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Causality and Demonstration: An Early Scholastic "Posterior Analytics" Commentary

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CAUSALITY AND DEMONSTRATION:
AN EARLY SCHOLASTIC
POSTERIOR ANALYTICS COMMENTARY

Broadly speaking, ancient concepts of causality in terms of explanatory priority have been contrasted with modern discussions of causality concerned with agents or events sufficient to produce effects.¹ As Richard Taylor claimed in the 1967 *Encyclopedia of Philosophy*,² of the four causes considered by Aristotle, all but the notion of efficient cause is now archaic. What we will consider here is a notion even less familiar than Aristotelian material, formal, and final causes—what we will call ‘demonstrational causality’. Demonstrational causality refers to the dependence of the conclusion on the premises of a demonstration. Here, if ever, we have a case of explanatory priority, since among other things what is required of the premises is that they be better known or more manifest than the conclusion. But, oddly enough, Aristotle and his medieval commentators describe demonstrational causality in the same terms as efficient causality. Aristotle speaks of the conclusion as an “effect” of the premises; his commentators speak of the “sufficiency” of first principles or axioms (*dignitates*) in producing the conclusion.

This concept of causality has seldom been studied,³ and little is known about the medieval *Posterior Analytics* commentaries in which it is most fully explicated. The aim of this article is correspondingly modest and introductory. We will first briefly describe the place of *Posterior Analytics* commentaries in the recovery of Aristotle and the development of medieval logic and natural philosophy. In the second place, we will introduce the work presented in this article, Richard Rufus of Cornwall’s newly discovered commentary. In the third place, after distinguishing metaphysical (explanatory), epistemological (evidentiary), and logical (validating) concepts of cause, we will describe demonstrational causality in terms of those notions. Finally, we will present a brief conclusion. Appended to the paper will be a short statement of the reasons for the at-

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tribution of this *Posterior Analytics* commentary to Richard Rufus and an excerpt from it prepared by Rega Wood.

1. *The Posterior Analytics in Its Medieval Context*

In the forgetful sleep which marked the birth of medieval logic, little of the Aristotelian corpus was known. Ancius Manlius Severinus Boethius served as a guide to what was subsequently called the Old Logic (*logica vetus*). The tradition of centuries of Greek Aristotelian commentary was preserved in a handful of works by Boethius. In addition to expounding Aristotle's *Categories* and *De interpretatione*, Boethius commented on a much older introduction to Aristotle's logic: Porphyry's *Isagoge*. Boethius' *De divisione* analyzed logical distinctions. Syllogisms were introduced in *De syllogismis categoricis* and *De syllogismis hypotheticis*; inferences in *De differentiis topicis* and *In Topicis Ciceronis*.

The Old Logic was known to be incomplete. Internal references in Aristotle and hints by other authors told of complex treatises on logic, natural philosophy, and ethics. And though before the 13th century medievals did not have access to the relevant discussions in *Physics* II (c. 3 & 7) and *Metaphysics* I (c. 3) and V (c. 2), they were aware of Aristotle's doctrine of the four causes: material, formal, final and efficient. Boethius presents it in his second commentary on Porphyry's *Isagoge*⁴ and in his *De differentiis topicis*.⁵ What was known about the missing works of Aristotle, from Boethius and from other sources, was frequently used. Introductions to medieval philosophical works, for example, often explained how the four causes were adumbrated therein.⁶

Logic itself was perceived to be deficient, because Boethius had described a progression in dialectical reasoning: The *Categories* deals with terms. Propositions composed of terms are treated in *De interpretatione*. The *Prior Analytics* deals with syllogisms comprised of propositions. Probable syllogisms are treated in the *Topics*; sophistical syllogisms, in the *Sophistici elenchi*; and apodictic (certain) syllogisms in the *Posterior Analytics*.⁷ Scientific knowledge is the product of demonstrative or apodictic syllogisms. Accordingly, the *Posterior Analytics* was seen as the culmination of logic and the indispensable tool for all scientific inquiry.

Knowing this program made for an enthusiastic reception of the Aristotle translations of the 12th and 13th centuries. The New Logic, com-

prising the *Topics*, *Sophistical Refutations*, and the *Prior* and *Posterior Analytics*, probably appeared first, closely followed by the *Metaphysics* and the works on natural philosophy. The first commentaries on the *Topics*,⁸ the *Sophistical Refutations*,⁹ and the *Prior Analytics*¹⁰ appeared at the close of the 12th century. Commentaries on the *Posterior Analytics*, the *Metaphysics*, the *Physics*, and other works of natural philosophy appeared in the early 13th century.

The earliest known surviving *Posterior Analytics* commentary is by Robert Grosseteste; it was probably written before 1230.¹¹ Based on Averroës' commentaries, commentaries on the *Metaphysics* and the *Physics* first appeared about five years later in 1235. By contrast, the interpreters of the New Logic confronted the texts on their own at a time when most of the Aristotelian corpus was still unassimilated. Thus the earliest *Posterior Analytics* commentators relied mostly on their thorough knowledge of the Old Logic and their own ingenuity, although some knew the brief paraphrase of the *Posterior Analytics* by Themistius, translated by Gerard of Cremona before 1187.¹² Not surprisingly, few authors cared to tackle this difficult work under these circumstances; very few commentaries written before 1250 have survived.

Grosseteste's is a unique case, since he is both one of the last great Aristotle translators and one of the first important commentators. Indeed, it seems likely that when Rufus refers to "the Commentator" on the *Posterior Analytics*, he means Grosseteste.¹³ Grosseteste's commentary was written in England. Not long afterwards Richard Rufus commented on the text at Paris as a master of arts, followed by Robert Kilwardby, whose commentary exists only in manuscript. None of these commentaries is well known, but Grosseteste's has received most attention.¹⁴ Since it also has less to say about the subject that concerns us, we have concentrated instead on Rufus' newly discovered commentary, printing the section from which we most often quote (Appendix 2).

2. Richard Rufus' *Posterior Analytics* Commentary

An early thirteenth-century philosopher and theologian, Richard Rufus of Cornwall (d. after 1259) was among the first Western medieval authors to study Aristotelian metaphysics, physics, and epistemology; his lectures on Aristotle's *Physics* are the earliest surviving Western medieval commentary we know. In 1238, after writing treatises against Averroës

and lecturing on Aristotle—at greatest length on the *Metaphysics*—he joined the Franciscan Order, left Paris, and became a theologian.

The first lectures based on Peter Lombard's *Sentences* presented by an Oxford bachelor of theology, Rufus' Oxford commentary was most influenced by Robert Grosseteste. By contrast, Rufus' Paris *Sentences* commentary was indebted to St. Bonaventure. Rufus' Paris lectures made him famous. According to his enemy, Roger Bacon, when he returned to Oxford after 1256 as the Franciscan regent master, his influence increased steadily. It was at its height forty years later, in the 1290's, when John Duns Scotus was a bachelor of theology. Early versions of many important positions developed by Scotus can be found in Rufus' works, including the formal distinction and a modal proof for the existence of an independent first being.

Like his *Metaphysics* commentary and his *Physics* commentary, Rufus' *Posterior Analytics* commentary is preserved in what Wood has called the Ave Maria Aristotle Quires which make up Erfurt Quarto 290 and 312. Originally, there were fifty-eight quires, sixteen of which have survived.¹⁵ Beginning on the fifty-second quire, only the first part of the *Posterior Analytics* commentary has survived; the rest of it has disappeared together with quire fifty-three. This fragmentary commentary is the earliest of Rufus' known works, dating about twenty years before his final *Paris Sentences* commentary.¹⁶

3. Concepts of Cause in Rufus' *Posterior Analytics Commentary*

3.1 Logical cause (validity)

Rufus' use of the terms 'cause' and 'causality' can be classified under four headings: logical, epistemological, metaphysical, and demonstrational. Least frequent is the strictly logical concept of cause. It is a usage we encounter in the phrase 'cause of truth' (*causa veritatis*). The meaning of this phrase is clearest by contrast with the phrases '*causa erroris*' and '*causa apparentiae*'. The '*causa apparentiae*' is the feature of a sophistical argument which accounts for its appearance of validity. Each of the nine fallacies listed by Aristotle is considered to have a distinct '*causa apparentiae*'.¹⁷ Used in connection with propositions as well as syllogisms, this notion of cause is connected with the validity of definitions or logical rules. We meet it in connection with assertoric propositions, concerning which it is claimed that only per se propositions are necessary. Rufus asks

himself what is the cause of the truth of this claim. He answers by presenting a definition of ‘necessarily true’ in the context of assertoric propositions—namely, the inseparable adherence of the predicate and the subject. This definition is the cause of the truth of the proposition according to Rufus: what makes it a valid rule.¹⁸

It is important to note that the “cause of the truth” considered here is not a state of affairs which verifies the statement. For Rufus as for Aristotle, truth depends on a correspondence between statements and states of affairs.¹⁹ But that is not what is in question here. Rather, it is something *a priori*, an axiom or definition, conformity with whose stipulations validates the rule. When Rufus speaks of cause in logic, he is not concerned with the nature of reality, since for Rufus logic concerns only modes of reality, not its true nature.²⁰

We should also note that Rufus describes logical cause, and notions about validity, in terms we associate with efficient causes. Thus when describing logical errors, Rufus speaks of the element of truth (*aliquid veritatis*) which moves the person making the mistake. In the absence of truth moving the intellect, error would not occur.²¹ This language is not metaphorical; it refers to the causal role of truth itself in producing a judgment. It explains how a judgment is possible at all, since nothing happens in the intellect without some element of truth. The association of the language of efficient causality with concepts of validity is a topic to which we will return at the end of the section on demonstrational cause.

