Some remarks against non-epistemic accounts of immediate premises in Aristotle's *Posterior Analytics*

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Most interpretations of Aristotle's *Posterior Analytics* believe that the term '*ameson*' is used to describe the principles or foundations of a given system of justification or explanation as epistemically prior to or more fundamental than the other propositions in the system. Epistemic readings (as I shall call them) arguably constitute a majority in the secondary literature. This predominant view has been challenged by Robin Smith (1986) and Michael Ferejohn (1994; 2013), who propose interpretations that should be classified as non-epistemic according to the definition above. My aim in this article is purely negative. I intend to show that these non-epistemic interpretations are liable to serious objections and are in conflict with some important features of Aristotle's theory of demonstration.

1. *Introduction*

According to Aristotle's *Posterior Analytics* (hereafter, *APo*), scientific expertise is two-folded. The scientist knows certain truths by demonstration, while other premises are indemonstrable. Thus, mastering a scientific domain involves acquiring demonstrative knowledge as well as a form of non-demonstrative knowledge Aristotle calls "comprehension" (νοῦς).[1] His motivation for this view is presented in *APo* I 3. If the premises in any demonstration require themselves a demonstration from different and more basic truths, proper scientific knowledge of the conclusion cannot be achieved unless the premises are themselves demonstrated, and so on *ad infinitum*. Such a regress would render scientific knowledge impossible, since we cannot go through infinitely many premises (72b7–15). One might think that an infinite regress is prevented if demonstrations can proceed "in circle and reciprocally" (72b15–18), i.e. if a conclusion can be used to demonstrate, directly or indirectly, the same premises from which it is demonstrated. Aristotle rejects this solution and prefers to deny the assumption that all scientific

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[1] *APo* I 2, 71b16–19; I 3, 72b18–25; I 33, 88b35–37; II 19, 100b5–17. I will follow Bronstein (2016, 9, n.16) and sometimes use the expression "noetic knowledge," from the Greek term "νοῦς," to refer to the knowledge of indemonstrable premises.

propositions are demonstrable. Demonstrable truths are ultimately demonstrated from premises that are not themselves known by demonstration, which work as the first principles (*archai*) of science (72b18–25).

In several passages, when Aristotle is interested in characterizing indemonstrable premises as fundamental truths in a given epistemic structure, he describes them as "primary" (πρῶτα) and "immediate" (ἄμεσα).[2] Therefore, many interpreters take "immediate" and "indemonstrable" as equivalent expressions, both conveying the foundational status of scientific principles.[3] *Epistemic* interpretations—as I shall call them—of the notion of immediacy in Aristotle's epistemology take the term 'ἄμεσος' as a qualification of the principles or foundations of a given system of justification or explanation, which means they are epistemically prior to or more fundamental than the other propositions in the system.[4] Epistemic readings arguably constitute a majority in the secondary literature on the *APo*. This predominant view has been challenged by Robin Smith (1986) and Michael Ferejohn (1994; 2013), who propose interpretations that should be classified as *non-epistemic* according to the definition above. My aim in this article is purely negative. I intend to show that these non-epistemic interpretations are liable to serious objections and are in conflict with some important features of Aristotle's theory of demonstration.

2. *An Objection against Epistemic Interpretations based on* Posterior Analytics *I 13*

The notion of immediacy seems to be related to Aristotle's syllogistic. A syllogism occurs when two categorical premises sharing a common term (μέσον or "middle term") entails another categorical sentence with the remaining two terms (the major and the minor extremes). Aristotle describes immediate predications in terms of "atomically belonging" (ἀτόμως ὑπάρχειν), which he defines as "there being no middle term" (*APo* I 15, 79a33–36; cf. I 17, 81a35–37). As Barnes (1993, 94) puts it, "to be immediate is to lack a middle term." However, "to lack a middle term" can mean at least three different things:

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[2] See *APr* II 23, 68b30–32; *APo* I 2, 72a5–8; 72a14–18; 72a25–32; I 3, 72b18–25; I 9, 75b37–40; I 17, 81a35–37; I 22, 84a29–b3; I 23, 84b19–31; I 24, 86a14–16; I 32, 88b15–21; I 33, 89a11–23; II 3, 90b24–27; II 10, 94a9–10; II 12, 96a8–19; II 19, 99b20–22. See Bonitz (1870, 38a24–36) for more references.

[3] For instance, Alexander *in An. Pr. I* 358.5–359.14; *in Top.* 16.40–46; Themistius *in An. Post.* 6.28–29; Philoponus *in An. Post.* 24.7–14; Aquinas *in An. Post.* lib. 1, l.4, n.14; Bonitz (1870, 38a24–25); Ross (1949, 509); Hadgopoulos (1977, 32); Smith (1986, 49); McKirahan (1992, 25); Mignucci (2007, 152); Angioni (2012, 16–23); Crager (2015, 15); Bronstein (2016, 109); Malink (2017, 176); Morison (2019, 14, 17–22); Gasser-Wingate (2020, 11).

[4] For this definition, see my Zuppolini (2021, 112).

