the development of a systematic study that deals with "modes of persuasion" rather than proof (*Rhetoric* I.1.1354a13, I.1.1355a4-5, I,1,1355a27, I.2.1355b37ff), that considers opposite sides of a question, that is equipped to handle contingent, imprecise, and merely plausible subject-matter, and that provides practical advice in personal, political, legal, religious, and ceremonial contexts.

When we add all this to Aristotle's comments on debating techniques in the *Topics* and his work on fallacies in the *Sophistical Refutations*, we are left with a picture of Aristotelian logic in keeping with Johnson's calls for a wider and more versatile discipline. Aristotle differs from Johnson in that he wants an overarching system that incorporates both formal and informal approaches, but more on that below.

If, however, the spirit that motivates Aristotle's general approach to argument and logic is largely parallel to the spirit that motivated the informal logic movement, I will focus on a more specific technical issue in this article. I will argue, in short, that Aristotle and modern informal logicians (for the most part) both privilege a 'natural language semantics' and that this overall orientation is at the heart of the modern informal logic movement. All I mean by the phrase 'natural language semantics' is that modern practitioners and Aristotle both accept, correctly, that the natural language meaning of words has a central role to play in any adequate argument evaluation. No formalism that obscures the lexical meaning of the words we use in

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[2] Some Greek passage translations have been slightly emended for English style.

everyday speech can suffice to provide a full or even an adequate account of everyday reasoning.

4. The Connection Between Logic and Metaphysics in Aristotle

I will argue, then, that the meaning of natural language words is a key component in Aristotle's logic. Of course, Aristotle borrows or makes up many technical words — like *entelékheia*, *ousía*, *noûs pathētikós*, *eídos*, etc. — but he privileges natural language terminology and grammar.

Here is a brief example from his formal logic. Aristotle is making a point about conversion, switching positions of subject and predicate terms in a categorical statement. He writes, "If some B is not A, there is no necessity that some of the As should not be B; e.g., let B stand for animals and A for man. Not every animal is a man; but every man is an animal" (*Prior Analytics* (Jenkinson) I.2.25a23-25). Notice how he establishes the point: by bringing up a specific example with semantic content: the case of "animal" and "man." We cannot go from 'Some Bs are not As' to 'Some As are not Bs' because, although 'some animals are not men,' we cannot convert terms and say: 'some men are not animals.' Aristotle brings in semantics to show that this formal rule is correct. Once we attach a specific meaning to these terms (A and B), we see what must be the case. This is just one of countless similar examples.

It is not merely that Aristotle uses symbols that are designed to represent terms with specific meanings that have a basis in natural language in the *Prior Analytics*. It is that Aristotle's approach to logic is permeated with metaphysical content. Although many informal logicians today will not share Aristotle's realist metaphysical convictions, it is the way he mixes metaphysics and logic that forces him into a semantic position that is more or less equivalent to that of most informal logicians, even those who hold drastically different metaphysical worldviews.

Aristotle knows about validity: a *sullogismós* is a valid deduction. If, however, Aristotle has a method (further systematized by, say, the Scholastics) for determining validity — indeed, for *proving* validity — he does not believe that form alone determines the logical force of an argument. What we are supposed to think about the logical force of a particular instance of logical implication depends, to a very large degree, on the semantic content. Here, again, there are many examples.

Consider Aristotle's distinction between "knowing the fact" and "knowing the reason why." (See *Posterior Analytics* I.13.78a23ff.) I will paraphrase here. Aristotle proposes two syllogisms:

- Syllogism 1: Planets do not twinkle; all non-twinkling things are near; so, planets are near.
- Syllogism 2: All planets are near; whatever is near does not twinkle; so, planets do not twinkle.

Both syllogisms possess the exact same form: all S are M; all M are P; therefore, all S are P (i.e., they are both in the syllogistic mood Barbara). Formally, there is no difference. (The S, P, M terms are defined differently.) Yet Aristotle thinks that the

second syllogism is a much stronger argument — it follows with more logical strength — because it explains the necessary *cause* of something. As he puts it, planets "are not near because they do not twinkle but because they are near, they do not twinkle" (*Posterior Analytics* (Mure) I.13.78a37-38). For Aristotle, science, understood as a stronger sort of reasoning, reveals the cause of something, but we can only find out if a cause has been revealed by looking at the meaning of the words used in a syllogism. That is, we can only determine this by accessing the semantic content, not by examining the formal structure of the syllogism. The contemporary logician may protest: this is mixing logical categories. But, for Aristotle, logic and science overlap. The strongest logical argument of all is a scientific demonstration that reveals the cause of something.

