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Aristotle on Demonstrative Knowledge: Particulars Included

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Abstract: This paper examines Aristotle's account of scientific knowledge through demonstration in *Posterior Analytics*, challenging the prevailing view that he excludes sensible particulars from demonstrative knowledge. I argue that Aristotle's conception of demonstration includes not only unqualified demonstrations but also what I call 'qualified' demonstrations, which can have definite sensible particulars as subjects. These demonstrations yield knowledge that meets Aristotle's central requirements for knowledge, albeit in a qualified way. Although qualified knowledge falls short of unqualified knowledge, it is nevertheless genuine demonstrative knowledge. I further argue that unqualified knowledge entails potential knowledge of a given particular, which is actualized by applying it to a particular at hand. Qualified demonstrations allow us to apply demonstrative knowledge to the sensible particulars around us.

Keywords: *Posterior Analytics*, scientific knowledge, explanation, necessity, essence.

1 Introduction

This paper examines whether Aristotle's account of scientific knowledge (ἐπιστήμη) through demonstration in *Posterior Analytics* (*An. Post.*) restricts all demonstrative knowledge to universals or allows for demonstrations involving definite sensible particulars. Aristotle's favorite example of a demonstrable truth in *An. Post.* A is that all triangles have angles equal to two right angles (abbreviated as '2R'). The demonstration yielding knowledge of this truth can be roughly reconstructed as follows:

1. All triangles are essentially thus-and-so.
2. Whatever is essentially thus-and-so has 2R.
3. Therefore, all triangles have 2R.

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Most scholars would agree that this demonstration yields knowledge of the conclusion by revealing the explanation of why it holds and does so necessarily, thereby satisfying Aristotle's central requirements for knowledge in *An. Post. A 2*. Nonetheless, Aristotle also acknowledges demonstrations – or, more cautiously, deductions – that apply this conclusion to subspecies of triangles, such as isosceles, as well as to particular sensible triangles. The latter deduction, envisioned in *An. Post. A 1*, may be reconstructed as follows:

1. All triangles have 2R.
2. This [figure in the semicircle] is a triangle.
3. Therefore, this has 2R.

The question of whether this deduction counts as a demonstration yielding demonstrative knowledge is significantly more controversial. The prevailing scholarly view leans strongly toward a negative answer and may be summed up as follows: “There can be no demonstrative knowledge, which strictly speaking means no knowledge at all, of particulars”; “There is a long tradition going back to Aristotle, according to which science deals only with the universal”; and “It is only universal propositions which Aristotle will allow into the sciences.”¹

This paper challenges the assumption that Aristotle's account excludes sensible particulars from demonstrative knowledge. I argue that his position is more nuanced and allows for demonstrative knowledge involving particulars. The central focus is a passage in *An. Post. A 8*, often regarded as evidence that Aristotle rejects demonstrations with definite particulars as subjects. However, I will argue that this passage leaves room for such demonstrations and that they yield knowledge satisfying Aristotle's requirements, albeit in a qualified way. Accordingly, I propose that Aristotle distinguishes between two types of demonstrative knowledge: unqualified and qualified. While qualified knowledge involving definite particulars falls short of unqualified knowledge, it nevertheless remains genuine demonstrative knowledge.

The remainder of this paper consists of four sections. The first outlines Aristotle's central requirements for demonstrative knowledge, as specified in *An. Post. A 2*. The second section examines the controversial passage in *An. Post. A 8*, arguing that Aristotle distinguishes between unqualified and qualified (‘as if accidental’) knowledge, with the latter involving sensible particulars as subjects. It further explains how qualified knowledge meets Aristotle's central requirements for knowledge. The third section argues that unqualified knowledge entails potential knowledge of

¹ Adamson 2005, 258; Marcos 2004, 73; Barnes 2002, 114. See also, e. g., Burnyeat 1981, 113; Hintikka 1967, 8; Koslicki 2012, 198; Taylor 1990, 121. For a discussion of some motivations behind the scholarly denial of scientific knowledge of particulars, see Leszl 1972.

a definite particular, which can be actualized by applying it to a particular at hand. The paper concludes by considering the role of qualified demonstrations in demonstrative science and highlighting the broader implications of this interpretation.

2 Aristotle's Requirements for Knowledge

Scholarly discussions of Aristotle's view of scientific knowledge typically center on *An. Post. A*, where he develops his account of demonstrative knowledge. I set aside the question of whether all scientific knowledge is demonstrative and focus on the converse view to which Aristotle is clearly committed, namely that all demonstrative knowledge is scientific.² In what follows, this is what I mean by 'knowledge.' This section outlines Aristotle's central requirements for knowledge and introduces some considerations regarding the knowability of particulars.

In *An. Post. A 2*, Aristotle provides the following definition of what he calls 'knowledge without qualification' (ἐπιστήμη ἀπλῶς), or, for short, 'unqualified knowledge':

We think that we know (ἐπίστασθαι) each thing without qualification (ἀπλῶς) (and not in the sophistical way, accidentally) when we think that we know the explanation (αἰτία) because of which the thing is, that it is its explanation, and that this [thing] cannot be otherwise.³ (71b9–12)

According to this definition, the two central requirements for knowing something without qualification are knowing its explanation and that it cannot be otherwise, which is Aristotle's way of saying that it must be necessary (*An. Post. A 4*, 73a21–22; *Met. A 5*, 1015b7–9). He holds that we have this knowledge through demonstration, a 'scientific deduction' (*An. Post. A 2*, 71b17), which consists of premises and a conclusion in subject-predicate form: the predicate term stands for that which belongs to a subject (let us call it an 'attribute') and the subject term for that to which the attribute belongs. Thus, the 'something' that we know without qualification is the conclusion of a demonstration in which an attribute is predicated of a subject. For a demonstration to yield knowledge of the conclusion, its premises must be explanatory and necessary.⁴ Let us examine these requirements in greater detail.

² According to a common interpretation, all scientific knowledge is demonstrative: we do not have such knowledge of the indemonstrable first principles of demonstrations. For recent criticism, see Bronstein 2016, ch. 4.

³ Translations are my own.

⁴ The explanatoriness requirement is listed in *An. Post. A 2*. For a discussion of other requirements listed in *A 2* (71b20–22), see McKirahan 1992, ch. 2. The necessity requirement is discussed in *A 4*; see also *A 6* and 8.

A demonstration is explanatory in virtue of having premises that are explanatory of the conclusion. Specifically, Aristotle takes the middle term, common to both premises, to be explanatory (αἰτιον, *A* 13; *B* 2, 89b37–90a9). A demonstration thus explains why an attribute belongs to a subject via the middle term: *S* is *P* because *S* is *M* and *M* is *P*.⁵ For Aristotle, the middle term expresses the essence of something, and paradigmatically, the essence of the subject.⁶ This is evident in Aristotle's main example of a demonstrable truth in *An. Post. A*: all triangles have 2R because they are essentially thus-and-so, and whatever is essentially thus-and-so has 2R.⁷ Here the middle term that explains the connection between the subject and the demonstrable attribute is the essence of triangle. As for the connection between the subject and its essence, Aristotle holds that it is immediate and does not admit of demonstration (*An. Post. B* 3–7). This suggests that, paradigmatically, the conclusions of demonstrations are truths in which the attribute belongs to the subject non-essentially. Given the necessity requirement, it follows that demonstrations explain why certain non-essential but necessary attributes belong to their subjects based on essential and necessary attributes.

That demonstrations reveal explanations of demonstrable truths from essences is a standard view, defended by Bronstein (2016), Koslicki (2012), and Goldin (1996).⁸ This view implies that there is a distinction between necessary and essential truths, on the one hand, and necessary and non-essential truths explained by essential ones, on the other. The distinction between two types of necessary attribute is

5 Admittedly, this formulation is a simplification. Demonstrations are, paradigmatically, deductions in Barbara, though Aristotle does not think that *all* demonstrations are in Barbara. See *An. Post. A* 21, 23–25.

