Ancient Commentators on Aristotle

GENERAL EDITOR: RICHARD SORABJI

PHILOPONUS:
On Aristotle
Posterior Analytics 2

Translated by
Owen Goldin

BLOOMSBURY
PHILOPONUS (?)

On Aristotle

Posterior Analytics 2
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>vii</td>
</tr>
<tr>
<td>Conventions</td>
<td>x</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Textual Information</td>
<td>12</td>
</tr>
</tbody>
</table>

Translation 13

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>143</td>
</tr>
<tr>
<td>Bibliography</td>
<td>189</td>
</tr>
<tr>
<td>English-Greek Glossary</td>
<td>193</td>
</tr>
<tr>
<td>Greek-English Index</td>
<td>197</td>
</tr>
<tr>
<td>Index of Passages Cited</td>
<td>205</td>
</tr>
<tr>
<td>Index of Names</td>
<td>209</td>
</tr>
<tr>
<td>Subject Index</td>
<td>211</td>
</tr>
</tbody>
</table>
Preface

Richard Sorabji

The Posterior Analytics contains Aristotle’s Philosophy of Science. In Book 2, one of the important issues is illustrated by the following question. How does the scientist discover what sort of loss of light constitutes lunar eclipse? The scientist has to discover that the moon’s darkening is due to the earth’s shadow. Once that explanation is known the scientist possesses the full scientific concept of lunar eclipse as the moon’s being darkened by the earth’s shadow. He can then use that definition to explain other necessary features of the phenomenon, such as its periodicity, shape, brevity, copper colouring and so on.

The present commentary, whose ascription to Philoponus is controversial, offers some interpretations of Aristotle that are unfamiliar nowadays. For example, at 437,15-438,2, the scientific concept of a human is acquired from observing particular humans. This results in marks being rubbed or wiped off (this is the metaphor in apomorxis, apomorgnunai, apomassessthai) in the aisthêma. It is familiar that an aisthêma might receive marks of the particular distinctive characteristics by which an individual is recognized, such as long hair and paleness (the examples given here). The unfamiliar idea is that it can also receive the marks of universal human characteristics, such as rationality. This need not be startling if the aisthêma is simply the perceptual content, for then the idea will be that we perceive individuals as rational as well as long haired, and this may well be one of the things that the text wants to convey. But in Aristotle, I believe, the aisthêma had been a sense-image and even in our text the metaphors of marking by rubbing and wiping treat it as if it were a visual, rather than a propositional, entity. The pervasive talk of the aisthêma being imprinted (tupoi) in the imagination strengthens this idea and makes it harder to see how the aisthêma receives the marks of a universal such as rationality.

The idea that the aisthêma is marked by universals such as rationality is offered by our commentary as an explanation of Aristotle’s unexpected departure from his normal view that perception apprehends only the particular. At 100a14 to b5, Aristotle says that perception is also of the universal. An earlier commentator, Themistius,
in the fourth century had already given some of the same interpretation of this remark in his commentary on the Posterior Analytics at 64,2-9. To obtain a fuller story, we need to put these two commentaries together with a third commentary on the same work, that of Eustratius, 266,14-29, from the eleventh to twelfth century.

Our commentary adds a special role for the imagination: it is to the imagination that the aisthêma is transmitted and in this it is imprinted (entupoun). The language of imprinting had again been used in Aristotle in his treatise on memory, I believe, for the imprinting of pictorial images and the imagination had served as a storehouse for the imprinted images. In other commentaries Themistius (in DA 98,35-99,10), Philoponus (in DA 5,38-6,4) and other Platonists equally speak of imprints (tupoi) in the imagination.

Our text adds that the first aisthêma transmitted supplies only a dim knowledge of the universal concept of human. Further similar aisthêmata need to be transmitted to the imagination as well. Themistius 64,24-65,2 and Eustratius agree that several reports from sense perception need to be assembled together (sunageirein, athrhoizein). But Eustratius adds that perception must already have some recognition of the universal human, or it would not be able to assemble relevantly similar aisthêmata (I here correct what I said in my Sourcebook, vol. 1, 174).

Both Themistius and Eustratius supply a possible explanation of the dimness of which our commentary speaks: the universal as apprehended by perception is still muddled up with the particular.