Aristotle famously says that a scientific demonstration (an apodeictic syllogism, *apódeixis*) involves claims that are "true, primitive, immediate, more familiar than, prior to, and explanatory of the conclusion" (*Posterior Analytics* (Barnes) I.2.71b21-22). This is the very best kind of syllogism. But how can we know if the premises in a particular syllogism are true, fundamental, self-evident, better known, metaphysically prior, and explanatory (giving the cause) without accessing the semantic content? We cannot determine this by simply looking at the bare structure of an argument. We have to evaluate the meaning of the claims presented to discover, then, whether a particular instance of reasoning is an apodeictic syllogism. It is not the form of the syllogism alone but the information that it is communicating that also matters.

In her ground-breaking text, *A Practical Study of Argument*, Govier outlines argument evaluation in terms of her ARG conditions (Acceptability, Relevance, sufficient Grounds). (See Govier, 1988.) The point here was that one must look at what the premises mean — their lexical content — to determine whether we are faced with a good argument. Aristotle is suggesting something very similar. Of course, he wants an argument with a valid form, but it is the meaning that separates out strong or weak deductions from one another.

At the end of the *Posterior Analytics*, in a passage that has bothered many modern exegetes, Aristotle writes:

> No other kind of thought except intuition [*noûs*] is more accurate than scientific knowledge [*epistémē*]. ... It follows that there will be no scientific knowledge of the primary premises, and since except intuition nothing can be truer than scientific knowledge, it will be intuition that apprehends the primary premises. ... Intuition will be [therefore] the originative source of scientific knowledge. ((Mure) II.19.100b7-16)

Aristotle believes that direct insight — what the translator has rendered here by "intuition" (a misleading English word) — is the most certain way of knowing; it is what gives us the *primary* premises of a scientific demonstration (so we can build strong arguments). (Cf. Biondi, 2004; McCaskey, 2014.) But this direct insight involves a 'semantic' understanding of natures in the world, not an awareness of mathematical structure. *Nous* judges claims and assertions according to their content (like Govier's ARG conditions). For Aristotle, the best arguments depend on a non-

discursive sort of *reasoning*, which, for Aristotle, is primary and more certain than anything else.

Many formal logicians may be tempted to respond: 'Well, what we really care about when it comes to the semantic content in logic is formal validity. It is whether the argument has the correct pattern to support the inference. If the premises are true, does that guarantee the truth of the conclusion? That is what matters from a purely *logical* point of view.' I understand, of course, but this is a very pinched point of view, considered from an Aristotelian perspective.

Aristotle distinguishes between strict logic (what he sometimes calls "dialectic") and persuasive logic (rhetoric). (Cf. *Rhetoric* I.2.1356b, 1357a; *Prior Analytics* II.27.) His terminology is somewhat fluid and not entirely consistent, but it mostly involves a comparison of logically rigorous arguments with merely plausible forms of argument (such as enthymemes (from merely probable premises), analogies, and arguments from example (from anecdotal evidence)). Although he is moving towards a more nuanced epistemological accounting, Aristotle's distinction between stronger and weaker arguments originates, surely, in the ancient distinction between knowledge and opinion. To one side, we have strict logic producing the highest degree of justified true belief; to the other side, we have 'rhetorical logic' producing eloquent persuasion.

What matters, in the present context, is that it is the semantic content of an argument, not the formal pattern of inference, that distinguishes between weaker and stronger forms of logic. The stronger and weaker types of argument use the very same syllogistic forms (in both deductive and inductive modes); what distinguishes them is not the formal structure but what they are talking about. It is the meaning of the sentences — the information they contain —that makes a particular argument this kind of rhetorical argument and not that kind of scientific argument. It is semantics, not structure, that, in Aristotle's mind, makes some syllogistic inferences weaker than others.

In an account of "for the most part reasoning" in the *Posterior Analytics*, Aristotle reports: "not every male person has hair on his chin, but most do" ((Barnes) II.12.96b10). He suggests that we should use an ordinary syllogism when dealing with such cases. We are to argue (Barbara): 'all M are P; all S are M; therefore, all S are P.' That is, 'All men have hair on their chins; Socrates and Aristotle are men; therefore, Socrates and Aristotle have hair on their chins.' We are to understand the middle term as a for-the-most-part universal because of the subject matter; because we know that chin-hair is not a necessary property of being male. In other words, it is the meaning of the symbols — the fact that they are referring to chin-hair on men — that makes 'all M are P' a weaker premise and 'all S are P' a weaker conclusion.

Suppose we used the same syllogistic form but argued: 'All men have to die; Socrates and Plato were men; therefore, Socrates and Plato had to die.' Here, the inference would be universally rigorous (for Aristotle, at least) because death is, metaphysically, a *necessary* property of all life. I cannot enter into details here. Simply note that we have two arguments with the exact same formal pattern (Barbara), one about facial hair and one about human mortality, which have a very different logical force. But we can only determine this by paying attention to the meaning of the words used in those arguments.

