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Aristotle's Analytic Tools

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Aristotle developed analytic tools to deal with conceptual difficulties that were important in his time. Some of these tools are his explicit analysis of homonymy, his eightfold classification of subjects and predicates and its elaboration into the predicaments and predicables, his syntactical analysis of ordinary language sentences, and his construction of a formal language for deductive and demonstrative syllogistic. Some of these conceptual difficulties are traceable to theories of Ideas, in which definitory predicates were not distinguished from non-definitory ones, as for instance in Hypothesis V of the *Parmenides*, where it is argued that the (non-existent) one is not equal to the others, because if it were equal, then it would both be and be like the others in respect of equality (161C3-5). Orders of generality were not distinguished from one another, which leads to infinite regress fallacies, like the Third Man. Additionally, relational predicates were not distinguished from non-relational ones, as at *Theaetetus* 154C7-155C7, where the contradictions result from taking relatives as if they were definitory predicates, or, on a weaker interpretation, taking relatives for quantitative expressions.1

The Platonic dialogues had exemplified the logical shortcomings of the sophistic movement without offering much in the way of analysis of these shortcomings, and so it fell to Aristotle not only to catalogue the sophistic moves and to put the more dignified dialectic of the Academy in order and on record, but also to develop a systematic approach to resolving typical fallacies, not just showing that they led to undesirable conclusions. In order to address problems and anomalies mooted in the dialogues—especially homonymy as exhibited, for instance, in *Euthydemus*, *Cratylus*, and *Hippias Minor*, Aristotle devised a categorial analysis of ordinary language, including an account of logical types, and a formal language that accommodated both ordinary language and demonstrative premisses.

Aristotle takes on several of these difficulties in the opening pages of the *Categoriae*, where he begins with a discussion of homonyma, or the equivocal in the Latin tradition:

'Ομώνυμα λέγεται ὃν ὄνομα μόνον κοινόν, ὁ δὲ κατὰ τοῦνομα λόγος τῆς ουσίας ἐτερος, οἷον ζῷον ὁ τε ἄνθρωπος καὶ τὸ γεγραμμένον.2

*Homonyma* is said of things of which the name only is common while the *logos tes ousias* corresponding to the name is different, as both the man and the portrait [have the name] animal. (Trans. mine)3

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1Cf. also *Parmenides* 131C12 ff., on great and small, which seems to have an echo at Cat. 5b11 ff.
The initial position of this account of ὀμώνυμα signals the importance of homonymy as an issue and highlights the importance of ὁ λόγος τῆς οὐσίας in resolving problems of homonymy. It should be noted that this expression is not the same as ὁρος or ὁρισμός in the Topica (I.v) and so cannot be rendered simply ‘definition’. Further, it does not contain τὸ τί ἦν εἶναι which figures there, so that it need not be rendered ‘essence’. What it does contain is οὐσία, suggesting that Aristotle intends categorial analysis, with its distinction of substance from accident, to be helpful in addressing problems of homonymy.

Next, Aristotle proceeds to distinguish what is a substance from what is predicated of a substance and from what inheres in a substance. This analysis begins with an eight-fold table (1a20-b9), which is presented below in the order in which Aristotle gives the cases.4

<table>
<thead>
<tr>
<th>Being a Subject</th>
<th>Being Predicable</th>
<th>Inhering in a Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. S</td>
<td>P</td>
<td>~I</td>
</tr>
<tr>
<td>2. S</td>
<td>~P</td>
<td>I</td>
</tr>
<tr>
<td>3. ~S</td>
<td>~P</td>
<td>I</td>
</tr>
<tr>
<td>4. S</td>
<td>P</td>
<td>I</td>
</tr>
<tr>
<td>5. S</td>
<td>~P</td>
<td>~I</td>
</tr>
<tr>
<td>6. ~S</td>
<td>P</td>
<td>~I</td>
</tr>
<tr>
<td>7. ~S</td>
<td>P</td>
<td>I</td>
</tr>
<tr>
<td>8. ~S</td>
<td>~P</td>
<td>~I</td>
</tr>
</tbody>
</table>

This table offers a perspicuous arrangement of the criteria that—among ὄντα or designata—distinguish substance from accident, individual from kind, and physical

