

## Definition and Demonstration: Aristotle, Averroes, Grosseteste

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### 1. Introduction

The aim of this article is to help to clarify the role which Aristotle gives to definition in his theory of demonstration.<sup>1</sup> I shall begin by examining his handling of the relations between definition and demonstration in chapters 8-10 of the second book of the *Posterior Analytics*,<sup>2</sup> in order to provide an outline for an interpretation of Aristotle's thought. Secondly, I shall examine chapter 10 in more detail, bringing out the contrast between the commentary by Averroes and that of Grosseteste. I have chosen these two commentators because, both being generally magnificent interpreters of Aristotle, as far as the nature and types of definition are concerned their understanding of Aristotle is strikingly different.

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1. A recent, very brilliant study which contributes to clarify this role is M. Deslauriers, *Aristotle on Definition*, Brill, Leiden/Boston, 2007.

2. One relatively recent book that focuses only on these chapters is O. Goldin, *Explaining an Eclipse* (1996). Other classical references are: R. Bolton, "Essentialism and Semantic Theory in Aristotle: *Posterior Analytics* II, 7-10", *The Philosophical Review* 85/4 (1976), 514-544; J. L. Ackrill, "Aristotle's Theory of Definition: Some Questions on *Posterior Analytics* II 8-10", in *Aristotle on Science. The "Posterior Analytics"* (E. Berti, ed.), Antenore, Padova, 1981, 359-384; D. Demoss & D. Devereux, "Essence, Existence, and Nominal Definition in Aristotle's *Posterior Analytics* II 8-10", *Phronesis* 33/2 (1988), 133-154; G. Bayer, "Definition through Demonstration: The Two Types of Syllogisms in *Posterior Analytics* II.8", *Phronesis* 40/3 (1995), 241-264; G. Bayer, "The What-is-X? Question in the *Posterior Analytics*", *Ancient Philosophy* 17 (1997), 317-334.

Book II of the *Posterior Analytics* begins by posing the question "what is it?" (*ti estin*, which would seem to be a question that can be answered by giving a definition) as one of the four questions that can be raised in the course of inquiry (*zetoumena*), and which will be answered or "known" (*epistamena*) when the search is ended (89b 23-25). On the other hand, some lines further on, the question "what is it?" is identified in some cases with the question "why is it?" (*to dioti*, the answer to which seems to be given not by a definition, but by a scientific demonstration as understood by Aristotle): "by 'one of the items' <I mean> eclipse, equality, inequality, if it is in the middle or not. In all these cases it is clear that *what it is* and *why it is* are the same". (90a 13-15)<sup>3</sup>

The cases in which these two aspects are identical (illustrated in II.2 using the examples of the eclipse and the harmony) are precisely the proper object of scientific inquiry as Aristotle understood it: cases in which there is a combination of things which are heterogeneous, but where one inheres *kath' auto* in another (being eclipsed does not belong to the essence of the moon, but it holds of it because of what the moon is; to harmonise does not belong to the definition of the high or the low, but they harmonise because of what these things themselves are). This is why Aristotle says that inquiry is always a search for the middle:<sup>4</sup> what is sought is the cause which explains why two different things are combined.

If, for the objects of science, the *why* is identified with the *what it is*, and if the *why* is a matter for demonstration whereas the *what it is* is a matter of definition, then definition and demonstration seem to be competing for a place in scientific knowledge. This apparent difficulty is what obliges Aristotle, before he goes on with his study of the

3. The Aristotelian texts are taken from Barnes: Aristotle, *Posterior Analytics*, Translated with a Commentary by Jonathan Barnes, Second Edition, Clarendon Press, Oxford, 1993.

4. I prefer to translate "*meson*" as "middle", instead of "middle term".

*episteme*, to take a break (for eight chapters, 3-10) in order to clarify two points: first, what exactly is the relationship between the question *ti estin* and demonstration; and second, what is definition, and what part does it play with regard to demonstration?

## 2. An example: understanding eclipses

Before we analyse Aristotle's texts, it may be useful to pause to consider one of the examples of *episteme* which is explained in more detail in the *Posterior Analytics*, and which forms the subject of many of the reflections in II.8, namely "scientific knowledge" or "understanding" about eclipses.

Let us recall that Aristotle understands the *episteme* as a degree of knowledge which is superior to perception, and also superior to mere experience, because it is "knowledge of the universal" or "knowledge through the cause". Perceptions lie at the origin of all our knowledge, but they are not the highest knowledge to which a human being can aspire. In the case that interests us here, our knowledge of eclipses begins with perception, but does not end there, because this imperfect knowledge naturally awakens in us the desire to seek higher knowledge.

The process which leads us to understanding the eclipse involves different types of imperfect knowledge, which are superseded once we come to know *why* the moon is eclipsed (*to dioti*). The question *why* is raised on the basis of (sensory) knowledge of the existence of the eclipse, which in turn depends on previous knowledge that the moon exists, and on our initial knowledge (which is still partial) of what it means for the moon to be eclipsed: the fact that the moon is eclipsed means that its light does not reach us (knowledge of the eclipse as deprivation of light).

On the basis of the knowledge that two heterogeneous things are combined (the moon is eclipsed), we can conduct

scientific research intended to find out a middle which explains this combination, the cause which makes the being eclipsed to hold of the moon. Why is the moon eclipsed? Because its fire is extinguished? Because the moon turns, and its light is therefore hidden? Because an opaque body is screening it from the sunlight? Once we have found this middle, we can construct a demonstrative syllogism which will provide us with scientific knowledge of the eclipse. The conclusion of this demonstrative syllogism will be a truth that we already knew, "the moon is eclipsed", but our knowledge will be of a higher order, because we know about its cause.

What does definition have to do with this process? We shall remember that the sphere of scientific knowledge is the sphere of things for which asking *why* is equivalent to asking *what it is*. The combination of an attribute with a subject (that the moon is eclipsed), about which we ask *why* it occurs (*to dioti*), results in the emergence of a new entity made up of the attribute with its subject (an eclipse of the moon), which raises a new question, the question as to *what it is* (*ti estin*). The answer to the question "why does the combination occur?" lies in the scientific *demonstration* that the moon is eclipsed. The answer to the question "what is this compound?" lies in the *definition* of the eclipse. Aristotle's central thesis concerning scientific knowledge about eclipses is that the demonstration that the moon is eclipsed also gives us a definition of what an eclipse is.

Aristotle is aware that this thesis may seem surprising (as his arguments in chapters 3-7 show): if the demonstration gives us the definition, can we demonstrate what something is?<sup>5</sup> Clarification of what his thesis means involves three stages, which I shall examine separately: a)

5. The point is crucial, as it shows the tension between *Metaphysics* and *Posterior Analytics*: substances (for example, man) are definable and not demonstrable, events (for example, eclipse) are demonstrable and not strictly definable. But in the *Posterior Analytics* Aristotle wants events to be definable in some sense, and *what they are* to be demonstrable in some sense.

answering the question about the possibility of demonstrating the *what it is*; b) delimiting the different meanings of the term "definition"; c) distinguishing the functions that the definition may carry out with regard to demonstration, according to what is being defined.

### 3. The first problem: is it possible to demonstrate the *what it is*? (*Posterior Analytics* II, 8)

In chapter 8, Aristotle takes up again the thesis, which has already been established, that it is the same to know the *what it is* and to know the *cause* of whether it is" (93a 4). Since these two questions are given as identical, it seems that in some cases it should be possible to know demonstratively the *what it is*, given that some causes are demonstrable (93a 5-7). (Others, however, are not: the essence of simple substances cannot be demonstrated.) But how could we demonstrate the *what it is*? Would it be possible to construct a demonstrative *logos* of the *what it is*, or is the definition the only admissible *logos* of what something is? After examining the main difficulties raised by this possibility in chapters 3-7, Aristotle goes on in chapters 8 and 9 to show in what cases and in what sense it is possible to say that there is a demonstrative *logos* of the *what it is*.

First, in 93a 4-15, Aristotle argues that the demonstration we are seeking cannot have a *what it is* as a conclusion, because it would be necessary to include another *what it is* as a middle, and we would have not a demonstration but an instance of dialectic syllogism (perhaps a circular one, as he argues in chapter 4, or perhaps one that is simply not demonstrative).

Once he has established that the demonstration of the *what it is* cannot have this as a conclusion, in 93a 16 he announces that he is going to explain in what other way it can be accepted that we have a "demonstration" of the *what it is*. The final answer will be that the *what it is* is not demon-

strated directly, as a conclusion, but is "shown" through a demonstration (93b 15-20), and that the *logos* which formulates this *what it is* can then be regarded as a "demonstration" (in an improper sense) of the *what it is*. So what syllogism will be capable of showing the *what it is* in this way, and what is the *logos* that expresses this? The core of chapter 8 concentrates on constructing the answer to this double question.