Aristotle has a more sophisticated but hard-to-decipher modal logic (set out in the *Prior Analytics*), which presupposes distinctions between necessary and contingent properties. But, here again, we cannot know whether the terms referred to are accidental or necessary properties by looking at the mere structure of the argument. We can only know this by understanding the meaning of the symbols — by evaluating what the sentences are saying — in light of a proper metaphysical understanding. As I will show further below, Aristotle's logic is metaphysical, not necessarily in any technical sense (although that is included), but in the sense that our knowledge of what we think reality is like determines, to a large degree, the logical status we assign to particular arguments. But we can only access this information through the *meaning* of specific words and expressions.

In Aristotle's mind, the point of logic is to provide us with a tool that we can use to discover, record, classify, and make sense of what is 'out there' in the world. This may seem old-fashioned, but it is why, in Aristotle's mind, the strength of logical implication matches the degree of metaphysical connection captured in the meanings of particular words. Contemporary informal logicians may disagree, of course, with Aristotle's metaphysics. Nonetheless, his metaphysically oriented worldview forces him to take a similar logical stance: understanding semantic content is an indispensable aspect of argument evaluation.

5. Aristotelian Essentialism

Aristotle has often been dismissed as a rank 'essentialist' in the public square. Enthusiast Nimrod Bar-Am, for one, claims that the modern mathematical logic is a huge improvement over Aristotelian logic because it "exorcises Aristotle's essences, thereby setting logic free of its ancient, traditional constraints" (Bar-Am, 2008, p. 123). According to this reading of intellectual history, "Methodology, epistemology, and science were [previously] linked in a knot commonly known today by the name of Aristotelian essentialism. … [Modern formal logic] was able to transcend, by default almost, some of Aristotle's most stubborn essentialist presuppositions … [by] separating the study of valid inferences from the Aristotelian endeavor [that conflated] both logic and science" (Bar-Am, 2008, pp. xi-xii). Subsequent to this new emancipation, "the ability to suspend all metaphysical judgment while doing logic, resonates in every corner of the logical cosmos" (Bar-Am, 2008, p. 125).

One could perhaps complain that Aristotelian logic is 'littered' with 'metaphysical distinctions,' but this is not by accident. It is a deliberate strategy. Aristotle wants a logic that helps us investigate the true nature of what is in the world. This is why the semantic dimension of language is so important. Because specific words — not abstract symbols — inform us as to the 'essentialist' natures, qualities and properties of things in the world. Natural language serves this purpose. It allows us to describe, assert, and explain what we are dealing with. When the substantive content of an argument is egregiously out of line with the nature of the world as we know it, this poses logical (not just factual) problems. Because logic is about how we truthfully describe things in the world, when we get this wrong, we get our logic wrong.

In a largely forgotten book, Henry Babcock Veatch once argued that Aristotle's logic is a "what logic" in comparison to the "relating logic" of contemporary

mathematical logicians (Veatch, 1969, *passim*). This seems largely correct. In the *Metaphysics*, Aristotle writes: "we think we know each thing most fully, when we know *what* it is, e.g., *what* a man is or *what* fire is" (*Metaphysics* (Ross) VII.1.1028b1-1028b3, my italics). He continues: "So too for us, most of all and first of all and, one might almost say, solely, it is necessary to study *what* this kind of being [a thing] is" (*Metaphysics* (Sachs) VII.1.1028b8, my italics).

For Aristotle, *whatness* matters most of all. Is this a dog, an orange, a statue, an evil act, an artificial kind, a genuine *differentia*, a first principle, an *endoxon* (proverbial truth), a necessary or contingent property? *What* are we dealing with here? That is the first question to be asked. Formal logic purposely leaves out most of this information. It uses symbols that are, in effect, ciphers, to skate over such 'metaphysical' preoccupations without entering into queries about the natures being argued about. But, at the very least, this is not an Aristotelian mindset.

In Aristotelian philosophy, we think by grasping natures. This has logical implications. When confronted with a material conditional, such as 'if the moon is made of green cheese, then a square circle has been discovered in Afghanistan,' we *immediately* understand that something has gone disastrously wrong. We don't have to look at the form of the argument. We all know that natures cannot be combined in these ways. We can readily depict the argument in symbolic form but it is not the structure of the claim but the substantive content that goes awry.

The Aristotelian mindset is like this: suppose I say that I keep Suzanne in a cage. You are taken aback. He keeps his girlfriend in a cage? I respond that Suzanne is my pet budgie. Now it makes sense! Once you know *what* Suzanne is, you can know what logically follows: she has wings, feathers, a stout beak; she lives in a cage; she is not made of concrete. This is the way of Aristotelian inference. If, however, we have no idea *what* Suzanne is, if we get her nature wrong, we cannot *logically* infer anything at all.