(1)   PxS is immediate iff. there is no M such that (PyM, MzS ⊢ PxS)

(2)   PxS is immediate iff. there is no M such that (PyM, MzS ⊢ PxS) & (PyM and MzS are true)

(3)   PxS is immediate iff. there is no M such that (PyM, MzS ⊢ PxS) & (PyM and MzS are true) & (PyM and MzS are prior to PxS)[5]

Barnes (1981, 31) argues that (3) is the only promising interpretation and rejects (1) and (2) for the following reasons. If we adopt (1), no propositions would satisfy the definition, since for every categorical proposition there are pairs of premises (not necessarily true) from which it can be deduced. Option (2), however, seems to contradict the following passage in *APo* I 13:

Understanding the fact and the reason why differ, first in the same science, and, within the same science, in two ways. In one way, if the syllogism does not proceed through immediates, for the primary cause is not grasped, but understanding the reason why is in virtue of the primary cause. In another way, if it proceeds through immediates, but not through the cause, but, of the converting terms, through the one which is better known. For, of counterpredicable terms, nothing prevents the one which is not the cause from being sometimes the better known, so the demonstration will proceed through it. For instance, [a demonstration] that the planets are near through their not twinkling. Let C be the planets, B not twinkling, A being near. It is true to affirm B of C, for the planets do not twinkle, and also A of B, for that which does not twinkle is near—let this be grasped through induction or through perception. Therefore, it is necessary that A belongs to C, so it has been demonstrated that the planets are near. Well, this syllogism is not of the reason why, but of the fact, for it is not because of their not twinkling that they are near, but it is because of their being near that they do not twinkle. There is also room for the latter to be proved through the former, and the demonstration will be of the reason why. For instance, let C be the planets, B being near, A not twinkling. B belongs to C and A to B, so to C also belongs A, not twinkling. And the syllogism is of the reason why, for the primary cause has been grasped (*APo* I 13, 78a22–b4).

In order to illustrate the difference between knowing *that* and knowing *why*, Aristotle presents the two following syllogisms:

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Syllogism I

Being close to the earth belongs to *not twinkling*
Not twinkling belongs to *planets*
Being close to the earth belongs to *planets*

Syllogism II

Not twinkling belongs to *being close to the earth*
Being close to the earth belongs to *planets*
Not twinkling belongs to *planets*

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[5] This is the formulation we find in Barnes (1981, 31) with minor changes. 'PxS' means that P (predicate) belongs to S (subject) in one of the four categorical forms of Aristotle's syllogistic, which are values for the lowercase variables (x, y, z …): universal affirmative (PaS = P belongs to all S), universal negative (PeS = P belongs to no S), particular affirmative (PiS = P belongs to some S) and particular negative (PoS = P does not belong to all S).

On the one hand, Aristotle claims that Syllogism I is not properly a demonstration because it deduces *the fact* (τὸ ὅτι) that planets are close to the earth, but it does not display *the reason why* (τὸ διότι) this is the case. On the other hand, Syllogism II is a properly explanatory syllogism, and therefore, a demonstration in the strict sense of the term, since the planets being near the earth is the cause of their not twinkling. Well, according to the text, Syllogism I proceeds "through immediate premises, but not through the cause" (δι' ἀμέσων μέν, ἀλλὰ μὴ διὰ τοῦ αἰτίου, 78a26–27). If so, its minor premise (*not twinkling* belongs to *planets*) is called 'immediate' in spite of the fact that it is syllogistically deduced from true propositions, as in Syllogism II.[6] Therefore, Barnes concludes that option (2) is false, which would make (3) the only viable interpretation. And (3) is a reading that should be classified as epistemic, according to my definition, since it understands immediacy in terms of epistemic priority.

However, Barnes did not seem to have noticed that *APo* I 13 apparently prevents us from understanding immediacy as an epistemic feature that distinguishes foundational premises from demonstrable truths. The minor premise of Syllogism I (*not twinkling* belongs to *planets*) is not only deducible from true premises, but also demonstrable, since it is the conclusion of Syllogism II, which is a demonstration. Now, if Syllogism II is a demonstration, its premises are epistemically prior to the conclusion (see *APo* I 2, 71b19–23), and therefore '*not twinkling* belongs to *planets*' does not satisfy the definition of immediacy in Barnes' option (3), i.e. there are premises epistemically prior to it from which it can be syllogistically deduced. Given that Aristotle classifies '*not twinkling* belongs to *planets*' as immediate, it would be possible for an immediate proposition to be deduced from prior premises. If so, (3) must be false as well. Apparently, we cannot take 'immediate' and 'indemonstrable' as synonymous. In fact, if the minor premise of Syllogism I is the conclusion of Syllogism II and vice-versa, and if both are taken as immediate in the passage, then their status as immediate propositions does not seem to depend on any epistemic differences between the two inferences. Michael Ferejohn (1994, 85) concludes that

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[6] Alternatively, one could follow Ross (1949, 552) and Mignucci (2007, 196), who suggest that only the major premise of Syllogism I is immediate, despite the plural "δι' ἀμέσων." However, this is not the most intuitive reading of the plural and, as has been argued, if we need to choose one of the premises to classify as immediate, the minor premise might be the more promising choice, since the major can be deduced from the laws of optics combined with certain astronomical truths (see *De Caelo* II 8, 290a17–24; Hadgopoulos 1977, 33; McKirahan 1992, 216; Goldin 2013, 202), while the planets' not twinkling can be established non-deductively through observation (see Zuppolini 2021, 128–131).