Our commentary holds, 440,1-12, that it is intellect (nous) that in the end apprehends the scientific concepts (e.g. of human) which are the first principles for science. Eustratius says that the universal human character apprehended by perception must be transmitted to reason. On one interpretation it is reason, or reason’s highest faculty, intellect, that finally separates out the universal concept from the particular by some process of abstraction (Sourcebook, vol. 1, 3 (g), 4-13). But is the transmission to reason a later stage than the transmission to imagination, of which our commentary speaks, or could these be the same transmission? In commentaries on another work of Aristotle, a number of Platonists including Themistius and Philoponus identify the lowest kind of intellect with imagination (Sourcebook, vol. 1, 3 (j)), although Aristotle himself would not have allowed this. This Platonist interpretation makes it possible that different levels of intellect process the transmitted aisthêmata. The lowest level, imagination, stores a series of similar aisthêmata until enough have been assembled, while higher levels of intellect are able by abstraction to separate the marks of the universal retained in these aisthêmata from the particulars in which they are embedded.

As regards the authorship of our commentary, Owen Goldin initiated an exchange of emails. He pointed out that, among known commenta-
tors who may have been responsible for the present text, the commentary’s very marked preference for the word *égoun* (512 occurrences in 106 pages), first noticed by Ian Mueller, is approached only by Asclepius (114 occurrences in 452 pages), another pupil of Ammonius, who reported Ammonius’ lectures on the *Metaphysics*. This might suggest some influence from Asclepius. Martin Achard has added another argument in favour of this conclusion – Asclepius’ *Metaphysics* commentary sometimes reads more like a paraphrase of Aristotle, displaying the same reduced philosophical and expository content as does the commentary on the second book of the *Posterior Analytics* in comparison with Philoponus’ commentary on the first book.¹ I would now add a third consideration, which takes account of Goldin’s further discovery that there are traces resembling Philoponus as well as Asclepius in our commentary. L.G. Westerink suggested that Philoponus corrected and expanded Asclepius in another commentary reporting Ammonius’ lectures on Nicomachus’ arithmetic. Philoponus corrected Asclepius’ arithmetical errors and doubled the size of Asclepius’ report of Ammonius’ lectures. (‘Deux commentaires sur Nicomaque: Asclépius et Jean Philopon’, *Revue des études grecques* 77, 1964, 526-35). This might suggest a new conclusion. Could Philoponus after all be the author of our commentary on Book 2 of the *Posterior Analytics*, but again have been correcting and expanding Asclepius’ report of Ammonius, so as to produce a better paraphrase commentary?

**Note**

¹. When Asclepius attempts more analysis, he sometimes shows a comparative lack of philosophical acumen. See Martin Achard, ‘How the physicist should define: Asclepius’ interpretation of *Metaphysics* E.1, 1026a2-3’, *Dionysius* 27 (2009) forthcoming.
Conventions

[...] Square brackets enclose words or phrases that have been added to the translation or the lemmata for purposes of clarity, as well as those portions of the lemmata which are not quoted by Philoponus(?).

<...> Angle brackets enclose conjectures relating to the Greek text, i.e. additions to the transmitted text deriving from parallel sources and editorial conjecture, and transposition of words or phrases. Accompanying notes provide further details.

(...) Round brackets, besides being used for ordinary parentheses, contain transliterated Greek words and Bekker pages references to the Aristotelian text.

Aristotle employs three verbs that can be translated as ‘to know’: gignôskein, eidenai, and epistasthai. In the present translation, ‘have scientific understanding’ renders epistasthai, as Philoponus recognizes that Aristotle uses the term in its technical sense, to indicate the sort of knowledge that comes about through an explanatory demonstration. Both other terms, gignôskein and eidenai, seem to be used to refer to knowing in general, which comprehends ‘having scientific understanding’ as its genus.

Since both terms have long histories in Greek philosophy, this translation allows the reader to determine which term is being used in each case. The verb gignôskein is translated ‘to know’ and eidenai, ‘to know’, and likewise with terms cognate to these.
Introduction

This volume contains a translation of a commentary, of unknown authorship, on the second book of Aristotle’s *Posterior Analytics*. It is appended to some (but not all) manuscripts of Philoponus’ commentary on the first book of *An. Post.*, and was published as the second part of that commentary in the Berlin edition of the ancient commentaries on Aristotle, edited by M. Wallies. Beginning with Wallies himself, the attribution to Philoponus has, however, come under sustained and repeated challenge. There are solid and convincing reasons for denying that the text as it has come to us is the direct result of Philoponus’ writing. But I believe that there is also significant evidence that, like Philoponus’ commentary on Book 1 of *An. Post.*, the present commentary (indirectly) derives from the lectures of Ammonius, teacher of Philoponus. Accordingly, I begin with the question of authorship. I evaluate the reasons for thinking that Philoponus is not its author as advertised, and although I find these considerations conclusive, I present my reasons for nonetheless thinking that the present commentary belongs to the tradition initiated by Ammonius. I close this introduction by indicating some features of the commentary that are of special interest.

