

Deduction in *Sophistici Elenchi* 6

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In the *Sophistici Elenchi* Aristotle identifies thirteen kinds of apparent refutations. In chapter 6 of the treatise, he states that these thirteen kinds can ultimately be reduced to one of them, namely to the *ignoratio elenchi*. To prove this, he argues that all apparent refutations violate some condition in the definition of what a refutation is. Since refutations are a kind of deduction (συλλογισμός), his argument also appeals to the definition of deduction. Aristotle explains in detail why various apparent refutations violate this definition. Thus, chapter 6 of the *Sophistici Elenchi* contains the most explicit discussion of the definition of deduction in Aristotle's works, and is therefore of special interest to students of his logic. Nevertheless, it has received relatively little attention in the recent scholarly literature. In this paper, I explore what we can learn from that chapter about Aristotle's conception of what a deduction is.

My focus will be on a passage in which Aristotle discusses the role of synonyms in deductions (*SE* 6 168a26-33). The passage concerns arguments such as the one in (ii), which differs from (i) in that the term 'cloak' in the second premiss has been replaced by its synonym 'mantle':

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|----------------------------------|----------------------------------|
| (i) Every robe is a cloak. | (ii) Every robe is a cloak. |
| Every cloak is useful. | Every mantle is useful. |
| Therefore, every robe is useful. | Therefore, every robe is useful. |

Clearly (i) is a deduction, that is, a valid deductive argument. But although 'cloak' and 'mantle' are synonyms, Aristotle denies that (ii) is a deduction. This shows that he took deductions to be of a linguistic nature, and to depend on the identity of the linguistic expressions involved.

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Moreover, it shows that he took (ii) to violate one of the conditions laid down in the definition of deduction. I will attempt to determine which condition this might be. Finally, I will argue that, by Aristotle's lights, the argument of *Sophistici Elenchi* 6 goes some way towards establishing the correctness of his definition of deduction.

1. The thesis of *Sophistici Elenchi* 6

In the opening sentence of the *Sophistici Elenchi*, Aristotle states that the treatise is concerned with certain fallacies called sophistical refutations:

Let us now discuss sophistical refutations, i.e. what appear to be refutations but are really fallacies instead.¹ (*SE* 1 164a20-2)

Sophistical refutations are arguments which appear to be refutations, but are not refutations. They are apparent refutations. In chapters 4 and 5 of the treatise, Aristotle identifies thirteen kinds of apparent refutations. He classifies six of them as being 'due to language' (παρὰ τὴν λέξιν), and seven as being 'outside of language' (ἔξω τῆς λέξεως):

due to language (*SE* 4):

homonymy
amphiboly
composition
division
accent
form of expression

outside of language (*SE* 5):

accident
secundum quid
ignoratio elenchi
consequent
begging the question
non-cause as cause
many questions

¹ περὶ δὲ τῶν σοφιστικῶν ἐλέγχων καὶ τῶν φαινομένων μὲν ἐλέγχων, ὄντων δὲ παραλογισμῶν ἀλλ' οὐκ ἐλέγχων, λέγωμεν. I read the καὶ in this sentence as expegetical, following Forster (1955: 11), *ROT*, Dorion (1995: 119), Schreiber (2003: 192), and Fait (2007: 99).

Aristotle takes this classification to be exhaustive, covering all apparent refutations.² A special role in the classification is played by the *ignoratio elenchi*; for Aristotle will argue in chapter 6 that all thirteen kinds of apparent refutations can be reduced to the *ignoratio elenchi*. He characterizes the *ignoratio elenchi*, in chapter 5, as follows:

Those [apparent refutations] which arise because it has not been defined what a deduction is or what a refutation is come about due to falling short of the definition [of deduction or refutation].³ (*SE* 5 167a21-2)

This passage refers to the definitions of deduction and of refutation. As we will see shortly, refutations are a special kind of deduction, namely, deductions which refute a given thesis. The definition of deduction is therefore included in the definition of refutation, and falling short of the former entails falling short of the latter. Thus, Aristotle's characterization of the *ignoratio elenchi* in effect relies on the condition of falling short of the definition of refutation.⁴ More precisely, an apparent refutation falls under the *ignoratio elenchi* just in case it comes about due to falling short of the definition of refutation.

What is it for an apparent refutation to come about due to falling short of that definition? First of all, the argument which constitutes the apparent refutation should violate one of the conditions laid down in the definition of refutation. But in addition, the

² See *SE* 4 165b23-30, 166b20-7, 8 170a9-11.

³ οἱ δὲ παρὰ τὸ μὴ διωρίσθαι τί ἐστὶ συλλογισμὸς ἢ τί ἐλεγχος παρὰ τὴν ἔλλειψιν γίνονται τοῦ λόγου. I omit ἀλλὰ after ἐλεγχος, following *ROT*, Dorion (1995: 238), Schreiber (2003: 212), Fait (2007: 12).

⁴ The phrase ἔλλειψις τοῦ λόγου at 167a22 may be taken to mean either 'defect in the definition of refutation' (e.g., Forster 1955: 29, Edlow 1977: 19 n. 17; Schreiber 2003: 88), or 'falling short of the definition of refutation' (Dorion 1995: 238-9). I prefer the latter option; cf. the phrase ὑπερβολὴ τε καὶ ἔλλειψις τοῦ μέσου at *NE* IV.8 1128a3-4, which refers to an excess and a deficiency as compared with the mean. On the first option, Aristotle states that in instances of *ignoratio elenchi*, the interlocutors implicitly rely on a deficient definition of refutation, and therefore take an argument which is not a refutation to be a refutation. In this case, too, the apparent refutation seems to come about due to falling short of the proper definition of refutation.

preposition ‘due to’ (παρά) introduces a causal aspect. Such a causal aspect is also prominent in the following passage, in which Aristotle speaks of a cause of apparent refutations:

If the refutation is merely apparent, the cause (τὸ αἴτιον) will be either in the deduction or in the contradiction [. . .], while sometimes it is in both. (SE 10 171a5-7)

The cause referred to here seems to be a cause which explains, or contributes to explaining, why a given argument is an apparent refutation. Now, apparent refutations are arguments which appear to be refutations but are not refutations. So we may distinguish between a cause which explains why the argument is not a refutation, and a cause which explains why it appears to be a refutation. In scholastic terminology, these causes are called *causa non existentiae* and *causa apparentiae*.⁵ The passage just quoted seems to refer to the former cause rather than to the latter.⁶ In the case of the *ignoratio elenchi*, it is doubtful whether an argument’s not satisfying the definition of refutation can constitute a *causa apparentiae*, but it clearly can constitute a *causa non existentiae*.⁷ We will have more to say about the way in which it is a *causa non existentiae* for an apparent refutation. For now, it suffices to note that every apparent refutation which falls under the *ignoratio elenchi* is required to meet two conditions: first, that it violate the definition of refutation; and secondly, that this violation constitute a *causa non existentiae* for the apparent refutation.