Aristotle's "immediacy condition must be independent of whatever such 'epistemic' features he finds lacking in the pseudo-demonstration" (viz. Syllogism I).

Given all we have seen so far, it seems that a coherent interpretation of the notion of immediacy in the *APo* should pursue the following two *desiderata*:[7]

1st *desideratum*: One must explain why Aristotle often describes scientific principles as immediate and uses the terms 'immediate' and 'indemonstrable' interchangeably.

2nd *desideratum*: One must account for the first half of *APo* I 13, where Aristotle refers to a deducible and demonstrable proposition as immediate.

3. Immediacy as a Non-Epistemic Notion: Smith (1986).

We have seen that the existence of immediate premises in a scientific domain is Aristotle's alternative to two unpalatable options, on his view: (i) infinite regress and (ii) circular demonstration (*APo* I 3, 72b5–25). In *APo* I 3, he concentrates his efforts on arguing against the second option, and it is only in *APo* I 19–22 that we find a proof that his model of demonstrative knowledge is protected from infinite regress. Smith (1986) claims that in order to make sense of the notion of immediacy, we must consider what exactly this proof attempts to establish. According to the author, Aristotle's reasons to deny infinite regress are not epistemological, as we may think at first sight, but proof-theoretic, in the sense that he first gives "a classification of all possible deductive structures of proofs and then argues that for each of these possibilities, an infinite regress is impossible" (Smith 1986, 54). But proving the impossibility of infinite regress amounts to proving the existence of immediate premises in a given deductive system. Thus, Smith argues, if this result is obtained only by considering the possible structures of syllogistic proofs, immediacy cannot be an *epistemic* feature of statements, but a *proof-theoretic* one. We should therefore avoid taking 'immediate' to mean 'non-deducible from prior premises' (option (3) above), since that definition depends on the notion of epistemic priority, which plays no role in *APo* I 19–22. Actually, the only meaning of 'immediate' that can be relevant in this context would be 'non-deducible from true premises,' our option (2) (Smith 1986, 49–55).[8]

Assessing Smith's reasoning requires a closer look at *APo* I 19–22. Aristotle's strategy in these chapters can be summarized as follows. First, in *APo* I 19–21, the

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[7] I have put forward these *desiderata* in Zuppolini (2021, 115–116).

[8] In a more recent article, Smith (2009, 54) reaffirms his thesis: "If there are immediate propositions, then there cannot be any demonstration of them, since *they cannot even be deduced from other true propositions*. Immediate propositions are thus indemonstrable *on purely logical grounds*, and if there is any knowledge of them it cannot consist of possessing a demonstration" (emphasis added).

philosopher attempts to show that a demonstration with infinitely many steps, framed in any combination of syllogistic moods, contains an infinite series of universal affirmative sentences of one of the following two forms: (i) the series starts from a given subject and goes "upwards" (ἐπὶ τὸ ἄνω), i.e. the predicate of each sentence occurs as a subject in the following statement, i.e. $\{M^1aS, M^2aM^1, M^3aM^2, ... , such\ that\ \forall n(M^{n+1}aM^n)\}$; (ii) the series starts from a given predicate and proceeds "downwards" (ἐπὶ τὸ κάτω), i.e. the subject of each sentence becomes the predicate of the next predication, i.e. $\{PaM^1, M^1aM^2, M^2aM^3, ... ,$ such that $\forall n(M^naM^{n+1})\}$. Aristotle himself does not present a complete, sound argument for this result—which would be extremely complex and time consuming—, but the chapters *APo* I 20–21 seem to offer at least a proof sketch that, if properly followed, will make it clear that no demonstrations can be extended *ad infinitum* without containing an infinite chain of universal affirmative predications.[9] The second step of the proof is taken in *APo* I 22, where Aristotle argues that an infinite chain of this kind is impossible, independently of going "upwards" or "downwards."

When it comes to the first part of proof, Smith's claim holds good. Only by analysing proof-theoretic features of his Syllogistic and without appealing to epistemological considerations, Aristotle shows that an infinite chain of universal affirmative sentences is generated whenever a sequence of syllogistic inferences is expanded *ad infinitum*. However, as impressively rich as this analysis can be, the crucial step in the proof is the second one, taken in *APo* I 22. The chapter is extremely difficult, and the correct way of reconstructing the argumentation is a matter of high controversy. Nevertheless, however numerous and irreconcilable the disagreements may be, we can safely state that *APo* I 22 goes beyond mere proof-theoretic considerations. Three arguments are presented in *APo* I 22, but for our present purposes it is enough to discuss only the first of them (82b36–83b31).[10] This first argument contains theses about the metaphysical structure of reality and the constraints that this structure imposes on the formulation of predicative sentences. More importantly, one of its decisive steps is definitely epistemological. Aristotle's argument works by showing that,

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[9] For a brilliant analysis of these chapters and a convincing argument showing that Aristotle came up with a sound strategy of his own, which applies to any combination of syllogistic moods, see Crager (2015, 100–126). Lear (1980, 25–30) claims that Aristotle's argument is invalid and offers his own proof. Smith (1982; 1986) argues that *APo* I 19–22 relies on a proto-syllogistic theory that contains only the universal moods *Barbara*, *Celarent*, *Camestres*, and *Cesares*.