Aristotle may have been overly optimistic about the possibility of definitions, although present discussion of his biological essentialism in the secondary literature attempts to remedy some of the exaggeration. (Cf. Balme, 1987.) Aristotle considers the impossibility of coming up with a definition of a goat-stag (τραγέλαφος), the ancient equivalent of a unicorn. He tells us: "No one knows the nature of what does not exist — one can know the meaning of the phrase or name 'goat-stag' but not what the essential nature of a goat-stag is" (*Posterior Analytics* (Mure) II.7.92b3). On Aristotle's account, we can invent a name and speak about goat-stags in a literary sense, but we cannot properly *reason* about or scientifically define goat-stags because we cannot logically infer anything from non-existence. Non-existence is the absence of a nature, and it is natures that are the ultimate engine of logical inference. (This is why Aristotle's logic leaves little room for non-referring terms like zero, the null set, square-circles, mermaids, or unicorns.) Here, then, is another example, where the semantic content of language — whether a term refers to something real or imaginary — plays a role in Aristotelian logic.

6. Hansen: The Illative Focus

Hans Hansen argues for a view of informal logic that focuses on "illative evaluation" of the strength of the inference-connection between premises and conclusion. He

writes, "I … disagree with those who think that informal logic should be a kind of argument evaluation or argumentation theory that includes judgments about premiss acceptability as well as other dialectical and rhetorical considerations"(Hansen, 2011, p. 12).

Writing "In Praise of Formal Logic," Hansen explains:

> Formal logic has no means of evaluating contingent propositions as true or false. … Hence, formal logic is aware that it cannot take it as part of its business, in general, to pronounce on premiss acceptability, and that therefore its true concern must be with illative issues. This is not to say that formal logicians do not have views about premiss acceptability; … but those views are not part of the formal logic they espouse: they are something else, tacked on. This may explain why at least since the nineteenth century, the preference is to identify logic with the study and evaluation of premises-conclusion relations and disassociate it from premissary questions. "[T]he rules of Logic," wrote Whately in the 1820's, "have nothing to do with the truth or falsity of the Premises, …" (1876, p. 153) and about 175 years later we have Skyrms expressing almost the same view when he writes that, except in special cases, "It is not the business of a logician to judge whether the premises of an argument are true or false." (Skyrms, 2000, p. 15) (Hansen, 2011, p.2)

This may sound, *prima facie*, like a rejection of Aristotle but I want to insist that one can wholeheartedly adopt Hansen's point of view and remain a thorough-going Aristotelian.

We need to take into account two important issues. First, Aristotle does not believe that it is the business of the logician to determine what is true in a particular field of knowledge. He maintains that each specialized scientific pursuit has its own basic set of *endoxa* (first principles and expert opinions). It is for astronomers to determine what is true about the heavens, for botanists to determine what is true about plants, and so on. Robert Bolton declares: "there is no room *at all* for overlap in content or subject matter, for Aristotle, between metaphysics and biology or physics" (Bolton, 2010, p. 32, my italics). (Cf. Judson, 2019.) This is a little strong; nonetheless, Aristotle does emphasize the role of specialized experts in determining whether specific premises in a particular field of inquiry are true. One can accept that determining truth or falsehood is not quite what logic is about and remain an Aristotelian in logic.

Second, Aristotle's term logic is not focused on the concept of a truth-value. The focus on truth-values and truth-preservation is an inheritance of Stoic propositional logic. Aristotle wants true premises that lead to true conclusions, of course. But the meaning of a statement for Aristotle is the lexical meaning of the words in that natural language; it is not 'true' or 'false.' For Aristotle, 'true' and 'false' are judgements we make about meaning; they are not meaning itself. This is almost wholly at odds with a more modern analytic focus on truth-conditional semantics. What the present emphasis on 'truth-values' does is substitute a mathematical marker for natural language meaning: true/false, up/down, 0/1. Considered from an Aristotelian perspective, this narrowing of subject-matter is, logically, a drastic impoverishment.

For Aristotle, the point of the logic *qua* logic is, as Hansen suggests, to see what follows from what. Aristotle presumes that intelligent people are capable of proper discernment and that specialist authorities will give us reliable information to work with — but what we infer is not some abstract truth-value. It is the semantic content of the premises — what they mean — that produces the illative moment of enlightenment. Seen from this semantic perspective, if you listened to an argument made in a foreign language you do not know, you could not see how the conclusion follows from the premises even if it were a sound or even a valid argument. One cannot discern whether there is a proper connection between premises and conclusions without first knowing what one is talking about. At least, that would be Aristotle's general view (outside of restricted formal contexts).