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4 This table has appeared earlier in my “Predicaments and Predicables in Aristotle’s Metatheory”, Society for Ancient Greek Philosophy Annual Meeting, 15 October 2005. Scholars ordinarily find in this text only a four-fold division, employing but two criteria, as for instance, Ackrill has it, ‘being in something as subject’ and ‘being said of something as subject,’ Aristotle’s “Categories” and “De Interpretatione,” translated with notes by J. L. Ackrill (Oxford, 1963), ad loc.; cf. J.M.E. Moravcsik, “Aristotle on Predication,” Philosophical Review, lxxvi (1967), pp. 80-96. My reasons for objecting to this view are, briefly: the fourth member of their division—allegedly primary substance—is characterized only negatively; their division recognizes “species and genera in categories other than substance,” whereas Aristotle (Cat. 2a14-18) gives the names ἐδος and γένος exclusively to secondary substance; and their division fails to distinguish psychic activities from accidents.
definitory series from mental definitory series. The criteria are three: being a subject (υποκείμενον), being predicable (καθ’ ύποκειμένου) of another subject, and being present in another subject (έν ύποκειμένων).\(^5\)

Of the eight possible combinations, the first six are included by Aristotle in his categorial approach to homonymy. The last two Aristotle excludes. Case 7 (~S & P & I), an accident class name like ‘color’, has no designatum among δοτα—it answers to;\(^6\) such accident class names are merely logical constructions that help us make sense of our perceptions. Case 8 (~S & ~P & ~I), in which all the criteria are negative, is excluded by Aristotle at 2a34-35 and at 2b4-5.

Two included cases are individuals that can be named only in the subject place of predicative formulae. Case 5 (S & ~P & ~I) includes primary substances—“this man,” “this horse”—individual physical substances that are neither definitory of other subjects nor inhere in other subjects. Case 2 (S & ~P & I) includes instances of psychic activities, such-and-such grammarianship (ή τις γραμματική, 1a25-26),\(^7\) which is indivisible and one in number (τά ἀτομα καὶ ἐν ἀρίθμῳ, lb6-8), corresponding to the physical individuals of Case 5.

If individuals in Aristotle’s arrangement are reckoned type 0, two others of his varieties of designata include items in types 1 through n-1, where items in type n are highest genera. These both are definitory themselves, that is to say that they determine their subjects, and, because they are secondary substances, are fit subjects for higher order definitory predications, whereby they are determined—Case 1 in series beginning with physical individuals, Case 4 in series beginning with mental individuals. Case 1 (S & P & ~I) includes secondary substances, which define primary substances. Both species and genera define individuals but species does so more informatively, as man, his example here, is the more apt (οἰκειότερον, 2b9) determination of individual men; the

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\(^5\) Τῶν δοτῶν in 1a20 has the force of a technical term and is opposed to τῶν λεγομένων four lines above: the contrast is of the designata of expressions with those expressions themselves. Aristotle’s use of δοτα as a technical expression is no less precise for being deliberately minimal. For Aristotle, ὁν is a πολλαχώς λεγόμενον and unqualified ὁν is vacuous; it acquires meaning only when subjected to a categorial sort. At Cat. 1a20, Aristotle uses δοτα to refer to the designata of object language expressions just insofar as they are the designata of object language expressions, prescinding from other questions as to their status. What are fit subjects for a categorial sort—nothing more, nothing less—these are the δοτα of 1a20. Concerning the pre-categorial vacuity of ὁν, see C.H. Kahn, “The Greek Verb ‘To be’ and the Concept of Being,” Foundations of Language, ii (1966), pp. 245-265; “Retrospect on the Verb ‘To Be’ and the Concept of Being,” in The Logic of Being, edd. Simo Knuuttila and Jaakko Hintikka (Dordrecht, 1986), pp. 1-28; and The “Parmenides” of Plato, translated with introduction and appendices by A.E. Taylor (Oxford, 1934), p. 133.

\(^6\) Accidents cannot be subjects of any variety of predication, definitory or descriptive (An. Post. 83b19-22). There are no descriptive predications about white for Aristotle, only about white objects (Cat. 5b ad init.; An. Post. 83a33). Some apparently had offered color as the genus of white, as Topica 109a ad finem records, but, on the Aristotelian theory, this does not amount to a definitory predication because the putative genus does not range over species. There are no color species because there are no grounds from which to derive a differentia that would distinguish white from green or purple or any other color.

\(^7\) To use Miss Anscombe’s entirely apt rendering (G.E.M. Anscombe and P.T. Geach, Three Philosophers [Ithaca, 1961], p. 8), which gives due weight, as Owen’s “a particular linguistic knowledge” does not, to Aristotle’s stipulation that the item in question inheres in the soul—it is someone’s competence respecting a point of grammar. Cf. G.E.L. Owen, “Inherence,” Phronesis, x (1965), pp. 97-105, esp. pp. 99-100.
corresponding genus, animal, is less apt (κοινότερον, 2b13). Species can serve as subjects for genera, and genera can serve as subjects for higher genera, on up to the highest genera, which are for Aristotle the upper limits of predication (cf. An. Post. 82a38-b3; An. Pr. 43a25 ad fin.). Case 4 (S & P & I), items that inhere in subjects and can figure both as subject and as predicate are mental kinds, which define mental individuals. Aristotle’s example is knowledge (ἐπιστήμη, 1b1), which he says defines such-and-such grammarianship, the competence or expertise of some knower.