[10] The first two of them (82b37–83b31 and 83b32–84a6) are described as arguing 'λογικῶς' (82b34–36), while the last one (84a7–28) is said to be arguing 'ἀναλυτικῶς.' Aristotle probably means that the first two arguments rely on general principles (metaphysical and epistemological), whereas the third argument depends on a particular doctrine of the *Analytics*, namely, the theory of *per se* predication as developed in *APo* I 4. Cf. Ross (1949, 573).

given the rules he prescribes for scientific predication, an infinite chain of universal affirmative sentences would imply that a single subject would have an infinite number of essential predicates.[11] An infinite set of essential predicates could not be surveyed with thought and would be, therefore, unknowable. Well, essences are knowable, which means that a chain of universal predications cannot proceed *ad infinitum* (*APo* I 22, 82b37–83a1; 83b5–8; 12–17; 26–27). If his proof against infinite regress depends on essences being knowable, it is not surprising that Aristotle recognizes the need to show, in *APo* II, how exactly essences become known. After all, definitions, which are accounts of essences, must be indemonstrable or, otherwise, the problem of infinite regress would remain unsolved (*APo* II 3, 90b24–27).

Smith denies that immediacy should be understood as epistemic primacy, but his main motivation is unjustified. Part of Aristotle's solution to the problem of infinite regress is proof-theoretic, but at least one crucial assumption in his argumentation is indisputably epistemological: the existence of immediate principles in science depends on essences being knowable.[12] The existence of indemonstrable premises in science is related to the knowability of essences because the ultimate explanatory premises are statements in which subject and predicate are essentially connected.[13] Therefore, what makes a premise 'PaS' indemonstrable is the fact that there is no middle term that *causally explains* why P belongs to S, in virtue of there being an essential connection between S and P. If so, Aristotle has no theoretical reason to impose the stricter requirement of non-deducibility in general—that is to say, the inexistence of a middle term based on which 'PaS' could be deduced from true premises.

What is also unconvincing in Smith's proposal is the way he approaches the two *desiderata* formulated at the end of Section 2. He attempts to meet the 1st *desideratum* by taking 'immediate' and 'indemonstrable' as equivalent expressions and claiming that both of them mean 'not deducible from any other true proposition', i.e. Barnes' option (2).[14] It is true that Aristotle sometimes uses the term 'ἀπόδειξις' in a weaker sense to refer to sound syllogisms in general.[15] However, this is certainly not the case in *APo* I 2, 71b9–72a8, a

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[11] For this result, see Zuppolini (2019, 146–150).

[12] As Smith himself affirms in a later article (see Smith 2009, 58), although he maintains his view that immediacy should be interpreted according to Barnes' option (2) above (see Smith 2009, 53–54; 58).

[13] See the doctrine of *per se* predications in *APo* I 4 and the comprehensive discussion about inquiry and the indemonstrability of definitions in *APo* II

[14] See Smith (1986, 49–55); cf. Mignucci (2007, 152).

[15] For instance, Aristotle uses the noun 'ἀπόδειξις' (78a30) and the verb 'ἀποδέδεικται' (78a36) to refer to our Syllogism I, but this argument cannot be classified as a proper demonstration, i.e. as an ἀπόδειξις in the sense of *APo* I 2, 71b17–19.

decisive text in which Aristotle (i) defines the notions of scientific knowledge and demonstration and (ii) characterizes first principles as primary and immediate. Demonstration is defined as "συλλογισμὸν ἐπιστημονικόν" (71b17–18), i.e. a syllogism that produces "scientific understanding" (ἐπίστασθαι) and grasps the proper cause of the fact expressed in the conclusion (71b9–12; 18–19) by articulating premises that, among other features, are primary and immediate. In this passage, 'immediate' and 'indemonstrable' are used interchangeably (see 71b27). Since this is a context in which 'demonstration' designates proper explanatory syllogisms, and not only sound syllogisms in general, it seems implausible to read 'immediate' or 'indemonstrable' as signifying 'not deducible from true propositions.'