3.2 Epistemological cause (evidence)

‘Epistemological cause’ is the phrase we use to describe the evidentiary notion of cause employed by Rufus. Here we are talking about cases in which Rufus is concerned with how we acquire knowledge: not what makes its conclusions true, but how we learn it. Rufus contrasts epistemological causes not with logical causes but with metaphysical causes. He distinguishes between the causes of our knowledge and the causes of being (*causa essendi vel cognoscendi*).²²

Another way of putting the distinction between epistemological and metaphysical cause is to say that when speaking of the former, Rufus is concerned with what is best known to us, not what is best known absolutely speaking. Here Rufus is following Aristotle (*Posterior Analytics* I c. 2 72a1–4).

What is best known to us is what we sense directly; it is from our senses that we first learn about the external world. The evidence provided by our senses need not be intelligible. And if intelligibility depends on understanding things as manifestations of ultimate causes, rather than as particular brute facts, then by itself the evidence provided by the senses cannot be intelligible. Hence Aristotle concludes that what is intrinsically most intelligible cannot be what is best known to us.

On this point, Rufus does not completely agree with Aristotle. It is true that particular propositions based on sensible evidence are better known to us than the generalizations we derive from that sensible evidence. But it is also true that some universal statements are better known than others. And Rufus claims that what we know and understand best are the most powerful generalizations. Among general statements, what is most intelligible in itself is also most intelligible to us. That is, the most powerful natural principles which explain many phenomena are more intelligible to us than more specific applications of general rules.

. . . we should say that if we compare all the things we can know generally (*communiter*) to each other, sensibles are better known to us; for all cognition begins with sense. Absolutely speaking, however, [sensibles] are less well-known, since in Aristotle's language they have less knowability. But when universals are themselves compared with each other, the more universal is better known to us, because our intellect begins at the more universal which is more incomplete since it is [itself] incomplete and possible. . . . Consequently among [universals] the same things are better known to us and absolutely speaking (Appendix 2 Series 2 ad 3).

In his discussion of what is best known, there is one further case, which Rufus promises to explain later: the case in which premises and conclusion are convertible. It is a promise which he may have kept in the *Posterior Analytics* commentary itself, in the section of the commentary which is lost. But it is redeemed in any case in Rufus' *Physics* commentary. In *Physics* I, Rufus says that in cases involving convertibles—such as propositions involving things caused and their causes—we must distinguish between certainty absolutely speaking and in a qualified sense. He concludes that if certainty absolutely speaking is in question, then what is better known in itself and to us are the same.²³

Moderns might also be inclined to disagree with Aristotle, but not in the same way. Modern philosophers have typically placed more emphasis on what is evident (what we have described as epistemological cause) and stressed intrinsic intelligibility less. Thus moderns might be more im-

pressed by Rufus' definition of 'cause' in terms of what look like necessary and sufficient conditions than his exposition of the Aristotelian four causes. In a typically brief passage we read:

. . . Properly speaking cause is what is sufficient for such and such an effect and in which there is nothing that is not a cause (*nihil est de non-causa*) . . . For if it is said 'a shape has three' etc., I am not adverting to a sufficient cause.²⁴

This looks something like the familiar notion of a necessary and sufficient condition. At least by Ockham's time, such definitions had become the basis for proving that something is cause: a cause is that which when posited the effect follows and when not posited the effect cannot naturally be produced.²⁵ But oddly enough, Rufus relates it not, as we might, to the 'triggering event' which produces a result, but to the definition of a triangle. He is concerned with what the relation of subject and predicate should be in such a definition. The *per se* definition which he considers necessary and sufficient is 'a triangle has three sides'. He rejects a definition in which the subject is not sufficiently determined to justify the predicate, 'three-sidedness'. The subject cannot be more general than 'triangle', since the genus to which triangle belongs is shape, and not all shapes have three sides; being three-sided is not part of the definition of 'shape'. Neither should the subject be more specific than 'triangle', since all the species of triangle have three sides. If the subject is 'isosceles', the subject is overdetermined; since a triangle need not have equal sides in order to be three-sided, it is unnecessary to postulate an isosceles triangle in order to justify the predicate 'three-sided'. Only when the subject of the definition is 'triangle' do we have both a necessary and a sufficient cause for predicating three-sidedness.

We should note here that, for Rufus, epistemological cause is a species of efficient cause. What we perceive causes our perceptions, and our ideas about the nature of reality are caused by the natures we understand. In his *Posterior Analytics* commentary, the example Rufus provides is our idea of number which is caused by the nature of unity.²⁶

3.3 Metaphysical cause (explanation)

It is metaphysical causes which deal with reality itself: "the causes of being rather than knowing," as it was put at the start of section 3.2. But in a way that is misleading; a metaphysical cause is rather an explanation of being. Understanding 'cause' as explanation is both the most technical

sense of the term and its meaning in ordinary language for Rufus. Indeed in most respects, his ordinary use of the term ‘cause’ differs little from ours. Rufus uses the word when he wants to explain why something is the case (Appendix 2 Series 5 ad 4). He means to provide reasons, the “cause on account of which.” Moreover, like Aristotle,²⁷ when Rufus speaks of explanatory causes, he does not distinguish between explanatory entities and explanatory propositions. And we frequently do the same, as when we equate ‘the cause of the ground’s being wet is that it was raining’ with ‘the rain caused the wetness on the ground’.

Coming to more technical senses, Rufus distinguishes four kinds of explanation corresponding to the four Aristotelian causes: formal, material, efficient, and final. Formal and material causes are associated as intrinsic or constitutive causes; knowing a definition in terms of formal cause shows what being is produced by the material cause.²⁸ Efficient and final causes, like matter and form, are closely related, not as intrinsic causes of the being of a thing, but rather as the extrinsic causes of a thing’s coming into being.²⁹ One can be defined in terms of the other. The end moves the efficient cause; the efficient cause actualizes the end:

. . . the special reason (*causa*) why the efficient [cause] is defined by the end and vice versa is that each is the cause of the other, but in a different way. For the final [cause], existing habitually and potentially, is the cause of the efficient, just as protection from storms is the cause which moves the architect. But the efficient [cause] is the cause of the actual existence of the final. And thus each can be defined by the other.³⁰

Roger Bacon contested this view, holding that the final cause moves the efficient cause only metaphorically speaking, not literally.³¹ But Rufus held it consistently. In his *Physics* commentary we read:

What moves as an efficient [cause] moves on account of the end. Hence just as the efficient [cause] moves on account of the end . . . an efficient cause exists and is preserved as efficient by the end.³²

As Rufus also notes in the *Physics* commentary, the whole of a thing can be defined in terms of any of the four causes. Explanations which combine all four kinds of definition are the most complete, however.³³

Rufus does not restrict himself to discussing metaphysical causes; he also concerns himself with causality, a term which refers to some thing’s capacity to cause. That is clear from a passage in the *Physics* commentary,

where Rufus says that a superior cause educes the causality of an inferior cause, by which he means that the inferior owes its function as a cause to the superior cause.³⁴

In a difficult passage from the *Posterior Analytics* commentary, Rufus speaks of the sources of causality.

There is another reason [*causa*] why infinities sometimes cannot be traversed, and that is because one was always the cause of another; for then if there were infinitely many, there would be no first, and there would be nothing from which the others would have causality. Thus infinite causality, ordered as prior and posterior causes, is not traversed.

Rufus does seem to be talking only about things here, not about propositions (although as we will see later there is comparable expression, '*virtus*', which does refer to propositions). But it is not clear what kinds of things Rufus is speaking about. There is no great difficulty in understanding this passage as it refers to efficient causes. Each essentially ordered cause depends for its own causal efficacy on a prior cause. He asserts that in such cases, absent a first cause, none of the subsequent causes can act; and so there cannot be an infinite regress of essentially ordered efficient causes. This argument is familiar to us from proofs for the existence of God. What causes difficulty is the question whether Rufus intends this claim to hold for all four kinds of causes or not. It is an argument which could be made in the case of final causes, since if I do *x* for the sake of *a*, and *a* for the sake of *b*, it does not appear that I would do *x* at all if in the series *a*, *b*, *c* . . . there is no one final end which I value simply for its own sake; that seems to be Aristotle's point at *Nichomachean Ethics* I c. 2 1094a20. Moreover, although we think of the end pursued for its own sake as a final end, Rufus refers to it as a first cause.³⁵

But form and matter are ultimate intrinsic causes: basic elements. So if we are going to construct an argument against regress in causality in such a case, it will have to be different in some way from the arguments we encounter for extrinsic causes.³⁶ It might be that we should not even look for essentially ordered causes among the causes of being. Perhaps Rufus is considering here only the causes of becoming—that is, efficient and final causes. After all, what is said of matter and form is not that they are first causes, but that they are ultimate causes or explanations for the structure of reality.

3.4 Demonstrational Cause (first principle)

If ‘causality’ seems to refer only to a capacity of things or parts of things, demonstrational causes, by contrast, must be propositions, and they must be propositions or premises which meet certain conditions. Aristotle specifies that premises must be first, immediate, and true; they must be prior and better known; and they must cause the conclusion (71b20–22). That last condition in one sense defines demonstrational causality: it is the relation of premise to conclusion. In another sense, the other conditions are at least as informative.

But before considering the conditions which must be met by demonstrational causes, let us look first at how cause and demonstration came to be associated for Rufus as an Aristotelian. It is a consequence of Aristotle’s twofold definition of science. Science is both the knowledge of the causes of things³⁷ (and how they cannot be otherwise) and the product of demonstration.³⁸ Since ‘science’ is not an equivocal term, the two definitions must somehow amount to the same thing. Taking up the hint which Aristotle provides in his last condition, medievals understood the relation of premises and conclusion in a demonstration as one of cause and effect.