6 See *An. Post. A* 4, 73b31–2; *A* 5, 74a30–4; *B* 13, 96b15–25. In *An. Post. B*, Aristotle discusses demonstrations where the middle terms express the essence of the attribute, e. g., being eclipsed belongs to the moon because of its being screened by the earth, and being screened by the earth is part of what it is to be eclipsed. Bronstein (2016) argues that such attributes are ultimately explained by the subject's essence (see n11). It is beyond the scope of this paper to discuss such demonstrations, but they are relevant for future work, as they involve singular events and processes.

7 For a reconstruction of this deduction, see Ferejohn 2013, 115. He takes 2R to be explained directly by the subject's essence. Bronstein (2016, ch. 7) takes it to be explained ultimately by the subject's essence.

8 This relates to a common interpretation of Aristotle's view on essence, according to which essences explain why things have other necessary attributes. See Kung 1977; Shields 2007, 104–105; Koslicki 2012. An alternative view is defended by McKirahan 1992, ch. 9; Tierney 2001. Tierney argues that essence does not explain necessary attributes but rather consists of them, and that demonstration is not an explanation, but a “logico-deductive unpacking of essential natures” (Tierney 2001, 154). For a critical discussion of this type of view, see Goldin 1996, 4–5.

present in *Topics* and also emerges from Aristotle's discussion of demonstrative necessity in *An. Post. A 4*:⁹

One thing belongs to another in itself (καθ' αὐτὸ) if it belongs to it in what it is (τί ἐστιν), e. g., line to triangle or point to line (for their being depends on these and they inhere in the account which states what they are), and also if what it belongs to itself inheres in the account which shows what it is, e. g., straight belongs to line and so does curved, and odd and even to number: [...] [C]oncerning things that can be known without qualification, those things which are said [to belong] in themselves, either in the sense of inhering in what is predicated or of being inhered in [by what is predicated], do so on account of themselves and of necessity. (*A 4*, 73a34–b19)

Aristotle associates demonstrative necessity with two ways in which an attribute belongs to a subject in itself. In the first case, an attribute belongs to a subject in itself, and thus of necessity, if it is part of what the subject is, that is, its essence. For example, if a triangle is defined as a plane figure bounded by three lines, then all the specified attributes belong to the subject essentially and of necessity. Such attributes figure in definitions, accounts revealing or stating the essence (*A 4*, 73a37–38; *B 10*, 93b29), which are among the premises of demonstrations. In the second case, an attribute belongs to a subject in itself, and thus of necessity, if the subject is part of the essence of the attribute. For example, number is part of the essence of even. There is considerable controversy over what kind of attributes Aristotle has in mind, but there is broad agreement that this sort of necessity is not restricted to premises of demonstrations. It also applies to conclusions, that is, to attributes that can be demonstrated to belong to their subjects.¹⁰

Bronstein (2016, ch. 3) argues that demonstrable attributes that are defined partly in terms of their subjects belong to their subjects ultimately because of the subject's essence.¹¹ He distinguishes these from 'in itself accidents,' which are explained by the subject's essence but are not defined in terms of their subjects.¹²

9 See *Top. A 5*, *E 1*. The non-essential and necessary attributes, standardly referred to as *propria* (ἰδία), are often taken to follow from essential ones in the sense of being explained by them. See, esp., Koslicki 2012.

10 For a defense of this view, see Zuppolini (2018). See also Graham (1975).

11 More precisely, Bronstein (2016, ch. 3) argues that such attributes belong to the subject because of the attribute's essence. However, since the attribute's essence belongs to the subject because of the subject's essence, the attribute belongs to the subject *ultimately* because of the subject's essence.

12 For 'in itself accidents,' see *An. Post. A 7*, 75a39–b1; *A 6*, 75a18–21; cf. *Met. Δ 30*, 1025a30–2. Bronstein's view implies that the two ways of belonging in itself do not exhaust demonstrative necessity, as might be suggested by *An. Post. A 6*, 74b5–12; *A 22*, 84a11–17. I agree that the attempt to analyze all premises of demonstrations in terms of these two ways of belonging would be challenging. For example, Aristotle recognizes other principles besides definitions (e. g., axioms) which do not seem

Setting aside the intricate details, I agree that demonstrable attributes belong to the subject (ultimately) because of the subject's essence and derive their necessity from it. As Barnes puts it, the necessity of the objects of scientific understanding is "ultimately grounded in essential or definitional connections" (Barnes 2002, 120). Accordingly, Aristotle's view on demonstrative necessity in *An. Post. A 4* may be summed up thus: an attribute belongs to a subject of necessity if it is part of the subject's essence or if its belonging to a subject is ultimately explained by the subject's essence.¹³

According to this interpretation, the subjects of demonstrative knowledge have essences that explain why they have other necessary but non-essential attributes. Notably, while this interpretation requires subjects to have essences, it does not specify what kind of things can figure as subjects. This leaves open the possibility that the subjects include definite particulars, provided they have essences. Whether Aristotle allows demonstrations with definite particulars as subjects is a separate question, which will be addressed in the next section. But first let us consider whether Aristotle regards particulars as things with essences, focusing on *Categories* 5, which provides his most extensive treatment of particular things in his logical works.

In *Categories* 5, Aristotle speaks of ordinary particulars like humans and horses as 'primary substances' and argues that all other things are, ultimately, in or said of them as subjects, while they themselves are not in or said of anything (2a10–13; 2a34–b6; 2b15–17). This argument is commonly understood to establish the ontological dependence of other things on particular substances, for Aristotle concludes that "if there were no primary substances it would be impossible for any of the other things to be" (2b5–6).¹⁴ However, while other things depend on particular substances, there remains an important difference: some reveal what the particular is, whereas others do not. Specifically, Aristotle argues (2b29–36; 2b7–14) that species and genera reveal what the primary substance is, "for if one is to say of the particular human what they are (τί ἐστίν), it will be in place to give the species or the genus (though more informative is to give *human* than *animal*)" (2b32–36). Assuming that what something is (τί ἐστίν) indicates its essence, Aristotle can be seen as distinguishing between what is essential to a particular from what is not.¹⁵ Accordingly, particular substances as the ultimate subjects are not the so-called bare particulars

to conform to these ways of belonging in itself. For a discussion of these principles, see McKirahan 1992, ch. 3. See also n32.

¹³ This has become a fairly common conception of necessity also in contemporary metaphysics among the Neo-Aristotelians. For a discussion, see Zylstra 2020.

¹⁴ For further discussion, see Sirkel 2024.

¹⁵ This is how this distinction is commonly construed. For a discussion and defense, see Cohen 1978.

which are essentially no kinds of things at all. Rather, particulars are things with essences: each particular substance is essentially of a certain kind. For example, this human is essentially human, this horse essentially horse, and so forth.¹⁶

The next section aims to show that Aristotle allows there to be demonstrations with definite particulars as subjects. To forestall a possible confusion, let me address two objections that no one (as far as I know) has stated in quite these terms but that might help to explain why Aristotle's views are thought to involve a difficulty regarding the knowability of particulars.

One might object that the alleged demonstrative knowledge of particulars as things of a certain kind is not about particulars as such, in all their uniqueness and particularity.¹⁷ I concede that demonstrations involving particulars explain why they have necessary attributes that belong to all things of the same kind, and they do not explain the presence of non-necessary or unique attributes (if we call such unique aspects of particulars 'attributes' at all). Hence, if the claim that there is no demonstrative knowledge of particulars means that there is no knowledge of them in all their uniqueness, then this is true: as such, particulars are objects of sense-perception, rather than knowledge. Nonetheless, to insist that this rules out demonstrative knowledge of particulars presupposes that they can only be viewed in their full particularity and uniqueness. Yet that is not the view that emerges from *Categories* 5, where Aristotle treats particulars as things of a certain kind. He characterizes a particular substance as a 'this something' (τόδε τι, 3b10–13), and his examples 'this human' and 'this horse' (2a13) suggest that 'something' indicates the species under which the particular falls.¹⁸ Thus, for Aristotle, particulars are not just unique 'thises' but also 'somethings,' and this is what matters for demonstrative knowledge.