Aristotle includes two remaining cases: Case 6 (~S & P & ~I), highest genera, designata that never are subjects for further predication, and Case 3 (~S & ~P & I), instances of accidental attributes, which never define and never are subjects of definitory predications. Instances of accidental attributes (τὸ τί λευκόν, 1a27) inhere in bodies, as distinct from mental individuals, which inhere in souls. For Aristotle, accidents are genuinely predicative: ‘Socrates is white’ is well-predicated, although ‘That white thing is Socrates’ is not (An. Pr. 43a34-35). Giving white or anything else that is not a secondary substance as a definition is on Aristotle’s view out of place (άλλοτρίως . . . άποδεδωκώς, Cat. 2b35). Accidents fail to define anything, but they are predicative, in a non-definitory or descriptive way, of the subjects in which they inhere.

Aristotle’s table of object language designata, because it distinguishes substance from accident, can be used to distinguish definitory predication, which is of substance by substance, from descriptive predication, which is of substance by accident. This distinction blocks paradoxes that arise from confusing definitory with non-definitory features, and thus would keep the reasoner from being led into seeking the αὐτό καθ’ αὐτό of size, health, and strength, as Socrates tries to entice Simmias to do at Phaedo 65E-66A. Further, his table distinguishes logical types—individuals, species, and genera to order n—and these in two series, physical and mental. Together with explicit restrictions that what is predicable be of higher order than its subject (Cat. 1b6-9, 2b15-21), the type distinction serves to block infinite regress fallacies, among them the Third Man, by disallowing statements about statements of the same generality. This sort by logical type apparently assumes an apparatus of genus, species, and differentia, since these are used—without apology—to illuminate predicating in Categoriae III.

In chapter IV, beginning at 1b25, Aristotle continues developing his approach to dealing with homonymy by making his famous categorial sort of ὄντα. Here he again

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8 Scholars have often thought that ἡ τῆς γραμματικῆς and τὸ τί λευκόν were examples both intended to illustrate a single case and that they did not differ from one another in their logical behavior. Especially they have thought that τὸ τί λευκόν, like ἡ τῆς γραμματικῆς, must be ἄτομον καὶ ἐν ᾅριθμῳ. Cf. Ackrill, ad loc.; Miss Anscombe, pp. 8-9; also R.E. Allen, “Individual Properties in Aristotle’s Categories,” Phronesis, xiv (1969), pp. 31-39; James Dueringer, “Predication and Inherence in Aristotle’s Categories,” Phronesis, xv (1970), pp. 179-203; Storrs McCall, “Abstract Individuals,” Dialogue, v (1966), pp. 217-231; Gareth Matthews and S. Marc Cohen, “The One and the Many,” Review of Metaphysics, xxi (1968), pp. 630-655; and Douglas Lewis, “Quality Individuals,” Review of Metaphysics, xxiii (1969), pp. 114-122. Holding that instances of accidental attributes are individual, however, leads to the paradox that no two objects, or, indeed, no two parts of the same object, have the same description. Various efforts have been made, in the articles cited, to patch this up. The problem need not arise, on the other hand, if what inhere in a body and what inhere in a soul are taken to be separate cases. There is an obvious sense in which someone’s mental acts are unique and hence able to meet Owen’s individuality criteria (pp. 99-100) —that individuals are wholly determinate and non-recurrent.
points out what underlies the distinction of descriptive predication, which is of substance by accident, from definitory predication, which is of substance by substance. Accidents not only are distinguished from substances, but they get a more refined analysis of their own in the nine accidental predicaments. Distinguishing relation from quantity, for instance, blocks paradoxes like those mooted in Plato’s *Theaetetus* 154B-155D, where Socrates gets Theaetetus’ head to swim merely by pointing out that six dice although more than four dice are less than twelve dice.

Aristotle may have been spurred on by the irregular syntax and the paradoxes that it engenders displayed in the Platonic dialogues, in spite of the apparent regularity and modern feel of the discussion of syntax in the *Sophist*. This contrast has recently been studied by J. J. Mulhern, who spotted 11 examples of irregular syntax in the *Euthydemus*, *Protagoras*, and *Parmenides*, which he represented in the notation of modern predicate logic. His “Summary List of Examples” displays the 18 possible non-redundant sentences using the predicate variables φ and ψ, the predicate constants O and E!, and the subject variables x and y. The 4 unremarkable sentences are not marked, the 11 examples from the dialogues are shown in bold face, and the 3 remaining possible irregular sentences, which Mulhern has not yet found, are shown in italics.