For obvious reasons, Smith is also unable to meet our 2nd *desideratum*. In *APo* I 13, the minor premises of Syllogisms I and II are said to be immediate despite being the conclusions of sound deductions (the minor premise of Syllogism I is the conclusion of Syllogism II and vice-versa). Smith (1986, 61–63) seems to recognize the difficulty and tries to mitigate it by pointing out that these syllogisms involve terms that are "convertible," which he believes is a synonym for "coextensive" (Smith 1986, 60). Convertible terms, he argues, are "simply disastrous" for Aristotle's project. In a system of universal affirmative propositions with such terms, there would be no immediate premises, in Smith's sense. Suppose, for instance, a deductive system containing the following set of propositions: {AaB, BaC, AaC, BaA, CaB, CaA}: AaB would be inferred from {AaC, CaB}, BaC from {BaA, AaC}, AaC from {AaB, BaC}, BaA from {BaC, CaA}, CaB from {CaA, AaB}, and CaA from {CaB, BaA}.[16] This is precisely the kind of deductive system needed if circular demonstration were a feasible solution to the problem of infinite regress, which would explain why Aristotle argues against it by claiming that these terms are "rare" in demonstrations (*APo* I 3, 73a17–18). However, I am afraid this attempt to mitigate the difficulty creates further problems. The use of coextensive terms is not just an idiosyncrasy of *APo* I 13 or an uncommon feature found in Syllogisms I and II. Aristotle repeatedly argues that the central *demonstranda* in a science should be formulated with coextensive terms[17], and insists on the coextensiveness between middle (*explanans*) and major term

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[16] See Smith (1986, 60–62) and *APr* II 5–7.

[17] This is Aristotle's doctrine of καθόλου predications, as introduced in *APo* I 4, 73b25–74a3: if (i) D and E are A because they are both members of a kind F and (ii) all and only Fs are A, then the scientist should explain why all (and only) Fs are A by finding a middle term that covers all occurrences of A—e.g. we should explain why all (and only) triangles have the sum of internal angles equal to two right angles (see *APo* I 4, 73b32–74a3; I 5, 74a16–74b4; I 24, 85a26–31; 85b4–15) or why all (and only) broad-leaved plants shed their leaves (see *APo* II 16, 98b32–38; II 17, 99a23–29).

(*explanandum*) in demonstrative syllogisms.[18] In fact, what might seem idiosyncratic or odd (at first sight, at least) is the claim in *APo* I 3, 73a17–18, that convertible terms are rare in science.[19] If this is so, Smith cannot avoid the "disastrous" consequences that coextensive terms bring to Aristotle's theory, consequences that follow only if we understand immediacy as he suggests. This is another reason, I believe, to pursue a different solution.

4. *Immediacy as a Non-Epistemic Notion: Ferejohn (1994; 2013)*

An alternative way of accounting for immediacy in non-epistemic terms was proposed by Michael Ferejohn (1994; 2013, 74–90). He correctly points out against Barnes (1981) that, from the fact that (1) and (2) are not viable options, it does not follow that (3) is the correct interpretation (Ferejohn 1994, 83–84). As a further alternative to (1), (2) and (3), Ferejohn formulates a notion of immediacy that is neither proof-theoretic (as Smith argues), nor epistemic (i.e. dependent on typically epistemic concepts such as justification or explanation). For him, immediacy is an *extensional* property of a statement, in the sense that it can be attested only by considering "(1) the functions of the logical expressions it contains and (2) the (actual) extensional relations (e.g., inclusion, mutual inclusion, membership, extensional overlap) which hold among its non-logical expressions (terms)" (Ferejohn 1994, 85). The claim that immediacy is an extensional notion was originally defended by Hintikka (1972, 58), according to whom an immediate premise is one "whose terms are so close together that no further term can be inserted between them." Ferejohn (1994, 87; 2013, 74–76) develops this view proposing the following definition: "'Every S is P' is immediate iff. (i) 'Every S is P' is true, and (ii) there is no term whose extension (a) properly includes that of S, and (b) is properly included by that of P."

Ferejohn defends his definition through an analysis of Aristotle's doctrine of "universal" (καθόλου) predications in *APo* I 4–5. A predication 'P belongs to S' is "universal" in this special sense if (i) P truly belongs to "every case" of S (κατὰ παντὸς), (ii)

P belongs to S "in itself" (καθ᾽ αὑτὸ), and (iii) P belongs to S "as such" (ᾗ αὐτό), i.e. P belongs to S *qua* S (*APo* I 4, 73b26–27). Aristotle gives us an example: having the sum of internal angles equal to two right angles (henceforth, 2R) belongs "universally" to the genus triangle, and "non-universally" to the species isosceles or equilateral—in order to distinguish this particular sense of 'καθόλου' from more common meanings of the term, Aristotle sometimes uses the expression 'πρῶτον καθόλου' (*APo* I 5, 74a4–6; II 17, 99a33–35), and thus I shall hereafter refer to this kind of predicative relation as 'primary-universality.' Interpreters usually emphasize two aspects of primary-universality, one extensional and one intensional. The extensional aspect is that subject and predicate are coextensive, e.g. all and only triangles have 2R. The intensional aspect is that the subject is described as possessing a feature that is explanatorily relevant for the occurrence of the predicate, e.g. 2R belongs to triangle *as such*, but to the isosceles *not as such*, the reason being that 2R belongs to the isosceles because it is a triangle and independently of its being isosceles, i.e. independently of its having two equal sides. This intensional aspect is commonly associated with clause (iii) above.[20] In fact, Aristotle seems to use the formula 'ᾗ …' to introduce opaque contexts of reference. For instance, a doctor who happens to build a house performs this activity *as a builder* (i.e. in virtue of realizing her capacity to build), and *not as a doctor* (i.e. independently of realizing her capacity to heal) (*Phys.* I 8, 191b4–10; cf. II 1,192b23–27; *Met.* VI 2, 1026b37–1027a4).[21]