First of all, Aristotle formulates a requirement that must be fulfilled in order to have genuine knowledge of the *what it is* (and therefore to achieve the "demonstration" of the *what it is* that we are looking for): "we plainly cannot grasp what it is to be something without grasping that it exists" (93a 20). If it is not possible to grasp the essence without grasping the existence, then we cannot formulate a syllogism capable of showing the *what it is* of a given thing without grasping its existence. But Aristotle distinguishes two senses of "grasping existence": a "proper" sense and an "incidental" sense. Sometimes we believe we are grasping the existence of something, but only incidentally can we say that we grasp that something exists.

According to Aristotle, we only grasp that a thing exists in the proper sense when we have "something of the thing itself". In our example, when we have a *logos* of the eclipse as deprivation of light. If we grasp that a deprivation of light has occurred on the moon, given that this deprivation of light is something that belongs to the thing itself, then this is a guarantee that there is "something" whose existence we can grasp. However, when we do not have a *logos* of the thing itself, "grasping that such a thing exists" only incidentally is grasping that something exists, since this *logos* does not offer any guarantee that there is "something" whose existence we know. (It might be the case, for example, that though we believe that we grasp that flogiston exists, through the *logos* "substance which a combustible body frees when it burns", in fact we are

not grasping the existence of anything.) Thus, when we incidentally grasp that something exists, we do not have genuine knowledge *that it is* ("we do not even know that it exists" 93 a 26).

As a result, when we do not set out from a certain *logos* "of the thing itself", as the requirement that we should grasp its existence is not fulfilled, we will have no knowledge of the *what it is*. If we can only say incidentally that we know *that it is*, then we can only say incidentally that we know *what it is*. Furthermore, in such cases, the question as to *what it is* does not even make sense ("to seek what something is without grasping that it exists is to seek nothing" 93a 27). It is therefore clear that to be able to reach a "demonstration of the *what it is*", we need to set out from a certain *logos* "of the thing itself", even though we do not yet have full knowledge of what that thing is. From this starting point, our inquiry may proceed in two ways:

- It may be that we do not know yet whether the thing exists. Given that in order to know *what something is* it is necessary to know *that it is*, in these cases we should first investigate whether the thing exists or not. For example, we investigate whether it is eclipsed or not. As Aristotle says in chapter 2, asking *whether it is* is the same as looking for a middle, but he now adds that looking for this is the same as asking if there is a *logos* of being eclipsed (93a 33).
- However, we may already be certain that it exists, in which case our investigation will commence directly by looking for *why*. Here, we do not look to see if there is a middle or a *logos*, but rather what the middle or *logos* is (93b 5). For example, we try to establish what the *logos* of being eclipsed is: is the earth screening, does the moon rotate, or is its light extinguished?

At this stage of our investigations, two *logoi* have already played a part: a certain *logos* concerning what the eclipse is (the *logos* which is our starting point), and a *logos* concerning why being eclipsed holds of the moon (the *logos* needed for us to be able to construct the demonstration). When we find this *logos* of being eclipsed, if we have found the right middle, we shall have a syllogism in which the fact *that it is* (that it is eclipsed) and the reason *why* (the cause of its being eclipsed) are both evident at the same time. If the right *logos* of being eclipsed is "screening by the earth", we will know scientifically that the moon is eclipsed, at the same time as we also know that the reason for this being eclipsed is the screening by the earth.

On the other hand, when we have not found the right middle (for example, when we take as middle the *logos* of some phenomenon which accompanies the eclipse, but which is not its cause: "not being able to produce a shadow during full moon"), even if we have attained some genuine knowledge *that it is* (we know that "there is something" which prevents us from producing a shadow during full moon), the *logos* through which we know this gives us no information as to *why* the moon is eclipsed, and as a result, no information about the genuine *what it is* of the eclipse.

Aristotle's proposal is that the *logos* which functions as a middle, which tells us *why* being eclipsed holds of the moon (the reason why of the combination), can also undertake a "demonstrative" task as far as the *what it is* of the eclipse is concerned (the essence of the compound). By pointing to the reason why being eclipsed holds of the moon, it can serve to give us "demonstrative" knowledge of the essence of the eclipse. Thus the middle serves not only to demonstrate the conclusion that "the moon is eclipsed" (by letting us know why this combination holds), but also to "demonstrate" that the eclipse is what it is, by enabling us to construct a certain *logos* (a "demonstrative" *logos*) which expresses in the most perfect way possible what the eclipse is (what the

compound entity under investigation is). How it does so is not explained until chapter 10, where Aristotle analyses the different ways in which definitions can behave with respect to demonstrations. For the moment, we know that the "demonstrative" *logos* of *what the compound is* is only reached when we have achieved the genuine demonstration, the syllogism whose middle is the cause of the combination.

Once the last stage of inquiry has been reached (inquiry which starts from the possession of a *logos* of the thing itself and gets under way as a search for the *logos* of the major extreme), a third *logos* has become apparent, the "demonstrative" *logos* of the *what it is*,<sup>6</sup> but this is not the only "*logos* of the *what it is*" related to demonstration. Understanding what type of *logos* is like a "demonstration" of the *what it is* means being quite clear about the distinction between this and the other "*logoi* of the *what it is*" involved in the demonstration.

#### 4. Narrowing down the answer: What is the *what it is* that is made manifest in the demonstration? (*Posterior Analytics* II, 9)

Up to now we have encountered three *logoi* involved in demonstration: a *logos* of what the eclipse is (grasped initially), which serves to trigger our research; a *logos* of being eclipsed (which is the *logos* that expresses the reason why the moon is eclipsed, which we need to be able to demonstrate that the moon is eclipsed); and another *logos* concerning what the eclipse is (which is shown through demonstration). In chapter 9, a further type of *logos* of the *what it is* appears, which Aristotle brings up to make it clear that, even though it is possible to "demonstrate" some *what it is* in the way that has been indicated, not every *what it is* can be shown by demonstration.

6. We shall see that the "demonstrative *logos* of the *what it is*" is not the demonstration itself (since a demonstration does not demonstrate the *what it is* of the compound, but the *that it is* of the combination, through its reason *why*).

In this case, the distinction between two different categories of *logoi* of the *what it is* is based on the nature of the entities whose *what it is* is formulated through a *logos*: some things have a cause that is different from the things themselves, while others do not.<sup>7</sup> As a result, some are immediate (undemonstrable), while others are mediate (demonstrable).

The immediate instances of *what it is* are those that are taken as principles of demonstration. The *what it is* of things that do not have a different cause cannot be demonstrated (they have to be taken for granted or made evident by some other means). In such cases, it will not be possible to “demonstrate the *what it is*”. The *logos* of a thing that does not have a cause different from itself will not be the one that is shown through demonstration: it can only function as a principle. However, the *what it is* that can be “demonstrated” are the *what it is* of mediate things (caused by something different, which is also demonstrable). In the case of these things, according to Aristotle, “you can show what something is through a demonstration without demonstrating what it is” (93b 27).

We thus have four *logoi* that are involved in demonstration. There are two *logoi* of the compound (of the eclipse), one which we had previously and the other attained through demonstration (which can be regarded in some sense as “demonstrative”); then there is a *logos* of the attribute (of being eclipsed), which is the middle of the demonstration that the combination occurs (which lets us

7. Goldin emphasises the importance of this distinction, and points out that Philoponus gave rise to a whole line of mistaken interpretation in this regard (1996, p. 102). Deslauriers formulates the distinction in terms of “simple objects” (which correspond to the Aristotelian *haplos*) and “complex objects” (which correspond to the Aristotelian *epi merous*) (2007, pp. 55-65). On the other hand, Goldin considers that the distinction is not absolute, but relative: the things which do not have a cause that is different from the things themselves are the species which are not considered by the science which studies them as inherent in another, more basic, subject. These are what he calls “epistemic substances”: last subjects from the perspective of a specific science. These are the subjects which are shown, by the science in question, to have certain inherent attributes.

know scientifically that the moon is eclipsed); and there is also a *logos* of the subject (the moon), which is not demonstrated but rather assumed as the principle of the demonstration.

Aristotle has taken a first step toward resolving the apparent conflict between definition and demonstration: he has examined the relationship between the *what it is* and demonstration, and has shown that a “demonstration” of the *what it is* is possible in some cases (for things that have a cause different from themselves, that is, combinations of a subject with an attribute), and in a certain (improper) sense. At this point, in order to examine the relationship between definition and demonstration, we must look first at the notion of definition and defend it from possible misunderstandings. In Aristotle’s clarification of the notion of definition, we can see on the one hand that not everything that seems to be a “*logos* of the *what it is*” is a definition, and on the other hand that the “demonstrative *logos* of the *what it is*” is not a demonstration but rather a definition.