**Summary List of Examples**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S1.</td>
<td>ψφ Holiness is just.</td>
</tr>
<tr>
<td>S2.</td>
<td>φφ Holiness is holy.</td>
</tr>
<tr>
<td>S3.</td>
<td>φχ A particular thing is holy.</td>
</tr>
<tr>
<td>S4.</td>
<td>φΟ Unity is holy.</td>
</tr>
<tr>
<td>S5.</td>
<td>φE! Existence is holy.</td>
</tr>
<tr>
<td>S6.</td>
<td>χφ Holiness is a particular thing.</td>
</tr>
<tr>
<td>S7.</td>
<td>xφ Holiness is a particular thing.</td>
</tr>
<tr>
<td>S8.</td>
<td>xx A particular thing is a particular thing.</td>
</tr>
<tr>
<td>S9.</td>
<td>xΟ Unity is a particular thing.</td>
</tr>
<tr>
<td>S10.</td>
<td>xE! Existence is a particular thing.</td>
</tr>
<tr>
<td>S11.</td>
<td>Oφ Holiness is one.</td>
</tr>
<tr>
<td>S12.</td>
<td>Ox A particular thing is one.</td>
</tr>
<tr>
<td>S13.</td>
<td>ΟΟ Unity is one.</td>
</tr>
<tr>
<td>S14.</td>
<td>OE! Existence is one.</td>
</tr>
<tr>
<td>S15.</td>
<td>E!φ Holiness exists.</td>
</tr>
<tr>
<td>S16.</td>
<td>E!x A particular thing exists.</td>
</tr>
<tr>
<td>S17.</td>
<td>E!Ο Unity exists.</td>
</tr>
<tr>
<td>S18.</td>
<td>E!E! Existence exists</td>
</tr>
</tbody>
</table>

If this syntactical approach is correct, one should find that the irregular forms are addressed in some way by Aristotle. Although scholars have not found that Aristotle does address them, since in the past they have had no reason to ask whether he did, Aristotle does address syntax in a way that clearly excludes these irregular forms, and he apparently alludes to *Sophist* 262C6-7. He excludes some of the irregular forms in his discussion of predication in the * Categoriae* by indicating what can be said of what and what cannot be said of what. Here his use of *ουπλακή* at the beginning of the second

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10 Harold Tarrant, for instance, has raised this point, Montreal, January 2006.
chapter (1a16), though his use is reformist, very likely is an allusion to the discussion reflected in \textit{Sophist} 262C6 (ἡ πρώτη συμπλοκή) as well as to the \textit{Sophist} itself in some form—not necessarily the form in which we have it. Indeed, it is not unlikely that the \textit{Sophist} and Aristotle’s discussion have a common source in the Academy. Again, Aristotle addresses existence and unity in the \textit{Topica}, pointing out that they can be said of everything (121a17-18)—that is, that they are vacuous as they stand, from one perspective, or, from another, that they are homonymous and must pick up part of their content from the objects of which they are predicated.

Of the forms employing constants, Aristotle’s position here excludes all six of the irregular forms with \(O\) or \(E!\) on the left (\text{SI1}, \text{SI3}, \text{SI4}, \text{SI5}, \text{SI7}, and \text{SI8}) by showing that these items are not informative by themselves; and it requires that the two unremarkable cases (\text{SI2} and \text{SI6}) be interpreted homonymously. The eight cases with \(O\) or \(E!\) on the right (\text{S4}, \text{S5}, \text{S9}, \text{SI0}, \text{SI3}, \text{SI14}, \text{SI17}, and \text{SI18}) are ruled out by the standard reflected in the eight-fold classification, according to which only four kinds of things can be subjects and these are not among them: neither \(O\) nor \(E!\) is able to have anything significant said directly of it in a monadic atomic sentence of the sort that the Stranger and Aristotle have in mind. Of the forms employing variables, Aristotle’s analysis excludes \text{S1} and \text{S2} on the grounds of their having a predicate in the subject place. \text{S7} is excluded on the double grounds of having a predicate in the subject place and a subject in the predicate place. \text{S6} and \text{S8} are excluded on the grounds of having a subject in the predicate place. And so, while Aristotle does not go through a list of these irregular forms as J. J. Mulhern has done, he both excludes them by his remarks on syntax and shows his acquaintance with the material and examples in \textit{Sophist} 261D1-263D4.