The only reservation Rufus displays about the identification of the knowledge of cause and the product of demonstration is to draw a few distinctions. One Aristotelian definition refers to demonstration as a process (demonstration); the other to the premises themselves, which are described as the causes of the conclusion. Rufus describes this distinction as between the ‘roots’ of science and its ‘act’:

We should say that to know scientifically is a certain effect and it is caused by demonstration, and consequently it has to be defined by demonstration. But this is twofold: It is either according as demonstration is considered in its root, and then it is nothing other than the medium itself or cause . . . Or it is according as demonstration is considered in act (Appendix 2 Series 1 ad 1).

To understand why there was so little resistance to this approach, we need to look at the six Aristotelian conditions as a group. In one respect at least Rufus is in agreement with Jonathan Barnes and modern interpreters of the *Posterior Analytics*:³⁹ The last three conditions stipulate the relation of a premise to a determinate conclusion—a premise must be better known, prior to, and a cause of the conclusion; the first three do not.

But since the premises of [a demonstration] are a necessary and indefectable cause, it follows that they are better known and prior. For those conditions, as was said, inhere in the premise on the basis of the comparison according to a determinate conclusion (Appendix 2 Series 2 ad 2).

But though the premise is better known, absolutely speaking, it is not better known to us. The premises must be better known when considered in the context of all the other propositions belonging to a given order, but not in regard to our understanding.

Premises can be compared in two ways, however: namely either to all propositions of that order, or to a determinate conclusion. This condition is 'prior' in the first mode [of comparison], . . . but it is posterior in so far as a premise and its conclusion are compared to us (Appendix 2 Series 2 ad 1).

Elsewhere Rufus tells us that premises must be prior, in being, to the conclusion (Appendix 2 Series 2 solutio instantiae). This tells us that demonstrational cause is a variety of metaphysical cause and not a form of epistemological cause, since epistemological causes are prior in cognition and better known to us. But it leaves us with a puzzle: what is the 'order' to which a premise belongs? And there is a similarly puzzling passage elsewhere, which speaks of genus in a like context.

. . . it should also be said that since to know scientifically (*scire*) is to know (*cognoscere*) the premises which are the cause, the premises must be true. For otherwise they would not be known or known scientifically. . . . However, since the premises are a complete cause—I mean in that genus—it follows that they are immediate in the same [genus], for if there were mediates, there would be a medium and a cause, and thus they would not be a complete cause (Appendix 2 Series 2 ad 2).

It seems likely that genus or order refers here to the ten categories or the four causes. Now it would be quite possible to establish ordered groups of substances, but presumably far greater difficulties would be involved in the case of relations, for example. By contrast, there are fewer difficulties in imagining hierarchically ordered causes in all four genera of causes, of the sort we discussed earlier when considering arguments about infinite regress in essentially ordered causes—efficient, final, formal, material—though, as we said, even that project taxes our imagination. Still, ordered causes are much more likely to be what Rufus has in mind when he speaks of the propositions in that order or specifies that the propositions must constitute a complete cause in the genus. Occasionally,

Rufus even stipulates which kind of cause he is referring to, not taking it for granted that regress arguments are always about efficient causes.⁴⁰

Thus, when Rufus says that the premises must be complete in their genus, he means that it is sufficient for the premises to provide an adequate basis for a conclusion which specifies something about the form or purpose of a thing. We do not also require that there be a complete set of premises related to its efficient or material cause.

Let us now look at the remaining conditions Rufus and Aristotle require of premises. They must be 'true', which Rufus describes as a relation between words and their significates. They must be 'immediate' and 'first'. That means they must be the most basic possible explanation. Finally, premises must be 'better known' and 'prior' in the order of being to the conclusion, by which Rufus means they must explain more about reality; they must—in other words—be very general. Here Rufus is concerned with intelligibility per se, a concept of explanatory power.

Thus it is clear that demonstrational cause is a variety of metaphysical cause, concerned with explanation. But since that explanation has to take the form of a valid demonstration, it must be a hybrid of metaphysical and logical cause. Of the six conditions, the first three might be taken as validity conditions; inference must be based ultimately on true, immediately evident, and primitive axioms. But what is immediately grasped includes 'reasons' (*rationes*), the term medievals used to refer to the formulas which correctly describe the essences of things as they are. Here nothing mysterious is intended, but quite ordinary definitions such as 'a triangle is a three-sided figure', 'a human is a rational animal'—where moderns might think of definitions such as 'water is composed of two parts hydrogen and one part oxygen'. The stipulation that science not only must include such definitions, but also must proceed from the more general to the less general, from causes to effects, and from the more basic to the less basic, shows that this is also a metaphysical concept of cause.

Finally, we must consider why the language we associate with efficient causality is so often associated with demonstrational cause. As the reader will recall, when we discussed logical truth we noted that Rufus spoke of an element of truth moving the intellect. When discussing epistemological truth, we noted that Rufus speaks of necessary and sufficient propositions when describing premises from which a conclusion could legitimately be inferred. And finally, though Rufus seems to use the term 'causality' only when referring to things, he has a comparable expression

for propositions, '*virtus*'. Discussing *enthymeme* and induction, he says that they have the same 'inferential power' (*virtus inferendi*).⁴¹ Elsewhere Rufus speaks of argumentive (*virtus arguendi*) power (Appendix 2 Series 4 q. 2).

A puzzling passage, which may help us toward a solution, reads as follows:

If one were to say 'first', since it is a premise in another demonstration, it is not [first] as far as its particular matter is concerned, but in so far as it has in itself the power of a posterior proposition, just as fire is not the first cause of combustion in its particular nature, but in so far as it has the force of superior causes. Therefore being first is appropriate to the premise of a demonstration not always through its own particular virtue, but rather by being prior . . . compared to a determinate conclusion . . . (Appendix 2 Series 2 solutio instantiae).

This passage is part of a reply to the question, why after having specified that a premise must be "first", Aristotle adds that it must also be "prior". It presents a number of difficulties we will not be able to address here. But at least one thing is clear from it: Rufus sees the relation of propositions in exactly the same terms in which he sees the relation of essentially ordered causes which are things. The relation of premises to each other and to the conclusion is like the relation of fire to prior causes of combustion. The conclusion has the force of an explanation of the world because its premises are basic and manifest.

4. Conclusion

What are we to make of demonstrational cause? It is an unfamiliar and perhaps an unattractive concept for twentieth-century philosophers. It is not, however, a concept which is unique or particularly characteristic of Richard Rufus. It can be seen in the works of Thomas Aquinas, for example.⁴² So if we are to understand the world of medieval philosophy, whose study is often rewarding precisely because of the extent to which it challenges our assumptions, we must begin to try to understand this usage. In this article our aims were modest and introductory, and as the reader will have noticed in our exposition of Rufus and will see in the text presented as an Appendix, there are still many more puzzles to consider. Nonetheless, three preliminary conclusions about demonstrational causality suggest themselves.

First, we should note that it is the sort of concept we should expect from medieval realists, who take predicates to refer to forms, essences (*rationes*), or natures, and who are comfortable speaking about predicating things as well as terms—philosophers who use language we would reserve for things also in regard to propositions. For example, not only do medievals say that the term ‘dog’ is said equivocally both of my canine dog and the stellar dog (the dog-star, Sirius), but also that my dog and that star are equivocal things.⁴³ Rufus distinguishes between the significate of the proposition and things. But he is quite comfortable speaking of the thing of the conclusion (*res conclusionis*), for example; that’s what underlies the significate of the conclusion.⁴⁴ He moves easily and unproblematically from talk of propositions to talking of things—which given his philosophical commitments is just what we should expect. He’s not gotten words and things confused, but he is confident that the ideas words express correspond to the nature of things.

Second, the concept of demonstrational cause rests on realist psychology. Here we need to proceed cautiously. But certainly for Rufus it is things in the world which cause understanding in the mind. He also holds that the intellect is incomplete, and it needs to be “informed” by principles before it is capable of knowing.⁴⁵ Only after we have grasped first principles does the intellect have a proximate potential (*potentia accidentalis*) for science. And that is a sense in which our grasp of first principles is a cause of science.

Third, we suggest that demonstrational causality is attractive to Rufus because of his views about what science is. For Rufus, scientific premises include scientific definitions which express *rationes* that describe real natures, and scientific demonstrations proceed from the more basic to the less basic propositions. Rufus does not aim at science without metaphysics or at a *Logic without Metaphysics*.⁴⁶ Rather, for Rufus, a science is a logically ordered explanation of the world. The notion of demonstrational causality relates to the proper order of explanation.

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APPENDIX 1

Like Rufus’ *Physics* and *Metaphysics* commentaries, his *Posterior Analytics* commentary was originally attributed to Walter Burley (fl.

1300–1340), an ascription which cannot be accurate, since the quires themselves were copied before 1250, as is clear from the scribe's practice of writing above the top line of the frame.⁴⁷ Stylistically, too, the *Posterior Analytics* commentary resembles the other two commentaries. It consists of a series of short questions, with minimal summary and division of the text. In all three commentaries, the style of writing is elliptical; the verb *est*, for example, is frequently missing. Ordinarily, Aristotle is referred to as the "author"; less frequently by name; almost never as "the philosopher".

Some of Rufus' characteristic views are stated in the *Posterior Analytics* commentary. The controversial claim that efficient causes depend on final causes found both in the *Posterior Analytics* and the *Physics* commentaries has been described above. The views on existential import associated with Rufus by Roger Bacon⁴⁸ can be found in both the *Posterior Analytics* and the *Oxford Sentences*. Rufus postulates habitual as well as actual existence and individual as well as specific forms. There need not exist individuals belonging to each most specific species, but such species will always be divided by individuals habitually according to Rufus. As instantiated by Socrates and Plato who are no longer living, 'man' refers to individuals which exist only habitually.