Let us now turn to chapter 6 of the *Sophistici Elenchi*, in which Aristotle argues that all thirteen kinds of apparent refutations introduced in chapters 4 and 5 can be reduced to the *ignoratio elenchi*. The chapter begins as follows:

⁵ See Ebbesen (1987: 115-17), Fait (2007: xix-xx). The former cause is also called *causa defectus*.

⁶ Thus, τὸ αἴτιον at 171a6 is translated as ‘cause of falsity’ Forster (1955: 57), ‘reason of the falsity’ ROT, or ‘cause de l’erreur’ (Dorion 1995: 144 and 272).

⁷ Fait (2007: xx).

We should either classify apparent deductions and refutations as just described [in chapters 4 and 5], or else reduce them all to ignorance of what a refutation is, and make this our starting-point; for it is possible to analyse all the aforesaid modes of apparent refutations into the definition of a refutation. (SE 6 168a17-20)

Aristotle's thesis is that every apparent refutation which falls under one of the thirteen kinds falls under the *ignoratio elenchi*. Since the classification into the thirteen kinds is meant to be exhaustive, his thesis is that every apparent refutation falls under the *ignoratio elenchi*. Given Aristotle's characterization of the *ignoratio elenchi*, this implies, first, that every apparent refutation violates the definition of refutation.⁸ In other words, it implies that the definition of refutation is extensionally correct with respect to the class of apparent refutations (in the sense that no apparent refutation satisfies the definition). We may call this the thesis of extensional correctness. Secondly, Aristotle's thesis implies that for every apparent refutation, its violating the definition of refutation is a *causa non existentiae* for it. In other words, the violation is a cause which explains why the argument in question is not a refutation. Call this the causal thesis.

The causal thesis implies, or presupposes, the thesis of extensional correctness. One might think that the latter thesis also implies the former, on the grounds that every violation of the definition of refutation constitutes a *causa non existentiae*. I will argue below, in Section 5, that this is not so, and that Aristotle had in mind a more specific notion of *causa non existentiae* which does not include any arbitrary violation of the definition of refutation. But for now, I want to have a look at the definition of refutation and deduction employed by Aristotle in his proof of the thesis of chapter 6.

2. Defining refutation and deduction

In the first chapter of the *Sophistici Elenchi*, refutation is defined as follows:

⁸ Dorion (1995: 89).

A refutation is a deduction (συλλογισμός) together with the contradictory (μετ' ἀντιφάσεως) of the conclusion. (SE 1 165a2-3)

This means that a refutation is a deduction whose conclusion is the contradictory of a thesis endorsed by one's opponent in a debate; the purpose of the deduction is to refute that thesis.⁹ Thus, every refutation is a deduction.¹⁰ Since the definition of refutation relies on the notions of deduction and contradiction, let us consider these in turn. In the first chapter of the *Sophistici Elenchi*, deduction is defined as follows:

A deduction is from certain things which have been assumed, in such a way as to necessarily lead to the assertion of something else than what has been assumed, through what has been assumed.¹¹ (SE 1 164b27-165a2)

This is a version of Aristotle's standard definition of deduction, which is also found at the beginning of the *Topics*, *Rhetoric*, and *Prior Analytics*.¹² The definition imposes at least three conditions on deductions:¹³

- C1 The conclusion follows necessarily from the premisses (*necessitas consequentiae*).
- C2 The conclusion is not identical with any of the premisses.

⁹ See Crivelli (2004: 140). Elsewhere, Aristotle simply says that a refutation is a 'deduction of the contradictory' (SE 6 168a36-7, 9 170b1-2, *AnPr.* II.20 66b11).

¹⁰ SE 10 171a2-3, see also 6 168b4-5.

¹¹ ὁ μὲν γὰρ συλλογισμὸς ἐκ τινῶν ἐστὶ τεθέντων ὥστε λέγειν ἕτερον ἐξ ἀνάγκης τι τῶν κειμένων διὰ τῶν κειμένων.

¹² *Top.* I.1 100a25-7, *Rhet.* I.2 1356b16-18, *AnPr.* I.1 24b18-20.

¹³ The plural phrase 'from certain things' can be taken to indicate a fourth condition, to the effect that deductions have more than one premiss (see Frede 1974: 20, Striker 2009: 79-80). But since this condition, unlike C1-3, plays no role in SE 6, we can leave it aside.

C3 The conclusion follows through the premisses.

While C2 is comparatively straightforward, the precise import of C1 and C3 is less clear, and we will consider these two conditions later.

As for the notion of contradiction, Aristotle does not explicitly define it in the *Sophistici Elenchi*; but he does so in the *De Interpretatione*, as follows:

Let a contradiction (ἀντίφασις) be this: an affirmation and a denial which are opposite. I speak of sentences as opposite when they (C4) affirm and deny the same thing of the same thing – (C5) not homonymously, (C6) together with all other such conditions that we add to counter the troublesome objections of sophists. (*Int.* 6 17a33-7)

Contradictions consist of an affirmation and a denial. Affirmations and denials are linguistic expressions; they are sentences.¹⁴ An affirmation is a sentence affirming something of something, and a denial is a sentence denying something of something. That which is denied or affirmed is called the predicate of the sentence; that of which it is affirmed or denied is called the subject of the sentence. Like sentences, their subjects and predicates are linguistic expressions.

Aristotle seems to require that in a pair of contradictory sentences, the same predicate is denied and affirmed of the same subject (C4). This means that the same linguistic expression serves as the predicate in both sentences, and likewise for the subject.¹⁵ In addition, Aristotle requires that the predicates (and subjects) of the two sentences not be merely homonyms (C5). Finally, Aristotle adds ‘all other such conditions that we add to counter the

¹⁴Affirmations and denials are λόγοι (*Int.* 5 17a8-9). A λόγος, in turn, is a ‘significant spoken sound’ (φωνή σημαντική, *Int.* 4 16b26). Consequently, affirmations and denials are significant spoken sounds (*Int.* 5-6 17a23-6), and hence linguistic expressions.

¹⁵ See Ammonius, who takes Aristotle at 17a33-7 to require that the predicate of both sentences be the same term (ὅρος), and likewise for the subject (Ammonius *In Int.* 84.13-27). It is clear that Ammonius regards terms (ὅροι) as linguistic expressions (see, e.g., *In Int.* 7.32-3, 10.1-17).

troublesome objections of sophists' (C6). He does not specify these conditions in the *De Interpretatione*; but he does specify them in the *Sophistici Elenchi*, in an extended definition of refutation which he gives in chapter 5:

A refutation is a contradictory¹⁶ (C5) of one and the same item, not merely of the name but of the object, (C4) and of a name which is not synonymous but the same name¹⁷ – (C1) a contradictory which follows necessarily from the premisses granted, (C2) without including in the premisses the original point to be proved – (C6) a contradictory in the same respect and relative to the same thing and in the same manner and at the same time. (*SE* 5 167a23-7)

The additional conditions mentioned in *De Interpretatione* 6 are specified at the end of the passage.¹⁸ The passage also shows that Aristotle endorses C4 and C5 in the *Sophistici Elenchi*. In his formulation of C4, Aristotle makes it clear that the subjects (and predicates) of a pair of contradictory sentences are required to be the same linguistic expression. Even if they are synonyms, the sentences will not be contradictory. For example, suppose that the nouns 'mantle' and 'cloak' are synonyms; since they are two distinct linguistic expressions, the sentences 'A mantle is useful' and 'A cloak is not useful' do not constitute a pair of contradictory sentences.