If Aristotle’s predicative sort and catégorial analysis seems to have been prompted at least in part by this irregular syntax, his analysis of ordinary language sentences in the \textit{De Interpretatione} seems to owe something to discussions in the \textit{Sophist} examined a half century ago by A.N. Prior and enlarged recently by J.J. Mulhern.\textsuperscript{11} Prior had noticed that in the discussion of syntax at 261D1-263D4, the Eleatic Stranger presents an analysis of “the first and littlest sentence”—that it consists of a noun and verb, as ‘Theaetetus sits’—that can be symbolized \(\phi\chi\) in modern notation and seems to accord pretty closely with modern notions of how monadic predications are formed. Mulhern has gone on to point out that \(\Thetaεατητος\ \kappa\alpha\theta\iota\tau\alpha\iota\) is far from being the first and littlest—\(\kappa\alpha\theta\iota\tau\alpha\iota\) by itself, being an inflected Greek verb form, qualifies for the honor. But \(\kappa\alpha\theta\iota\tau\alpha\iota\), since it doesn’t tell us definitely who sits, cannot be assigned a truth value. Before he offered \(\Thetaεατητος\ \kappa\alpha\theta\iota\tau\alpha\iota\), the Stranger had given \(\acute{\alpha}ν\theta\rho\omega\pi\omega\ \mu\alpha\nu\theta\alpha\nu\varepsilon\), ‘man learns’, and led us through an argument that asserted that a sentence must be about something—\(\tau\iota\nu\circ\) (262E5-6), and thus switches from the common noun ‘man’ to the proper one ‘Theaetetus’, and so can obtain a truth value by inspecting the situation—if it is the case that Theaetetus is seated, then the sentence is true and false if he is not. Inspection for whether even \(\acute{\alpha}ν\theta\rho\omega\pi\omega\ \tau\iota\nu\circ \mu\alpha\nu\theta\alpha\nu\varepsilon\)\textsuperscript{— ‘a

\textsuperscript{11} A.N. Prior, \textit{Formal Logic}, 2\textsuperscript{nd} ed. (Oxford, 1962), pp. 72-73; these remarks in the \textit{Sophist} on syntax were noticed even earlier by I. M. Bocheński (\textit{Ancient Formal Logic}, Amsterdam, 1951, p. 14), who thought that they were not original with Plato. Cf. Rosamund Sprague’s Appendix “Fr. Bocheński on Plato’s Logic” in \textit{Plato’s Use of Fallacy} (New York, 1962), pp. 88-97.
certain man learns’ can be confirmed or disconfirmed is not so easy, and when Aristotle constructs an argument along the same lines in *De Interpretatione* VII, he is careful to use the same easily confirmable or disconfirmable predicate—‘is white’—in both examples: ἐστι λευκός ἄνθρωπος, 17b910, and ἐστι Ἑωκράτης λευκός, although his main discussion does not feature copulative verbs and pronominal adjectives. Aristotle also uses examples that survive almost intact from this *Sophist* passage—ἄνθρωπος in 16a14-15, where the noun’s lack of truth-value is pointed out. In 17a40-b1, he also distinguishes ἄνθρωπος from a proper name—not that of Theaetetus in this case, since the mathematician died around 369, but that of Callias, who presumably was alive and present. The parallels, though sometimes not noticed, are striking.

Aristotle’s main discussion proceeds along lines definitely reminiscent of the *Sophist* passage but takes the discussion much further. A noun or name (ὄνομα) is for Aristotle “a sound significant by convention, which has no reference to time, and of which no part is significant apart from the rest” (*De Int.* 16a19-21). Some natural sounds, as those made by beasts, are significant; but none of these is a name—a conventional sound (σωμβολος, a28). For Aristotle, a name is a noun in the nominative case, it is a subject, in terms of the *Categoricae* table; inflections of nouns are excluded because they do not meet this condition (*De Int.* 16a35-b5). A name need only have sense; Aristotle notes that a name may fail to refer either because it names something fictitious or impossible, for example, τραγέλαφος, goat-stag, at *De Int.* 16a17, Aristotle’s ‘Pegasus’, in place of the Stranger’s ἐλαφος (262B9), or because it names something which might exist but does not, for example, μη δντος Ἑωκράτους, the non-existent Socrates, at *Cat.* 13b17, Aristotle’s ‘the present king of France’. The Stranger mentions ἵππος in what seems to be a commonplace list of Academic examples (262B10), and this mention has an echo in a22 in Aristotle’s analysis of the meaninglessness of ἵππος separated from the proper name Κάλλιππος versus its significance when separated from the phrase καλὸς ἵππος.