Ad ultimo quaesitum dicendum quod hoc quod dico 'homo' et quaelibet species specialissima dupliciter potest dividi per individua: aut per individua actualiter existentia, aut habitualiter. Licet ergo non semper dividatur per individua actualiter existentia, dividitur tamen per individua habitualiter—habitualiter existentia—ut homo in Sorte et homo in Platone. Et tango per hoc quod dico 'in' habitualem existentiam individuorum vel hominis in Sorte et in Platone (Appendix 2 Series 6 ad 3).

Fortunately, 'habitual existence' is not something mysterious. As is clear in other contexts, habitual existence differs little from potential existence.

Ad ultimum dicendum quod specialis causa secundum quam efficiens definitur per finem et e converso est quod utrumque est causa alterius, aliter tamen et aliter. Finis enim habitualiter et potentialiter existens est causa efficiens movens ipsum, sicut tegere ab intemperiebus etc. est causa movens architectorem (Appendix 2 Series 1 ad 4).

More generally, Rufus' account of universals distinguishes between essential being and actual being. The essential being of universals is incorruptible, though the individuals which instantiate it are corruptible. Logically prior to the existence of actual individuals are both a form's

universal being and its power or potential for instantiation. In the absence of actual individuals, Rufus refers to this potential as a habitually existing individual.

Propterea dicendum quod universale dupliciter potest considerari: aut secundum esse quod habet in individuis; aut secundum esse quod debetur ei non in quantum est in individuis, sed quod debetur ei in sua essentia. Primo modo est corruptibile, secundo modo est incorruptibile, quod sic intelligendum est: Forma primo secundum naturam est natura aliqua differens a materia; consimiliter, secundum naturam habet potestatem complendi materiam, et faciendi individuum; et tunc est individuum habitualiter. Esse ergo universalis non habet forma ex hoc quod est in individuo actualiter, sed prius. Et propterea, per corruptionem individuorum non corrumpitur quoad esse quod habet in sua essentia, sed tantum quoad esse quod actualiter habet in individuis corrumpitur ad eorum corruptionem.⁴⁹

When lecturing on theology at a later date, Rufus employed the distinction between habitual and actual existence to argue that in the three days before the resurrection, Christ as man was buried in his tomb. Typically for Rufus, he employs his considerable logical acumen in defense of the literal interpretation of Augustine's claim that the flesh was Christ, and Christ was buried for three days. Rufus argues that during those three days 'man' signified Christ habitually (*in habitu*). More generally, the word 'man' need not signify a man who exists actually at a time or place (*esse actu in tempore vel loco*).⁵⁰

Somewhat less widely held than Rufus' views on existential import, his beliefs about individual form are also less clearly stated in the *Posterior Analytics* commentary than they are in his *Metaphysics* commentary and his Oxford and Paris *Sentences* commentaries.⁵¹ Nonetheless they are clearly implied in an argument for the priority of number to magnitude: Number is prior to magnitude because it is an accident which results from the individuation of form as such, as opposed to the individuation of form in matter. Implicit in this argument are Rufus' tenets that the principle of individuation is not an accident, that it is not matter, and that there are individual forms.

Ad aliud dicendum quod numerus qui est accidens universaliter causatur ex individuatione formae; magnitudo autem ex individuatione formae in materia, non quantum est, sed situati et extensibili. Et sic numerus a priori secundum naturam causatur quam in aggregando, et sic ipsum prius est secundum naturam. Non quod prius recipiat praedicatum quantum-

cumque, sed quod prius dictum est, quia ipsum sit simplicioris naturae. Cum ergo prius salvetur in posteriori et non e converso, patet quod magnitudo participabit naturam numeri, et non e converso.⁵²

Finally, Rufus not only holds the same views in the three Aristotle commentaries, but sometimes employs similar wording. The views just quoted—that is, Rufus' views on the distinction between number and magnitude, provide one example. In the *Physics* as in the *Posterior Analytics*, Rufus holds that number is related to magnitude, as form by itself is related to form in matter. Number is a consequence of form alone; magnitude, of form in matter.

Ex materia enim quae est in potentia corpus provenit magnitudo. Quam cito enim intelligamus formam in materia, intelligimus ex parte materiae partem extra partem, et ab hac condicione non potest absolvi, et ita statim consequitur magnitudo. Forma interum, ubicumque individuetur, facit unum quod est principium numeri, et ita ratione formae consequitur numerus. Sic ergo consequitur numerus et magnitudo ex materia et forma in se . . .⁵³

Another example comes from a discussion of the passive intellect. In the *Posterior Analytics* and the *Physics* we read the same warning:

In An. post. f. 29vb: Sed cum hoc posset esse falsus intellectus, si simpliciter intelligeretur quod intellectus possibilis respectu principiorum esset in potentia accidentali. Tunc enim non indigeret intellectu agente, quod falsum est.

In Phys. I prooem. f. 1ra: Sed posset hic esse error. Videtur enim quod intellectus possibilis simpliciter esset in potentia accidentali, et sic non indigeret agente aliquo modo.

From a chronological point of view, these passages have a further interest, in that the *Physics* discussion of the distinction between essential and accidental position is much clearer and better developed than what we read in the *Posterior Analytics*. Presumably that means that the *Posterior Analytics* commentary was written first.

In An. post. f. 29vb: Ad aliud dicendum quod, cum intellectus sit sicut tabula nuda, et omni careat cognitione, est simplex respectu cuiuscumque cognitionis in potentia. Sed intelligendum quod potentia duplex est, essentialis et accidentalis. Intelligendum ergo quod illud quod primo modo est in potentia proprie dicitur fieri, cum exit in actum. Quod autem secundo modo est in potentia, non proprie dicitur fieri tale, sed essentialiter. Est enim tale ubi sit prohibitum, et est dicere quod essentialiter tale est, licet accidentaliter sit non tale, sicut lapis est deorsum essentialiter, licet accidentaliter sit sursum.

This passage with its talk of accidental potential as something not in potential properly speaking is interesting for what it tells us about the development of the terminology. But when Rufus tells us that accidental potential differs from essential potential because what is in accidental potential is essentially the thing which will be actualized, it is just plain confusing. Fortunately, the distinction is better explained in the *Physics* commentary.

In Phys. I prooem. f. 1ra: Dico: cum primo dicitur ‘ergo ei nihil fit notum’, dicendum quod intellectus infusus est corpori sine omni cognitione et est in potentia respectu eius, sed hoc dupliciter. Respectu namque cognitionis principiorum est in potentia accidentali, respectu cognitionis conclusionum est in potentia essentiali. Et est potentia accidentalis illa quae non indiget nisi tantum removente prohibens ad hoc quod exeat in actum, ut lapis retentus sursum est in potentia deorsum. Potentia vero essentialis est quae indiget agente et transmutante et disponente ad hoc quod exeat in actum, sicut materia aeris est in potentia ignis.

Like his views on essential and accidental potentiality, Rufus’ comments on the certainty of propositions in which subject and predicate are convertible suggest that the *Posterior Analytics* commentary precedes the *Physics*. As we saw above, Rufus does in the *Physics* what he has promised to do in the logical commentary. In another, such borrowing might not signify much. But Rufus took particular trouble not to take credit for the words of others. The pains he took to distinguish passages from Bonaventure from his original contribution have been ably documented by Raedts.⁵⁴

By themselves none of these points would suffice for the attribution; taken together they make it altogether unlikely that it is mistaken. Let us review them here. The three commentaries come from the same manuscript, belong to the same genre, and were written in the same style. They express shared views, and they borrow from one another—this in an author who not only did not quote without acknowledgement, but sometimes referred to his own work in the third person (or spoke of a treatise he happened to have in his hand—“*ecce in manu*”) rather than take credit for the work himself.

As to time and place, once the attribution is settled, they are reasonably easy to establish. Rufus was a Master of Arts at Paris until 1238, when he joined the Franciscan Order and turned his attention to theology. Presumably, then, his *Posterior Analytics* commentary was produced at Paris before 1238. Since Rufus also wrote a *Physics* commentary and a

long *Metaphysics* commentary before then, it is reasonable to suppose that his *Posterior Analytics* commentary dates before 1235.

APPENDIX 2

Rufus, *In Anal. post.* I c. 2–5

Quaestiones

Codex Erfurt Q. 312 f. 30ra–31ra⁵⁵

[Quaestiones in I, c. 2–5
Series prima]

1. Quaeritur quae sit differentia primae et secundae definitionis.⁵⁶
2. Deinde propter quid non dicit ‘scire est’ sed ‘scire opinamur’ (71b9).
3. Deinde quae sit virtus illius determinationis qua verificat dictam definitionem.
4. Deinde, cum ‘scire’ definiatur per demonstrationem,⁵⁷ quaeritur quare demonstratio possit per ipsum definiri.⁵⁸

1. Dicendum quod scire est quidam effectus, et causatur a demonstratione; et propterea habet definiri per demonstrationem. Sed hoc dupliciter: Aut secundum quod demonstratio consideratur ut in sua radice, et sic nihil aliud est quam ipsum medium sive causa, secundum quod dicitur quod “medium et causa idem” (90a6–7);⁵⁹ et sic datur definitio prima. Aut secundum quod demonstratio consideratur ut in actu, et sic secunda. Et est alia differentia, quod in praemissa definitione attendenda est probatio indirecta, in secunda directa. Non enim est scire conclusionem ipsam cognoscere causam—si <in E> directe loquamur—sed magis per illam <illud E>.

2–3. Ad aliud dicendum quod non solum intendit definire ‘scire’, sed cum hoc definitionem verificare, quia namque universaliter ita opinamur—scilicet, scire—opinamur causam cognoscere. Signum est quod hoc sit hoc, vel ex hoc. Et est virtus huius significationis quod illud quod inest omnibus non est a voluntate, sed a natura. Cum ergo haec opinio inest omnibus, erit a natura, et sic non finita. Et sic patet tertio quaesitum.