In C5, Aristotle requires that the subjects (and predicates) of the two sentences be not only the same linguistic expression, but also signify the same object, thereby ruling out homonymous subjects (and predicates). For example, the sentences 'Ajax fought against

¹⁶ This is to say that a refutation is a deduction whose conclusion is the contradictory of the opponent's thesis.

¹⁷ ἔλεγχος μὲν γὰρ ἐστὶν ἀντίφασις τοῦ αὐτοῦ καὶ ἑνός, μὴ ὀνόματος ἀλλὰ πράγματος, καὶ ὀνόματος μὴ συνωνύμου ἀλλὰ τοῦ αὐτοῦ. This is one of the few places in Aristotle's writings where συνώνυμος means 'synonymous', applying to expressions which differ in linguistic form but have the same meaning (Bonitz *Index Arist.* 734b54-8, Dorion 1995: 239, Schreiber 2003: 212, Fait 2007: 120).

¹⁸ See Weidemann (2002: 200-1).

Hector' and 'Ajax did not fight against Hector' are not contradictory if 'Ajax' is taken to signify Ajax the Greater in the first sentence and Ajax the Lesser in the second.

In sum, the three requirements which Aristotle imposes on the contradiction occurring in refutations can be stated as follows:

- C4 The predicate of the refutation's conclusion is the same linguistic expression as the predicate of the opponent's thesis – and likewise for the subject.
- C5 The predicate of the refutation's conclusion signifies the same object as the predicate of the opponent's thesis – and likewise for the subject.
- C6 The refutation's conclusion and the opponent's thesis affirm and deny the predicate of the subject in the same respect, and relative to the same thing, and in the same manner, and at the same time.

In his formulation of C4 and C5, Aristotle draws a clear distinction between names (ὀνόματα) and objects (πράγματα). Thus he distinguishes between linguistic items and non-linguistic items. This distinction is not prominent in Aristotle's discussion of deductions in the other works of the *Organon*; in fact, it is often thought that Aristotle is unclear or confused about it. But the distinction is prominent in the *Sophistici Elenchi*, as is shown, for example, by the following passage from the first chapter:

It is not possible to discuss by bringing in the objects (πράγματα) themselves, but we use names (ὀνόμασιν) as symbols instead of objects [. . .]. Names are finite and so is the number of phrases, while objects are infinite in number. Necessarily, then, the same phrase and a single name signifies many [objects]. (*SE* 1 165a6-13)

Since the number of linguistic expressions is finite and the number of objects is infinite, there are cases in which one expression signifies many objects. This potential ambiguity of linguistic expressions constitutes a cause (αἰτία, 165a4, 165a18) of apparent refutations, especially of those which fall under the heading of homonymy and amphiboly. Hence it is important for

Aristotle in the *Sophistici Elenchi* to attend to the distinction between linguistic and non-linguistic items. In this context, his endorsement of C4 shows that he takes contradictions, and hence refutations, to depend essentially on the linguistic items involved. As I will argue in the next section, his argument in chapter 6 shows that he holds a corresponding view about deductions.

3. Two additional conditions on deduction

As we saw above, Aristotle's thesis in chapter 6 implies the thesis of extensional correctness, that every apparent refutation violates at least one of the conditions in the definition of refutation. Aristotle's proof of this latter thesis relies on conditions C1-6, which are stated in chapters 1 and 5. In addition, however, the proof relies on two more conditions which Aristotle does not state in chapters 1-5. Both conditions concern deductions. One of them occurs in Aristotle's discussion of apparent refutations due to many questions; the other occurs in the discussion of apparent refutations due to composition, division, and accent. I will first briefly consider the former condition; the main body of this and the next section will then be devoted to the latter.

In the course of establishing the thesis of extensional correctness, Aristotle argues that apparent refutations due to many questions violate the definition of what a premiss is:

Those apparent refutations which arise because several questions are made into one consist in our failure to articulate the definition of premiss. For a premiss is concerned with one item about one item. [. . .] If, then, a single premiss is a premiss which claims one item of one item, a premiss, without qualification, will be the putting of a question of that kind. (*SE* 6 169a6-12)

According to this passage, premisses are questions which ask whether a single item holds of a single item. The first of these items is the predicate of the premiss, or what is signified by the predicate; the latter item is the subject or what is signified by it. Each of these

items is required to be one, not many. Questions which meet this requirement may be called simple predicative questions.

Apparent refutations due to many questions contain would-be premisses which fail to be simple predicative questions, and therefore violate the definition of what a premiss is (169a12-18). For present purposes it is not necessary to consider what these apparent refutations are, and why they violate the definition of premiss. What is important is the fact *that* Aristotle takes them to violate the definition of premiss. From this he infers that they violate the definition of refutation and fall under the *ignoratio elenchi*. Thus Aristotle seems to regard the condition that premisses be simple predicative questions as part of the definition of deduction and refutation. Call this condition C7.

In the *Prior* and *Posterior Analytics*, premisses are taken to be declarative sentences rather than questions. Specifically, they are taken to be simple declarative sentences, in which something is affirmed or denied of something.¹⁹ According to the *De Interpretatione*, every single affirmation and denial is required to affirm or deny a single item of a single item.²⁰ In view of this, C7 may be reformulated as follows:

C7 The premisses of every deduction are simple predicative questions or simple declarative sentences.

This condition rules out declarative sentences which are not simple. For example, it rules out compound sentences composed of two or more simple ones, such as ‘If it is day, the sun is above the earth’ or ‘Either it is day or it is night’. Given C7, such sentences cannot, by definition, serve as premisses of deductions.²¹ In his formulation of C4 and C5, Aristotle

¹⁹ Cf. *AnPr.* I.1 24a16-17, *Int.* 5-6 17a20-6; see also Alexander *In AnPr.* 11.6-9, Barnes (2007: 135).

²⁰ *Int.* 8 18a12-13, 10 19b6-7, 11 20b12-15.

²¹ Barnes (2007: 135-6) argues that one and the same sentence can be analysed as having the form of a simple and of a compound sentence. In this case, C7 may be taken to require that premisses of deductions *be analysed* as having the form not of compound but of simple declarative sentences.

implicitly assumed that the conclusion of any refutation is a simple declarative sentence. He now makes the same assumption for the premisses of any deduction in general.

Alexander and other commentators in antiquity thought that C7 is already implicit in Aristotle's standard definition of deduction found in the first chapter of the *Sophistici Elenchi* and elsewhere in the *Organon*. This definition states that 'a deduction is from certain things which have been assumed'. Alexander and others took the word 'assumed' (τεθέντων) to imply that the premisses are simple declarative sentences.²² However, their view is open to question, and it is rejected by Ammonius (*In AnPr.* 27.6-14, 28.13-20). If Ammonius is right, C7 adds new content to Aristotle's standard definition of deduction.