##### 5. The second problem, first part: what is a definition? (*Posterior Analytics* II, 10)

Once the possibility of a “demonstrative” *logos* of *what it is* has been established, Aristotle is ready to sharpen his notion of definition, distinguishing between two senses in which this term can be understood. It is true that in Aristotle the word “definition” is used in several ways, although not as many as some scholars have maintained. In my view, the root of the confusion lies in not distinguishing properly what Aristotle is doing in chapter 10. On the one hand, Aristotle explains the different *senses* in which the word “definition” is used. On the other, he takes this distinction of senses as a basis to establish a division of the definition into *species*. Finally, he rounds off his study of definition by distinguishing the *functions* that definition

can have with regard to demonstration. The confusion of these perspectives, together with interference from other kinds of *logos* which are not definitions but which are also under scrutiny in this chapter (the “*logos* of the meaning of the name” and the *logos* whose unity is that of a mere “connection”), is what has given rise to the controversy as to how many types of definition there are, and whether some types are the same as others.

In this section, I shall turn to the senses of “definition” (there are two of them), and to the consequent division of definitions into species (there are also two of these). In the following section, I shall address the functions of definition in the context of demonstration (there are three of these).

### 5.1. THE TWO SENSES OF “DEFINITION”

In chapter 10, Aristotle explicitly formulates two “definitions of ‘definition’”. In 93b 29, he defines *horismos* as a *logos* of what it is, and at 93b 39 he defines *horos* as a *logos* which indicates why something is.<sup>8</sup> Regarding each of these two senses of “definition”, Aristotle deems it necessary to pay special attention to distinguishing definitions from other types of *logos* which might seem similar, but which are not definitions.

5.1.1. The definition as “*logos* of the *what it is*”. The problem of the so-called “nominal definition”.

As far as the first sense of “definition” is concerned, the problem is that not everything that seems to be a “*logos* of the *what it is*” is a true definition. This may come about in two different ways: because the thing that has been named does not exist (and therefore there is nothing to define), or because the *logos* lacks unity (it is one only by connection,

8. To my knowledge, no scholar has taken the fact that he uses *horismos* for the first sense and *horos* for the second to be significant.

like the *Iliad*, because there is no “one thing” in the proper sense which can support this unity).<sup>9</sup> In neither case is there a *what it is* that can be defined, although in both there can be a *logos* that resembles a definition. Concerning the problem of existence, the “*logos* of what the name means” comes into play, which has traditionally been interpreted as a certain “type” of definition, the so-called “nominal definition”. The basic issues which the passage raises, and which are still a matter for discussion, are: whether the *logos* Aristotle is talking about here is a type of definition, whether it belongs to things that exist or do not exist, and why it does not appear in the final list of definitions.<sup>10</sup> It is worth analysing this point in more detail.

Aristotle presents a first definition of “definition” as a *logos* of the *what it is*. If we have a *logos* of what the thing is, it is obvious that this *logos* also gives us an explanation of what the name of the thing means. For example, a *logos* of what a triangle is can be used to explain the meaning of the name “triangle”: “a figure with three sides”. Why does Aristotle here focus on the *logos* of the meaning of the name? Because an explanation of the meaning of the name may have an important role in scientific inquiry: when we do not know that the thing exists, we must start out from a certain kind of knowledge of what it is, in order to be able to grasp the thing’s existence and thus ask the question as to why it exists. But when we do not know that the thing exists, it is not strictly possible to ask *what it is*: all we can ask for the moment, strictly speaking, is what the name of

9. For example, a *logos* of what it is to be a white man is not a definition, because white man has no essence, the unity is accidental. (*Metaphysics* VII.4) The question is whether an eclipse, for example, has or has not a mere accidental unity. The eclipse is not a “thing”, but an “accident” that occurs when three “things” coincide: two bodies in certain positions, and an observer placed also in a certain position.

10. See, for example, R. Bolton (1976); A. Gómez-Lobo, “Definitions in Aristotle’s *Posterior Analytics*”, in *Studies in Aristotle*, (D. J. O’Meara, ed.), Washington, 1981, 25-46; D. Demoss & D. Devereux (1988); D. K. W. Modrak, *Aristotle’s Theory of Language and Meaning* Cambridge University Press, Cambridge, 2001; M. Deslauriers, (2007).

the thing means. (And if the explanation of what the name of the thing means provides us with a certain knowledge of *what it is*, this will only be in the incidental sense of the word "knowledge".)

My thesis is that in 93b 30-35, Aristotle is, on the one hand, acknowledging the important role of the *logos* of the meaning of the name and, on the other, warning us of the confusion that this *logos* might give rise to with regard to definition.<sup>11</sup> He is not presenting it as a type of definition, since although it is true that every *logos* of the *what it is* serves as a *logos* of the name, it is not true that every *logos* of the name is also a *logos* of the *what it is*, that is, a *genuine definition*. What he is doing is emphasising that "being a definition" is not determined by the structure that a certain *logos* has, but by the cognitive role that this *logos* plays; that the cognitive role played by one and the same *logos* can change in the course of the scientific inquiry; and that, depending on the stage of inquiry, a *logos* which is *in itself* a definition is not always *to us* a definition in the strict sense, but can sometimes just be "incidentally" (to us) a definition.

In my view it is obvious that, if a definition is a *logos* of what it is, a *logos* such as this cannot be formulated of a supposedly non-existent "thing". "Of that which does not exist, no one knows what it is. You may know what the account or the name means when I say 'goat-stag', but it is impossible to know what a goat-stag is." (92b 5-8) I agree with many of the interpreters of this issue that this passage actually expresses Aristotle's opinion, even though it is in one of the "aporetic" chapters.<sup>12</sup> For this

11. I agree with Sorabji's reconstruction of 93b 32-35: R. Sorabji, "Definitions: Why Necessary and in what Way?", in *Aristotle on Science. The "Posterior Analytics"* (E. Berti, ed.), Antenore, Padova, 1981, 205-244 (note 30).

12. See, for example, Demoss-Devereux (1988), p. 141; Deslauriers (2007), p. 71; Sorabji (1981), p. 218. In contrast, Charles argues that there is no textual evidence for the suggestion that Aristotle restricts definitions to being accounts of existing things: D. Charles, *Aristotle on Meaning and Essence*, Clarendon Press, Oxford, 2000, pp. 57-77.

reason, I consider that at the beginning of chapter 10, Aristotle has no need to warn us of the danger of confusing the *logos* of the meaning of a name, when that name does not name anything, with a genuine definition. What he is trying to do is point out a more subtle difficulty which may beset the *logoi* of things that really do exist: if we formulate a *logos* of a thing that exists *but whose existence is not known to us*, this *logos* will not yet be *to us*, in the strict sense, a *logos* of the *what it is*.

As long as we do not know that the thing exists, this *logos* cannot be *to us* a definition in the proper sense: that is, this *logos* cannot provide an answer to the question *what it is*, given that this question does not yet have any meaning *to us*. As we have seen, Aristotle is very concerned about the priority of knowledge of existence over knowledge of essence: one cannot try to grasp what a thing is, without having previously grasped its existence. This affects cases in which we express the meaning of a name by means of a definition. "And thus it is difficult to grasp things if we do not know that they exist" means that when we still do not know of the existence of a thing, a definitional *logos* which gives the meaning of the name does not provide us with a true grasp of its *what it is*, but only an incidental grasp.<sup>13</sup> (It may be the case, as sometimes happens, that the name fails to name anything, and if we grasp its meaning we cannot be grasping the *what it is* of nothing.)

What Aristotle is doing in 93b 30-35 is simply transferring to the sphere of *what it is* the distinction (previously established for the sphere of existence) between the proper sense of knowing and the incidental one. We can only know *what something is* in the true sense if we have previous knowledge that it exists. The same *logos* that will later exprime the *what it is*, when it is used at a preliminary stage of inquiry, that is, when existence is ignored, cannot yet provide a proper knowledge of the *what it is*: at that mo-

13. This would be the first interpretation offered by Ackrill (1981), p. 375.

ment, this formula can only be (to us) a "*logos* of the *what it is*" in an improper sense. It is therefore (to us) only a definition in an incidental way.<sup>14</sup>

The labels "nominal definition" and "real definition", if we want to use them, could be useful to distinguish not between two types of definition, but between two different moments of one and the same *logos*, associated with two different cognitive values. For example, if we do not know that eclipses exist, the *logos* "deprivation of light" may serve as a tool with which we can inquire into the existence of eclipses: at this moment, "deprivation of light" is not a definition (to us) in the strict sense, as it is still unknown whether anything exists whose *what it is* we can ask about. At this stage of the inquiry, this *logos* is not (to us) a definition in the full sense, as it does not provide us with knowledge about any *what it is*.<sup>15</sup> At this moment, the formula simply gives us the meaning of a name (even though the formula *on itself* is a *logos* of the *what it is*, it cannot give this knowledge *to us*). For this reason, it can be called a "nominal definition". When, through this meaning, knowledge in the proper sense that eclipses exist has been attained, this same *logos* will have become, to us, a definition in the true sense: this *logos* will be, to us, the *logos* of a *what it is*. If we know that eclipses exist, the *logos* "deprivation of light" can give us knowledge in the proper sense (albeit of a partial kind) of the *what it is* of eclipses. It can thus now be called a "real definition".