4. Ad ultimum dicendum quod specialis causa secundum quam efficiens definitur per finem et e converso est quod utrumque est causa alterius, aliter tamen et aliter. Finis enim habitualiter et potentialiter existens est causa efficiens movens ipsum, sicut tegere ab intemperiebus etc. est causa movens architectorem; efficiens autem causa actualis exis-

tentiae ipsius finis. Et sic utrumque per reliquum definiri potest, et tamen alia causa communior, quia unumquodque correlativum cadit in definitione sui correlativi, quae alias habet tangi.

“Si igitur scire est” (71b20). Incipit demonstrare, primo ostendens quandam conclusionem de praedicato composito ex multis condicionibus,⁶⁰ unumquamque illarum condicionum plenius pertractando.

[Series secunda]

1. Potest hic quaeri per quam viam possumus sumere numerum harum condicionum, et in quo differant.

2. Deinde, quare ex definitione eius quod est scire sequitur quod demonstratio sit ex huiusmodi.

3. Deinde, cum oporteat praecognoscere praemissa,⁶¹ praemissa erunt nobis notiora; sed praemissa sunt magis universalia quam conclusio; ergo universaliora sunt nobis notiora.

1. Ad primum dicendum quod praemissis demonstrationis debetur aliqua condicio absolute in ipsa praemissa: Quaedam autem ipsi praemissae comparatae absolute. Quaedam in comparatione vocis ad significatum, ut ‘esse verum’; et haec IE 30rbl condicio est ex comparatione partium essentialium <essentialiter E> ipsius praemissae ad invicem sicut ex comparatione vocis ad significatum. Quaedam autem ex comparatione partium integralium ut subiecti et praedicati, sicut [esse] immediatum; dicitur enim ‘immediatum’, eo quod non sit medium inter subiectum et praedicatum. Comparari autem possunt praemissae dupliciter: aut scilicet ad omnes propositiones illius ordinis, aut ad determinatam conclusionem. Primo modo est haec condicio prius—secundo modo, tres aliae—sed posterius secundum quod praemissa et sua conclusio ad nos comparantur; secunda et tertia, secundum quod inter se comparantur. Et oportet praemissam non solum in ordine secundum prius et posterius gradum priorem obtinere, sed etiam conclusionem ex illa causari et provenire, sicut hae duae condiciones, quarum prima est ‘prius’, secunda ‘causa conclusionis’.

[Instantia eiusque solutio]

Si quaeret quis, quare apponat hanc condicionem ex posterioribus, cum praedixerat ex primis; superfluit enim dicere quod ideo sit albior, habito quod sit albissimus:

Dicendum quod si illae condiciones, primum et prius, debentur praemissae demonstrationis, penitus ex parte eadem praecederent. Sed non est

ita, praemissa namque quaelibet ex sua natura particulari prior habet esse quam sua conclusio, sed non semper prima, conclusio namque quae probata est.

Si dicatur ‘prima’, cum sit praemissa in alia demonstratione, non est hoc quoad materiam suam particularem, sed in quantum habet virtutem posteriorum propositionum in se, sicut ignis ex particulari sua natura non est prima causa combustionis, sed in quantum habet virtutem superiorum causarum. Esse ergo primum debetur praemissae demonstrationis non semper per suam virtutem particularem, sed esse prius. Et sic comparari ad determinatam conclusionem debetur ei ex natura sua particulari.

2. Ad aliud dicendum quod ex hoc quod scire est cognoscere praemissa quae sunt causa, oportet praemissa esse vera. Aliter enim non cognoscerentur vel scirentur. Et hoc tangit in littera cum dicit “verum igitur” (71b26) etc. Ex hoc autem quod praemissae sunt causae completae—in illo genere dico—sequitur quod sint immediata in eodem, quia si essent mediata, haberent medium et causam, et sic non essent completa causa. Et hoc est quod dicit “ex praemissis autem” etc. (71b27)

Ex hoc autem quod oportet quod praemissa ipsius sunt causa necessaria et indeficiens, sequitur quod ipsa sunt notiora et priora. Illae enim condiciones <condicione E>, sicut dictum est, insunt praemissis ex comparatione sui ad conclusionem determinatam, quae comparatio tangitur per hoc quod dixit “Quoniam illius est causa” (71b31) etc.

3. Ad aliud dicendum quod si comparamus communiter omnia cognoscibilia ad invicem, sensibilia sunt nobis notiora; omnis enim nostra cognitio incipit a sensu.⁶² Simpliciter tamen sunt minus nota, quia minus habent de cognoscibilitate, et sic loquitur AUCTOR (72a1–4). Sed cum ipsa universalialia comparantur ad invicem, magis universale est nobis magis notum, quia noster intellectus, cum sit incompletus et possibilis, incipit a magis universali quod est magis incompletum, et est simpliciter magis notum apud intellectum receptivum. Propterea in his idem notius nobis et simpliciter sicut voluit obiectio, quare tamen dicendum sit ubi praemissa et conclusio sint convertibilia, posterius patebit.

[Series tertia]

1. Quaeritur quare magis notificat primum et immediatum quam aliquam aliarum condicionum.

2. Quaeritur etiam propter quid ‘primum’ habeat talem definitionem.

3. Et iterum minime videtur 'principium' cadere in ratione 'primi';⁶³ 'primum' enim causalitatem non dicit, sed solum ordinem; 'principium' autem utrumque. Magis ergo 'primum' habet cadere in eius definitione secundum quod dicitur 'principium est prima causa' quam e converso.

4. Quaeritur qualiter enuntiatio cadit in definitione propositionis,⁶⁴ cum videantur esse idem.

5. Deinde videtur quod sicut non est aliqua demonstrativa propositio quae contineat utramque partem [contradictionis], sic nec dialectica. Quaelibet enim propositio, eo quod propositio est, est alteram partem contradictionis recipiens.

6. Deinde quaeritur qualiter intelligenda est definitio contradictionis hic posita.

1. Ad primum dicendum quod hoc quod dico verum est condicio communior quam primum vel immediatum, et ita magis nota. Similiter prius et notius; esse enim primum est prius, sed non convertuntur. Primum ergo et immediatum sunt condiciones minus notae quam illae.

2. Ad aliud dicendum quod 'primum' superaddit super principium rationem appropriationis; aliqua enim dignitas rationem principii obtinet etiam in sua communitate, sed non rationem primi, nisi cum fuerit appropriata ad aliquod genus. Eo enim quod superlativum est, hoc quod dico primo significat ut suprapositum rebus sui communis et dicit sic appropriationem. Recte ergo definitur sic 'primum': est principium proprium.

3. Ad aliud dicendum quod 'primum', secundum quod hic intenditur, non solum dicit rationem ordinis, sed etiam rationem causae. Hoc enim 'primum', ex quo est idea, causa est. IE 30val

4. Ad aliud dicendum quod illud idem quod secundum se consideratum est enuntiatio, ad syllogismum comparatum est propositio. Et propterea enuntiatio sui ipsius est et potest cadere hac ratione in ratione propositionis. Et intelligitur quod ratio ista a qua imponitur propositio maxime manifestatur <manifestate E> in partibus enuntiationis quae sunt affirmatio et negatio. Et propterea per partem enuntiationis definitur. Est enim propositio quaedam dimensio inter subiectum et praedicatum, ut alias patet, quam tango cum dico praedicatum affirmari de subiecto vel negari. Et sic patet quod haec definitio propositionis eadem est cum hac: "propositio est oratio affirmativa vel negativa alicuius de aliquo vel ab aliquo" quae datur in libro *Priorum*.⁶⁵

5. Ad aliud dicendum quod non vult dicere quod aliqua mediata propositio accipiat utramque partem contradictionis eiusdem, sed una

unam et alia aliam. Et sic haec ratio “propositio dialectica cadit super utramque partem contradictionis eiusdem” non sic est demonstrativa. Quia si aliquis recipit affirmationem illam, accipit negationem.

Vel potest dici quod licet aliqua propositio dialectica sumat affirmativam partem, sumit tamen eam quaerendo assensum respondentis ad hoc vel eius oppositum. Et sic aliquo modo tangit negativam partem.

6. Ad aliud dicendum quod haec determinatio “secundum se” dicit includere negationem, et significat quod haec propositio secundum se—id est, per naturam extremorum—caret medio, et per hoc separatur a privativis, et contrariat immediatis. Sanum enim et aegrum non de se carent medio, sed per subiectum; in aliis enim carent medio. Et similiter caecum et videns non de se, sed in oculo.

[Series quarta]

1. Quaeritur in primis, unde est quod “necesse est quemlibet docendum habere dignitatem” (72a17), non autem positionem.

2. Videtur quod dignitas non sit principium demonstrationis. Si est principium, tunc maior vel minor; et sic, cum dignitas sit communis, esset demonstrativa ex communibus. Aut ut stans extra, et hoc dupliciter: aut ut confirmans aliquam propositionem argumenti, et tunc illa propositio per dignitatem possit probari, et sic dignitas adhuc erit maior vel minor, et tunc idem quod prius; aut erit principio stans extra confirmans virtutem arguendi vel inferendi, et tunc, cum ipsa sit communis, erit virtus inferentiae communis.

3. Deinde sic: dignitas in demonstrativa, et penitus immediata [est]; aut ergo ponat praedicatum essentiale aut accidentale. Si accidentale, ergo non esset penitus immediata; omne enim accidens habet causam in subiecto. Si essentiale, aut ergo partem essentiae, et tunc non adhuc penitus immediata; aut totam essentiam, et tunc definitio. Videtur ergo quod omnis dignitas sit definitio, et sic definitio species positionis non erit.