Let us now turn to the second additional condition imposed on deductions in chapter 6. It occurs within Aristotle's discussion of the six kinds of apparent refutations which he classifies as being due to language: homonymy, amphiboly, form of expression, division, composition, and accent. The first three kinds are due to an ambiguity of linguistic expressions (παρὰ τὸ διττόν, 168a24). That is, they are due to the fact that the same linguistic expression signifies different things in different contexts. The other three kinds of apparent refutations, by contrast, are not due to an ambiguity. Instead, Aristotle claims, they are due to the fact that two distinct, though similar, linguistic expressions signify different things.²³ For example, consider the following apparent refutation due to accent, in which the two expressions οὗ ('where') and οὐ ('not') signify different things (*SE* 21 177b37-178a3):

- A1 A house is where you lodge (τὸ οὗ καταλύεις οἰκία).
 'You do not lodge' is a denial (τὸ οὐ καταλύεις ἀπόφασις).
 Therefore a house is a denial (ἡ οἰκία ἄρα ἀπόφασις).

²² See Alexander *In AnPr.* 17.5-10, *In AnPr.* 348.29-32, 350.16-18, *In Top.* 8.8-14. Alexander says 'predicative' (κατηγορικός) instead of 'simple declarative'; the two expressions are equivalent, see Ammonius *In Int.* 73.35-74.1, *In AnPr.* 17.26-9.

²³ *SE* 6 168a26-8; see Dorion (1995: 245), Schreiber (2003: 57-8), Fait (2007: 125).

This argument is a merely apparent deduction because it lacks a single middle term; for the predicate of the first premiss (τὸ οὐ καταλύεις) is not the same linguistic expression as the subject of the second premiss (τὸ οὐ καταλύεις). Likewise, apparent refutations due to composition and division are caused by the distinctness of linguistic expressions.²⁴ In order to show that these three kinds of apparent refutation violate a condition in the definition of refutation, Aristotle writes:

Composition and division and accent arise because the phrase is not the same, or because the name which is different is not the same. For this also would be required, just as it is required that the object be the same, if a refutation or deduction is to be effected. For instance, if a mantle is under consideration, you must not deduce a conclusion about a cloak but about a mantle. For the former conclusion is also true, but it has not been deduced, and there is a further need for a question whether it signifies the same thing in response to the one who asks the reason why.²⁵ (SE 6 168a26-33)

The three kinds of apparent refutation violate the definition of refutation because certain linguistic expressions are not the same in them. If this defect occurs in the supposed contradiction, then the apparent refutation typically violates C4 (the condition that the predicate of the refutation's conclusion be the same linguistic expression as the predicate of the opponent's thesis, and likewise for the subject). However, when this defect occurs within the supposed deduction, as it does in A1, then it cannot be accounted for by C4.

²⁴ Aristotle has in mind here distinctness in oral language, not necessarily in written language (SE 20 177b1-9; see Schreiber 2003: 60-76).

²⁵ ἢ δὲ σύνθεσις καὶ διαίρεσις καὶ προσφθία τῷ μὴ τὸν αὐτὸν εἶναι τὸν λόγον ἢ τὸ ὄνομα τὸ διαφέρων. ἔδει δὲ καὶ τοῦτο, καθάπερ καὶ τὸ πρᾶγμα ταυτὸν, εἰ μέλλει ἔλεγχος ἢ συλλογισμὸς ἔσεσθαι, οἷον εἰ λώπιον, μὴ ἰμάτιον συλλογισασθαι ἀλλὰ λώπιον. ἀληθὲς μὲν γὰρ κάκεῖνο, ἀλλ' οὐ συλλελογίσται, ἀλλ' ἔτι ἐρωτήματος δεῖ εἰ ταυτὸν σημαίνει, πρὸς τὸν ζητοῦντα τὸ διὰ τί.

Aristotle can be taken to describe such a defective deduction in the example he gives in the second half of the passage. The example involves the names ‘mantle’ and ‘cloak’, which are two distinct linguistic expressions. Aristotle takes them to signify the same object (*Top.* I.7 103a9-10, 103a25-7). He regards them as synonyms. It is not entirely clear what role these synonyms play in Aristotle’s example. Two quite different interpretations are found in the scholarly literature. On one interpretation, the synonymy occurs in the supposed contradiction; on the other, the synonymy occurs in the supposed deduction. According to the former interpretation, the opponent’s thesis contains the name ‘mantle’. Aristotle’s point would be that this thesis cannot be refuted by means of a deduction whose conclusion contains the name ‘cloak’ instead of ‘mantle’. Even if this deduction is entirely correct, it would not constitute a refutation of the original thesis. For example, if the opponent’s thesis is ‘A mantle is useful’, it cannot be refuted by a deduction whose conclusion is ‘A cloak is not useful’. The person mentioned at the end of the passage who ‘asks the reason why’ would be the opponent asking why his thesis has been refuted by the deduction. This interpretation is endorsed, for example, by Poste (1866: 19) and Schreiber (2003: 90).²⁶

However, this interpretation is in tension with Aristotle’s remark ‘for the former conclusion (κακείνο) is also true, but it has not been deduced’. As I have translated it, κακείνο refers to the incorrect conclusion with ‘cloak’ instead of ‘mantle’. Consequently, the remark states that the incorrect conclusion with ‘cloak’ has not been deduced.²⁷ This is incompatible with the interpretation under consideration; for on this interpretation, the incorrect conclusion with ‘cloak’ has been properly deduced, but merely fails to contradict the opponent’s thesis. Hence, commentators who endorse the interpretation take κακείνο to refer

²⁶ It also seems to be suggested by the translation of 168a30-1 in *ROT*: ‘if the point concerns a doublet, then you should deduce about a doublet, not about a cloak. For the former conclusion also would be true, but it has not been deduced’.

²⁷ I take it that in the phrase ἀληθές μὲν γὰρ κακείνο, ἀλλ’ οὐ συλλελόγισται, the pronoun κακείνο is the grammatical subject of οὐ συλλελόγισται. *Pace* Forster (1955: 37) and Colli (1955: 660), who translate ἀλλ’ οὐ συλλελόγισται as ‘but the reasoning is not complete’.

to the correct conclusion with ‘mantle’.²⁸ As a result, the remark says that, given the truth of the premisses of the deduction, the conclusion with ‘mantle’ is true as well as the conclusion with ‘cloak’, but that the former conclusion has not been deduced (simply because no attempt was made to deduce it).

Now, this reading of $\kappa\acute{\alpha}\kappa\epsilon\acute{\iota}\nu\omicron$ is less natural than the other. For the pronoun $\acute{\epsilon}\kappa\epsilon\acute{\iota}\nu\omicron$ typically refers to the item which is more distant in the preceding text. According to this rule, $\kappa\acute{\alpha}\kappa\epsilon\acute{\iota}\nu\omicron$ should refer to the conclusion with ‘cloak’ rather than to that with ‘mantle’.²⁹ In this case, Aristotle seems to say that the conclusion with ‘cloak’ cannot be properly deduced from the premisses adduced because the premisses contain the word ‘mantle’ instead of ‘cloak’. This is the traditional interpretation of the passage given by Michael of Ephesus and the anonymous author of a paraphrase of the *Sophistici Elenchi* edited in *CAG* 23.4.³⁰ The anonymous author, who is believed to be Sophonias, gives the following example:

- A2 Every mantle is preventive of frost and heat.
 Everything preventive of frost and heat is useful.
 Therefore, every cloak is useful.