Another related objection is that knowledge of particulars as falling under kinds is not about the particulars themselves, but about the kinds under which they fall. For example, when we know why Socrates *qua* human is grammatical, our knowledge is not about Socrates but about the species *human*. Indeed, Aristotle holds (at least in his logical works) that particulars of the same kind share the same essence, along with necessary and non-essential attributes explained by

¹⁶ For a defense of the view that Aristotle is in *Cat.* committed to a form of essentialism according to which to be a particular substance is to be a member of its respective kind, see Loux 1991, ch. 1. For a discussion of how this form of essentialism is compatible with the ontological priority of primary substances, see Sirkel 2024.

¹⁷ See Leszl (1972), who discusses possible evidence for the view that particulars are not knowable in their uniqueness, and argues (like I do) that this is compatible with them being knowable as falling under universals.

¹⁸ For this interpretation of the phrase τόδε τι, see esp. Loux 1991, 29; Gill 1989, 31.

their essence.¹⁹ However, this does not mean that their essences are not their own, as it were. Some authors associate the denial that particulars have essences with Platonism, as Aristotle understands it.²⁰ On this view, particulars are what they are in virtue of something else. For example, Socrates is human because he participates in the Form of Human. For Aristotle, Socrates is human (not in virtue of something else but) in himself.²¹ Consequently, our knowledge about Socrates *qua* human is knowledge about Socrates, given that being human is part of what he is. Thus, demonstrative knowledge about particulars as things of a certain kind can be said to be about particulars, insofar as they are things of a certain kind.

Without further ado, let us examine what I will call a ‘target passage’ in *An. Post. A 8*. This passage is often regarded as a crucial piece of evidence against the proposal that Aristotle allows for demonstrative knowledge with definite particulars as subjects. However, I will argue that this passage does not rule out such knowledge but rather makes a distinction between unqualified and qualified demonstrative knowledge.

3 Unqualified and Qualified knowledge

Let us first present the target passage from *An. Post. 8* and outline the key issues that this passage raises:

It is also clear that if the premises from which a deduction proceeds are universal, then the conclusion of such a demonstration – of a demonstration without qualification – must be eternal. There is therefore no demonstration or knowledge of perishables without qualification, but only as if accidentally because it [the predicate] does not belong [to the subject] universally but only at a certain time and in a certain way. Whenever there is [such demonstration and knowledge], one premise must be non-universal and perishable – perishable because when it holds, the conclusion too will hold, and non-universal because it will hold of one [instance of the subject] to which [the major premise applies] but not of others – so it is impossible to deduce [a] universal [conclusion], but that [the conclusion holds] now.²² (75b21–30)

¹⁹ The sameness involved is specific (or qualitative), i. e., particulars of the same species are specifically the same. There is still room for disagreement over whether the essences of particulars are individual in the sense of being numerically distinct.

²⁰ See esp. Code 1986; Spade 1999.

²¹ For a discussion on how to understand the role of essence, see Sirkel 2018.

²² Φανερόν δὲ καὶ ἐάν ᾧσιν αἱ προτάσεις καθόλου ἐξ ὧν ὁ συλλογισμός, ὅτι ἀνάγκη καὶ τὸ συμπέρασμα αἰδιον εἶναι τῆς τοιαύτης χάποδείξεως καὶ τῆς ἀπλῶς εἰπεῖν ἀποδείξεως. οὐκ ἔστιν ἄρα ἀπόδειξις τῶν φθαρτῶν οὐδ' ἐπιστήμη ἀπλῶς, ἀλλ' οὕτως ὥσπερ κατὰ συμβεβηκός, ὅτι οὐ καθ' ὅλου

This passage invokes two issues with implications for the knowability of particulars. First, Aristotle asserts that the premises, and so also the conclusion, of an unqualified demonstration – presumably, a demonstration yielding unqualified knowledge – are universal. This invokes the question of what he means by a ‘universal’ (καθόλου), and whether he requires the premises of demonstrations to be universal. I will argue that whereas unqualified demonstrations proceed from universal premises, definite particulars can figure in ‘as if accidental’ demonstrations yielding demonstrative knowledge that meets the requirements for knowledge, albeit in a qualified way. Second, Aristotle makes use of temporal notions, describing the conclusion of an unqualified demonstration as ‘eternal’ and contrasting it with the conclusion of an ‘as if accidental’ demonstration that holds ‘at a certain time’ and ‘now.’ I will examine these temporal notions in connection with his account of necessity and reject a line of interpretation which requires the subjects of necessary truths to exist eternally.

What does Aristotle mean by a ‘universal’ in *Posterior Analytics*? In *A* 4, he introduces two relevant notions, which we may regard as notions of a universal.²³

I say that something belongs to all instances of the subject (κατὰ παντός) if it does not belong to some instances and not to others, nor at some times and not at others. (73a28–29)

I mean by a universal (καθόλου) that which belongs to all instances of the subject and in itself (καθ' αὐτό) and as itself (ἡ αὐτό). (73b25–26)

The first notion of a universal is defined in terms of belonging to all instances of the subject, which is contrasted with belonging to some instances and at some times. In the target passage, Aristotle contrast the conclusions of an unqualified and an ‘as if accidental’ demonstrations in similar terms: the latter holds of one instance of the subject and at a certain time. This suggests that Aristotle takes the conclusions, and so also the premises, of unqualified demonstrations to be universal at least in the sense that the attribute belongs to all instances of the subject and at all times. We may thus conclude that unqualified demonstrations are deductions in the universal affirmative mood Barbara, with premises and conclusions of the form ‘all *S*’s are *P*’ or ‘*P* belongs to all *S*.’ Nonetheless, Aristotle does not think that all demonstrations are in Barbara. He describes deductions in the universal affirmative mood as

αὐτοῦ ἐστὶν ἀλλὰ ποτὲ καὶ πῶς, ὅταν δ' ἧ, ἀνάγκη τὴν ἑτέραν μὴ καθόλου εἶναι πρότασιν καὶ φθαρτὴν – φθαρτὴν μὲν ὅτι ἔσται καὶ τὸ συμπέρασμα οὐσης, μὴ καθόλου δὲ ὅτι τῷ μὲν ἔσται τῷ δ' οὐκ ἔσται ἐφ' ὧν – ὥστ' οὐκ ἔστι συλλογίσασθαι καθόλου, ἀλλ' ὅτι νῦν. Some issues concerning the translation are discussed in n28.

²³ The first notion is similar to Aristotle's characterization of a universal as what is predicated of many things. See *De Int.* 7, 17a39.

‘especially scientific’ (A 14, 79a24) but also acknowledges demonstrations in other moods (A 21, 23–25).

The second notion of a universal (referred to in the above passage as ‘universal’) is more demanding: it requires that the attribute belongs not only to all instances of the subject but also in itself and as itself. While it is not immediately clear what belonging as itself adds to belonging in itself, I will follow a well-established interpretation that associates belonging as itself with co-extensiveness or convertibility.²⁴ This interpretation finds support in Aristotle’s explanation in A 4 (73b32–74a3), where he states that 2R belongs to triangles as triangles but not to figures as figures (which is too broad) or to isosceles as isosceles (which is too narrow: “it does not apply to isosceles universally but extends further,” 74a2–3). This suggests that an attribute belonging to a subject as itself is convertible with that subject. For example, if something has 2R, then it is a triangle and if something is a triangle, it has 2R. Scholars often refer to such universals as ‘commensurate universals.’