14. Sorabji holds the same view, which he expresses somewhat differently: "These accounts *qualify* as accounts of *ti esti*, only so long as instances of the things defined exist, and a man will be said to *possess* one of these accounts only so long as he *knows* in some sense that instances exist." (1981, p. 218)

15. I disagree with Deslauriers and Demoss-Devereux: at the preliminary stage, such a *logos* cannot "say something of what the definiendum is". Similarly, it does not "give us knowledge of the existence of that definiendum". (Deslauriers 2007, p. 72. See also Bolton 1976, p. 521.) This *logos*, by making the meaning of the name clear, *guides our search* for knowledge of existence and hence of the *what it is*, but *does not provide* neither of them. I find very illuminating the "three stage view" of scientific inquiry developed by Charles (2000), pp. 23-56, although I do not agree with every consequence he draws concerning definitions.

Of course, there will be certain apparently definitional *logoi* which can never turn into real definitions to us. These are those which express the meaning of a name which does not name any existent thing (a *logos* of the meaning of "goat-stag", or "vacuum"), and also those which express the meaning of a name without giving us "something of the thing itself" (since this *logos* does not capture the *what it is*). In my view, it makes no sense to call this kind of *logoi* a "nominal definition",<sup>16</sup> as they will never be able to express any *what it is*. They are not definitions in themselves, so they cannot be incidental definitions to us. In such cases, it would be more appropriate to keep the label of the simple "*logos* of the meaning of the name".

Finally, there are certain *logoi* which will always be real definitions, which can never be just incidentally a definition to us: the *logos* which contains the cause, given that its formulation can only be achieved through demonstration, can never be a *logos* of something whose existence is not known. It will always, therefore, provide knowledge of the *what it is*, it will always be a definition to us.

In short, a *logos* which expresses the meaning of a name can be: a) only a formula which expresses the meaning of the name, when the thing named does not exist or the *logos* does not include "something of the thing itself", or b) a phrase which is *in itself* able to express the *what it is* of the thing, when the thing named really does exist and the *logos* includes something of the thing itself. But this ability does not suffice for the *logos* to be a definition in the strict sense *to us*. In this case, with regard to the different stages of inquiry, this *logos* may be: b1) just incidentally a definition to us, when we do not know whether the thing exists, or b2) a true definition to us, when we know that the thing exists. The distinction between b1 and b2 is useful to indicate two

16. For Gómez-Lobo, for example, these are two of the three types of nominal definition: Gómez-Lobo (1981), p. 41. Charles considers the "account of what a name signifies" as a distinct form of definition, independently of whether or not the name is naming something existent: Charles (2000), pp. 67-69.

moments of the same *logos* in the course of scientific inquiry,<sup>17</sup> but cannot be used to create a classification of the various types of definition. "Nominal definitions" are *not yet, to us*, definitions of any kind.<sup>18</sup>

5.1.2. Definition as a "*logos of why it is*". How it can be distinguished from demonstration.

Regarding the second sense of "definition", a *logos* which indicates *why something is* could be confused with a demonstration. Aristotle says that a definition in this sense "is different in arrangement from a demonstration". Although we could call this a "demonstration of the *what it is*" (because it connects the *what it is* with the cause, which is proper to demonstration), this is not a genuine demonstration.<sup>19</sup> For example, we can construct a *logos* that tells us why thunder occurs ("thundering occurs in the clouds because the fire is extinguished in the clouds": this would be a "continuous demonstration"), and a *logos* that tells us what thunder is ("thunder is the noise of fire being extinguished in the clouds": this is a definition which contains the cause). It is as though one *logos* is being said in two different ways, with small changes: but the changes are essential, as in one case we have a demonstration of the thundering occurring in a subject (the object of the demonstration is the "combination"), while in the other, we have a definition of

17. There is still a third moment, when this partial definition is "demonstrated" (and thus superseded) by the complete definition which includes the cause.

18. It is also misguided to try to find any structural characterisation of nominal definitions (as Bolton, for example, does). What makes a *logos* to be a "nominal definition" to us is not any specific component of it, but rather the cognitive role it is able to play.

19. Some interpreters seem to be misled by the expression "demonstration of what something is". The "demonstration" Aristotle is speaking about is not the demonstrative syllogism that proves, for example, that thundering holds of the cloud. He is not telling that a demonstration can be regarded as a "definition" in an improper sense (this is Harari's interpretation: O. Harari, *Knowledge and Demonstration. Aristotle's Posterior Analytics*, Kluwer Academic Publishers, Dordrecht/Boston/London, 2004, pp. 134-136), but rather that certain kind of definition can be regarded as a "demonstration" in an improper sense.

thunder (the object of the definition is the "compound"). The first *logos* is the one which we present in response to the question *to dioti* ("why does it thunder?" using the verb), while the second is the one we give to answer the question *ti estin* ("what is thunder?" using the name).<sup>20</sup> Aristotle is proposing that even though these two questions are different, when we answer the first, the answer to the second will become apparent.

## 5.2. THE TWO TYPES OF DEFINITION

However, not everything can be demonstrated, nor is the cause of every demonstrable thing known to us, and so the distinction between the two senses of "definition" gives rise to a division of definitions into types (which is implicit in 93b 39-94a 2, which mentions "the first" and "the second", even though it is unclear what this refers to): some definitions are only definitions in the first sense, since they only express the *what it is* (we formulate definitions of this kind to express the *what it is* of things that cannot be demonstrated, or of those whose cause we do not yet know), while other definitions are "definitions" in both senses, expressing the *what it is* and the *why it is* (a thing which has a middle, when this middle is already known, is defined more completely when its cause is included in the *logos* of the *what it is*).<sup>21</sup> This is at first sight a structural distinction: we can tell whether a given definition belongs to one or the other type by simply looking at the *logos* and seeing if it contains explicit mention to the external cause.

20. Unlike Barnes (1993), I think that Aristotle's terminology when he speaks about the "demonstration of the *what it is*" is indeed significant: the "*ptosis*" in 94a 12 must make reference to the different grammatical forms, which make the definition different *in aspect* from a genuine demonstration.

21. Here I mean by "cause" the efficient one: the cause that, being different from the thing itself, acts as the sufficient condition for its existence. I do not include the formal cause, and this is the reason why I can distinguish between definitions that involve the cause and definitions that do not. In this point I differ from Deslauriers, who understands that any definition have to include causes: (2007), pp. 81-111.

Now, regarding their relationship to demonstration, the very reason why there are different types of definition is that each kind is linked to demonstration in a different way. The difference between the two types is therefore not simply structural, but rather has to do with the level of knowledge at which each one is situated: the first only signifies the *what it is*, but does not demonstrate it, whereas the second is like a demonstration of the *what it is* and therefore gives us more perfect knowledge (93b 39-94a 2).

We could therefore define the two types of definition as follows: "*logos* which means the *what it is* (without demonstrating it)", and "*logos* which 'demonstrates' the *what it is*, by expressing why it is". It is only the latter which competes with demonstration (since both this type of definition and demonstration involve the cause: they would both seem to answer the question *to dioti*). But Aristotle has distinguished this *logos* from a true demonstration: demonstration is the answer to the question *to dioti*, while definition is the answer to the question *ti estin*.<sup>22</sup> It remains for Aristotle to show how, despite their differences, definition and demonstration are closely related.