7. What Does a Term Mean? Extension Versus Intension

There are two ways, I think, that Aristotle's attitude towards meaning lines up with what informal logic is about. First, Aristotle privileges an intensional over an extensional understanding of meaning. I am not saying that he rejects an extensional account of meaning; not at all. That is, in effect, what Aristotle's *Prior Analytics* is about. (The Venn diagram method of proof and Fred Sommers and George Englebretsen's arithmetic interpretation of the syllogistic follow suit.) (Cf. Sommers & Englebretsen, 2016.) Nonetheless, what a word means is, first and foremost, for Aristotle, the nature it designates: the properties that make it what it is. Hence, the 'essentialist' tag. This is at odds, however, with the reliance on 'extensionalist' set theory in contemporary formal logic.

Aristotle (like most informal logicians) would not accept modern set theory as the ultimate basis of logic. Why? Because of its conspicuous lack of 'semantic' content. Because it focuses on the extension of a term understood in mathematical terms. Aristotle does, of course, rely on mathematical notions in his philosophy — for example, the notion of a mean or ratio, which turns up in his ethics, his political science, his biology, his chemistry, and his psychology (Louis Groarke, 2015). Aristotle also regularly appeals to geometry. Still, as his famous list of 10 categories demonstrates, Aristotle accepts that the world is filled with distinctly non-mathematical properties: the fact of existence, biological essences, qualia, forms, final causes, moral goodness, God, mind, free-will, etc. (The most famous list of such things is in *Categories* 4.1b25-2a3, but there are other lists: *Topics* I.9.103b21-25; *Eudemian Ethics* I.8.1217b26-33; *Metaphysics* VII.1.1028a32-28b3-25, X 1054a5ff, XII.1.1069a20ff.) What is important for present purposes is that Aristotle believes, for example, that qualities are as important (indeed, more important) than quantities, that teleology is real, that the whole is greater than the parts, that moral attributes exist, that incommensurable differences separate species, that the active mind is immaterial and immortal, that theology is scientific knowledge (*epistémē*), and so on. These attitudes do not map on to any mathematical scheme. But Aristotle wants a logic that deals with all these kinds of issues. An extensional logic, based on set theory, is inadequate to the task.

Definition plays a large role in Aristotle's epistemology. As Leo Groarke and Christopher Tindale explain, we can define a concept "by identifying members of

the class of things it names" or "by identifying the essential qualities that make something a member of [that] class" (Groarke & Tindale, 2004, p. 95). For example, we could define the Concordia University football team by providing a list of the players' names. This is to provide an extensional definition of the term 'Concordia University football team.' Or, we could define the football team by identifying the "essential qualities" that make one a member of the team: full-time student, male, passing grades, medically examined, won a try-out. This is to provide an intensional definition of the term 'Concordia University football team.' Put a little too simply, formal logic, in privileging set theory, presupposes an extensional understanding of what logic is about, whereas Aristotle is primarily focused on an intensional understanding of what logic is about. Champions of modern formal logic, such as Bar-Am, explicitly argue that set-theory/extensional logic is a better version of Aristotelian intensional logic. But this is, I think, a fundamental mistake. Set theory logic is not a better (or worse) version of Aristotelian logic. It is a different kind of logic.

Imagine the following syllogism. 'George and Bill are offensive linemen on the Cleveland Browns football team; offensive linemen in the National Football League (NFL) are big boys; therefore, George and Bill are big boys.' Now, look at the underlying pattern of inference. How do we get from the premises to the conclusion? A set-theory understanding and an Aristotelian intensional logic understanding are very different.

On an extensional (set-theory) model, we effectively reason: the group 'George and Bill' is included in the group of 'NFL offensive linemen'; but the group of 'NFL offensive linemen' is included in the group 'big boys'; so, the group 'George and Bill' must be included in the group 'big boys.' This is, of course, correct. This line of extensional reasoning is what the traditional '*Dictum de omni et nullo*' is about. It is about seeing the relationships that must obtain inside (or outside) of groups. But this is not what Aristotle was *primarily* interested in.

The kind of intensional inference Aristotle is after follows from an intelligent grasp of the nature of what is being talked about. How does one explain the logical inference in the present case? If we know anything about football, we know that the purpose of an offensive lineman is to protect an expensive, smaller quarterback from monstrous hulks who rush from all sides. But, if we know anything about the physical world, we immediately discern that skinny linemen will do a very poor job defending someone so precious against bulky giants. One has to be big to stand up to big opposition. It is this sort of intelligent realization that is in the background of an intensional understanding and secures the above logical inference, not some mathematical rule that tells us about group inclusion. The group-inclusion rule is sound, but it is an understanding about the *nature* of the world and the role of offensive linemen that drives home the inference.