²⁸ Poste (1866: 19), *ROT*, Schreiber (2003: 90).

²⁹ This interpretation of $\kappa\acute{\alpha}\kappa\epsilon\acute{\iota}\nu\omicron$ is preferred by Michael *In SE* 57.25-31, Anonymus *In SE* 18.16-17, von Kirchmann (1883: 12), Forster (1955: 37), Colli (1955: 660), Dorion (1995: 133). Of course, it is not impossible that $\kappa\acute{\alpha}\kappa\epsilon\acute{\iota}\nu\omicron$ refers to the correct conclusion with ‘mantle’. But such an interpretation also leads to a problem with the $\kappa\acute{\alpha}\iota$ in $\kappa\acute{\alpha}\kappa\epsilon\acute{\iota}\nu\omicron$. The $\kappa\acute{\alpha}\iota$ implies that the conclusion which is not referred to by $\acute{\epsilon}\kappa\epsilon\acute{\iota}\nu\omicron$ is true, and that its truth can be taken for granted in the context under consideration. Given the preceding sentence, the conclusion which is salient in the context is the correct conclusion with ‘mantle’; for this conclusion is recommended by Aristotle while the other is dismissed. If $\acute{\epsilon}\kappa\epsilon\acute{\iota}\nu\omicron$ referred to the correct conclusion, $\kappa\acute{\alpha}\iota$ would imply the truth of the incorrect conclusion dismissed in the preceding sentence. In this case, the connection to the preceding sentence would be less smooth than on the other interpretation, on which $\kappa\acute{\alpha}\iota$ implies the truth of the correct conclusion with ‘mantle’.

³⁰ Michael *In SE* 57.15-31, Anonymus *In SE* 18.8-18; the interpretation is also given by von Kirchmann (1883: 12).

According to this interpretation, the synonymy between ‘mantle’ and ‘cloak’ occurs not in the supposed contradiction, but in the supposed deduction. Because of this synonymy, A2 fails to be a deduction, and hence is not a refutation of the thesis ‘A cloak is not useful’. The person mentioned at the end of the passage who ‘asks the reason why’ is the opponent asking why the conclusion of A2 follows from the premisses adduced.

In view of the problems the other interpretation has with the pronoun *κακεῖνο*, the traditional interpretation seems to be preferable. Still, whichever of them is chosen as an interpretation of the example at 168a30-3, both of them are perfectly in accordance with Aristotle’s intentions in the passage 168a26-33 as a whole. The first sentence of the passage indicates that Aristotle is concerned with the identity of certain linguistic expressions in refutations. The second sentence states that this kind of identity is required ‘if a refutation or deduction is to be effected’. The fact that deductions are mentioned here strongly suggests that Aristotle is concerned with the identity of linguistic expressions not only within the contradiction of a refutation, but also within the deduction. Thus, even if the subsequent example about ‘mantle’ and ‘cloak’ focused exclusively on defective contradictions such as ‘A mantle is useful’ vs ‘A cloak is not useful’, the passage as a whole would still take into account defective deductions such as A2: the passage would still imply that A2 is not a deduction.³¹

It seems clear, then, that in 168a26-33 Aristotle denies A2 the status of a deduction. Given this, he should also deny the status of a deduction to arguments such as A3, which have a synonymy in the middle term:

A3 Every robe is a cloak.
 Every mantle is useful.

³¹ Cf. Crivelli (forthcoming). At the end of *SE* 6, Aristotle claims that all apparent refutations due to language have their defect in the contradiction (169a18-21; see Michael *In SE* 65.25-66.1). However, this claim is simply not true (Poste 1866: 115-16, Dorion 1995: 250, Fait 2007: 130-1). Elsewhere Aristotle recognizes apparent refutations due to language whose defect is solely in the deduction, for example, under the heading of accent (see A1 above; *SE* 21 177b37-178a3) and under the heading of homonymy (see A5 below; *SE* 10 171a9-11, *AnPo.* I.12 77b27-33). Hence, it makes sense for him to address such apparent refutations at 168a26-33.

Therefore, every robe is useful.

The fact that Aristotle rejects A2 and A3 shows that he takes deductions, like contradictions, to depend for their success on the identity of the linguistic expressions involved. For Aristotle, deductions are not preserved by substitution of synonymous expressions. Consider, for example, the following correct deduction:

A4 Every robe is a cloak.
 Every cloak is useful.
 Therefore, every robe is useful.

When the second occurrence of ‘cloak’ in this deduction is replaced by ‘mantle’, the result, i.e. A3, is not a deduction.

This is in tension with some claims which Alexander of Aphrodisias makes about Aristotle’s views on deduction. Alexander claims that unlike the Stoics, Aristotle does not attend to linguistic expressions in his account of deduction. Discussing certain arguments which the Stoics called ‘subsyllogistic’, he writes:³²

They [the Stoics] do not call such arguments deductions since they attend to language and expression, whereas Aristotle, where the same object is signified, looks to what is signified and not to the expressions. (Alexander *In AnPr.* 84.15-17)

Accordingly, Alexander attributes to Aristotle the following view:

A deduction has its being not in the words but in what is signified by the words.
(Alexander *In AnPr.* 372.29-30)

³² On subsyllogistic arguments, see Barnes (2007: 314-21).

As we said, a deduction comes about through what is signified by the words, not through the words. (Alexander *In AnPr.* 373.16-17)

Alexander suggests that Aristotle took deductions to depend for their success not on words, but only on what is signified by words. On this view, given that synonyms signify the same object, deductions should be preserved by substitution of synonyms, contrary to what we saw with A3 and A4.³³

Alexander's claims may be motivated, in part, by the fact that Aristotle often does not pay attention to the precise linguistic formulation of deductions. In the *Sophistici Elenchi*, however, the distinction between linguistic expressions and what is signified by them is of importance, and in this context Aristotle's rejection of A2 and A3 makes it clear that he took deductions to depend not only on what is signified by linguistic expressions, but also on these expressions themselves. Thus, Alexander does not, in the above passages, adequately represent Aristotle's views on deduction.

Given that A2 and A3 are not deductions, the definition of deduction should contain a condition violated by them. It is not immediately clear which condition this might be. In the next section, I will argue that none of the three conditions we have seen so far (C1-3) is sufficient to rule out A2 and A3, and to explain why they are not deductions. Hence, I will argue, the definition of deduction needs to be extended by an additional condition which rules out A2 and A3.