Against this prevailing view, Ferejohn argues that (iii) is purely extensional: what determines that S is P *qua* X is the fact that X is coextensive with P.[22] In support of this claim, he quotes *APo* I 5, 74a35–b4 (Ferejohn 1994, 88–93; 2013, 84–90). In this passage, Aristotle explains that the kind to which an attribute belongs as a primary-universal predicate will be, in a list of subjects, the first of which it holds once the others are "removed" (*APo* I 5, 74a37–38). For instance, let us say that 2R belongs to a given bronze isosceles triangle. If we abstract the features of being made of bronze or being isosceles, 2R would still apply. However, if we "remove" the attribute of being a triangle (or more general ones, like being a

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[20] See, for instance, Lennox (1987, 92); Kosman (1973, 375–376); McKirahan (1992, 95–102); Charles (2000, 206–209); Hasper (2006); Angioni (2012, 50–52; 2018, 179, n.44); Bronstein (2016, 43–44).

[21] This is the common reading, anyway. The use of '*qua*' clauses in Aristotle can also be taken to introduce not different descriptions of the same object, but different entities that co-exist in the same spatio-temporal segment, e.g. a man (a substance) and a doctor (an accidental compound, i.e. a man plus the capacity to heal etc.). Cf. Lewis (1991, 200–210). In any case, this alternative extensional reading of '*qua*' clauses also differs from Ferejohn's interpretation.

[22] Although he accepts that at least condition (ii)—that P must belong to S καθ᾽ αὑτὸ—is intensional (Ferejohn 1994, 88).

figure or a limit), 2R would no longer obtain. The first item whose "removal" prevents 2R from being instantiated (in this case, triangle) is the subject to which 2R belongs in a primary-universal way (*APo* I 5, 74a38–b4). Ferejohn (1994, 91; 2013, 86) admits that expressions of the form 'ἧ̃ …' are sometimes used by Aristotle with intensional concerns, but he contends that this is not the case when it comes to condition (iii). According to him, this requirement is meant to secure that scientific premises are immediate, as he defines it: if S and P are coextensive (as in primary-universal predications), there is no term which "intervenes extensionally" between S and P (Ferejohn 1994, 91), i.e. there is no term whose extension properly includes the extension of S and is properly included by the extension of P.

One problem with this view is that it depends on a heterodox interpretation of a set of chapters (*APo* I 4–5) that do not contain a single occurrence of 'ἄμεσος' or cognates, which makes them at best indirectly relevant to the debate. Additionally, the interpretation itself has problems. In *Met*. VII 11, 1036a34–b2, Aristotle argues that even if all spheres were made of bronze, it would still be wrong to think that being realized in bronze is part of the essence of sphericity, since we can explain what it is to be a sphere, with all the features that characterize it as such, without any specification of the type of matter in which it may inhere. However, he admits that, in this hypothetical scenario, it might be difficult to "separate in thought" sphericity from bronze (1036b2–3). Similarly, in *APo* I 5, 74a16–17, Aristotle claims that if all triangles were isosceles, one could be led to think that 2R belongs to them *as isosceles*. Here it becomes clear that condition (iii) for primary-universality cannot be understood in purely extensional terms.[23] In this chapter, Aristotle analyses situations in which we mistakenly believe to be demonstrating a primary-universal predication, when in fact we are not (*APo* I 5, 74a4–6; see Hasper 2006). For instance, in a situation in which all triangles happen to be isosceles, we could wrongly assume that 2R is predicated of them for the very fact that they are isosceles, which would make us believe that isosceles is the kind to which 2R belongs in a primary-universal way. If (iii) were an extensional requirement, as Ferejohn argues, the counterfactual scenario of 74a16–17 would not be a situation in which a predicate P *falsely* appears to belong to a subject S *qua* S, but a situation in which P *does in fact* belong to S *qua* S. However, Aristotle's point is precisely that the coextension between S

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[23] There is, however, a relevant difference between the two examples, since in the counterfactual scenario of *Met*. VII 11, 1036a34–b2, Aristotle is not necessarily assuming that all and only spheres are made of bronze, whereas coextensiveness is an important aspect of the counterfactual in *APo* I 5, 74a16–17. The reference to *Met*. VII 11 is merely illustrative, therefore. I am thankful to one of the referees for bringing my attention to this.

and P does not warrant that P belongs to S *as such*, and therefore is insufficient to establish that the connection between S and P is one of primary-universality (see *APo* I 5, 74a25–32).