A verb or predicate (ῥήμα), for Aristotle, is:

that which, in addition to its proper meaning, carries with it the notion of time . . . . it is a sign of something said of something else . . . i.e. of something either predicable of or present in some other thing. (*De Int.* 16b6-11).

A verb proper indicates present time; a predicate expression referring to time other than the present is for Aristotle not a verb simply but a tense, one kind of πτώσις or inflection, of a verb (*De Int.* 16a16-19). No expression, no matter how complex, is a proposition unless it contains a verb (*De Int.* 17a11-15). A noun or verb standing alone is well-formed to the extent that it is significant. A noun or verb standing alone, however, is not a sentence and has no truth-value (*De Int.* 16a10-19). Verbs not combined with subject nouns are names (ὄνοματα, 16b20) that may stand for states of affairs

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12 As Mrs. Sprague notes, "'Know' and 'learn' were terms which were notoriously productive of sophistical arguments. Cf. *Theaetetus* 199A, ὅπι τις χαίρει ἐλκων τὸ ἐπιστασθαι καὶ μανθάνειν." *Plato’s Use of Fallacy*, p. 35, n. 19.
A sentence ( façon) is for Aristotle a significant utterance ( σημαντική) whose parts have independent meaning, but only as a whole makes any affirmation or denial (De Int. 16b26-27). Every sentence is significant by convention, but not every sentence is a declarative sentence (17a3). A prayer, for instance, is a sentence, but not a declarative sentence, since it has no truth-value (17a5-6). Declarative sentences are the subject matter of logic; the study of non-declarative sentences belongs to rhetoric or poetry (17a6-7).

A sentence is well-formed for Aristotle—that is to say, it is a [properly] combined expression ( κατά συμπλοκήν, cf. Cat. 1a16-19)—if it contains a name in the subject place and a verb in the predicate place. A sentence with the name of an individual in the predicate place is ill-formed, as is any sentence with a predicate of lower order than its subject. Only combined expressions are true or false (Cat. 2a4-10; De Int. 17a3-4).

The De Interpretatione discussion, taken with what had been established in the Categoriae, brings the syntax and semantics of the Sophist to a stage in which it is useful for the logical analysis of ordinary language. We have in these two brief works an analysis of predication, dividing it into definitory and descriptive and including at least the germ of a theory of logical types—blocking infinite regress fallacies; a categorial sort of διντα—blocking fallacies of equivocation that arise from what Ryle called category mistakes, which include both innocence of categories altogether and slotting things into the wrong category. The Categoriae discussion focusses on διντα, which are the conditions of Aristotle’s analysis and are the designata of the names that he supplies. In the Topica, Aristotle devised a sort of products of this analysis: the predicables, which do not have designata among διντα, but which serve as terms in the premises of reasoning, not only dialectical, as in the Topica, but demonstrative as well. The predicables—genus, accident, definition, and property—may be viewed as headings for kinds of predicate expressions considered as actually playing roles in predicative formulae.13 They provide a scheme for analyzing the logical behavior of premises in arguments. Thus the expressions ‘genus,’ ‘accident,’ ‘definition,’ and ‘property’ belong to the language of the metatheory of predication. Under the heading ‘genus’ fall predicate expressions whose designata are substances, under ‘accident’ fall those whose designata are accidents, and

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under ‘definition’ and ‘property’ fall those which do not have designata among the six varieties recognized by Aristotle.\textsuperscript{14}

The syntax of ordinary language developed in the De Interpretatione differs from the syntax of the formal language for syllogistic reasoning in the Analytica Priora. Where the ordinary language syntax used a straightforward noun plus verb structure, readily accommodated to the modern $\neg x$ notation into which Prior cast it, the Priora construction uses ύπάρχειν with the subject in the dative case, as

\begin{center}
\begin{align*}
\text{ει δε γε το Α τινι των B μη ύπάρχει,} \\
\text{but if A does not apply to some one of the Bs (An. Pr. 25a22),}
\end{align*}
\end{center}

[Note here that Greek definite articles (in the neuter gender) are prefixed to the letter variables to indicate their grammatical role and, perhaps, to indicate that they are being mentioned, not used. Thus, το A indicates that A is nominative and singular, while των B indicates that B is genitive and plural, hence “of the Bs.” The demonstrative pronoun τινι is singular and dative, hence “to some one.”]

Although ύπάρχειν is widely used in ancient Greek, Aristotle’s constructions with ύπάρχειν not only strike English speakers as odd, but, as Patzig points out, their unnaturalness in Greek is remarked by Alexander.\textsuperscript{15} Patzig and Smith both point out that ύπάρχειν is artificial, in the sense of being stilted or possibly technical.\textsuperscript{16} What the constructions with ύπάρχειν do very effectively is to make perfectly clear which term is the predicate and which is the subject, a strategy that seems to have been called for by the previously noted irregular syntax, cavalier as it is with predicate placement.