6. The second problem, second part:  
the roles of definition with regard to demonstration  
(*Posterior Analytics* II, 10)

The famous list of definitions which Aristotle provides at the end of chapter 10 is a catalogue of the different functions that definitions can have in relation to demonstration. The fact that there are three different roles, but there are only two types of definition that account for these, can be explained by the central position which the distinction

22. I disagree with Deslauriers, who distinguishes two major types of definition, one which answers the question why, and the other which answers the question as to what it is: (2007) pp. 46, 50. In my view, a definition always answers the question "what is it?" (this is why it differs from a demonstration), even if its phrasing includes the answer to the "why?" question.

between demonstrable and undemonstrable things occurs in Aristotle's theory of science.<sup>23</sup>

- a) An undemonstrable thing (for example, the moon) only has a definition of the first type, that is, a *logos* which means the *what it is*. As the moon does not have a different cause, this definition is "an undemonstrable position of what it is" or "an undemonstrable *logos* of what something is" (94a 11-12). The part which these definitions play in demonstration is that of being principles that are assumed, but are not demonstrated ("and here you must suppose, or make clear in some other way, both that the thing exists and what it is. (Arithmeticians do this: they suppose both what a unit is and that there are units.)" 93b 23-25). In the case of the eclipse, this definition is the *logos* of what the moon is, which has to be taken for granted in our investigation into why it is eclipsed.
- b) Demonstrable things (e.g. the eclipse) have definitions of both types: a *logos* which signifies the *what it is*, and a *logos* which "demonstrates" the *what it is* by expressing why it is. Each of these has a different role as far as demonstration is concerned.
  - b.1) About demonstrable things, which have a cause that is different from themselves, it is clear that we should be able to formulate a *logos* concerning why it is: this is the definition which becomes a "demonstration of the *what it is*", as it makes the cause of the thing explicit. In the case of the eclipse, it is the *logos* which defines the lunar eclipse as "a deprivation of light caused by the screening by the earth". This is

23. This distinction is dependent on the more basic distinction between things that have a cause different from themselves and things that have not. Deslauriers (2007) rightly places this distinction at the core of Aristotle's discussion on definition, giving rise to the basic classification between "immediate definitions" and "syllogistic definitions".

precisely the definition which is achieved *through* demonstration, without being demonstrated in the strict sense. In fact, once we have a demonstration, with the middle between the two extremes, a definition can be formed which contains the cause, and which is therefore a kind of "demonstration of the *what it is*" ("an eclipse is the deprivation of light on account of the screening by the earth"), which differs in aspect from a demonstration proper (or from the *logos* that expresses the continuous demonstration: "a deprivation of light occurs in the moon because it experiences a screening by the earth").

b.2) However, it is also possible to formulate a *logos* of the *what it is* of demonstrable things which is not a *logos* of *why it is*: a definition which only signifies the *what it is*, without "demonstrating" it (i.e. without accounting for its cause). Clearly, a definition which does not make the cause of a caused thing explicit will be an incomplete definition, giving only partial knowledge of the *what it is*. Just as a definition which tells us explicitly why it is can be regarded as a certain type of "demonstration of the *what it is*", this incomplete definition can also be considered its "conclusion".<sup>24</sup> In the case of the eclipse, what is "demonstrated" by connecting it to its cause (in the complete definition) is the *logos* which (partly) defines the eclipse as "deprivation of light". This is

24. This is not the conclusion of the demonstration of the *what it is* (there is not a demonstration properly speaking of the *what it is*, as essence is not strictly demonstrable) neither the conclusion of the demonstration *that it is* (which is the syllogism that provides scientific understanding of this existence), but the "conclusion" of the "demonstration (in the improper sense) of the *what it is*". Bayer (1995) finds puzzling the fact that the conclusion of the demonstration seems to be a statement of existence, as how could it be identified with a definition? (p. 257) Bayer answer by using his distinction between two types of syllogisms (p. 259). However, *pace* Ackrill, who reconstructs how a syllogism whose conclusion is a definition would be like (1981, pp. 360-363), I think that the right answer is that no definition is the conclusion of any syllogism, but some are the "conclusion" of a "syllogism".

properly speaking the *what it is* that can be demonstrated. This *logos* may have been present at the outset of our research, when we did not know of the existence of eclipses: in this case, the *logos* was not *to us* properly speaking a definition of the eclipse, but simply an explanation of the noun "eclipse". Once we know that this exists, the *logos* turns into a genuine definition to us, and provides us with a certain kind of knowledge of what an eclipse is. But this is non-scientific knowledge, which has not been demonstrated, because it does not give us information about the cause. When we do finally achieve, through demonstration, the complete definition of an eclipse, we will have scientific knowledge about this mysterious deprivation of light.

Now that the three roles of definitions as regards demonstration have been clarified, we can see that there is no danger of rivalry between definition and demonstration:

- There are definitions which do not answer the question "why?" (as they belong to things that do not have any cause different from themselves), but which have to be taken for granted in order to explain why these immediate things have a certain property. In our example, the definition that answers the question "what is the moon?" is such an instance.
- There are definitions which somehow contain the answer to the question "why?" (and which we can therefore formulate only insofar as we have a demonstration that answers this question explicitly),<sup>25</sup> but which are themselves formulated in response to another question, that is, to the question "what

25. Unless the cause is perceived: we do not require a demonstration or even ask ourselves why, because we can see it for ourselves.

is it?". In our example, the definition which completely answers the question "what is an eclipse" is such a definition.

Finally, there are definitions which do not answer the question "why?", even though they belong to things which do have an external cause. These definitions are incomplete, but are the only kind we can have at the outset of our investigation, which will consist of looking for the right middle to complete them, i.e., to "demonstrate" them through a definition which contains the cause. In our example, the definition which incompletely answers the question "what is an eclipse?" is the only definition we can make until we have found out the reason for this absence of light.

We could summarise the three-fold role of definitions in Aristotle's theory of demonstration as follows: the definition is important in the theory of demonstration a) as an undemonstrable principle of demonstration, b) as a ("demonstrable") starting point for research, and c) as a ("demonstrative") result of the demonstration. Definition is thus revealed as a key component in Aristotle's theory of demonstration: a) as an undemonstrable principle for a demonstration, it excuses us from the need to demonstrate everything, freeing us at the same time from the absurdities which derive from not having stable ground to build our demonstration on; b) as the trigger for research, it enables us to resolve the Platonic paradox whereby we cannot investigate into something's existence without knowing its essence, nor can we seek its essence without knowing about its existence; c) as the result of inquiry, it enables us to realise how having a scientific demonstration increases our knowledge: it provides us with knowledge of the *what it is* that is deeper, reaching down to the causes.

## 7. Definition in medieval commentaries: Averroes and Grosseteste

In this section I would like to examine how two great commentators on Aristotle understood his ideas about definitions. The contrast between Averroes and Grosseteste will enable me to bring out some of the points that I regard as the key to interpreting chapter 10. In my opinion, Averroes' commentary on these pages is an example of a very neat reading of Aristotle, with a clear grasping of the underlying problems.<sup>26</sup> Grosseteste's one, on the contrary, is an example of a rather loaded reading, that replaces the Aristotelian genuine problems by some worries alien to the real concerns of Aristotle in this particular chapter.<sup>27</sup>

### 7.1. AVERROES

As might be expected, the most illuminating analyses are located in the *Long Commentary*. The *Middle Commentary* just contains a brief explanation of the notion of definition and the different types into which it can be divided (29 rb-va): a straightforward reading of Aristotle, doubtless coloured by Themistius' paraphrase. Nevertheless, some of the key aspects of Averroes interpretation are already present in this work: a notion of definition as connected with essence ("*substantiam*" in the latin translation) and therefore with existent things, and an examination of the "*oratio declarans nomen*" as an improper kind of definition, with the explicit declaration that there are just three species of definition.

26. My reading of Averroes is limited by the fact that I have to approach his work through translations. *Aristotelis Opera cum Averrois Commentariis* (Venetiis 1562-1574). Reprint: Minerva G. m. b. H., Frankfurt am Main, 1962. *Averrois Expositionis Mediae In Librum Demonstrationis Aristotelis* (Vol. I part. 2b), and *Averrois In Librum Aristotelis de Demonstratione Maxima Expositio* (Vol I part. 2a). In my citations of the *Long Commentary*, I will indicate whether the text corresponds to Abramo de Balme's translation (A) or to Burana's one (B).

27. Robertus Grosseteste, *Commentarius in Posteriorum Analyticorum Libros*. *Introduzione e testo critico di Pietro Rossi*, Leo S. Olschki, Firenze, 1981. I will use the line numbers of this edition for my citations.

In the *Middle Commentary*, after characterising the definition in general terms as a "phrase which makes manifest the essence of the thing and its attributes" and after a brief mention of the essential unity of any definitional *logos*, Averroes devotes a few lines to explaining the different types of things we call "definitions". In his opinion, we apply the name "definition" to four different kinds of thing, though the first one is an improper use of the word. The *logos* of what the name means gets a separate place in the list of definitions: it is not identified with any of the following types.

A "phrase which declares the name" (*oratio declarans nomen*), Averroes says, "comes from the name without meaning that the thing is or is not" (it is *exiens ab ipso absque eo quod significet quod haec res sit aut non sit*). This existential neutrality is the reason why the phrase which declares the name is not regarded as a true definition. In contrast, a definition in the proper sense is one that "shows the substance of the existing thing" (*doceat substantiam entis*). Averroes explicitly connects the definition in the proper sense with existence, following the Aristotelian principle that if we do not know that something exists, we cannot have authentic knowledge about either *what* or *why*.