It is controversial whether Aristotle requires demonstrations to have commensurately universal premises and conclusions. Some scholars maintain that he does, whereas others do not consider this a requirement for all demonstrations.²⁵ In what follows, I will proceed on the assumption that *unqualified* demonstrations have premises and conclusions in which the attribute belongs to all instances of the

²⁴ See Angioni (2018) and Hasper (2006), who argue that co-extensiveness is a necessary (though not sufficient) condition for belonging as such. In A 4, Aristotle complicates matters with a “puzzling claim” (Ross, 2001, 523) that belonging in itself and as itself are the same, illustrating it with examples of point and straight belonging to lines and 2R belonging to triangles (73b28–32). This claim is puzzling because the way Aristotle introduces these types of belonging in A 4 suggests that they represent different relations (Ross, 2001, 523). Further, there are cases where these relations come apart. For example, parts of a definition (e. g., the genus *animal*) are not convertible with the subject (e. g., the species *human*) yet are essential to it. A possible response is that in some cases, belonging in itself and as itself are the same, while in others, they come apart. Paradigmatic examples of the former are full definitions and certain demonstrable truths, such as 2R belonging to triangles (*Top.* A 8, 108b9–12). Examples of the latter include parts of definitions and, presumably, certain demonstrable truths, such as 2R belonging to isosceles (*An. Post.* A 24). Additionally, one might question whether Aristotle’s example of point and straight belonging to line illustrates convertibility. In response, one could propose that ‘point’ and ‘line’ serve as shorthand for attributes that are convertible with the subject: ‘point’ could be a shorthand for a definition of line, and ‘straight’ for ‘straight or curved’ (for the latter construal, see Ferejohn 1991, ch. 5).

²⁵ Angioni (2009) argues that in a demonstration all three terms must convert; Angioni (2016, 2018) argues that the middle and major term must convert. Barnes (2002, 258) and McKirahan (1992, 176, cf. 97) argue that Aristotle does not adopt what Barnes calls “the ‘most extreme form’ of the doctrine of the Commensurate Universal,” according to which all premises of a demonstration must involve convertible terms. See also Inwood 1979. Cf. *An. Post.* A 3, 73a18; A 12, 78a6–12.

subject, in itself and as itself, which entails convertibility. A paradigmatic example is a demonstration establishing that all triangles have 2R, where all terms (minor, major, and middle) convert. My aim is to show that even if we take Aristotle to have such universals in mind when stating in *A 8* that an unqualified demonstration proceeds from universal premises, this does not rule out demonstrations involving definite particulars. After stating that such a demonstration has an eternal conclusion (more on this shortly), he adds that “there is therefore no demonstration or knowledge of perishables without qualification, but only as if accidentally” (75b25–26). This suggests that demonstrating without qualification is not the only way to demonstrate: there can be demonstrations of perishables ‘as if accidentally.’

The translation ‘as if accidentally’ (ὥσπερ κατὰ συμβεβηκός) follows McKirahan’s translation ‘as if incidentally’ (1992, 181). However, it is common to omit the qualifier ‘as if’ (ὥσπερ, ‘as it were’) and translate the phrase simply as ‘accidentally’ or ‘incidentally,’ as seen in Barnes (2002, 13). This translation becomes problematic if one assumes that accidental knowledge is not genuine knowledge.²⁶ In the target passage, Aristotle does not deny the possibility of demonstrations about perishables but rather the possibility of unqualified demonstrations. If there are demonstrations about perishables, they must yield demonstrative knowledge, though not unqualified knowledge. Accordingly, I propose that the phrase ‘as if accidentally’ introduces a qualification on knowledge: such knowledge meets Aristotle’s central requirements for knowledge, albeit in a qualified way. Insofar as it satisfies these requirements, it counts as genuine demonstrative knowledge. I will henceforth refer to ‘as if accidental’ demonstrations and knowledge as ‘qualified’ demonstrations and knowledge.²⁷ Qualified knowledge remains distinct from unqualified knowledge but also from what Aristotle in *A 2* calls accidental (or sophistical) knowledge, which is not genuine knowledge.

Before expanding on these distinctions, let us consider plausible candidates for examples of qualified demonstrations:

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|---|--|
| (A) 1. All triangles have 2R.
2. All isosceles are triangles.
3. Thus, all isosceles have 2R. | (B) 1. All triangles have 2R.
2. This is a triangle.
3. Thus, this has 2R. |
|---|--|

²⁶ There are other instances as well, where skipping the qualifier ‘as if’ can significantly change the meaning (e. g., “the female is as if a mutilated male”; *GA B 3*, 737a27–28). See also Sorabji (1995), who shows that Aristotle makes frequent use of such qualifications in his discussion of cognitive capacities of animals.

²⁷ A phrase ‘qualified knowledge’ (as contrasted with ‘unqualified knowledge’) is used by McKirahan 1992, 172. Cf. Ross (2001, 253), who seems to treat ‘only in a qualified sense’ as equivalent with ‘only in an accidental way.’

In the target passage, Aristotle says that in a qualified demonstration one of the premises, and so also the conclusion, is “non-universal because it will hold of one [instance of the subject] to which [the major premise applies] but not of others.”²⁸ The term ‘non-universal’ covers both subordinate species such as isosceles triangles, as well as particular triangles. The first example (A) is a reconstruction of a demonstration about isosceles that Aristotle mentions frequently in *An. Post.*²⁹ The second example (B) is a reconstruction of a deduction outlined in *An. Post.* A 1 (71a17–29), which will be discussed in the next section. Here it will suffice to say that this example fits well with Aristotle’s characterizations of a non-universal premise and a conclusion as ‘perishable’ and as holding ‘now,’ assuming that this triangle is a sensible, perishable object.³⁰ This characterization does not fit as well with example (A), since the conclusion that all isosceles have 2R holds at all times. This suggests that while Aristotle recognizes demonstrations about subspecies, in the target passage he likely has in mind demonstrations about definite particulars, such as this sensible triangle here and now.

In what follows, I turn to the question of how knowledge provided by qualified demonstrations meets Aristotle’s central requirements for knowledge. My focus is on demonstrations with definite particulars as subjects, where it is less clear how these requirements are satisfied. Both types of qualified knowledge – as exemplified by (A) and (B) above – meet the requirement concerning explanation in a qualified way, and the same reasoning applies to both cases. As far as the necessity requirement is concerned, however, qualified knowledge involving subspecies

28 The text here is difficult. I read τῷ ... τῷ, with Ross and Bekker: μὴ καθόλου δὲ ὅτι τῷ μὲν ἔσται τῷ δ' οὐκ ἔσται ἐφ' ὧν. Barnes translates the conjecture ὅτε μὲν ἔσται ὅτε δ' οὐκ ἔσται τὰ ἐφ' ὧν (“its subjects will sometimes exist and sometimes not exist”; Barnes 2002, 133). He rejects the standard reading that Aristotle is speaking here of particular things, and proposes that Aristotle has in mind a universal affirmative proposition which holds for a given time. Yet it is not clear what kind of examples Barnes has in mind and why this conjecture would not be compatible with the standard reading. For a defense of the view that the minor premise is about a definite particular, see Ross 2001, 534. See also Angioni 2009.

29 See *An. Post.* A 4, 73b38–74a4; A 5, 74a32–74b4; A 24, 85a27–28, 85b6–15, 85b38–86a1; B 3, 91a1–5. Such demonstrations count as qualified demonstrations on the assumption that unqualified demonstrations have commensurately universal premises and conclusions. If we were to require unqualified demonstrations to have premises and conclusions that are universal merely in the sense that the attribute belongs to all instances of the subject, it might be possible to include such demonstrations among the unqualified ones. Yet, this would be difficult to reconcile with textual evidence (e. g., 73b38–74b4), where Aristotle appears to distinguish such demonstrations from those involving commensurate universals.

30 For a list of considerations supporting the view that Aristotle is speaking in A 1 of a particular, sensible triangle, see Gifford 2000, 201–202. See also *An. Pr.* B 21, where the triangle is described as a ‘sensible triangle’ (67a14).

meets it without qualification, whereas it may be unclear whether qualified knowledge involving particulars meets it at all. In what follows, it will be argued that it does meet the necessity requirement, albeit in a qualified way.