Set-theory logic leaves out what is, for Aristotle, the most important aspect of logical implication. Yes, the mathematics of set-theory is correct, but it omits the 'essentialist' basis of inference. Seen from a truly Aristotelian perspective, contemporary formal logicians confuse the means with the ends. What they privilege is the means, which is really the consequence of something much more important and primary: the rational insight into natures, which is invariably expressed in words that provide a content-filled commentary on the world.

The set-theory approach has attenuated the semantic content of logic to such a degree that it bears very little resemblance to Aristotle's view of logical entailment. To confuse the extensional range of an inference with the inference itself would be, from Aristotle's perspective, like confusing the animal with the skeleton. The whole animal is (logically and metaphysically) prior to the skeleton. The skeleton does an admirable job of holding all the parts together. But the animal is not the skeleton. Of course, we should study skeletons, biological and otherwise, but we should not mistake the skeleton for the whole animal.

A seminal thinker in the formal logic tradition, such as Gottlob Frege, is particularly concerned with differentiating logic from psychology, but this is not at issue with the metaphysically realist Aristotle. Aristotle thinks, for example, of things in terms of four causes. Consider the previous football inference. Discerning the logical inference requires, for example, some understanding of efficient cause (we need big bodies to block other big bodies), some understanding of material cause (heavy boys are harder to move), some understanding of formal cause (for example, the form (rules) of a football game: one can hit other players), and some understanding of final cause (the purpose of offensive linemen). Much more could be said. But this exercise in understanding is not mere psychology. For Aristotle, this sort of intelligent understanding shows us what logically follows from what.

8. What Does a Sentence Mean? The Truth-Functional Approach

Aristotle's attitude towards meaning in logic lines up with the general practice in informal logic in a second important way. Aristotle pays close attention to the meaning of words and never attempts to reduce meaning to a mere 'truth-value.' He does not embrace anything like the truth-functional approach to the study of semantics that took pride of place among an earlier generation of linguists and formal logicians. Although formal semantics is no longer confined to anything like traditional truth-conditional semantics, I will focus on the latter here because it embodies an important aspect of the 'formalist' tendency that seminal authors such as Johnson, Blair, and Govier set out to oppose. Insomuch as there are alternative approaches to formal semantics (such as game-theory semantics or discourse representation theory), they require a more nuanced treatment than the historical analysis I offer here. Wittgensteinian language-game approaches likewise deserve a different discussion.

In a discussion of the truth-functional approach, Jaroslav Peregrin borrows a passage from Alonzo Church's *Introduction to Mathematical Logic*. Church reports:

> [T]he denotation (in English) of "Sir Walter Scott is the author of *Waverley*" must be the same as that of "Sir Walter Scott is Sir Walter Scott," the name "the author of *Waverley*" being replaced by another which has the same denotation. Again, the sentence "Sir Walter Scott is the author of *Waverley*" must have the same denotation as the sentence "Sir Walter Scott is the man who wrote twenty-nine *Waverley* Novels altogether," … the latter sentence, … if it is not synonymous with "The number, such that Sir Walter Scott is the man who wrote that many Waverley Novels altogether, is twenty-nine," is at least so nearly so as to ensure its having the same denotation; and from this last

sentence in turn, replacing the complete subject by another name of the same number, we obtain, as still having the same denotation, the sentence "The number of counties in Utah is twenty-nine."

Now the two sentences, "Sir Walter Scott is the author of *Waverley*" and "The number of counties in Utah is twenty-nine," though they have the same denotation … seem actually to have very little in common. The most striking thing that they do have in common is that both are true. Elaboration of examples of this kind leads us quickly to the conclusion … that all true sentences have the same denotation. And parallel examples may be used … to suggest that all false sentences have the same denotation. (Peregrin, 2007, p. 914; Church, 1956, pp. 24–25)

What Church refers as "denotation" is the semantic content of a claim: what it refers to; it's 'reference' (in formal logic jargon). But leave aside complexities. For Aristotle, the sentence "Sir Walter Scott is the author of *Waverley*" refers to something very different — and so, has a very different meaning — than the statement "The number of counties in Utah is twenty-nine." They do not mean the same thing. They both mean what they say, and they say very different things even if they are both true. Aristotle never reduces meaning to anything like a truth-value (understood as the mere fact of satisfying relevant truth-conditions).

Aristotle (like most of us) wants to preserve truth but, on his view, truth is not the same as meaning. All true sentences in the world do not mean the same thing; all false sentences in the world do not mean the same thing. They mean, as in informal logic, what their words mean. The claim 'God exists' and the claim 'my toe hurts' might both be true (or false) but the logical implications we can draw from those two claims are radically different. Church's reductionism simplifies semantics, turning it into a mathematically manageable system by getting rid of the meaning of the words. By the same token, it gets rid of the insight into natures that is, for Aristotle, the engine of logical implication. We get rid of animals and are left with skeletons. But Aristotle's logic is, in the main, designed to make sense of whole animals.