Concerning the proper senses of "definition", they constitute three mutually exclusive, jointly exhaustive categories. Everything that we properly call a "definition" must fall into one of these three categories, and only one. Within definitions proper, a first kind is the one which lets us know about *what* and *why*, which could be called the "*demonstratio variata positione*". (Averroes paraphrases Aristotle in distinguishing two different questions, "*propter quid existit tonitruus*" and "*quid est tonitruus*". He makes explicit mention to the change of order in the respective answers, but does not emphasise the contrast between the form which uses the verb and the form which uses the name.) A second type is the definition *per se nota*, which is

an undemonstrable principle for a demonstration. A third type of definition is the conclusion of the demonstration (Averroes only gives one example, the conclusion which states that thunder is a noise in the clouds, but he does not explain what demonstration this definition is the conclusion of).

Given that the passage on the different kinds of things called "definitions" is so short (29rb-va), in the *Middle Commentary* Averroes does not clarify anything new, or discuss explicitly the criteria he used to divide definitions (properly speaking) into three categories. However, the scope of the *Long Commentary* enables Averroes to sketch a much more complete picture of the types of definition (470r-474v), with explanations that succeed in illuminating the main difficulties in the chapter's interpretation.

All the types which he distinguishes in the *Long Commentary* are contained within a great definition of "definition" as "phrase which means the essence of the thing" ("*oratio quae rei quidditatem significat*" in Balmes' translation, "*oratio significans super essentia rei*" in Burana's). The Aristotelian "*logos tou ti estin*" functions as a general framework for all kinds of definition, not as the description of any particular kind or sense of definition. This forces Averroes to give a particular interpretation of the "one... another" in 93b 38, as we will see later.

In what follows, Averroes offers the interpretation that the rest of chapter 10 is dedicated to distinguishing the different "species into which the name 'definition' is divided" (470r). He will eventually propose a total of five kinds of (genuine) definition, which he obtains from two different criteria: first, the criterion as to whether or not the definition becomes manifest through a demonstration gives rise to a twofold division (definition which does not contain the cause / definition by the cause); secondly, the criterion as to how the definition behaves with regard to the demonstration gives rise to a threefold division (conclusion of

the demonstration of what something is / demonstration of what something is / principle of the demonstration). The five species or types listed are thus not mutually exclusive, but rather belong to different classifications. On the other hand, the so-called "nominal definition" is not among them.

In accordance with the definition of "definition" mentioned above, what will later be called the "nominal definition" cannot, in Averroes' view, be a genuine definition. He explains that "One of the phrases in which the name 'definition' is left aside is the phrase which declares the meaning of the name."<sup>28</sup> Thus, Averroes is interpreting the passage in 93b 30-35 neither as the introduction of a separate kind of definition (nor as the preliminary presentation of some definitions that will be later examined from a different perspective), but as the explanation of why certain *logoi* should not be taken as definitions in the true sense. What is interesting here is the analysis which Averroes gives of this existential neutrality of the *logos* of the name which had only been mentioned in passing in the *Middle Commentary*.

According to Averroes, the phrase which states the meaning of the name corresponds to the things whose existence is not known. For example, for the name "*vacuum*" we can find a *logos* that explains its meaning: "a place where there is no body", even though we do not know whether a vacuum exists or not. Similarly, for the name "*natura*" one can offer the *logos* "principle of bodies that move and rest by themselves". It is plain that he is characterising certain *logoi* in terms of the stage of inquiry to which they belong, not in terms of their structure or constitutive parts. Neither is he linking the "*oratio declarans significationem nominis*" either to things that exist or to those that do not exist: we can construct a *logos* explaining the name of any of them. The crucial point is that a *logos* which merely explains the

28. "Una orationum super quibus dimittitur nomen definitionis est oratio declarans significationem nominis." (470r, B)

meaning of a name corresponds to things which we do not know whether they exist or not: therefore, to things which, following one of Aristotle's basic theses, we cannot yet know, or even ask ourselves *what they are*. These "definitions" are those which we find at the beginning of our investigation about the existence of things which have a cause different from themselves.

Next, Averroes makes an interesting interpretation of the "or some other name-like account" in 93b 31. He speaks about some *orationes* that "declare the name of some things that we have without having their name" (470r), and he thinks that they are included among the *orationes declarantes significationem nominis*, because of the things they are speaking about: again, things whose existence is unknown. The reason he gives for this inclusion is the key for his interpretation of the first species of genuine definition. There are some things whose existence *is known*, but whose existence *we do not know through its causes* (remember that, for Aristotle, this way of knowing existence does not constitute a genuine knowledge of existence). A definition of these things, according to Averroes, will be a true definition in itself, but at this stage of the inquiry it will be unable of providing a proper knowledge of the thing. To this extent, this definition is assimilated to a mere *oratio declarans significationem nominis*.<sup>29</sup>

For instance, in geometry we explain the name "triangle" by saying that it is a figure with three sides. To the extent that we know that triangles exist, this phrase is a definition of the triangle: it tells us what triangles are. But, to the extent that we do not know that triangles exist through their cause, this phrase cannot but state the name (as, without a proper knowledge of existence, it cannot give a proper knowledge of essence), and in this

29. "Atqui fuit hoc ita quoniam eorum de quibus non scitur existentia ipsorum propter causas suas, non scitur utique existentia ipsorum secundum veritatem, quemadmodum definitiones quae sunt de huiusmodi rebus: quae assimilantur definitionibus quae sunt orationes declarantes nomina." (470r, B)

sense, it resembles (functions as) a "phrase which states the name".<sup>30</sup>

Averroes thus recognises ambivalent definitions, which may or may not be taken as definitions in the proper sense: they are true definitions insofar as they can tell us what something is, but they are not definitions (to us) in the strictest sense insofar as they cannot tell us, in the strictest sense, what something is. They cannot tell this to us, because if we do not know in the strict sense that something exists, we cannot have knowledge, in the strict sense, of what it is. These phrases which are formulated when we do not know the cause, which are genuine definitions in themselves but are not definitions in the strict sense to us, are the key that allows Averroes to give meaning to "one... another" in 93b 38, which marks the first division of definitions into kinds.

The first kind is the type of definition which is formulated at the outset of inquiry, when the reason why the thing exists is not yet known. The structural mark of this kind of definition is that it does not indicate the cause of what is being defined, as is the case with the definition of triangle or circle which is the starting point of research in geometry.<sup>31</sup> Then Averroes interprets the Aristotelian "means something but does not prove it" in this way: not only that this definition *does not constitute* a demonstration of *what it is*, but also that about this definition *there is no demonstration*.<sup>32</sup> What he might have in mind is that this

30. "Deinde adduxit exemplum istius speciei definitionum, et dixit: 'exemplum huius quid significat quid est triangulus'; sensus est: exemplum huius per quod monstrat Geometra nomen trianguli ex eo quod est figura trium laterum, quoniam haec est definitio trianguli ex parte qua est triangulus notae existentiae apud nos, et ipsa plane declarat <nomen> ex parte qua triangulus non est notae existentiae apud nos per causam suam. Et ipsa ex hoc modo assimilatur orationibus declarantibus nomina, hoc est, quorum ignoratur existentia absolute." (470v, B)

31. "Deinde dixit: 'una definitionum ea est quae dicta est nunc', hoc est, definitio per quam non adduxit causam consequentem definitum, quemadmodum definitio trianguli et definitio circuli." (472r, B)

32. Et dum dixit: 'praecedens autem haec significat quidem significationem quandam, veruntamen non commostrarat commostrationem', intendit primam speciem definitionum quam diximus quod significet esse rem definitam, sed quod non commostrarat illam, idest, quod de his definitionibus non sit demonstratio." (472r-v, A)

definition is not the one that is made manifest through a demonstration (it is, rather, the one already had at the outset of inquiry).

The other kind of definition is the phrase which shows why the thing is. This definition is only for things that have external causes (eclipses, thunder), and is the one which is shown by demonstration.<sup>33</sup> Averroes interprets the Aristotelian "demonstration of *what it is*" in the sense that this kind of definition is a demonstration *in potentia*: it turns into a demonstration if the order of the terms is changed accordingly.<sup>34</sup> He conceives the difference between definition and demonstration not only in terms of a different arrangement of constituents, but also in terms of some difference in the nature of the constituents.<sup>35</sup> This type of definition is what Averroes regards as a perfect definition.

Although Averroes indicates that this first division into types makes a distinction between definitions that are shown by demonstration and definitions that are not, this first division really stems from an analysis of the definition in itself (definition which contains the cause / which does not contain the cause). By contrast, the second division comes from an analysis that is external to the definition: its possible relationship to demonstrations. To Averroes, it is obvious that this second division is threefold (473v).