If we put these difficulties aside, Ferejohn succeeds in meeting our 2ⁿᵈ *desideratum.* Since the terms in Syllogisms I and II are assumed to be convertible[24], he can easily explain why their minor premises are said to be immediate. Their immediacy follows from their subject and predicate being coextensive, which means no term could intervene extensionally between them. However, the author meets the 2ⁿᵈ *desideratum* at the cost of failing to meet the 1ˢᵗ. Aristotle's favorite example of demonstrable truth, 'every triangle has 2R,' and all primary-universal *demonstranda* would be immediate insofar as they contain only coextensive terms. In fact, as Ferejohn himself admits, even non-universal propositions such as 'every isosceles has 2R' satisfy the immediacy requirement, as he defines it (Ferejohn 1994, 93–96; 2013, 89–90).[25] As a result, his interpretation does not account for the numerous passages in which Aristotle uses the term 'immediate' to qualify scientific principles, as opposed to demonstrable truths, including, for instance, *APo* I 2, 71b9–72a8, where Aristotle characterizes scientific principles as immediate, the terms 'immediate' and 'indemonstrable' are used interchangeably and immediacy is explained in terms of indemonstrability.[26] For these reasons, I think that Ferejohn's proposal also fails to provide a convincing account of immediacy as a non-epistemic feature.

5. *Conclusion*

I presented a series of objections against two interpretations of the *APo* that avoid understanding the immediacy of scientific premises in terms of epistemic priority: Robin Smith (1986) and Michael Ferejohn (1994; 2013). I believe these readings are in conflict with

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[24] See Ferejohn (1994, 86; 2013, 77). The example is supposed to work under some sort of domain restriction (probably ranging over heavenly bodies of a certain sort) and in conformity with Aristotle's astronomical beliefs, according to which planets are closer to the earth in comparison to the stars in the composition of celestial spheres. On this domain restriction, see Ferejohn (1994, 86 n.14; 2013, 76 n.32).

[25] That is to say, there is no kind-term whose extension properly includes the extension of 'isosceles' and whose extension is properly included by the extension of '2R.' Ferejohn (1994, 91–92) assumes that, for Aristotle, demonstrative language is restricted to terms that designate kinds, since a disjunctive expression such as 'being isosceles or equilateral' intervenes extensionally between 'isosceles' and '2R.'

[26] For a similar criticism, see Yu (2022, 61). This shortcoming is not avoided by the fact that Ferejohn interprets "the noun *apodeixis* and its derivatives in these early chapters to refer to the generic notion of discursive epistemic justification and not specifically to the syllogistic theory of justification developed later in the treatise" (Ferejohn 2013, 75 n.27)—see also Ferejohn (1994, 79; 2013, 65). If this is correct, 'ἀναποδείκτων' in 71b27 would be saying, of demonstrative principles, that they cannot receive or do not require any discursive epistemic justification. Well, propositions like 'every triangle has 2R' or 'planets do not twinkle' (all ἄμεσα in his interpretation) are not ἀναπόδεικτα in this sense either, so Ferejohn must deny that 'ἀναποδείκτων' in 71b27 is a reference to 'ἀμέσων' in 71b21, as he understands it.

important aspects of Aristotle's doctrine. For this reason, they do not seem to be promising solutions to the difficulty presented in Section 2 and more needs to be said in favor of them before we abandon the more traditional, epistemic accounts. After all, Aristotle defines immediacy in terms of epistemic priority: "a principle of a demonstration is an immediate proposition, and a proposition is immediate if there is no other proposition prior to it" (*APo* I 2, 72a7–8). It seems more promising, therefore, to pursue an interpretation of the notion of immediacy that (i) preserves its connection to epistemic primacy and indemonstrability and (ii) turns out to be compatible with *APo* I 13, a chapter in which a deducible and demonstrable premise is classified as immediate.[27]

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Bibliography

Alexander of Aphrodisias. "In Aristotelis Analyticorum Priorum Librum I Commentarium." In *Commentaria in Aristotelem Graeca. Voluminis II. Pars I*, edited by Max Wallies 1883. Berlin: G. Reimer.

Alexander of Aphrodisias. "In Aristotelis topicorum libros octo commentaria." In *Commentaria in Aristotelem Graeca. Voluminis II. Pars II*, edited by Max Wallies 1891. Berlin: G. Reimer.

Angioni, Lucas. 2012. "Os Seis Requisitos das Premissas da Demonstração Científica em Aristóteles (Segundos Analíticos I 2)." *Manuscrito* 35 (1): 7–60.

Angioni, Lucas. 2018. "Causality and Coextensiveness in Aristotle's *Posterior Analytics* 1.13." *Oxford Studies in Ancient Philosophy* 54: 159–185.

Aquinas, Thomas. 1989. *Opera Omnia, Tomus I, 2. Expositio Libri Posteriorum*. Roma - Paris: J. Vrin.

Barnes, Jonathan. 1981. "Proof and Syllogism." In *Aristotle on Science: The Posterior Analytics, Proceedings of the Eighth Symposium Aristotelicum*, edited by Enrico Berti, 17–59. Padova: Editrice Antenore.

Barnes, Jonathan. 1993. *Aristotle: Posterior Analytics*. 2nd ed. Oxford: Clarendon Press.