1. The question of authorship

The full titles of Philoponus’ commentaries on the *Prior* and *Posterior Analytics* declare that what follows are records of the lectures on the *Analytics* given by Ammonius (c. 440-520), transcribed by his student John the Grammarian (aka Philoponus; c. 490-570), supplemented by a few observations of his own. What is to prevent us from respecting the traditional attribution of the commentary on *An. Post.* 2 to Philoponus? In spite of what is said on the spine and page headings of the volume of the Berlin edition in which this commentary was published, its editor, M. Wallies, argued against such an attribution. He brought up the following considerations. First, the commentary on *An. Post.* 2 is much less expansive than that on *An. Post.* 1. (To this one might add that the commentary lacks the observations supplemental to the exegetis of Aristotle’s text, present in the commentary on *An. Post.* 1 and indicated in its title.) Second, on 25 occasions in the commentary on *An. Post.* 1 Philoponus mentions Alexander of Aphrodisias (and then in
order to disagree), but there is no such mention in the commentary on Book 2. Third, the commentary on An. Post. 1, but not that on An. Post. 2, directly cites the authority of Ammonius (referred to as ‘the Philosopher’ or ‘the Teacher’). Fourth, the transmission of the two books is different. Only the later codices of the commentary on An. Post. 1 append to it the commentary on An. Post. 2 in question, while earlier codices append the text that Wallies appends as of anonymous authorship, which surely does not have Philoponus as author. We may add a fifth observation: a stylistic consideration strongly tells against ascribing the two commentaries to the same author: a TLG search indicates that the author of the present commentary uses the word êgoun (‘that is’, ‘namely’, or ‘for example’) 512 times in the current text, while the word is found twice in the commentary on Book 1 (which is longer) and 98 times in all of the rest of the extant writings of Philoponus. The frequency of êgoun is reflective of the unique character of the present commentary. Although it shares several features that are standard in commentaries (for example, a discussion of the aim of the work and the significance of its title, attention to grammatical points and the elucidation of obscure references) the bulk of the commentary is paraphrase. Because the Greek of Aristotle’s Posterior Analytics is even more abbreviated than that of most of his writings, the expansion of Aristotle’s text, by which unstated antecedents are identified and missing steps to the arguments are filled in, are essential but difficult stages. It is to these tasks that the present commentary is primarily devoted. But Philoponus’ commentary to An. Post., like all of his other extant commentaries, goes well beyond these steps, and the present commentary does not.

Hence the title that precedes the commentary on Book 1 cannot be taken as direct evidence for the authorship and nature of the commentary on Book 2. However, we should bear in mind that the Greek commentators on Aristotle are records (by either teacher or student) of lectures given by teachers who are presenting and explaining Aristotle’s text to students. When available, previous commentaries were consulted, and material from them (sometimes attributed, sometimes not) was incorporated into the lecture material. Creativity in interpretation was not valued; what was important in these lectures was a full and accurate discussion of the text. Hence from generation to generation within the commentary tradition we see an inexorable reproduction of problems, resolutions of problems, and points of interpretation, the passage of centuries bringing little change. These now seem to me to be decisive reasons for accepting the scholarly consensus that the text here translated is not, as it stands, from the pen of Philoponus. Nonetheless, the attribution is not groundless. As I pointed out above in the case of the Greek commentaries of Aristotle, authorship is a relative matter. Originality, though not unheard of, was neither expected nor honoured in the context of such
scholarship. So, even if stylistic considerations tell against Philoponus as author in our sense of the term, the details and even the wording of much of the commentary may in fact derive from a lost commentary of Philoponus (or the lectures of Ammonius, his source). Perhaps a scholar who copied and condensed an already existing commentary of Philoponus may have been happy with referring to the commentary as having Philoponus as author.

As a matter of fact, there are some considerations which, however inconclusively, indicate that the commentary does derive from a lost commentary by Philoponus or the primary source of his commentaries on the *Analytics*, Ammonius.