33. "Dum dixit: 'iamque invenitur definitio una, et est oratio docens propter quid est', sensus est: iamque invenitur species una definitionis, et est ea cuius potentia est potentia demonstrationum, quae tradunt definitionum et causam ipsius. Et istae sunt definitiones quae habent causam, quae est causa essentiae, secundum id quod dixit in praecedentibus, quemadmodum definitio defectus et definitio tonitruus, hoc est, definitiones de quibus dicitur quod manifeste fiunt ex demonstratione, quodque non tradit ipsas demonstratio per se." (472r, B)

34. "Et cum dixit: 'planum autem quod haec altera tanquam demonstratio de quid est, sed diversificatur demonstratio per positionem', sensus est: species autem definitionum, quae est definitio per quam adducitur causa extrinseca, est in potentia demonstratio absoluta de definitione, hoc est, tradens existentia definitionis et causam ipsius simul, sed diversificatur in talibus definitiones et demonstrationes in ordine et positione." (472v, B)

35. "Differunt autem tales definitiones et demonstrationes ordine et positione: hoc est, quia demonstrationum compositio sit compositio orationis enuntiative, et definitionis compositio sit compositio conditionis et corroborationis clausulae, ac etiam quod praeponitur in una postponitur in altera." (472v, A)

One type of definition can be the conclusion of a particular demonstration. At first, he does not explain what kind of demonstration this is, but he does so when he summarises at the end: this is the kind of "demonstration" which, taken together, is a perfect definition.<sup>36</sup>

The second type of definition is the definition which is like a demonstration, differing in arrangement (a definition-demonstration in which the definition-conclusion is taken together with its cause).<sup>37</sup> This is what can be called a "*demonstratio de essentia rei*" (474r).

And the last type is the definition which can be a principle of demonstrations. Averroes explains that these definitions are for things that do not have a middle. As a result, they cannot be shown by a syllogism, but are *per se notae*. That is, these definitions immediately show that they are definitions of existing things: this is why they can be used as the premises of a demonstration. But he clarifies the two senses in which these "things that have no middle" can be interpreted, and thereby explains the self-evident nature of the corresponding definitions: they have no middle *simpliciter*, and of them we know *per se* that they are definitions; or they have no middle *in the science in which they are placed*, but they do in another, in which they could be demonstrated (473v-474r).

In short, Averroes' interpretation in the *Great Commentary* takes its focus from a general idea of the definition as a "*logos of what it is*" and therefore as necessarily connected to the existence of the things that are thereby defined. This central idea, together with the Aristotelian thesis of the priority of knowledge of existence over knowledge of essence, enables Averroes to understand the role of the "*logos*

36. "Definitiones igitur apud ipsum sunt trium specierum: definitio quae est principium demonstrationis, et definitio quae est demonstratio variata positione, et definitio quae est conclusio demonstrationis, hoc est conclusio demonstrationis quae est in summa definitio perfecta." (474v, B)

37. "Et definitio ex qua est demonstrationis conclusio quando autem connectitur suae causae et secum capitur, est demonstratio positione differens, et haec est altera species definitionis perfectae." (473v, A)

which indicates the meaning of the name" (*logos* which is formulated when we do not know that the thing exists), and also to reconstruct without difficulty the first division of the definition into types: given that the existence of some things may be known in an improper sense when we do not know their causes, or in a proper sense when we know their causes, the *what it is* can be formulated imperfectly, through a definition which does not include the cause, or perfectly, through one which does so. This first division seems to be conceived as applying to the definitions of those things that have a cause different from themselves, and it concerns the different stages of inquiry into their essence. Finally, regarding the second division into types, which echoes Aristotle's functional division, Averroes is not misled by the improper use of the term "demonstration". He is aware that only one type of definition plays a role in demonstration properly speaking (the role of indemonstrable principle). The other two types of definition only play a role in "demonstration" improper, that is, in what can be called a "demonstration" of the *what it is*, just because it shows the *what it is* through its external cause.

## 7.2. GROSSETESTE

The first difference from Averroes' commentary is that Grosseteste, when commenting chapter 10, does not set out by characterising definitions in general, but goes directly to the types into which definitions can be divided. Whereas Averroes interprets the "*logos tou ti estin*" at the beginning of the chapter as a definition of "definition" which applies in every type, Grosseteste seems to interpret this as the description of a first sort of definition.

Another serious difference is that when Grosseteste addresses chapter 10, he is looking for the answer to a question which Aristotle himself did not pose. The perspective which Grosseteste adopts to analyse this chapter

is determined by a prior assumption that the way to demonstrate a definition is by using another definition.<sup>38</sup> This is conclusion XII of his commentary: "*Illud quod est diffinitio demonstratur per medium quod est diffinitio.*" (540)<sup>39</sup> Grosseteste thus considers that Aristotle's division of definitions arises from the attempt to clarify which definition has the function of demonstrating and which is demonstrated. The schema of "demonstrating" and "demonstrated" provides a basic classification of definitions, into which Grosseteste tries to fit the Aristotelian analysis.

On the other hand, when he seeks appropriate candidates for the roles of demonstrating and demonstrated, this process is inevitably conditioned by the way he identifies the definition of a thing with its cause. Grosseteste thus gives a certain ontological status to the definition. Following Philoponus, he distinguishes between the 'formal definition' (which he understands that Aristotle refers to when he talks of the 'cause identical to the thing', and which encompasses both formal and final causes) and the 'material definition', (which he believes Aristotle is referring to when he discusses the 'different and demonstrable cause', and which covers both the material cause and the efficient cause).<sup>40</sup>

In this way, the ontological criterion for the distinction (identification with one type of cause or another) enables him to locate a first division of definitions into two kinds, which can be used to answer the question as to demonstrating and demonstrated definitions. On the one hand, the formal definition is the demonstrating definition. A formal definition cannot be the demonstrated definition,

38. For an account of this traditional interpretation of "demonstration of the essence" see Harari (2004), pp. 133-134 and Goldin (1996), pp. 102-106.

39. It is true that he recognises, like Aristotle, that the definition as such is not strictly demonstrated in this way (543).

40. This is how he divides definitions in lines 694-700. But in line 575 he points out that the 'definition by the final cause' may be a different type of definition (to which Aristotle may be referring when he talks of a 'different but undemonstrable cause').

because it lacks a middle through which it can be demonstrated of the thing (since the form of the thing is identical with the thing itself). On the other hand, the material definition is indeed the demonstrated definition. The material definition can be demonstrated by virtue of another definition (the formal kind), because it has a middle, i.e., a cause other than itself (namely, the formal definition). This is conclusion XV: "*diffinitio formalis est demonstrans diffinitionem materialem de diffinito et non demonstratur formalis de diffinito suo*" (675-676).

Once he has located the demonstrating and demonstrated definitions, Grosseteste is able to situate two of the types of definition which appear on the final list in chapter 10 (the functional division of definitions): some definitions serve as the principles of a demonstration, while others are the conclusion of some demonstration. Since formal definitions are undemonstrable, these are the ones that function as principles of the demonstration<sup>41</sup> (either because the existence and essence of defined things are manifest in themselves, or because they have been assumed without demonstration and shown by other means). Since material definitions are the demonstrated kind, they are the ones that function as conclusions of the demonstration (717-728). Grosseteste does not seem to notice that these two senses of "demonstration" are different.

Moreover, this simple hylomorphic division leaves two loose ends: the third type of definition which appears on the list at the end of chapter 10 (the one which is like a demonstration but "differing in arrangement") and the "*logos* of the meaning of the name" at the beginning of the chapter, which would seem to be a further kind of definition.

The former is easy to fit in without abandoning the hylomorphic framework. To account for this third type of defi-

41. But in another sense, a formal definition functions as the middle of a demonstration: because it is the cause by which the material definition is demonstrated. (727)

inition, Grosseteste proposes a composite definition (made up of the material and the formal definition).<sup>42</sup> He explains that Aristotle considers this composite definition to be the same as a demonstration, because the cause and the definition are the same, but they differ in mode.<sup>43</sup> The difference between definition and demonstration seem to be conceived only in terms of the arrangement of words: if the composite definition is turned round, it is converted into a complete demonstration (one which demonstrates the material definition of the defined thing, with the formal definition as a middle, and the material definition as a conclusion, placed at the end).<sup>44</sup> Grosseteste does not understand that the definition is a "demonstration", in an improper sense, of the *what it is*, but he interprets that this composite definition *may become* a demonstration, in the proper sense, of one definition by means of another.