4. Synonyms in deductions

Among the conditions laid down in the definition of deduction, the most important one is C1, that the conclusion follow necessarily from the premisses.³⁴ However, Aristotle does not

³³ Moreover, Alexander claims that 'He has a dagger' is the same premiss (πρότασις) as 'He has a poniard' (*In Top.* 12.11-15). Thus, he should also hold that 'Every mantle is useful' is the same premiss as 'Every cloak is useful'. Again, this would make it difficult to explain why A3 is not a deduction while A4 is a deduction.

³⁴ This is the first condition to which Aristotle refers in his proof of the thesis of *SE* 6 (168a19-23).

explain what this condition means. Rather, he treats the relation of following necessarily as an undefined primitive in his logical writings.³⁵ It is therefore not always obvious which arguments Aristotle takes to satisfy C1 and which not. Still, many cases are reasonably clear. For example, an argument such as A5, which involves a homonymy in the middle term, does presumably not satisfy C1:³⁶

A5 Homer's poem is a circle.
 Every circle is a figure.
 Therefore, Homer's poem is a figure.

It is less clear whether arguments such as A2 and A3, which involve a synonymy, satisfy C1. But there is reason to think that Aristotle took them to satisfy C1. This can be seen as follows. As we saw above, Aristotle states that in arguments such as A2 and A3 'there is a further need for a question whether it signifies the same thing in response to the one who asks the reason why' (168a31-3). By this he seems to mean that if the opponent asks why the conclusion follows from the premisses, one should ask him whether 'cloak' signifies the same thing as 'mantle'. The implication is that if his answer is affirmative, there will be a genuine deduction. Thus, Aristotle seems to hold that A2 and A3 can be turned into genuine deductions by adding a premiss to the effect that 'cloak' signifies the same as 'mantle'; but as long as such a premiss is missing, they are not deductions.

Now, Aristotle holds that arguments in which premisses are missing may nevertheless satisfy C1.³⁷ He gives an example of such an argument in *Prior Analytics* I.32:

³⁵ See Lear (1980: 2-14).

³⁶ In addition, Aristotle seems to hold that, like apparent refutations due to many questions, arguments which contain a homonymous subject or predicate term violate C7 (SE 17 175b39-176a18; see Bobzien 1995: 258-64, 2007: 301-12).

³⁷ *AnPr.* I.32 47a22-35. See Alexander *In AnPr.* 21.28-30, 344.9-345.12, 346.27-8, Philoponus *In AnPr.* 320.16-322.18, 323.18-27, Frede (1974: 20-3).

A6 A substance is not destroyed by the destruction of what is not a substance.
If the things out of which something is composed are destroyed, then what consists of them must also perish.
Therefore, any part of a substance is a substance.

Aristotle comments on this argument as follows:

When these [that is, the two premisses of A6] have been put, it is necessary that any part of a substance be a substance; yet it has not been deduced through what has been assumed, but premisses are missing.³⁸ (*AnPr.* I.32 47a26-8)

A6 satisfies C1: its conclusion follows necessarily from the premisses. Nevertheless, A6 fails to be a deduction (47a31-5) because one or more premisses are missing. Aristotle does not specify which premisses are missing in it. Alexander suggests that a premiss such as ‘A whole is composed of its parts’ is missing.³⁹ In any case, whichever premiss or premisses are missing in this argument, their truth does not seem to be more obvious than the truth of the premiss which is missing in A2 and A3: that ‘cloak’ signifies the same thing as ‘mantle’. Hence, given that A6 satisfies C1, the two arguments A2 and A3, too, should satisfy it.

If the two arguments satisfy C1, they may still violate C3, the condition that the conclusion follow through the premisses.⁴⁰ What does it mean to ‘follow through the premisses’? According to the *Topics*, this condition rules out superfluous premisses which are

³⁸ τούτων γὰρ τεθέντων ἀναγκαῖον μὲν τὸ οὐσίας μέρος εἶναι οὐσίαν, οὐ μὴν συλλελόγισται διὰ τῶν εἰλημμένων, ἀλλ' ἐλλείπουσι προτάσεις. In this passage, ἐλλείπειν can be taken to mean ‘be missing’ (Mueller 2006: 30, Ebert & Nortmann 2007: 78, Striker 2009: 52). For this meaning of ἐλλείπειν, see Bonitz *Index Arist.* 238b5-11.

³⁹ Alexander *In AnPr.* 347.5-7. For alternative suggestions, see Ebert & Nortmann (2007: 800-5), Striker (2009: 214).

⁴⁰ Aristotle expresses this condition in various ways: διὰ τῶν κειμένων *SE* 1 165a2, *Top.* I.1 100a26-7; διὰ ταῦτα *Rhet.* I.2 1356b16, *AnPr.* I.1 24b20; τῶ ταῦτα εἶναι *Rhet.* I.2 1356b17, *AnPr.* I.1 24b20, see also *SE* 6 168b24, *Top.* VIII.11 161b30.

not needed to deduce the conclusion (*Top.* VIII.11 161b28-30). But according to the *Prior Analytics*, it also seems to rule out arguments in which premisses are missing. In the first chapter of the *Analytics*, Aristotle explains the import of C3 as follows: ‘no further term is needed from outside in order for the necessity to come about’ (24b20-2). This can be taken to mean that no premiss needed to deduce the conclusion is missing.⁴¹ If so, then given that a premiss is missing in A2 and A3, these two arguments violate C3.

However, C3 does not explain why a premiss is missing in the two arguments, nor does it imply that one is missing in them. Consequently, C3 alone does not suffice to establish that they are not deductions. In general, it is not at all clear whether and, if so, which premisses are missing in a given argument. For example, Aristotle regards A4 as a deduction, in which no premiss is missing. But the Stoics deny this, and insist that a premiss is missing in order for A4 to be a deduction (e.g., a premiss such as ‘If every robe is a cloak and every cloak is useful, then every robe is useful’).⁴² Conversely, someone might hold that no premiss is missing even in A2 and A3: based on Alexander’s contention that ‘a deduction has its being not in the words but in what is signified by the words’, she might argue that these two arguments satisfy C3, and are deductions without the addition of further premisses.

In order to defend the view that premisses are missing in A2 and A3, Aristotle might appeal to the schemata of deduction which he discusses in the first chapters of the *Prior Analytics*. These schemata contain schematic letters like ‘A’ and ‘B’ in place of concrete expressions like ‘mantle’ and ‘useful’; for example:

A7 Every C is B.
 Every B is A.
 Therefore, every C is A.

⁴¹ Frede (1974: 22), Ebert & Nortmann (2007: 227), Striker (2009: 81).

⁴² Mueller (1969: 179-80), Frede (1974: 4-5, 10), Barnes (1990: 114-16).

Aristotle takes the schemata of deduction introduced in the *Prior Analytics* to be applicable to a wide range of deductions. In fact, he claims that any deduction whatsoever ‘comes about through’ one of these schemata (*AnPr.* I.23 40b20-2, 41b1-5). Thus Aristotle could argue that due to the distinctness of the expressions ‘mantle’ and ‘cloak’, A2 and A3 do not fit the pattern of A7 or another schema of deduction, and therefore fail to be deductions. To make them fit a schema of deduction, a premiss such as ‘Every cloak is a mantle’ needs to be added. However, Aristotle’s opponent may still disagree. She might contend that whether or not an argument fits a schema of deduction should be decided not with respect to linguistic expressions, but with respect to what is signified by them. Since ‘mantle’ signifies the same thing as ‘cloak’, she might argue, A2 and A3 both fit the pattern of A7, so that no premiss is missing in them.