3.1 Qualified Knowledge and Necessity

In the target passage, Aristotle distinguishes the conclusion of an unqualified demonstration from that of a qualified demonstration in temporal terms: the former is ‘eternal,’ while the latter holds ‘at a certain time’ and ‘now.’³¹ I take this distinction to be compatible with Aristotle’s conception of demonstrative necessity in *An. Post. A 4*, where necessity is tied to essence: an attribute is necessary if it is essential or explained by essence. As discussed in the first section, this allows particulars to have necessary attributes insofar as they have essences. Thus, the premises and conclusions of qualified demonstrations involving definite particulars, such as the example (B), can be understood as expressing necessary truths. It is uncontroversial that the major premise (e. g., ‘all triangles have 2R’) expresses a necessary truth. But Aristotle’s conception of necessity in *A 4* allows also the minor premise (e. g., ‘this is a triangle’) to be necessary, since the attribute is part of the essence of the subject (e. g., this triangle is essentially triangle). If both premises express necessary truths, then so does the conclusion.³²

Aristotle’s claims in *An. Post. A 8* can be understood as adding a temporal dimension to his account of demonstrative necessity. In *A 4*, belonging to all instances of a subject (κατὰ παντός) is taken to include belonging at all times.³³ This may inform the contrast drawn in *A 8* between the conclusion of an unqualified demonstration and that of a qualified demonstration, which holds of a particular instance at a particular time. This contrast does not extend to qualified demonstrations involving subspecies, where the attribute likewise belongs to all instances of a subject at

³¹ See also *An. Post. A 31*.

³² See *An. Post. A 6*, 74b13–18. Even if we grant that the conclusion is necessary, one might question whether 2R belongs to a definite particular in the second sense of belonging ‘in itself’ specified in *A 4*. This seems to require that the attribute be defined partly in terms of the subject, but it is unclear how a definite particular could figure in the definition of 2R. Yet, the same concern arises in the case of isosceles, even though it is fairly uncontroversial that ‘all isosceles have 2R’ expresses a necessary truth. In response, we might attempt to show how a particular triangle (or isosceles) figures in the definition of 2R by, say, emphasizing that it figures there *qua* triangle. Alternatively, since this concern assumes that the two way of belonging ‘in itself’ exhaust demonstrative necessity, we may challenge this assumption. See n12.

³³ I am grateful for an anonymous referee for drawing my attention to the point that temporal dimension is present already in Aristotle’s account of belonging κατὰ παντός.

all times. But as noted above, Aristotle's primary concern in *A* 8 appears to be with demonstrations involving perishable particulars. When combined with the necessity requirement, it follows that in qualified demonstrations with definite particulars as subjects, the necessary attribute – that is, one that is essential or explained by essence – belongs to the subject *at a particular time*, whereas in unqualified demonstrations, the necessary attribute belongs to the subject *at all times*. The relevant difference is that a conclusion such as 'this triangle has 2R' is tied to the existence of a sensible triangle here and now, and so the conclusion holds here and now. A conclusion such as 'all triangles have 2R,' by contrast, holds of all triangles as such at all times, regardless of whether they exist now or at some other time. We may thus distinguish these conclusions in temporal terms, while maintaining that both express necessary truths.³⁴

Let me also consider an alternative interpretation, according to which necessary predications require eternally existing subjects. This line of interpretation can be traced back to Hintikka (1957) and is more recently defended by Upton (2004). Hintikka argues that there is a close connection between universality and necessity, bridged by the notion of time: what is universal is eternal (i. e., exists at all times), and what is eternal is necessary. Hence, he says that "the attributes 'necessary,' 'imperishable,' 'indestructible,' 'omnitemporal,' and 'eternal' become virtually equivalent" (Hintikka 1957, 111). Similarly, Upton claims that "the need for necessary premises leads to the apparent need for eternal and necessary subjects of demonstration" (Upton 2004, 743). On this interpretation, conclusions holding at a particular time are not necessary, since their subjects exist only at certain times rather than eternally. Consequently, this interpretation rules out the possibility of having knowledge about sensible particulars.³⁵

Although Aristotle regards truths about eternally existing subjects as necessary (see *NE Z* 1), he does not appear to confine demonstrative necessity to such subjects. Several scholars reject the interpretation that links demonstrative necessity with eternally existing subjects.³⁶ I will not reiterate their main objections here but emphasize a consideration that has received less attention: this interpretation overlooks a crucial connection between necessity and essence.³⁷ As a result, it is not easily compatible with Aristotle's views that rely on this connection. For instance, the standard interpretation of his account of demonstration relies on a distinction between essential and necessary truths, on the one hand, and non-es-

³⁴ A similar view is defended by McKirahan 1992, 107–110, 124–127.

³⁵ This is confirmed by Hintikka 1967.

³⁶ See, esp., McKirahan 1992, 125–127; Angioni 2009.

³⁷ As discussed above, this connection is established in *An. Post. A* 4.

sential and necessary truths explained by essences, on the other. However, if necessity is defined solely in terms of universality and omnitemporality, then statements such as ‘all triangles have 2R’ and ‘all triangles are essentially thus-and-so’ are both necessary and we have no grounds to explain the necessity of one in terms of the other.

In response to this challenge, one could modify Hintikka’s interpretation in a way that preserves the connection between essence and necessity but confines essences to externally existing subjects, including species and genera. But even with this revision, several difficulties emerge. For example, it becomes problematic to account for Aristotle’s distinction between necessary attributes and accidents that “may belong or not belong to any one and the self-same thing” (*Top. A* 5, 102b6–7). We would have to deny that this distinction holds at the level of perishable particulars, regarding all of their attributes as accidental.³⁸ Yet Aristotle assumes (*Cat.* 5, 2a34–b4; *An. Post.* A 4, 73a29–31) that attributes belonging to the species belong to its particular members, and there is no indication that what belongs to the species necessarily belongs to particulars accidentally. In *Cat.* 5, Aristotle treats attributes revealing what the particular is as necessary, as is confirmed also by his discussion of accidental change (4a10–21).³⁹ If all attributes of particulars were accidental, it would be difficult to see how a particular could remain the same through a change in accidents. Rather, to change certain attributes, others have to belong to particulars of necessity for as long as they exist.

These difficulties can be avoided by adopting the interpretation outlined above, which distinguishes between necessary truths that hold at all times and those that hold at a specific time. Here sensible particulars are not required to exist eternally to be subjects of knowledge; rather, they must possess attributes that are essential or explained by essential ones for as long as they exist. This interpretation allows qualified knowledge involving particulars to satisfy the necessity requirement, albeit in qualified way. Unqualified knowledge involves knowing that the truth in question cannot be otherwise, full-stop – it holds of necessity at all times. Qualified knowledge involving definite particulars, in contrast, involves knowing that the truth in question cannot be otherwise, yet its necessity is temporally constrained, holding at a certain time.

³⁸ We would also face a difficulty of explaining how the distinction holds at the level of species but I will leave these complications aside for now.

³⁹ For a more detailed discussion, see Sirkel 2024.