On the other hand, to account for the "logos of the meaning of the name", Grosseteste adds a fourth type of definition, which is different in nature from the other three, since it "does not claim to say what it is, but only what the name means".<sup>45</sup> The types of definition are thus organised according to a first major division, that between *diffinitio nominis* and *diffinitio rei*. The latter contains the three-fold division arising from the hylomorphic criterion.<sup>46</sup>

42. "Et ex hac sicut corollarium manifestum est quod diffinitio composita ex diffinitione materiali et formali est demonstratio in situ alterata." (677-679)

43. "Et dico quod diffinitio composita est idem cum demonstratione, quia causa et diffinitio idem sunt, sed differunt in modo, quia differt dicere propter quid tonat et quid est tonitruus." (755-758)

44. "Quare hec diffinitio coniuncta: 'tonitruus est extinctio ignis in nube propter continuum sonum in nube, si convertatur situs eius, erit completa demonstratio demonstrans diffinitionem materialem de diffinito. In diffinitione namque composita ordinatur diffinitio materialis ante formalem predicto modo, sed, cum convertitur talis diffinitio in demonstrationem, diffinitio formalis fit medium et ordinatur ante, et diffinitio materialis fit ultimum et conclusio. Et sic differunt in situ et ordine terminorum, unde idem uno modo est diffinitio et alio modo continua demonstratio." (763-771)

45. "Et preter has diffinitiones est diffinitio quarta que non intendit dicere quid est res, sed solum quid significat nomen, ut supra dictum est." (702-704)

46. "Iam igitur manifestum est quod diffinitio primo bifarie dividitur, quia aut est diffinitio nominis aut rei, [...]. Diffinitio vero rei preter duas species predictas, scilicet diffinitionem formalem et materialem, habet tertiam speciem que compo-

It is in the context of the nominal definition that Grosseteste provides a general account of what definitions are: "every definition is something on which the reason discourses in order to know the *what it is*". The *diffinitio nominis dicens* is regarded as a special type of definition, because it corresponds to a special type of "*what it is*". One of these "*what it is*" that can be known is simply *esse in intellectu*: the unreal sense of "*what it is*" is simply what the name signifies. To know it, the reason discourses on a special type of definition, the *diffinitio nominis*, which explains this kind of intellectual being.<sup>47</sup> But to call this a "definition" is still an improper use of the word, since the *what it is* defined in this way is not the being of the thing, but the meaning of the name. For this reason, he also says that the "definition" which explains the meaning of the name is not a true definition, nor is it scientific (in particular, it cannot function as a middle of a demonstration).<sup>48</sup> But he does acknowledge that it has a role in triggering inquiry into the thing's existence.

Grosseteste is identifying the initial "*logos tou ti estin*" with the *diffinitio nominis*, thereby establishing a first type of definition which he contrasts to the "definition which demonstrates why it is": this would be the sense of "one... another" in 93b 38, which makes a strong contrast between two types of definition. One is the one we have at the outset of our research, which *only* tells us what the name means,

sita est ex duabus predictis, et hec est secundum rem demonstratio unius de uno, sicut iam explanabitur." (743-749)

47. "Quoniam quidem diffinitio omnis est id super quod decurrit ratio in cognitionem quid est, esse autem dupliciter est in se et in intellectu, manifestum est quoniam aliqua erit diffinitio super quam decurrit ratio in cognitionem huius, scilicet quid significat nomen iam inpositum, aut erit illud super quod decurrit ratio in cognitionem quid significat nomen imponendum. Proponimus enim diffinitionem explicantem esse intellectuale vel ut faciamus intelligere quid significat nomen ignote significationis vel ut per ipsam instituamus nomen ad significandum." (729-737)

48. "Ille vero oppositiones, que ostendebant quod diffinitio explicans intentionem nominis in quantum huiusmodo est non potest esse medium quo demonstratur si est simpliciter et quod talis diffinitio non est diffinitio vera neque scientifica, sunt oppositiones vere." (616-619)

and the other is the one which we reach at the end, which is able to demonstrate why the thing is.<sup>49</sup> The difference between nominal and real definition is not related to any question about existence or about our knowledge of existence. It is related to the two senses of "quid est x?": one of the senses is just "quid significat 'x'?", a question that can be asked independently of whether 'x' names or does not name an existent thing, and independently of whether we know about this existence.

Regarding the three-fold division of real definitions (which is at once hylomorphic and functional), one of the problems with Grosseteste's interpretation of Aristotle is that the hylomorphic distinction obliges him to reformulate the examples in his own personal way, as Aristotle's examples of each kind of definition do not fit into Grosseteste's division (760-773, 802-836). For example, the extinguishing of fire (which was, for Aristotle, the middle in the demonstrative syllogism) appears in Grosseteste's material definition of thunder ("fire extinguished in the clouds"), that is, the one that functions as conclusion of the demonstration. On the other hand, the noise in the clouds (which was, for Aristotle, the "conclusion" of the "demonstration" of the *what it is*) appears in Grosseteste's formal definition of thunder ("continuous noise in the clouds"), that is, the one that functions as "demonstrating" definition and hence as indemonstrable principle of the demonstration. Finally, the composite definition which is like a demonstration of what thunder is (which Aristotle formulated as "a noise of fire being extinguished in the clouds"), is formulated by Grosseteste as "the extinguishing of fire in the clouds by a continuous noise in the clouds (*propter continuum sonum*

49. "Ergo de duabus diffinitionibus nunc ultimo dictis una est diffinitio nominis et alia est diffinitio demonstrans propter quid est; quare prius dicta illarum ostendit quid significat nomen, et in quantum huiusmodi non demonstrat; que vero posterius dicta est, scilicet, que composita est ex diffinitione formali et materiali, est idem quod demonstratio non differens a demonstratione nisi in situ et ordine terminorum." (751-755)

*in nube*)". If we turn this composite definition round, it becomes a complete demonstration which demonstrates the material definition of what is defined: "it thunders because a continuous noise in the clouds is the (final) cause of the extinguishing of the fire" (which, again, differs from the Aristotelian continuous demonstration "thunder holds of the cloud because the fire is extinguished in the clouds").

To sum up, I find two main shortcomings of Grosseteste's interpretation: his view about "nominal definition" and his understanding of the "demonstration of the *what it is*". Where Averroes had attained some very illuminating explanations of what Aristotle intended in chapter 10, Grosseteste uses an ontological framework that tends to obscure the meaning of Aristotle's distinctions, rather than shed light on them. On the one hand, Grosseteste not only interprets the "logos of the meaning of the name" as a special type of definition, but he also forces the interpretation of the "logos tou ti estin" (with an intellectual sense of "esse", which is equal to "significare"), and accordingly forsakes the leading role which Aristotle attributes to existence and to our knowledge of it. On the other hand, Grosseteste is misled by the improper use of the word "demonstration": he fails to adequately distinguish between those definitions which play a role in demonstration properly speaking (the ones that are undemonstrable principles of demonstration, as they define simple objects) and those definitions which just play a role in the "demonstration" of the *what it is* (the ones that correspond to complex "objects", such as eclipses and thunders).

## 8. Conclusion

Although this article cannot contain a detailed analysis of every interesting question that is raised by the Aristotelian texts, I hope to have shown at least both the richness of Aristotle's thought and the efforts of the commentators

for giving a coherent account of it. It might be that most of the difficulties that we face when trying to understand Aristotle had a root in the hidden tension between *Posterior Analytics* and *Metaphysics*, that is, between the strict sense of "definition" (which is a *logos* of essence and thus corresponds to substances), and one of the derivative senses of "definition" (as applied to the combination of a substance with its *kath' auto symbebekos*). But this is a very different story, which does not fit into the limits of the present work.<sup>50</sup>

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## Insights of Avicenna

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### On the Intuition of Real Essences

Aristotelian definitions claim to get at the real essences of objects. Aristotle himself distinguishes such real definitions from nominal definitions. [An. Po. II.10] These real definitions give *formulae* of the essences: what it is for things, primarily substances, to be. [Metaph. 1029b25-6]

For many today such pronouncements of real definitions amount to jokes. I need not resort to *post-moderni* like Foucault to make this point.<sup>1</sup> Famously Quine charges that what attributes something has are determined by convention and pragmatics. Take a human being like Xanthippe. If we are interested in her riding a (normal) bicycle, then being two-legged is essential to her, while being rational is not; if we are interested in her *qua* mathematician, then being rational is essential to her, while being two-legged is not.<sup>2</sup> To be sure, in our theories, both in biology and in politics, we find being rational more important to Xanthippe than being two-legged usually. If she lost her legs, we would still call her Xanthippe; if she lost her reason, we would tend no longer to call her 'Xanthippe' and 'a human being' — especially if she lost her reason by becoming a corpse. Rel-

1. Michel Foucault, *Les Mots et les choses*, (Paris, 1966).

2. *Word and Object* (Cambridge, 1960), p. 199.