At this point, it is instructive to consider briefly a parallel disagreement between two more recent logicians, namely Bolzano and Tarski. Bolzano (1837) would accept that in arguments such as A2 and A3 the conclusion is logically derivable from the premisses, whereas Tarski (1936) would deny this.⁴³ Bolzano takes his relation of derivability, and more specifically of logical derivability, to obtain not between sentences, but between certain non-linguistic items signified by sentences (1837: §155). He calls these items ‘sentences-in-themselves’, and they can be thought of as the propositional content of sentences. Two distinct sentences may signify the same sentence-in-itself. For example, ‘Every cloak is useful’ and ‘Every mantle is useful’ signify the same sentence-in-itself, say: EVERY GARMENT IS USEFUL. Consequently, the three sentences in A3 signify exactly the same three sentences-in-themselves as those in A4, namely:

A8 EVERY ROBE IS A GARMENT.
 EVERY GARMENT IS USEFUL.
 THEREFORE, EVERY ROBE IS USEFUL.

⁴³ This disagreement has been pointed out by Siebel (1996: 204-7, 2002: 593-4).

In A8, the third sentence-in-itself is logically derivable from the first two. Now, Bolzano does not explain how the relation of logical derivability can be extended from sentences-in-themselves to linguistic sentences; but it is natural to assume that a given sentence is logically derivable from a plurality of sentences if and only if the sentence-in-itself signified by it is logically derivable from the sentences-in-themselves signified by that plurality.⁴⁴ Given this, there is no difference in logical derivability between A3 and A4: in both arguments, the conclusion is logically derivable from the premisses. Likewise for A2.

Unlike Bolzano, Tarski takes his relation of logical consequence to obtain between sentences, that is, between expressions of a given language. In order to decide whether the conclusion of an argument is a logical consequence of the premisses, he proceeds in two steps. First, the argument is transformed into an argument form. This is done by replacing every non-logical expression in the argument by a variable, in such a way that all occurrences of the same expression are replaced by the same variable, and different expressions are replaced by different variables (1936: 8). Tarski does not, in his 1936 paper, explain how the distinction between logical and non-logical expressions might be drawn. Still, it is clear that A4 contains exactly three non-logical expressions, namely ‘robe’, ‘cloak’, and ‘useful’. When A4 is transformed into an argument form, each of these expressions is replaced by a distinct variable. The resulting argument form therefore contains three distinct variables, much like A7 (except that A7 employs schematic letters instead of variables). By contrast, the argument in A3 contains a fourth non-logical expression, namely ‘mantle’, so that the resulting argument form contains four distinct variables.

As a second step, Tarski determines whether the resulting argument form is valid (he does so by means of his notion of satisfaction). If it is valid, the conclusion of the original argument is a logical consequence of the premisses. Now, whereas the argument form obtained from A4 is valid, those obtained from A2 and A3 are not. Hence, for Tarski, the conclusion of A2 and A3 is not a logical consequence of the premisses.

⁴⁴ Siebel (1996: 196-7, 2002: 586).

Aristotle's denial that these two arguments are deductions is in line with Tarski's approach. Of course, Aristotle did not have Tarski's conception of an argument form, but rather employed schemata deductions in the *Prior Analytics*. Moreover, Aristotle and Tarski do not agree on exactly which schemata, or forms, should be regarded as valid and which not. They do, however, seem to agree that deduction, or logical consequence, depends on the identity of the linguistic expressions involved and on their being arranged in certain patterns. Thus, Aristotle may be taken to reject A2 and A3 on the basis of a condition closely akin to Tarski's account, such as the following:

- C8 Any deduction can be obtained from a schema of deduction by replacing every occurrence of a given schematic letter by the same linguistic expression.

Clearly, A4 can be obtained by such a substitution from the schema in A7. By contrast, A2 and A3 cannot be obtained in this way from this or another schema of deduction, and hence, given that C8 is part of the definition of deduction, are not deductions.

C8 does for deductions what C4 does for contradictions, namely to require that linguistic expressions be arranged in certain patterns. In C4 the pattern is given by the subject-predicate structure of simple sentences, and in C8 it is given by Aristotle's schemata of deductions. It must be acknowledged, however, that C8 is a rather strong condition, and that Aristotle is far from formulating it explicitly in the *Sophistici Elenchi*. In fact, he would arguably not be in a position to formulate it in this treatise. It is generally agreed that the *Topics* and *Sophistici Elenchi* were written before the *Prior Analytics*, and it seems unlikely that the account of schemata of deduction developed in the latter work was already available to Aristotle at the time he wrote the former two. Nevertheless, his rejection of A2 and A3 points into the direction of C8, and suggests that he implicitly accepted this condition. Had he been pressed to explain why these two arguments are not deductions, he would, I submit, ultimately refer to a condition very much like C8.

5. Causes of (not) being a refutation

As we have seen, apparent refutations due to composition, division, and accent fail to be refutations because certain linguistic expressions are not identical. If this defect occurs in the supposed contradiction, then C4 is violated; if it occurs in the supposed deduction, C8 is violated. However, apparent refutations due to composition, division, and accent fail to be refutations not only because of the distinctness of certain expressions, but also because these expressions do not signify the same object.⁴⁵ For example, consider the apparent refutation due to accent given in A1 above: it fails to be a deduction not only because the expressions ‘where you lodge’ (τὸ οὖ καταλύεις) and ‘You do not lodge’ (τὸ οὐ καταλύεις) are distinct, but also because they do not signify the same object. If this kind of defect occurs in the supposed contradiction, then C5 is violated. If the defect occurs in the supposed deduction, as it does in A1, then the apparent refutation will presumably violate C1 (just as arguments which involve a homonymy like A5 violate C1).

Given this, every apparent refutation due to composition, division, and accent violates either C1 or C5. These two conditions suffice to prove that those apparent refutations violate the definition of refutation. Conditions C4 and C8 are not needed, nor are they used elsewhere in chapter 6 to establish that other apparent refutations violate the definition of refutation. Consequently, the latter two conditions are not necessary to establish the thesis of extensional correctness, that every apparent refutation violates the definition of refutation.⁴⁶

Why, then, does Aristotle introduce C4 and C8 in *Sophistici Elenchi* 5 and 6? He does not need them to establish the thesis of extensional correctness. But given that he does not

⁴⁵ See Schreiber (1983: 89-90), Fait (2007: 126-7). Aristotle can be taken to express this view at *SE* 7 169a25-9 (see Fait 2007: 126) and *SE* 20 177a33-5, 177b1-4 (see Dorion 1995: 341-2 n. 295).