In the Prior Analytics treatment of propositional structure, Aristotle employs a notation consisting at least of his basic three-term schemata of Greek capital placeholder letters\textsuperscript{17} but able to be supplemented. For the three authentic figures, these schemata are $\text{ΑΒΓ}$, which we have seen in the premiss example above, $\text{ΜΝΞ}$, and $\text{ΠΡΣ}$. These schemata are a limiting case of schema, consisting as they do entirely of blanks, although

\textsuperscript{14} If property is metatheoretical for Aristotle and does not designate anything, the use of 'property' in recent controversy about “recurring” and “non-recurring” properties in the Categories has framed the debate in the wrong terms. Cf. Philip Corkum, “Parts and Properties in Aristotle's Categories,” Society of Ancient Greek Philosophy with the American Philosophical Association, Eastern Division, 28 December 2002, and “The Problem of Recurring Properties,” Ancient Philosophy, forthcoming.

\textsuperscript{15} In An. Pr. I in Wallies 1905, p. 54, 21-29.

\textsuperscript{16} Gunter Patzig, Aristotle’s Theory of the Syllogism, trans. J. Barnes (Dordrecht, 1968), pp. 9-11; Robin Smith, trans., Aristotle’s Prior Analytics (Indianapolis, 1989), p. xvii, “quite artificial;” cf. 107, “The locutions ‘belongs to some,’ etc. are peculiar to Aristotle and not at all everyday Greek.” Patzig considers the reasons that Alexander proposes for Aristotle’s choosing such artificiality. The first is that “because in this way the union of the terms (συναγωγή των λόγων) is clear.” Patzig says that he does not understand this but refers in his note 23 to the occurrence in a logical sense in Aristotle of συναγωγή only in the Rhetoric (1400b26 and 1410a22), where Patzig says that “it means much the same as the logical proof of a proposition.” It clearly means the same in the quotation from Alexander, provided one doesn’t insist on rendering των λόγων “of the terms” as if it were των δρων, but rather ‘of the sentences’ or ‘of the statements.’

\textsuperscript{17} Lynn E. Rose, Aristotle’s Syllogistic (Springfield, IL, 1968), p. 23.
of blanks in a spatially-ordered arrangement. Aristotle himself probably used connecting lines in his diagrams to exhibit the relations of the terms to one another, perhaps elaborating these into arbelus-and-triangles proof forms of the three figures, such as appear from Ammonius forward. In the notation that Aristotle used in diagrams, the connecting lines occur where he might have used inflections of ύπάρχειν in writing or speech.\footnote{Mary Mulhem, “Aristotle’s Formal Language”, presented to the Society for Ancient Greek Philosophy at the Annual Meeting of the American Philological Association, Boston, January 2005, and published in the Society’s Newsletter 2004/5.1.} The ύπάρχειν construction and thus its formal representation provide for quantification and modality within their propositional structure, all the while exhibiting that structure with the utmost clarity and allowing multiple interpretations of the syllogistic.

In developing the logical syntax of his syllogistic, Aristotle does not begin with terms and go on to build up propositions with terms and connectors. He starts by defining ‘premiss’ (An. Pr. 24a16):

Πρότασις μὲν οὖν ἐστὶ λόγος καταφατικὸς ἢ ἀποφατικὸς τινὸς κατά τινος· οὗτος δὲ ἢ καθόλου ἢ ἐν μέρει ἢ ἀδιόριστος.

A premiss is an affirmative or negative statement of something about some subject. This statement may be universal or particular or indefinite. (trans. Tredennick)

The introduction here of indefinite (ἀδιόριστος) signals Aristotle’s intended multiple interpretations of his syllogistic, since in indefinite premisses, the operator ύπάρχειν is used “without reference to universal or particular”. At 24b16, he states that “terms” (ὄροι) are that into which premisses can be analyzed—the κατηγορούμενον, usually translated ‘predicate,’ and the καθ’ οὐ κατηγορεῖται, usually translated ‘subject.’ The infinitive ύπάρχειν appears in Aristotle’s discussion of premisses, for example, at 24a18, where he gives a broad definition of ‘universal’:

λέγω δὲ καθόλου μὲν τὸ παντὶ ἢ μηδενὶ ύπάρχειν

By universal I mean applies to all, or to none (trans. Tredennick, modified)

Aristotle employs ύπάρχειν in the Analytica Priora as an operator to indicate the relation that terms—not objects or the designata of terms—have to one another in his analysis of the premisses of his syllogistic. The Analytica Priora premiss construction is designed to accommodate at least two interpretations—an extensional interpretation of syllogisms whose premisses are in the object language, but including predicates of higher orders of generality, and a non-extensional interpretation of syllogisms at least some of whose premisses are in the metalanguage.