Bonitz, Hermann. 1870. *Index Aristotelicus*. Berlin: G. Reimer.

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[27] I propose an interpretation in these terms in Zuppolini (2021).

Bronstein, David. 2016. *Aristotle on Aristotle on Knowledge and Learning: The Posterior Analytics*. Oxford: Oxford University Press.

Charles, David. 2000. *Aristotle on Meaning and Essence*. Oxford: Clarendon Press.

Crager, Adam. 2015. "Meta-Logic in Aristotle's Epistemology." PhD diss., Princeton University. http://arks.princeton.edu/ark:/88435/dsp01vt150m64d.

Ferejohn, Michael. 1994. "The Immediate Premises of Aristotelian Demonstration." *Ancient Philosophy* 14 (Special Issue): 79–97.

Ferejohn, Michael. 2013. *Formal Causes: Definition, Explanation, and Primacy in Socratic and Aristotelian Thought*. Oxford: Oxford University Press.

Gasser-Wingate, Marc. 2020. "Conviction, Priority, and Rationalism in Aristotle's Epistemology." *Journal of the History of Philosophy* 58 (1): 1–27.

Geach, Peter. 1972. *Logic Matters*. Oxford: Basil Blackwell.

Goldin, O. 2013. Circular Justification and Explanation in Aristotle. *Phronesis* 58 (3), pp. 195–214. Hadgopoulos, Demetrius J. 1977. "*Posterior Analytics* II, viii, 93a36." *Apeiron* 9 (1): 32–39.

Hasper, Pieter Sjoerd. 2006. "Sources of Delusion in *Analytica Posteriora* 1.5." *Phronesis* 51 (3): 252–84.

Hintikka, Jaakko. 1972. "On the Ingredients of an Aristotelian Science." *Noûs* 6 (1): 55–69.

Kosman, L.A. 1973. "Understanding, Explanation, and Insight in Aristotle's Posterior Analytics." In: E.N. Lee, A.P.D. Mourelatos, and R. Rorty, eds., *Exegesis and Argument, Studies in Greek Philosophy Presented to Gregory Vlastos*, New York: Humanities Press, pp. 374–392.

Lear, Jonathan. 1980. *Aristotle and Logical Theory*. Cambridge: Cambridge University Press.

Lennox, James G. 1987. "Divide and Explain: The *Posterior Analytics* in Practice." In *Philosophical Issues in Aristotle's Biology*, edited by Alan Gotthelf and James G. Lennox, 90–119. Cambridge: Cambridge University Press.

Lewis, Frank A. 1991. *Substance and Predication in Aristotle*. Cambridge: Cambridge University Press.

Malink, Marko. 2013. "Aristotle on Circular Proof." *Phronesis* 58 (3): 215–248.

Malink, Marko. 2017. "Aristotle on Principles as Elements." *Oxford Studies in Ancient Philosophy* 53: 163–213.

McKirahan, Richard. 1992. *Principles and Proofs: Aristotle's Theory of Demonstrative Science.* Princeton: Princeton University Press.

Mignucci, Mario. 2007. *Aristotele - Analitici Secondi. Organon IV.* Bari: Laterza.

Morison, Benjamin. 2019. "Theoretical Nous in the *Posterior Analytics*." *Manuscrito* 42 (4): 1–43.

Philoponus. "In Aristotelis Analytica Posteriora Commentaria cum anonymo in librum II." In *Commentaria in Aristotelem Graeca. Voluminis XIII. Pars III*, edited by Max Wallies 1909. Berlin: G. Reimer.

Ross, W.D., ed. 1949. *Aristotle's Prior and Posterior Analytics: A Revised Text with Introduction and Commentary*. Oxford: Oxford University Press.

Smith, Robin. 1982. "The Relationship of Aristotle's Two *Analytics*." *The Classical Quarterly* 32 (2): 327–335.

Smith, Robin. 1986. "Immediate Propositions and Aristotle's Proof Theory." *Ancient Philosophy* 6: 47–68.

Smith, Robin. 2009. "Aristotle's Theory of Demonstration." In *A Companion to Aristotle*, edited by Georgios Anagnostopoulos, 51–65. Oxford: Wiley-Blackwell.

Themistius. "Analyticorum Posteriorum Paraphrasis". In *Commentaria in Aristotelem Graeca. Voluminis V. Pars I*, edited by Max Wallies 1900. Berlin: G. Reimer. 3.

Yu, Jingfang. 2022. *A Noção de Imediato nos* Segundos Analíticos *de Aristóteles*. Dissertação (Mestrado)—Universidade Federal do Rio Grande do Sul, Instituto de Filosofia e Ciências Humanas, Programa de Pós-Graduação em Filosofia, Porto Alegre, BR-RS.

Zuppolini, Breno. 2019. "Avoiding Infinite Regress: *Posterior Analytics* I 22." *Manuscrito* 42 (4): 122–156.

Zuppolini, Breno. 2021. "Immediacy in Aristotle's Epistemology." *Phronesis: A Journal for Ancient Philosophy*. 66(2): 111–138.