When we use a truth value, such as 'true' or 'false' as a marker of all the logical content of a statement, we eliminate the semantic aspects of logical inference. We get deliberately 'meaningless' strings of symbols glued together by the rules of a particular logic game rather than by their intended meaning. This is very unAristotelian: the final cause of logic (the proper joining and dividing of natures) is gone; the efficient cause of logic (the intelligent grasping of natures) is gone; the formal cause of logic (including the definitions of the words) is gone; and even the material cause of logic (the stuff arguments are made of, their conceptual content) is gone. There is nothing to glue together the resulting inferences except for mathematical rules of syntax. Aristotle would have heartily applauded the development of an informal logic approach that equally takes into account the logical ramifications of the meanings of the words.

We could think of logical implication like a thread passing through and connecting premises and conclusions. Aristotle thinks we trace out this connection, not by learning mathematical rules, but through our understanding of the world. We learn, not through bare observation, but through observation penetrated by intelligence

(*nous*). (Cf. Louis Groarke, 2009.) Through observation, we come to understand sequences like 'if it's autumn, then the leaves fall; it's autumn; so, the leaves fall.' And, by extension, we understand the symbolic sequence: 'A→B, A ⊢ B.' When we observe the world, we intelligently discern relationships and come, eventually, to discern logical relationships in general and how they apply across the board. This is the 'metaphysical' origin of logical inference (and the distant origin of mathematics as well), at least for Aristotle.

Consider the standard definition of formal validity: if the premises are true, then the conclusion must be true. Of course, Aristotle wants valid arguments but what we call 'validity' results from good reasoning; it is not the cause of good reasoning. I think this is the informal logic position too. When, in the strongest case, a conclusion follows necessarily from premises, this is only because something about the prior claims elucidates something that *requires* something else. It is the understanding of the meaning of the words that precipitates or triggers the illative moment. We may elaborate a concise mathematical framework (often in hindsight) as a way of cataloguing responses, but the act of intelligent understanding that makes initial sense of the meaning of the claims is prior to correct logical structure. I think that Aristotle and informal logicians are on the same page here.

One final point is worth making. Michael Wolff argues that Alfred Tarski and his followers try to explain meaning solely "in terms of syntax and set theory" (Wolff, 2006). What results is an abstract mapping of one structure onto another structure: "the syntax is an algebra, the semantics is an algebra and there is a homomorphism mapping elements of the syntactic algebra onto elements of the semantic algebra" (Partee & Hendriks, 2011). This mathematics to mathematics relation omits the lexical level of utterance that refers to real-world natures and specific properties. Max Kolbel insists that

> the underlying idea of truth-conditional semantics is … not the idea that a theory of meaning … ought to tell us something about how that language's expressions relate to extra-linguistic reality. Rather, it is motivated by the need to describe … how the meanings of complex expressions depend on the meanings of their parts. Most theorists who work within the truth-conditional paradigm do so because it allows them to account for the compositionality of languages. (Kolbel, 2002, pp. xii-xiii)

But any exclusive study of how the parts of an artificial language system fit together that neglects consideration of how the meaning of natural language connects up with what we believe to be true about the content of the world provides an incomplete picture of what reasoning is about. This is equally true viewed from an Aristotelian or an informal logic perspective.

9. Formal Versus Informal Logic

There is a great diversity of approaches in both formal and informal logic today, but I think it is fair to say, generally, that Aristotle would not view 'formal' and 'informal' logic as opposing categories. The Mathematical Association of America features a little history of symbolic logic on its webpage. It reads, in part:

The great German philosopher and mathematician Gottfried Leibniz (1646–1716) was among the first to realize the need to formalize logical argument forms. It was Leibniz's dream to create a universal formal language of science that would reduce all philosophical disputes to a matter of mere calculation by recasting the reasoning … in this [mathematical] language.

The first real steps in this direction were taken in the middle of the nineteenth century by the English mathematician George Boole (1815–1864. (Bezhanishvili & Fussner, 2013)

The passage goes on to mention Augustus De Morgan, Charles Sanders Peirce, Ernst Schröder, Giuseppe Peano, Bertrand Russell, and Alfred North Whitehead as seminal thinkers that pushed this exciting project ever further ahead. It seems to me, however, that Ralph Johnson and his informal logic colleagues were responding to what they largely saw as the narrow straitjacket of such "mathematicized" thinking (Johnson, 2019, p. 179).