3.2 Qualified Knowledge and Explanation

In what way does qualified knowledge meet the requirement of “the explanation because of which the thing is, that it is its explanation” (71b11–12)? To begin, it is worth noting that some scholars – most notably McKirahan (1992) and Lennox (2001) – have also recognized what I call qualified demonstrations. Lennox distinguishes between ‘B-type’ and ‘A-type’ explanations, which are similar to unqualified and qualified demonstrations, respectively. In A-type explanations, “the predication is explained by showing that the subject is an instance of the kind to which the predicate belongs primitively and as such” (Lennox 2001, 10). McKirahan develops an account of ‘application arguments,’ which apply conclusions of unqualified demonstrations (‘USA proofs’) to “species, subspecies, or other subdivisions of the subjects of the original proofs, or even to individuals belonging to the species” (McKirahan 1992, 177–178). While Lennox takes the subjects of A-type explanations to be subspecies (‘forms of a kind’) and does not address whether they could extend to particulars, McKirahan explicitly includes particulars among the subjects of application arguments, asserting that such arguments “have an honest claim to being demonstrations” (McKirahan 1992, 178, also 181).⁴⁰

My interpretation emphasizes that qualified demonstrations with definite particulars as subjects are genuine demonstrations yielding genuine – albeit qualified – knowledge. This knowledge meets the explanatoriness requirement for two related reasons, recognized also by Lennox and McKirahan. First, a qualified demonstration proceeds from a truth that admits of unqualified demonstration. Following McKirahan, we may view qualified demonstrations as applying the conclusions of unqualified demonstrations to particular cases. This starting point ensures that the truth to be explained is an instance of a demonstrable truth, where the attribute belongs to all instances of the subject as such. Second, a qualified demonstration identifies a particular as a member of a kind to which the attribute belongs as such, a point emphasized also by Lennox (2001, 10). For example, given that 2R belongs to all triangles as triangles, a qualified demonstration establishes that this triangle has 2R as triangle (rather than, say, as isosceles or as a bronze figure). This ensures that the connection between the subject and attribute is not accidental but demonstrable; for example, 2R belongs to this triangle not accidentally but due to the nature of triangle.

Nonetheless, while the connection between 2R and this triangle is demonstrable, it does not admit of an unqualified demonstration. The key difference, I

⁴⁰ See also Ferejohn (2013), who speaks of ‘application arguments’ that apply universal conclusions to subordinate species. Inwood (1979), Morison (2012), and Bronstein (2016) treat the example involving a particular triangle as a demonstration.

propose, is that an unqualified demonstration satisfies the requirement of knowing “the explanation because of which the thing is, that it is its explanation” (71b11–12) by revealing an explanation that holds of its subject as such, which entails that the *explanans* and *explanandum* are coextensive. In contrast, a qualified demonstration reveals an explanation that holds of its subject not as such, but as a member of a kind to which the demonstrable attribute belongs as such. Even so, qualified demonstrations with definite particulars as subjects can be seen as providing “the explanation because of which the thing is, that it is its explanation.” As argued in the second section, Aristotle considers particulars to be things of a certain kind; for example, this triangle is essentially triangle. So there is a sense in which the explanation of why 2R belongs to this triangle as triangle is its explanation, even though it applies equally to other triangles. Further, Aristotle seems to think that a qualified demonstration reveals the best explanation we can have of demonstrable truths involving particulars.

This interpretation is supported by Aristotle’s discussion in *An. Post. A 24*, where he defends the superiority of universal demonstrations over particular (κατὰ μέρος) ones. Notably, in this context, universal demonstrations include those that take as subjects definite particulars at the appropriate level of universality. For Aristotle says that we know something better when we know as it holds (85b7, b14–15) and provides the following example:

For if having two right angles belongs to something not as isosceles but as triangle, then if you know that isosceles [have two right angles], you will know it less as such (ἢ αὐτό) than if you know that triangles [have two right angles]. (85b5–7)

Further, he says that we know something best when the why-questions come to an end:

Now when we know that the external angles are equal to four right angles because it is isosceles, it still remains to ask why an isosceles is so – because it is a triangle, and this because it is a rectilinear figure. And if this is no longer so because something else is so, it is then that we know best. And then [we know] universally. Hence universal [demonstration] is superior. (85b38–86a3; see also 85a23–24)

Aristotle here compares two ways of knowing why 2R (or, in the latter passage, 4R) belongs to something, where the subject is most plausibly a particular isosceles triangle.⁴¹ Some claims in *A 24* (esp. 86a4–7) can be understood as denying the possibility of knowing particulars in all their infinite particularity. However, this

⁴¹ I am grateful to an anonymous reviewer for insisting that the subject is a particular triangle. I agree that this is the most natural way to understand these passages. If the subject were isosceles,

comparison suggests that particulars can be known as falling under kinds – this isosceles triangle can be known as triangle or as isosceles. Presumably, the idea is that we know better when we know that this triangle has 2R because it is a triangle and all triangles have 2R, rather than because it is an isosceles and all isosceles have 2R. Schematically:

- | | |
|--|--|
| (B) 1. All triangles have 2R.
2. This is a triangle.
3. Thus, this has 2R. | (C) 1. All isosceles have 2R.
2. This is an isosceles.
3. Thus, this has 2R. |
|--|--|

I have used deduction (B) as an example of a qualified demonstration, and here Aristotle treats it as yielding better knowledge of the conclusion than deduction (C). The relevant difference is that the former deduction classifies the particular within the kind to which the demonstrable attribute belongs as such: 2R belongs to triangles as such, but not to isosceles as such.⁴² Given that there is no demonstration of why 2R belongs to this triangle as this triangle, this suggests that a qualified demonstration provides the best available explanation of this fact. This is compatible with the superiority of unqualified demonstrations. In *A* 24, Aristotle holds that why-questions end when we know that 2R belongs to triangles due to their essence (due to being certain rectilinear figures). Thus, knowing why a demonstrable attribute belongs to all members of a kind as such remains superior to knowing why it belongs to a particular member of that kind. Nevertheless, when it comes to knowing a particular, the best knowledge arises from considering it as a member of a kind to which the demonstrable attribute belongs as such.

If a qualified demonstration provides the best explanation of why a demonstrable attribute belongs to a definite particular, it would allow us to know “the explanation because of which the thing is, that it is its explanation” (71b11–12). Unlike an unqualified explanation, this explanation is not coextensive with what it explains but extends beyond it; for example, the explanation of why this triangle has 2R applies to any particular triangle, whichever one you take. Perhaps this is what Aristotle has in mind when he says that there is knowledge of perishable particulars ‘as if accidentally’ (*A* 8, 75b26). This does not mean that knowledge involving

such that the conclusion would be ‘all isosceles have 2R,’ it would be difficult to see what the major premise would be.

⁴² When Aristotle states “if you know that isosceles [have two right angles], you will know it less a such” (85b6–7), it is not clear how to understand ‘as such’ in this context. Perhaps Aristotle thinks that someone who knows the conclusion through deduction (B) knows ‘more as such’ than someone who relies on deduction (D) because their knowledge is based on an ‘as such’ predication (‘all triangles have 2R’).

particulars fails to meet the explanatoriness requirement but that it does so ‘as if accidentally,’ insofar as the explanation could just as easily apply to any other particular of the same kind. Thus, while the connections between the terms in the explanation are not accidental, there remains something accidental about which particular the explanation happens to apply to.

Given that qualified (or ‘as if accidental’) knowledge is genuine knowledge, it remains distinct from ‘sophistical’ (or ‘accidental’) knowledge mentioned in A 2, where Aristotle says that “we have knowledge of each thing without qualification (and not in the sophistical way, accidentally)” (71b9–10). Scholars tend to overlook this clause, but there seems to be broad consensus that Aristotle distinguishes unqualified knowledge from what is not real knowledge at all (but only appears so).⁴³ For example, Barnes (2002, 89) argues that sophistical knowledge fails to meet the requirements for knowledge; since there are several ways to fail, there are several ways to have accidental knowledge. While I do not take issue with this interpretation of A 2, I have argued that the qualified knowledge of A 8 meets the central requirements for knowledge and thus should not be lumped together with the sophistical knowledge of A 2.

Aristotle most explicit remarks about sophistical knowledge appear in A 5: “Even if you prove of each triangle [...] that each has two right angles – separately of the equilateral and the scalene and the isosceles – you do not know it of triangles, except in the sophistical way [...] for you do not know it of triangles as triangles” (74a25–30). He seems to envision a series of proofs aiming to establish for each species of triangles that it has 2R. If one infers that all triangles have 2R, one knows it in the sophistical way, presumably because one fails to recognize that 2R belongs to these species as triangles.⁴⁴ As Lennox explains: “Knowing of every sort of triangle that each has 2R, while missing the fact that it is *as* triangle that each has it, it

⁴³ In *Soph. El.* Aristotle describes sophistry as ‘wisdom in appearance only’ (165a23–24). For further discussion, see Angioni 2016.