⁴⁶ If A2 and A3 counted as apparent refutations, C8 would be needed to establish that they violate the definition of refutation. However, these two arguments are presumably not apparent refutations, since they lack the deceptive appearance typical of the thirteen kinds of apparent refutation introduced in *SE* 5 and 6. Aristotle takes the thirteen kinds to provide an exhaustive classification of all apparent refutations (see n. 2); but A2 and A3 do not seem to fall under any of them. They do not *appear* to be refutations in the appropriate way. Likewise, arguments which violate C4 without violating C5 do presumably not count as apparent refutations.

introduce them without having a reason for it, a natural assumption is that he needed them to establish the causal thesis: that for every apparent refutation, its violating the definition of refutation is a *causa non existentiae* for it, i.e., a cause which explains why it is not a refutation. On this view, the violation of C1 or C5 is not a *causa non existentiae* for apparent refutations due to composition, division, and accent. It does not constitute a specific defect characteristic of these apparent refutations, and therefore does not provide the proper explanation of why they are not refutations. Rather, such a defect is given by the non-identity of certain linguistic expressions, i.e., by the violation of C4 and C8.

If this is correct, then Aristotle's argument in chapter 6 crucially relies on the assumption that each of the conditions C1-8 is part of the definition of refutation, and in particular that C1-3 and C7-8 are part of the definition of deduction. This is not an uncontroversial assumption. Those who follow Alexander and Bolzano would deny that C4 and C8 are part of the definition of refutation or deduction. Others might reject other conditions. For example, the Stoics would reject C7, the condition that the premisses of deductions be simple predicative sentences. Also, the Stoics would reject C2, the condition that the conclusion be not identical with any of the premisses.⁴⁷ In view of this, Aristotle's appeal to C1-8 may seem unwarranted and *ad hoc*. Thus, Poste complains about Aristotle's argument in chapter 6:

We only give a semblance of unity to the theory of fallacies by lumping them all together under the definition of confutation, for the elements of that definition are obtained by no systematic subdivision, and form, as far as appears, a purely arbitrary and incoherent agglomeration. (Poste 1866: 116)

In the remainder of this paper, I want to indicate a possible way for Aristotle to reply to this objection. I will argue that the proof of the causal thesis itself provides such a reply, and that this proof goes some way towards establishing that C1-8 are part of the definition of refutation.

⁴⁷ See Alexander *In Top.* 10.6-12, *In AnPr.* 18.14-18; Ammonius *In AnPr.* 27.35-28.8; Frede (1974: 23).

In his proof of the causal thesis, Aristotle demonstrates that for any apparent refutation, there is a condition among C1-8 such that the violation of this condition is a *causa non existentiae* for it. In other words, for any argument which is an apparent refutation, there is a condition among C1-8 such that the argument's violating that condition is a cause of its not being a refutation. Given this, it is natural to say that for any argument which is an apparent refutation, its violating C1-8 is a cause of its not being a refutation.⁴⁸ Violating C1-8 is such a cause inasmuch as violating a specific member of C1-8 is such a cause. Since 'violating' here simply means 'not satisfying', we have: for any argument which is an apparent refutation, its not satisfying C1-8 is a cause of its not being a refutation.

Now, Aristotle holds that if not being A is a cause of not being B, then being A is a cause of being B:

For example, why does the wall not breathe? Because it is not an animal. For if this were a cause of not breathing, then being an animal would have to be a cause of breathing: i.e. if the denial is a cause of not holding, then the affirmation is a cause of holding. Thus if the hot and cold elements' being imbalanced is a cause of not being healthy, their being balanced is a cause of being healthy. (*AnPo.* I.13 78b15-20)

If not being an animal were a cause of not breathing, then being an animal would be a cause of breathing. (Aristotle denies that being an animal actually is a cause of breathing, 78b21-3.) If the hot and cold elements' not being balanced is a cause of not being healthy, then their being balanced is a cause of being healthy. Likewise, if not satisfying C1-8 is a cause of not being a refutation, then satisfying C1-8 is a cause of being a refutation.

What does it mean to say, in this context, that being A is a cause of being B? Jonathan Barnes takes it to mean that for anything which is B, its being A is a cause of its being B. More

⁴⁸ Part of the reason why this is natural is that none of the conditions C1-8 is superfluous: each of them is used by Aristotle in his proof of the causal thesis.

precisely, everything which is B is A, and its being A is a cause of its being B. Likewise for the negative case. Thus, Barnes (1994: 157) takes Aristotle to endorse the following principle:

If for anything which is not B, its not being A is a cause of its not being B,
then for anything which is B, its being A is a cause of its being B.

As we saw above, for any argument which is an apparent refutation, its not satisfying C1-8 is a cause of its not being a refutation. This does not imply that the same is true for any item which is not a refutation. What about arguments which do not appear to be refutations, or items which are not arguments at all? What is a cause of their not being a refutation? Perhaps for some of them such a cause consists in not satisfying one of the conditions C1-8. For others such a cause may consist in not satisfying another, additional condition. Assuming that the number of these additional conditions is finite, let C1-n be the conjunction of C1-8 and the additional conditions. So, for anything which is not a refutation, its not satisfying C1-n is a cause of its not being a refutation. It follows by Aristotle's principle that for anything which is a refutation, its satisfying C1-n is a cause of its being a refutation.

Satisfying C1-n is a cause which explains why a given argument is a refutation. Now, Aristotle holds that causal explanation is closely connected to definition and essence. Consider, for example, the following passage from the second book of the *Posterior Analytics*:

In all these cases it is clear that what it is and why it is are the same. What is an eclipse?
Privation of light from the moon by the screening of the earth. Why is there an eclipse?
or Why is the moon eclipsed? Because the light leaves it when the earth screens it.
(*AnPo*. II.2 90a14-18)

The answer to the question what an eclipse is the definition of eclipse, that is, a specification its essence. The answer to the question why the moon is eclipsed is a cause of its being eclipsed. According to Aristotle, the two answers are identical: the definition of eclipse is identical with a cause of the moon's being eclipsed.

As we saw above, Aristotle suggests that for anything which is healthy, its having the hot and cold elements balanced is a cause of its being healthy. At the same time, he takes ‘balance of hot and cold elements’ to be the definition (ὁρισμός) of health.⁴⁹ Thus, the answer to the question what health is is the same as the answer to the question why anything which is healthy is healthy.

For anything which is a refutation, the answer to the question why it is a refutation is that it satisfies C1-n. This answer should be the same as the answer to the question what a refutation is. So we may conclude that C1-n constitute the definition of refutation. Consequently, C1-8 are part of the definition of refutation, and, in particular, C1-3 and C7-8 are part of the definition of deduction.

If this is correct, Aristotle’s proof of the causal thesis provides the resources for establishing that C1-8 should in fact be part of the definition of refutation. Thus, reflection on the defects of apparent refutations and on their *causae non existentiae* can teach us something about what a genuine refutation and deduction is. Specifically, it can teach us that refutations and deductions are essentially of a linguistic nature in the way indicated by C4 and C8, and that they depend on the identity of the linguistic expressions involved.

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⁴⁹ *Top.* VI.6 145b7-8, see also VI.2 139b20-1, *Phys.* VII.3 246b4-5.

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