One cannot overemphasize the enthusiasm for formalism in some circles. Here is Richard Montague's trend-setting 1970s declaration, in favour of a strictly formal understanding of natural language:

There is in my opinion no important theoretical difference between natural languages and the artificial languages of logicians; indeed I consider it possible to comprehend the syntax and *semantics* of both kinds of languages with a single natural and mathematically precise theory. (Montague, 1970, p. 373, my italics)

In a tone similar to Russell above, Montague dismisses any emphasis on the natural language meaning of words and even on validity (and, by implication, the field of informal logic) as an old-fashioned technique to be replaced by a formal logic for enlightened minds:

Is it really so important [he argues] … to be able to establish conclusively that a given argument in a natural language is invalid? I believe that as the scope of exact artificial languages is enlarged, people will begin to use them for argumentation; witness the gradual abandonment of ordinary language by mathematicians between 1875 and the present. … It would appear more important to extend the scope of constructed systems than to discover the exact rules of natural languages. (Staal, 1969, pp. 273–275)

Montague buys into the Leibnizian model: the real challenge is inventing a mathematical language that replaces natural language arguments so that we can turn our natural language disagreements into mere calculations. From an informal logic point of view and from an Aristotelian point of view, these are misguided aims and aspirations.

One of the salient features of informal logic is the seriousness with which it approaches natural languages. Seen from an informal logic perspective and from an Aristotelian perspective, the underlying belief here — that natural language arguments are better captured in artificial mathematical languages — is *naïve* in the extreme. One can never devise a universal formal language to broker substantive

philosophical disputes because, as someone like Govier would say, we cannot evaluate argument inferences without knowing something about the meanings of the claims being made.

Although it may seem surprising, I believe that Aristotle would consider 'formal logic' as a subspecies of informal logic. That is, he would view informal logic — to use an alternative terminology, 'argumentation theory' — as the genus; he would consider the 'formal' in *formal* logic as a differentia. Seen from this perspective, *informal* logic would be the big category; *formal* logic would be a smaller subdivision within the larger category. Formal logic is what happens when we minimize semantic content as much as possible until we end up with something so abstract and generalized that it approaches the rigour of mathematics. (Even mathematics has semantic content, but the semantics is minimized so that it does not interfere with the focus on syntax.)

10. Is Aristotle the Forefather of Informal Logic?

It may surprise the reader, but when all is said and done, I am somewhat ambivalent about the claim that Aristotle is the historical forefather of 'informal logic.' It depends what one means. I hope I have shown that the spirit and semantic outlook of Aristotelian logic fits neatly into the informal logic paradigm. If, however, Aristotle has had an important influence on informal logicians, there are reasons for caution. First, Aristotle was not working alone. He had been a student at Plato's Academy and was teaching at the Lyceum. Details have been lost in the mists of time, but it is clear that there were debating contests, logic classes, competing schools of thought, and heated discussions about how to win (or lose) an argument. Add in the Sophists — those masters of disputation that Plato and Socrates opposed — and one finds an Athenian intellectual circle that stands as a distant precursor to the spirit that animated the contemporary founders of informal logic. It is perhaps the Sophists, most of all, who stand as the initiators of what became, in time, the Aristotelian tradition in logic.

Second, we should acknowledge that there are more immediate historical precursors to the informal logic movement that seem to be overlooked; philosophers aligned with the Idealists, the Neo-Thomists and the 'great books' movement resisted, to varying degrees, the 'encroachment' of the new mathematical logic (Johnson's FDL). F. H. Bradley and Bernard Bosanquet devised non-analytic logics (in a Hegelian bent), whereas Jacques Maritain and Veatch vociferously criticized the new logic on Aristotelian or scholastic grounds. (Maritain derisively called the formal logicians "logistaticians" (Maritain, 1946, p. 268).) Some enterprising historian of ideas should investigate the presence or lack of any connection here.

To sum up: Aristotle's logic is characterized by a healthy respect for the semantic side of logical reasoning in a way that mirrors, I think, the philosophical attitude that was the driving force behind the informal logic movement that rejected the hegemony of the formal logic curriculum in university philosophy departments. One of the remarkable features of the informal logic movement, which is too lightly passed over, is the intellectual courage it took to stand up to the then usual way of doing things. Academics, in my experience, are often fiercely resistant to change. In a Canadian context, when thinkers such as Ralph Johnson and Tony Blair at the

University of Windsor, along with Trudy Govier and many others I cannot list here, articulated a more semantically minded vision of logic that took seriously the real-world content of natural language, they were adopting quasi-Aristotelian attitudes. Not all informal logicians are Aristotelians, but anyone who adopts a genuinely Aristotelian approach to logic is, it seems to me, wittingly or unwittingly, an informal logician.

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