⁴⁴ Aristotle may have in mind the following deductions:

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|---|--|------|
| 1. Isosceles are essentially thus-and-so. | 1. Scalenes are essentially thus-and-so. | Etc. |
| 2. Whatever has such an essence has 2R. | 2. Whatever has such an essence has 2R. | |
| 3. Thus, isosceles have 2R. | 3. Thus, scalenes have 2R. | |

If one were to infer from such deductions that 2R belongs to triangles, then one would seem to be inferring that 2R belongs to triangles as isosceles (due to the essence of isosceles) and as scalene, etc., rather than to isosceles as triangles (due to the essence of triangle) or scalenes as triangles, etc. Aristotle makes this distinction clear in A 24: “If triangle extends further than isosceles [...] and if having two right angles belongs to all triangles, then it is not the triangle as isosceles but rather the isosceles as triangle which has such an angle-sum” (85b1–13).

to have only an incidental grasp of the predication in question” (Lennox 2001, 9). This provides further evidence that sophisticated knowledge is distinct from qualified knowledge: a qualified demonstration proceeds from the premise that 2R belongs to all triangles as such and infers that it belongs to all isosceles (or to definite sensible triangles) as triangles.

In sum, this section has argued that qualified knowledge with definite particulars as subjects meets Aristotle’s central requirements for knowledge. Possessing such knowledge about a definite particular involves knowing the explanation that applies to it as falling under the relevant kind (though not as such), and knowing that the truth in question holds of necessity at that time (though not at all times). Qualified knowledge involving subspecies fully satisfies the necessity requirement, since the truth in question holds of necessity at all times, and meets the explanatoriness requirement in a qualified way: here, too, the explanation applies not as such, but insofar as the subspecies falls under the relevant kind.

The following section aims to bolster the interpretation that qualified knowledge with definite particulars as subjects is genuine knowledge by showing the intimate connection between it and unqualified knowledge. I have so far used McKirahan’s application terminology to highlight this connection: qualified demonstrations apply the conclusions of unqualified demonstrations to particular cases. However, one might worry that unqualified knowledge remains radically different from its application, and the latter does not count as genuine knowledge. Similarly, one could argue that knowledge of Platonic Forms can be applied to sensible particulars, but this does not yield knowledge. The next section addresses this concern by showing that unqualified knowledge entails potential knowledge of a definite particular, and qualified demonstrations offer a way to actualize this knowledge by applying it to a particular at hand.

4 Applying Unqualified Knowledge to Particulars

Let us start by presenting the passage in *An. Post. A 1* which presents a deduction previously used as an example of a qualified demonstration:

It is possible to come to know by knowing some things beforehand and getting knowledge of the others at the very same time, namely of whichever things fall under a universal which one knows. Thus, the person already knew that all triangles have two right angles, but they come to know that this [figure] in the semicircle is a triangle at the same time as they draw the conclusion [that it has two right angles] [...] Before drawing a conclusion or grasping the deduction, they should perhaps be said to know in one way, but in another way not. If they did not know without qualification (*ἀπλῶς*) whether there is [such-and-such a thing], how could

they have known without qualification that it had two right angles? Yet it is clear that they know in this way: they know it universally (καθόλου), but do not know it in an unqualified way. (71a17–29)

Assuming that we are dealing here with an example of a qualified demonstration, this passage sheds light on the ‘mechanism’ of such demonstrations. It suggests that the major premise must be known beforehand, whereas the minor premise becomes known simultaneously with the conclusion.⁴⁵ For example, knowing in advance that all triangles have 2R, the geometer recognizes that this figure in the semicircle is a triangle and immediately infers that it has 2R. More importantly for our purposes, this passage offers insight into the knowledge expressed in the major premise. Assuming that this premise expresses unqualified knowledge, this passage suggests that unqualified knowledge entails potential knowledge of a given particular.

Aristotle argues that when we know the major premise but have not yet drawn the particular conclusion, we know the conclusion in one way but not in another. There is a sense in which having prior knowledge is compatible with ignorance of the conclusion: we may have this knowledge without being aware of the particular instance to which it applies. For example, we may know that all triangles have 2R without realizing that this applies to some particular triangle we have never come across. However, there is also a sense in which we do have knowledge of the conclusion. In the passage above, Aristotle says that we know it universally (καθόλου). In *An. Post. A 24*, he says we that know it potentially (δυνάμει).⁴⁶ Thus, when we know that all triangles have 2R, we know – universally or potentially – that this triangle has 2R. This, then, suggests that unqualified knowledge entails potential knowledge of a given particular.

I will focus on two questions raised by this suggestion, starting with the question of what ‘potential’ might mean in this context. To address this, it becomes relevant to consider an aspect of Aristotle’s definition of knowledge in *An. Post. A 2* that we have not yet addressed: this definition characterizes a cognitive state of a person possessing knowledge (a scientist, if you wish). The state of having unqualified knowledge is achieved by knowing the explanation of something as being its

⁴⁵ See LaBarge 2004; Bronstein 2010, 23–24. The minor premise is learned via sense-perception. See *An. Pr. B 21*, 67a23–26. See also McKirahan 1983.

⁴⁶ Aristotle says in *A 24* that “if you know that all triangles have 2R, you know in a sense of the isosceles too that it has 2R – you know it potentially – even if you do not know of the isosceles that it is a triangle” (86a25–27). Here the subject appears to be isosceles, but the same reasoning applies to particular isosceles, as also suggested by the claim that “someone possesses a universal [demonstration] knows the particular [fact] as well” (*A 24*, 86a12–13).

explanation and that it cannot be otherwise.⁴⁷ To say that a person with unqualified knowledge has potential knowledge of a given particular does not mean that they have a mere capacity to acquire such knowledge.⁴⁸ Rather, they already possess actual knowledge which entails potential knowledge of that particular. Here it is helpful to invoke Aristotle's distinction between two ways of being actual, commonly called 'first' and 'second' actuality: first actuality is a kind of potentiality with respect to its exercise, while second actuality corresponds to its exercise or use – a distinction "analogous to the possession of knowledge and the exercise of it" (*De An. B* 1, 412a23; see also *B* 5, 417a21–b2).

Unqualified knowledge corresponds to 'first actuality' knowledge – an acquired knowledge that, for example, all triangles have 2R. This knowledge entails potential knowledge of a definite particular and can be exercised by applying it to a particular of the relevant kind. When we recognize something as a particular instance of that kind and combine it with unqualified knowledge, we come to know that this particular is thus-and-so, which corresponds to 'second actuality' knowledge. In *An. Post. A* 1, Aristotle claims that as soon as we recognize a particular member of the relevant kind, we come to know 'without qualification' that it has the attribute belonging to things of this kind. When we know that all triangles have 2R and recognize this figure as triangle, we come to know 'without qualification' that this triangle has 2R.

This claim raises a second question: why does Aristotle refer to knowledge of the particular conclusion as 'unqualified knowledge' when such knowledge is described in *A* 8 as knowledge as if accidentally or in a qualified way? One might propose that knowledge applied to particulars is knowledge without qualification.⁴⁹ My position is more moderate: I agree with the prevailing view that, for Aristotle, demonstrative science is primarily concerned with explaining universal truths rather than applying them to particular cases. Yet this does not mean that particulars fall outside the scope of science or that applying universal knowledge to particulars fails to yield scientific knowledge. If unqualified knowledge is scientific and entails potential knowledge of a given particular, then, reasonably, applying it

⁴⁷ Aristotle's discussion of knowledge (ἐπιστήμη) as one of the intellectual virtues is found in *NE Z* 3.

⁴⁸ A version of the view that correlates universal knowledge with a 'general power of knowing' is discussed and criticized by Leszl 1981, esp. 293–298.