4. Deinde sic: cum omnis definitio sit positio, et sic principium immediatum, erit ergo propositio, et sic dicit esse vel non esse.

1. Ad primum dicendum quod dignitas data est super terminos communes, et ideo notissimae sunt dignitates; positiones autem super terminos proprios alicuius scientiae, et ideo sunt minus cognitae. Quod ergo dignitates necessario habentur, per iam dicta dupliciter potest verificari—scilicet aut quia eorum veritas non potest latere; aut quia primae demonstrationes in scientiis aut accipiunt duas dignitates ex quibus demonst-

tur, aut ad minus unum. Et non posset omnino esse ex positionibus, quia cum eorum veritas non sit penitus manifesta, non sufficerent ad faciendam conclusionis scientiam.

2. Ad aliud dicendum quod dignitas coartata ingreditur demonstrationem. Ipsa autem in sua communitate stat extra, confirmans se ipsam coartatam, nec tamen est hic confirmatio per demonstrationem, quia eadem veritas hinc inde, sicut harum propositionum “omne totum est maior sua parte” et “omnis totus angulus est maior sua parte”; eadem utrobique est veritas, sed ibi planior.

3. Ad aliud dicendum quod omnis vere dignitas definitio est, et non convertitur, et propterea non potest definitio secundum totam communitatem contineri sub positione, sed aliqua.—Sciendum tamen quod aliqua propositio, cum non sit vere dignitas, sed possit probari loco dignitatis, accipitur—eo, scilicet, quod manifesta sit.

4. Ad aliud dicunt QUIDAM quod definitio nominat huiusmodi orationes ‘homo’ ‘animal’ ‘rationale’ ‘mortale’. Definitio ergo propositio non est de se, sed unum eorum praedictorum tactorum in libro *Topicorum*. Verumtamen, quia omnis definitio bene assignata debet etiam coassignare cuius sit, et sic debet tangere subiectum et praedicatum, ex consequenti est propositio.

Sed potest melius dici quod nomine definitionis intelligit huiusmodi orationes ‘homo est animal rationale mortale’. Et licet huiusmodi oratio intendat <intendatur E> probare et componere hoc de hoc, tamen ultima intentio est ut cognoscatur primum subiectum sui ipsius in se. Et sic quoad primam eius intentionem dicit definitio esse vel non esse, quoad ultimam vero non.

[Series quinta]

1. Potest quaeri intelligendo sic haec propositio: “omne propter quod, illud magis” IE 30vbl (72a29). Videtur enim habere instantiam in ebrio propter vinum.

2. Deinde cum dicit quod ‘oportet praemissa scire propter quid’, dicit “aut omnia aut quaedam”.⁶⁶ Videtur enim quod omnia oportet scire.

3. Deinde videtur quod nihil ad demonstrationem de oppositis principiorum, quia haec non ingrediuntur demonstrationem, sed solum ad falsigraphum.

4. Deinde circa partem sequentem sic: videtur quod contingit pertransire infinita (72b11). Moveatur enim sphaera vel corpus angulare super

planum, ubique contingit planum in puncto, et significabit punctum actu. Ergo pertransibit infinita non solum potentia sed actu signata.

5. Deinde videtur quod sit demonstratio circularis (72b25); ostenditur enim 'quia et propter quid' ut habetur in consequenti: 'A' enim potest ostendere 'B' propter quid, et 'B' 'A' quia.

1. Ad primum dicendum quod nunquam est "propter quid" etc. Solum intelligendum est in univoco processu, et hoc est quando aliquid inest duobus, uni tamen per alterum, ut vinum amatur quia dulce amatur; sic autem non est in vino et ebrio.

Sed adhuc contra, possum dicere quod "homo generat hominem propter solem", et convenit (ut videtur) praedicatum <praedictum E> utrique; nec tamen soli magis. Et quod conveniat utrique videtur quia sicut ARISTOTELES dicit "homo generat hominem et sol".⁶⁷

Item, calor inest igni et ferro, et ferro propter ignem, et tamen ferrum [est] candens.

Dicendum ad primum quod ille sermo "homo generat hominem et sol" non habet intelligi divisim sed coniunctim, ut sit sensus: 'virtus hominis coniuncta virtuti solis generat' etc. Et propterea generare hominem soli non convenit; convenit enim non a se ad generationem hominis, sed haec actio magis est virtutem hominis generantis complendo quam naturam hominis generati. Cum ergo actio-generatio sit transmutantis, actio solis generatio non vocatur.

De ferro autem dicendum quod calidum dicitur dupliciter: vel in appropinquando ad caliditatem, et sic non est ad propositum; vel in habendo caliditatem. Et hoc dupliciter: vel in magis habendo caliditatem, vel in habendo maiorem caliditatem. Primo modo est ignis calidius; purius enim et verius habet caliditatem quam ferrum; secundo modo, ferrum magis. Cum enim in ferro sit plus de materia quam in igne, plus est ibi de receptivo caliditatis quam in igne, et sicut plus de receptivo, sic plus recepta, cum fuerit dans. Ignis est calidior ferro, eo quod purius et ferventius habet caliditatem. Et sic principium est magis scitum, quia ferventius et purius habetur eius scientia.

2. Ad aliud dicendum quod demonstrationis pro maxima parte est in maiori propositione. Et ideo de ea magis manifestum est quod oportet eam praescire et magis scire. Ut ergo sua conclusio esset magis manifesta, dixit "aut quaedam", intelligendo maiorem propositionem.

3. Ad aliud dicendum quod demonstranti iam syllogistice <syllogistici E> non pertinet de oppositis principiorum, pertinet tamen demonstrata

praemissa quaerenti. Si namque non cognosceret opposita principiorum, posset ea accipere pro veris.

4. Ad aliud dicendum quod hoc modo possunt pertransiri infinita. Sed tamen duplex est causa propter quam aliquando non possunt pertransiri infinita. (1) Et est una quando ipsa pertranseunda quantum constituunt; tunc enim significatis pertransitibus respondet tempus, et sic toti respondet tempus infinitum quod pertransiri non potest. Sic non est in pertransitu punctorum; punctus enim pertransitur in instanti, et infiniti puncti infinitis instantibus, quae sunt in uno tempore finito. Alia est causa quare infinita quandoque non possunt pertransiri: et est cum unum fuerit semper causa alterius; tunc enim si essent infinitae, non esset primum, et sic non esset unde alia <aliam E> causalitatem haberent, et sic causalitas infinita non pertransitur <pertransit E> secundum prius et posterius ordinata; hoc modo est hic. Scientia enim praemissae est causa conclusionis scientiae. Et propterea non possunt praemissae sciri infinitae.

5. Ad aliud dicendum quod sic, ut posterius dicitur. Unde convenit quod apud diversos 'A' ostendit 'B' propter quid; 'B', 'A' quia; sed non apud eundem. Et ideo cum non fuerint tales demonstrationes simul apud eundem, non faciunt circulum.

[Series sexta]

1. Potest quaeri, cum in libro *Priorum* determinetur hoc quod dico 'dici de omni',⁶⁸ et AUCTOR habeat hic supponere quod ibi determinavit, cum illa doctrina superior sit ad istam, videtur quod superfluit hic demonstratio eius quod est 'dici de omni' hic.—Et supposito quod hic debeat determinari, quare ergo in libro *Topicorum* non similiter determinavit.

2. Item, hoc quod dico 'de omni' tangit universalitem subiecti, ut videtur. Quaeritur ergo quare in eius definitione cadit simultas temporis.

3. Item, quaeritur de exempli positione; ponit enim exemplum de hoc quod est de omni in hac propositione 'omnis homo est animal', dicens quod hoc est 'dici de omni'.⁶⁹

Sed contra: species specialissima tantum est divisibile <!> per materiam, ergo si non sint individua, non erit amplius divisibile <!>. Ergo si non sint individua eius quod est homo, haec erit falsa: 'omnis homo est animal'; sed possibile est individua non esse; ergo possibile est hanc esse falsam 'omnis homo est animal', ergo haec non erit dici de omni.

1–2. Ad primum dicendum quod de omni non est idem secundum quod hic intendit de eo et in libro *Priorum*. Adiungitur enim super hoc quod dico ‘dici de omni’ secundum quod intendit hic de eo universalitas temporis. Et hoc est quia demonstrator non solum intendit quod hoc insit IE 31ral ‘huic omni’, sed et ‘semper et omni’, et sic simpliciter et ex necessitate. Dialecticus autem solum intendit quod haec insunt ‘omni huic’, abnegatis illis condicionibus quas demonstrator addit supra hoc quod dico ‘de omni’, non adiciendo aliud. Et ideo in libro *Topicorum* non determinat de eo quod est dici de omni. Non enim aliquam condicionem addit supra dici de omni secundum quod est in libro *Priorum* determinatum, sed solum discretionem. Et sic patet solutio subsequentis quaestionis.

3. Ad ultimo quaesitum dicendum quod hoc quod dico ‘homo’, et quaelibet species specialissima, dupliciter potest dividi per individua: aut per individua actualiter existentia, aut habitualiter. Licet ergo non semper dividatur per individua actualiter existentia, dividitur tamen per individua habitualiter existentia—ut homo in Sorte et homo in Platone. Et tango per hoc quod dico ‘in’ habitualement existentiam individuorum vel hominis in Sorte et in Platone.

NOTES

1. Michael Frede, “The Original Notion of Cause,” in *Doubt and Dogmatism*, ed. M. Schofield, Myles Burnyeat, and Jonathan Barnes (Oxford: Clarendon Press, 1980), pp. 217–49; William Wallace, *Causality and Scientific Explanation* (Ann Arbor, MI: University of Michigan Press, 1972), p. 8.