Aristotle’s choice of vocabulary for his examples serves to integrate the Analytica Priora analysis of propositions with that in the rest of the Organon, which distinguishes definitory from descriptive predication. The examples that Aristotle
supplies as values for his term variables include both definitory predicates like ‘animal’ and descriptive predicates like ‘white,’ which suggests that ύπάρχειν is chosen as neutral between these two kinds of predication and thus accommodates both of them. It is thus not a vague, untechnical “blanket term” but a technical term, used with a deliberately minimal meaning, so that it can be used of conditions of analysis—both substance and accident, in first and higher orders—and thus can be bound with quantifiers—and can equally well be used with terms that name products of analysis and thus have no referent among things and hence cannot be bound with quantifiers and are reckoned by Aristotle άδιόριστος.20

In the Analytica Posteriora, Aristotle gives a more detailed and refined definition of καθόλου than the Analytica Priora definition cited above, so as to be able to work with the premisses of demonstration more instructively than άδιόριστος would have allowed him to do.21 In 73b25-74a3, Aristotle stipulates the three conditions of this strict technical sense of καθόλου:

καθόλου δὲ λέγω ὅ ἂν κατὰ παντός τε ὑπάρχη καὶ καθ’αὐτὸ καὶ ἢ αὐτό

I call universal what belongs to every instance and in virtue of its nature as being itself (translation mine; note the occurrence of ύπάρχειν in both this formulation and the less strict definition of καθόλου at An. Pr. 24a18)

To be assigned in this strict sense of καθόλου, a predicate must be assignable in all three ways: κατὰ παντός, καθ’αὐτό, and ἢ αὐτό. Aristotle defines κατὰ παντός negatively: “whatever is not predicated of one instance but not of another, or predicated at one time but not at another (73a28-29, trans. Tredennick)”, and this seems to correspond to universal quantification as ordinarily understood. He defines καθ’αὐτό, on the other hand, with clear reference to necessity but none to quantity or quantification:

τὰ ἀρα λεγόμενα ἐπὶ τῶν ἀπλῶς ἐπιστητῶν καθ’αὐτὰ οὔτως ὡς ἑνυπάρχειν τοῖς κατηγορομένοις ἢ ἑνυπάρχεσθαι δι’ αὐτὰ τέ ἐστι καὶ εξ ἀνάγκης

Thus regarding what is known without qualification, those which are called καθ’αὐτά as inhering in the subjects of which they are predicated or being inhered in by them belong to those subjects in virtue of their own nature and of necessity (73b16-18, trans. mine)

The third condition, ἢ αὐτό, Ross takes to signify that the predicate assigned “must be true of the subject ... precisely as being itself, not as being a species of a certain genus

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19 Ackrill, p. 109, note ad Cat. 11b38.
20 Aristotle’s examples of άδιόριστος premisses are ‘contraries are studied by the same science’ and ‘pleasure is not good’.
21 I have discussed these matters in detail in “Aristotle on Universality and Necessity”, Logique et Analyse, 47 (September 1969), pp. 288-299.
... not in virtue of a generic nature which it shares with other things".22

This discussion of the strict sense of καθόλου is the first item in Aristotle’s discussion of the premises from which demonstrations proceed, which he says we must understand. This discussion provides a further indication that modalities are built into his system, and it is of a piece with the distinction of secondary substance in his categorial apparatus. Additionally, this advance beyond the merely enumerative universal to the genuine generic universal disarms the sophistic move of asking someone if he knows, for instance, that every triangle has the sum of its interior angles equal to two right angles, and, when he says that he does, confronting him with a drawing of a triangle that he has not seen before and hence does not know.

I have tried to show that Aristotle’s explicit analysis of homonymy, his eightfold classification of subjects and predicates and its elaboration into the predicaments and predicables, his syntactical analysis of ordinary language sentences, and his construction of a formal language for deductive and demonstrative syllogistic are consistent pieces of a coherent approach designed not only to resolve the paradoxes of the sophistic and the Academy but also to provide secure underpinnings of discussions both in the exact demonstrative sciences and in the more chancy arenas of ethics and politics. I hope that it seems reasonable to suppose, based on this preliminary study, that what remain unexplored of Aristotle’s battery of analytic tools will resemble in their conception and motivation those which have been examined here.