⁴⁹ See Leszl (1972), who argues that knowledge applied to particulars is knowledge most fully. See also van Fraassen (1980), who interprets Aristotle as describing two distinct processes: demonstration, which consists in laying down first principles and deriving consequences; and explanation, which is an application of scientific knowledge to particular cases. He holds that scientists are concerned primarily with explanations.

to a particular at hand yields scientific knowledge too – it is a way to exercise or use unqualified knowledge. My position thus occupies a middle ground between the view that knowledge applied to particulars is knowledge without qualification and the view that such knowledge plays no role in science. How, then, should we reconcile the apparent tension between *A 1* and *A 8*?

My preferred answer was introduced already in the previous section as part of my interpretation of *An. Post. A 24*. I argued that the best explanation for why this triangle has 2R holds of it as triangle: it has 2R because it is a triangle and all triangles have 2R. This, I propose, is what Aristotle has in mind in *A 1* when he speaks of unqualified knowledge: it is the best or most appropriate knowledge we can have of demonstrable truths involving definite particulars. In *An. Pr. B 21*, Aristotle distinguishes between universal and particular knowledge (ἐπιστήμη) and states that “we contemplate particulars by universal [knowledge], without knowing them by [knowledge] appropriate (οἰκεία) to them” (67a28–30). It is reasonable to associate universal knowledge with unqualified knowledge and knowledge appropriate to particulars with qualified knowledge.⁵⁰ Qualified knowledge would provide a more appropriate knowledge of a given particular than unqualified knowledge, which we may possess without being aware of the existence of that particular.

The above interpretation suggests that Aristotle’s use of the term ‘unqualified knowledge’ varies depending on whether he speaks of the requirements for knowledge or of knowledge involving definite particulars. With respect to the requirements for knowledge, knowledge of the universal conclusion (e. g., ‘all triangles have 2R’) satisfies the requirements without qualification. When this knowledge is applied to a given particular, we acquire knowledge of a particular conclusion (e. g., ‘this triangle has 2R’) that satisfies these requirements in a qualified way. With respect to knowing a particular conclusion, however, qualified knowledge counts as the most appropriate knowledge. Thus, by having knowledge that satisfies requirements for knowledge in a qualified way we have unqualified knowledge of a given particular. By having knowledge that satisfies these requirements without qualification, we have potential and less appropriate knowledge of that particular.⁵¹

⁵⁰ This is also suggested by Aristotle’s discussion in *An. Pr. B 21* of a deduction similar to the one offered in *An. Post. A 1*, which I have used as an example of a qualified demonstration. See also Morison 2012.

⁵¹ Cf. LaBarge (2004, 211–212), who proposes that Aristotle’s use of ‘unqualified knowledge’ depends on context: in most contexts it refers to knowledge appropriate to universals, though in some contexts it refers to knowledge appropriate to the particular, and so his use of the term is “needlessly confusing and regrettable” (LaBarge (2004, 212). My interpretation suggests that his use of the term does not depend on just any context, but on whether he has in mind requirements for

This concludes my exposition of Aristotle's view on demonstrative knowledge, showing that his position is more nuanced than commonly assumed and does not exclude knowledge involving sensible particulars. This could be further strengthened by examining additional evidence, such as demonstrations with premises and conclusions that hold 'for the most part' or those involving singular events, like eclipses or thunder.⁵² But I hope my interpretation of *An. Post. A 8* has removed an important obstacle to acknowledging demonstrative knowledge of definite sensible particulars. In the final section, I will summarize my interpretation and highlight some of its implications.

5 Conclusion

According to the interpretation developed in this paper, the target passage in *A 8* does not contrast demonstrative knowledge with what is not real knowledge but rather distinguishes between unqualified and qualified demonstrative knowledge. This raises the question of how much this interpretation alters the prevailing view that knowledge is restricted to universals and there is no knowledge of sensible particulars. One could argue that these claims still hold, with the modification that they apply only to unqualified knowledge. Nonetheless, I maintain that this modification is significant: it challenges the assumption that unqualified knowledge exhausts the domain of demonstrative knowledge. I have argued that knowledge involving particulars meets Aristotle's requirements for knowledge, albeit in a qualified way: it involves knowing the explanation of why the attribute belongs to a subject as of a certain kind (though not as such), and it involves knowing that this truth holds of necessity (though not at all times). Although it falls short of unqualified knowledge, it is genuine demonstrative knowledge.

Further, I have argued that unqualified knowledge entails potential knowledge of a given particular, and qualified demonstrations actualize this knowledge by applying it to a particular at hand. Admittedly, applying unqualified knowledge to particulars is not the only way scientists can exercise their knowledge. As Heina-man (1981, 65–67) argues, universal knowledge can be exercised by contemplating

knowledge or knowledge involving particulars. Hence, Aristotle's use of the term is more systematic than LaBarge thinks.

⁵² A full account of Aristotle's views would require an exploration of the acquisition of universal knowledge, especially the role of perception and induction, as well as an examination of how to construe the subjects of universal knowledge, which leads to questions concerning the nature of universals. For an interesting account, see Tweedale 1987, 1988.

or thinking about it.⁵³ Nonetheless, while scientists may reflect on their knowledge from an armchair, applying it to sensible particulars remains an important way of using it. McKirahan (1992, 184) emphasizes that application arguments are “the key to applying demonstrative knowledge to the world,” and I agree. Insofar as demonstrations yield knowledge about the world, qualified demonstrations have a role to play: they enable us to apply scientific explanations to the particulars around us. For example, they allow a geometer with demonstrative knowledge of triangles to have knowledge of a triangle drawn on the chalkboard or an ornithologist with knowledge of birds to apply it to a bird flying by.

Qualified demonstrations can be especially valuable in the context of learning by students. Aristotle holds that in learning a new domain, we should proceed from what is better known to us – sensible particulars – to what is better known by nature – universals.⁵⁴ Qualified demonstrations involving particulars can facilitate this transition. Similarly, Lennox argues that A-type explanations are “a crucial stage in the acquisition of understanding about a domain” (Lennox 2001, 11). Further, qualified demonstrations may play a role in the acquisition of knowledge by the scientists themselves. While it has been argued that scientists do not acquire knowledge by demonstrations but rather use demonstrations to set forth knowledge already gained, Bronstein (2016) challenges this view.⁵⁵ One of his arguments is that scientists can learn new facts through demonstrations involving definite particulars; for example, “an expert geometer, who has scientific knowledge of the fact that all triangles have 2R, learns that and why this particular figure has 2R upon learning that it is a triangle” (Bronstein 2016, 41). My interpretation can be seen as supporting Bronstein’s view by showing that such cases involve genuine demonstrations.

This interpretation also bears on a more fundamental question regarding the consistency of Aristotle’s philosophy. There has been a long-standing worry that Aristotle’s philosophical commitments are inconsistent. He holds that sensible particulars are fully real – indeed, ontologically fundamental – and assumes that knowledge is of what is real. Yet he restricts knowledge to universals.⁵⁶ His

53 Contemplation or thinking might still involve (application to) particulars. See LaBarge 2004, esp. 208; Menn 2013, esp. 247; Leszl 1972, 303.

54 See *Phys. A* 1, 184a17–20; *Met. Z* 4, 1029b1–12; *EN Z* 3, 1139b25–31; *Top. A* 2, 101a36–b4, *Z* 4, 141b17–19.

55 For an influential presentation of this view, see Barnes 1969.

56 Among the first scholars to draw attention to this issue is Zeller, claiming that “it only remains, then, to recognize in this point, not merely a lacuna, but a deep contradiction in the philosophy of Aristotle” (Zeller 1879, 234). Cherniss claims that Aristotle’s commitments lead to “a discrepancy between the real and the intelligible” (Cherniss 1962, 340). For further discussion, see Leszl 1972; Heinaman 1981.

account of knowledge, which receives its most rigorous treatment in *An. Post. A*, is often seen as the main source of this tension, seemingly isolating demonstrative knowledge from the world of sensible particulars. However, this presupposes that Aristotle excludes particulars from demonstrative science. Since my interpretation challenges this assumption, it helps to alleviate this worry. At the very least, it shows that demonstrative knowledge does not remain isolated from the world of sensible particulars.

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