2. Richard Taylor, “Causation,” in: *The Encyclopedia of Philosophy*, vol. 2, ed. by Paul Edwards (New York: Macmillan, 1967), p. 56.

3. Cf. Melbourne G. Evans, “Causality and explanation in the Logic of Aristotle,” in: *Philosophy and Phenomenological Research* 19 (1958–59), pp. 466–85.

4. A. M. S. Boethius, *In Isagogen Porphyrii commenta*, edited by S. Brandt, *Corpus Scriptorum Ecclesiasticorum Latinorum* 48, (Vienna: F. Tempsky, and Leipzig: G. Freytag, 1906), p. 175: “Quattuor omnino sunt principia quae unum quodque principaliter efficiunt. Est enim una causa quae effectiva dicitur, velut pater filii; est alia materialis, velut lapides domus; tertia forma, velut hominis rationabilitas; quarta, quam ob rem, velut pugnae victoria.”

5. Boethius, *De topicis differentiis (Patrologiae cursus completus 64)*, ed. by J. P. Migne (Paris: Vivès, 1860), col. 1189C–1190A.

6. R. W. Hunt, “The Introductions to the ‘Artes’ in the Twelfth Century,” in: *Studia Mediaevalia in honorem admodum Reverendi Patris Raymundi Josephi Martin* (Bruges: De Tempel, 1948).

7. A. M. S. Boethius, *In Isagogen Porphyrii commenta*, pp. 12–14: “Ordo tamen est quod omnes post Porphyrium ingredientibus ad logicam huius primum libelli traditores fuerunt, quod primus hic ad simplicitatem tenuitatis usque progressus, quo procedentibus

viandum sit, praeparat. . . . Itaque prius primi Resolutorii, qui de [universo genere] syllogismi sunt, quam secundi Resolutorii, qui de apodictico syllogismo, vel Topica, quae de dialectico syllogismo sunt accipiuntur. . . . Sed quoniam syllogismum ex propositionibus constare necesse est, librum Peri hermeneias qui inscribitur, 'de propositionibus' adnotavit. Omnes vero propositiones ex sermonibus aliquid significantibus componuntur. Itaque liber quem de decem praedicamentis scripsit, quae apud Graecos Categoria dicuntur, de primis rerum nominibus significationibusque est."

Cf. Anonymus Aurelianensis III, *In Analytica priora*, ed. S. Ebbesen in "Analyzing Syllogisms; or, Anonymus Aurelianensis III—The (Presumably) Earliest Extant Latin Commentary on the *Prior Analytics*, and Its Greek Model," *Cahiers de l'Institut du Moyen-âge grec et latin* 37 (1981) 15: "Ordo vero eius talis est ut praecedentibus doctrina terminorum in Praedicamentis, inde propositionum in Peri hermeneias, tertio sequantur Priores analytici secundum Boethium, qui huius ordinis hanc ponit causam quod universaliora priora sunt particularibus . . . Quare praecedere debet doctrina Priorum analyticorum et inde sequi particulares doctrinae Topicorum et Posteriorum. . . . De Sophisticis autem elenchis nullam facit mentionem in ordine huius doctrinae, quoniam non est eorum doctrina pars logicae, cum neque ad materiam neque ad formam syllogismorum pertineant."

8. Niels J. Green-Pedersen, *The Tradition of the Topics in the Middle Ages: The Commentaries on Aristotle's and Boethius's 'Topics'* (Munich, Vienna: Philosophia, 1984), p. 87.

9. Sten Ebbesen, *Commentators and Commentaries on Aristotle's Sophistic Elenchi. A Study of Post-Aristotelian Ancient and Medieval Writings on Fallacies (Corpus Latinum Commentariorum in Aristotelem Graecorum VII)*, 3 vols. (Leiden: E. J. Brill, 1981), I pp. 70–71.

10. Sten Ebbesen, "Analyzing Syllogisms; or, Anonymus Aurelianensis III—The (Presumably) Earliest Extant Latin Commentary on the *Prior Analytics*, and Its Greek Model," in: *Cahiers de l'Institut du Moyen-âge grec et latin* 37 (1981), p. 4.

11. Pietro Rossi (1220–1230), *Robertus Grosseteste Commentarius in Posteriorum analyticorum libros* (Florence: Olschki, 1981), p. 19; Richard Southern (1228–1230), *Robert Grosseteste* (Oxford: Clarendon Press, 1986) pp. 120, 150–55; James McEvoy (1228–1230), *The Philosophy of Robert Grosseteste* (Oxford: Clarendon Press, 1982), pp. 19–20, 518.

12. "Themistius' Paraphrasis of the *Posterior Analytics* in Gerard of Cremona's Translation," edited by J. R. O'Donnell, *Mediaeval Studies* 20 (1958), pp. 239–315.

13. Richard Rufus, *In An. post.*, Erfurt Q.312, f. 32rb: "Item, quaeritur de hoc quod dicit COMMENTATOR, cum ponit duo extra subalternationem. Dicit enim quod musica subalternatur arithmeticae, et hoc videtur falsum, quia numerus et sonus de quibus sunt illae scientiae sunt diversorum praedicamentorum; ergo neutrum sub altero." Cf. Grosseteste *In An. post.* I, 7 (ed. Rossi, 1981) 138: "Perspectiva enim subicit lineam radiosam, quae est quodammodo eadem cum linea simpliciter, et musica subicit numerum relatum, qui est sub numero simpliciter, quem subicit arithmetica."

Grosseteste seems more likely to be meant here than Themistius; see "Themistius' Paraphrasis of the *Posterior Analytics* in Gerard of Cremona's Translation," edited by J. R. O'Donnell, *Mediaeval Studies* 20 (1958), p. 264: "Et similiter invenimus dispositiones scientiae compositionis cantuum apud scientiam arithmeticae, quoniam non fiunt tonis usitatis in scientia compositionis cantuum duplum et aequale et tertium et aequale et medium nisi ex scientia numerorum."

14. Cf. W. Wallace, *Causality and Scientific Explanation* (Ann Arbor, MI: University of Michigan Press, 1972), pp. 28–47; A. C. Crombie, *Robert Grosseteste and the Origins of Experimental Science* (Oxford: Oxford University Press, 1953). Translation by S. MacDonald, forthcoming in *The Yale Library of Medieval Philosophy*.

15. Rega Wood, "Richard Rufus' *Speculum animae*: Epistemology and the Introduction of Aristotle in the West," in: *Die Bibliotheca Amploniana im Spannungsfeld von Aristotelismus, Nominalismus und Humanismus (Miscellanea Mediaevalia 23)*, ed. A. Speer (Leiden-New York: Brill, 1995), p. 103.

16. For more on Rufus' life and works, see R. Wood, "Richard Rufus of Cornwall and Aristotle's Physics," *Franciscan Studies*, forthcoming.

17. Ebbesen, *Commentators and Commentaries*, vol. III, p. 180.

18. Richard Rufus, *In An. post.* f. 31vb: "Potest hic quaeri causa veritatis huius propositionis 'sola per se sit necessaria' (74b6–12). Videtur enim esse falsa, quia haec est necessaria 'risibile est coloratum'. . . . Ad primum dicendum quod necessitas nihil aliud est quam inseparabilis adhaerentia praedicati cum subiecto. . . . Sic ergo 'necessarium' dicitur communiter et proprie et magis proprie. Dicendum ergo quod hic sumitur proprie, tunc patet quaesitum."

19. Terence Irwin, *Aristotle's First Principles* (Oxford: Clarendon Press, 1988), p. 6; Richard Rufus, *In An. post.*, Appendix 2 Series 2 ad 1.

20. Richard Rufus, *In An. post.* f. 31vb.

21. Richard Rufus, *In An. post.* f. 31rb.

22. Richard Rufus, *In An. post.* f. 31ra.

23. Richard Rufus, *In Phys.* I f. 1vb: "Dicendum quod possumus comparare sensibilia ad intelligibilia, vel intelligibilia ad invicem. Si primo modo, dicemus quod non sunt eadem nobis notiora et notiora naturae. Si secundo modo, hoc potest esse dupliciter: possumus enim comparare maius commune vel minus commune vel convertibilia ad invicem. Primo autem modo est idem nobis notum et simpliciter, quia universale est nobis notius et naturae, ut patet. Videndo enim aliquid a remotis cognoscimus prius commune quam speciale. Si secundo modo, scilicet comparando convertibilia ad invicem, cuiusmodi sunt propria causa et proprium causatum, distinguendum est notum: aut quod dicit certitudinem simpliciter, aut certitudinem secundum quid sive diminutam. Primo modo est adhuc idem nobis notius et simpliciter, quia non potest plena cognitio haberi de causato nisi de causa prius habeatur. Si secundo modo, e converso est."

24. Richard Rufus, *In An. post.* f. 32ra: "causa autem proprie loquendo est quod est sufficiens ad talem effectum, et in qua nisi est de non-causa, quia si dicatur 'figura habet tres' etc., non tango causam sufficientem."

25. William of Ockham, *Quaestiones in librum secundum Sententiarum, Reportatio* (Guillelmi de Ockham *Opera Philosophica et Theologica; Opera Theologica V*), ed. by G. Gál and R. Wood (St. Bonaventure, NY: The Franciscan Institute, 1981), pp. 258, 314.

26. Richard Rufus, *In An. post.* f. 31va. This is itself a difficult subject, which we cannot discuss much further here. But given the Platonic elements in Rufus' philosophy, he clearly does not mean to claim that external natures directly produce cognition. For more on Rufus' epistemological views see Wood, "Rufus' *Speculum animae*" and her forthcoming "Richard Rufus of Cornwall and the Classical Tradition: A Medieval Defense of Platonism." For the present, we should simply note in passing that there is further evidence of Rufus' Platonism in his *Posterior Analytics* commentary. Rufus says that Plato's views on the soul were correct in part (*In An. post.* f. 30ra).

27. Terence Irwin, *Aristotle's First Principles*, p. 2.

28. Richard Rufus, *In An. post.* f. 32va: “definitio per causam formalem, haec ostendit illam quae est per causam materialem.”

29. Richard Rufus, *In Phys.* I f. 1vb: “Nota quod per hoc quod dicit ‘usque ad elementa’ (184a15) innuit ordinem causarum. Per hoc enim quod dicit ‘primas causas’ intelligit causas finales, quia finalis in genere causarum prima est et extrinseca, et hanc sequitur efficiens. Et materia et forma in genere causarum sunt ultima et sunt causae intrinsecae . . .”

30. Richard Rufus, *In An. post.* f. 30ra: “Ad ultimum dicendum quod specialis causa secundum quam efficiens definitur per finem et e converso est quod utrumque est causa alterius, aliter tamen et aliter. Finis enim habitualiter et potentialiter existens est causa efficiens movens ipsum, sicut tegere ab intemperiebus etc. est causa movens architectorem. Efficiens autem causa actualis existentiae ipsius finis. Et sic utrumque per reliquum definire potest.”

31. Roger Bacon, *Quaestiones supra libros quatuor Physicorum Aristotelis (Opera hactenus inedita Rogeri Baconi*, fasc. 8), ed. Robert Steele (Oxford: Clarendon Press, 1930), pp. 74–76.

32. Richard Rufus, *In Phys.* II f. 4rb: “Movens ergo ut efficiens movet propter finem. Unde sicut efficiens propter finem movet et exit in actum propter finem, sic efficiens in ratione efficientis salvatur et est per finem.”

33. Richard Rufus, *In Phys.* II f. 4rb: “In qualibet enim causa est totum rei esse sed non totaliter. Si enim respiciatur ad efficientem in quantum intendens, tota res aliquo modo erit in efficiente; efficiens enim totam rem facit. Si autem respiciatur ad causam formalem, tota res erit in causa formali; facit enim forma totam rem esse. Si autem respicitur ad causam materialem, tota res in ipsa erit; tota enim res educitur a materia. Totum ergo esse rei est in qualibet causa, sed non totaliter, quia diminute et secundum virtutem; sed in omnibus causis [simul sumptis] est totum esse rei totaliter. Et propterea per quamlibet causam potest definiri; per omnes tamen simul definitur completissime.”

34. Richard Rufus, *In Phys.* II f. 4ra: “Causa enim superior est ordinans omnes causas inferiores; ut complete educat causalitatem inferiorum causarum, facit ipsas esse causas. . . .”

35. Richard Rufus, *In Phys.* I f. 1vb: “Nota quod per hoc quod dicit ‘usque ad elementa’ . . .”, quoted above.

36. In the case of matter, the most basic is prime matter, which is completely unspecified or pure potential. Perhaps we can envision a regress in material causes, which would start when we ask “what is a house made of?” and continue when we ask “what is wood made of?”, and would end only when the answer we receive is “prime matter”.

At least the direction of dependence in a series of essentially ordered material causes seems clear. But that is not so clear in the case of formal causes. Would we be looking for a form so determinate, that it could not be further specified? That is, should we move downward on a Porphyrian tree from generic forms through ever more specific forms? Or would we move from the form of man to the form of animal and so on until we came to ‘being’ or some utterly indeterminate form?

37. Aristoteles, *An. post.* I, 2 71b10 (*Aristoteles latinus* IV, 1, ed. L. Minio-Paluello et B. G. Dod, Bruges-Paris: De Brouwer, 1968), p. 7.

38. Aristoteles, *An. post.* I, 2 71b16, p. 7.

39. J. Barnes, *Aristotle’s Posterior Analytics* (Oxford: Clarendon Press, 1975), p. 98.

40. Richard Rufus, *In Phys.* VII f. 10va: “Ex quo, ut videtur, sequitur quod pars sit causa totius motus—et loquor de causa unde est motus. Et similiter cum illa pars sit divisibilis, erit sua pars causa sui motus, et sic in infinitum. Ergo in infinitum procedit causalitas, quod est contra ostensum in hac lectione.”

41. Richard Rufus, *In An. post.* f. 29vb.

42. Thomas Aquinas, *Expositio libri Posteriorum* I 1. 3 n. 1 (*Opera omnia* I, 2, Editio altera retracta) (Rome: Commissio Leonina, 1989), p. 146. As Scott MacDonald reports in an excellent article on Aquinas's "Theory of Knowledge," *The Cambridge Companion to Aquinas* (Cambridge-New York-Victoria: Cambridge University Press, 1993) p. 170: "Aquinas holds that because fully developed demonstrations are isomorphic with reality, the premisses in a demonstration can be thought of as giving the *cause* of the conclusion The premisses in a demonstration give the explanation of the conclusion in the sense that they cite the underlying and metaphysically more basic facts in virtue of which the conclusion is true; they provide what we might think of as a theoretically deep explanation."

43. Cf., for example, Walter Burley, *Liber Praedicamentorum*, in: G. Burlaeus *Super artem veterem* (Venice 1497; reprinted Frankfurt: Minerva, 1967), f. 15vb.

44. Richard Rufus, *In An. post.* f. 30ra: "res tamen conclusionis quae subest signato conclusionis."

45. Richard Rufus, *In An. post.* f. 29va.

46. Cf. Ernest Nagel (Glencoe, IL: Free Press, 1956).

47. Cf. N. R. Ker, "From 'Above Top Line' to 'Below Top Line': A Change in Scribal Practice," in: *Celtica* 5 (1960), pp. 13–16.

48. Roger Bacon, *Compendium of the Study of Theology*, edition and translation with introduction and notes by Thomas S. Maloney (Leiden: E. J. Brill, 1988), pp. 86–87; Sten Ebbesen, "Roger Bacon and the Fools of His Time," in: *Cahiers de l'Institut du Moyen-âge grec et latin* 3 (1970), pp. 40–44.

49. Rufus, *In An. pos.*, f. 32va. Printed here as Appendix 2 are excerpts from Rufus's *Posterior Analytics* commentary, taken from a provisional edition by R. Wood.

50. F. Pelster, "Der Oxford Theologe, Richard Rufus OFM über die Frage: 'Utrum Christus in triduo mortis fuerit homo,'" in: *Recherches de théologie ancienne et médiévale* 16 (1949), pp. 279–80.

51. R. Wood, "Richard Rufus and English Scholastic Discussion of Individuation," *Aristotle in Britain during the Middle Ages*, Proceedings of the International Conference of Cambridge (Trinity College, April 8th–11th, 1994) organized under the Auspices of the Société Internationale pour l'Etude de la Philosophie Médiévale, ed. J. Marenbon in *Recontre de Philosophie Médiévale* 5 (Turnhout: Brepols, 1996) pp. 117–43.

52. Richard Rufus, *In An. post.* f. 32rb.

53. Richard Rufus, *In Phys.* II f. 4rb.

54. P. Raedts, *Richard Rufus of Cornwall* (Oxford: Clarendon Press, 1987), pp. 56–60.

55. What survives of the commentary has been transcribed provisionally; printed here is the second set of questions from the first book, the section on which most of this article was based.

56. Prima definitio: "causam rei dognoscere" (71b10–12); secunda: "per demonstrationem intelligere" (71b17).

57. Aristoteles, *An. post.* I, 2 71b16 (translatio Iacobi), p. 7: "Si quidem igitur et alius est sciendi modus, posterius dicimus, dicimus autem et per demonstrationem intelligere"; Robertus Grosseteste, *In Post. an.* I, 2 (ed. Rossi, 1981), p. 100.29–30: "omne quod scitur, per demonstrationem scitur".

58. Aristoteles, *An. post.* I, 2 71b18–19 (translatio Ioannis), p. 113: "Demonstrationem autem dico syllogismum facientem scire"; Robertus Grosseteste, *In Post. an.* I, 2 (ed. Rossi, 1981), p. 100.38–9: "demonstratio est syllogismus faciens scire".

59. Cf. Jacqueline Hamesse, *Les Auctoritates Aristotelis (Philosophes Médiévaux XVII)* Louvain: Publications Universitaires and Paris: Béatrice-Nauwelaerts, 1974), p. 319.

60. Aristoteles, *An. post.* I, 2 71b20–2 (translatio Iacobi), p. 7: “Si igitur est scire ut posuimus, necesse est et demonstrativam scientiam ex verisque esse et primis et immediatis et notioribus et prioribus et causis conclusionis”; cf. Robertus Grosseteste *In Post. an.* I.2 (ed. Rossi, 1981), p. 101.57–8.

61. Note that the word ‘praemissa’ is used here both as a neuter plural and as a feminine singular.

62. Cf. Aristoteles, *An. post.* I, 18 81a38–40, p. 40.

63. Aristoteles, *An. post.* I, 2 72a6–7 (translatio Iacobi), p. 8: “Ex primis autem est quod ex principiis propriis est.”

64. Aristoteles, *An. post.* I, 2 72a9–12 (translatio Iacobi), p. 8: “Propositio autem est enunciationis altera pars. . . . Enunciatio autem contradictionis quamlibet partem.”

65. Aristoteles, *An. priora* I, 1 24b16; Hamesse, *Les Auctoritates*, p. 308.

66. Aristoteles, *An. post.* I, 2 72a27–28 (translatio Iacobi), p. 9: “necesse est non solum precognoscere prima, aut omnia, aut quedam, sed et magis.”

67. Aristoteles, *Physica* II, 2 194b13; cf. Hamesse, *Les Auctoritates*, p. 145.

68. Aristoteles, *An. priora* I, 1 24b28.

69. Aristoteles, *An. post.* I, 2 73a30, p. 12.