First, something can be learned by considering the evidence for the most prominent *An. Post.* commentary in antiquity, that of Alexander of Aphrodisias, now lost. Moraux has done some of the spadework here. Although he reproduces as fragments of the lost commentary of Alexander of Aphrodisias only those passages from later commentators that cite Alexander as a source, he has argued that much of the paraphrase of Themistius as well as an anonymous commentary on *An. Post.* derive from this commentary, and that the latter commentaries are very likely condensations of Alexander’s work. The Byzantine commentator Eustratius, too, reproduces much material from Alexander, but also much material from the present commentary appears in Eustratius’ commentary; when interpretations deriving from both sources are present, they are not always well integrated by Eustratius. The present commentary, on the other hand, never cites Alexander, and presents some interpretations radically different from those of Alexander. Like the commentaries of Ammonius and his students Philoponus, Asclepius, and Simplicius, and unlike those of Alexander, it presents interpretations of Aristotle as wholly consistent with Neoplatonic metaphysics and psychology. As noted above, in his commentary on *An. Post.* 1 Philoponus himself finds Alexander worthy of mention only when disagreeing with him; that the present commentary does not consider his readings as authoritative suggests that it too derives from Philoponus.

Second, as I point out in a number of notes, TLG searches reveal that the present commentary has a number of features shared only by other writings of Ammonius or Philoponus, and, in some cases, only in Philoponus’ commentary on *An. Post.* 1. Third, the present work includes a commentary on *An. Post.* 2.19 which on several points goes beyond a paraphrase of Aristotle’s text, and incorporates allusions and appeals to Neoplatonic teachings on universals, concept acquisition, and Platonic recollection. The account of *An. Post.* 2.19 offered by the present commentary is consistent with what we know of Philoponus’ teachings on these matters. Fourth, what I take to be the most philosophically interesting line of thought presented in the commentary – the interpretation of 2.8-10 that appeals to the distinction between
material and formal definitions – has an antecedent only in the commentary on *An. Post.* 1 at 109,8-33, for which the authorship of Philoponus is uncontested.

The commentary, as it comes to us, therefore, dates from 475, the earliest date for which we have evidence of Ammonius’ lectures,\(^\text{13}\) to 1075, the approximate date of Eustratius’ commentary on *An. Post.*\(^\text{14}\) This is quite a stretch of time, but considering how most lecture courses on Aristotle’s writings reproduced earlier commentary material with little change, and considering how free this commentary is of material deriving from Alexander’s commentary (which was widely disseminated and highly influential) it can be taken as good evidence for a line of interpretation of the *An. Post.* adopted within the school of Ammonius.

My suspicions, then, are that the work before us is a largely paraphrastic condensation of either a lost commentary on *An. Post.* \(^\text{2}\) by Philoponus, or of another commentary on this book that derives from the lectures of Ammonius. This would explain both stylistic differences and similarities, and would give the benefit of the doubt to whoever it was that bound this commentary together with Philoponus’ commentary on *An. Post.* 1. Nonetheless, the matter of authorship and the ultimate source of this material remains highly uncertain. For this reason,\(^\text{15}\) I refer to the author as Philoponus(?)

**2. The interest of the commentary**

While the name of Philoponus has become associated with radical breaks from the synthesis of Neoplatonic and Aristotelian thought taught in Alexandria by Ammonius,\(^\text{16}\) there is little or no evidence of this in the *Posterior Analytics* commentaries. Are the interpretations of *An. Post.* \(^\text{2}\) offered here of independent interest? In spite of the bad press this genre has received\(^\text{17}\) the present commentary has considerable philosophical and historical interest.

*An. Post.* \(^\text{2}\) is written in a style gnarled and abbreviated even for Aristotle. It is often unclear what questions Aristotle is asking, let alone what his answers are. If any of Aristotle’s text demand paraphrase, this one does. Whatever its authorship, the commentary of Philoponus(?) provides such a paraphrase, offering a number of suggestions that have been echoed by commentators and Aristotle scholars in the centuries since it was written.

*Formal and material definitions*

Three aspects of the commentary are especially worthy of note. These are how Philoponus(?) understands Aristotle’s discussion of the demonstration of a definition as an exploration of the relation between ‘material’ and ‘formal’ definitions, Philoponus(?)’ discussion of how the middle term presents all four causes, and Philoponus(?)’s account of intellect (*nous*).
As Philoponus(?) points out (334,8-12), the second book of *An. Post.* is marked by a special concern with causation, and how the causal relationships that hold among the objects of scientific study are exhibited and reflected in the logical relationships that hold among the terms of demonstration (the variety of inference by virtue of which one comes to, and imparts, scientific understanding). Thus, the first half of the second book is a single extended discussion of how demonstration and definition are related to expressions that indicate whether something is (*ei esti*), whether some state of affairs holds (or whether some fact is the case, *to hoti*), what something is (*ti esti*), and why the state of affairs holds (or why the fact is the case, *to dioti*). The first book of *An. Post.* discussed the relationship between definition and demonstration. A definition is an account of what some subject is, and is a conjunction of predicates, any of which can serve as a middle term of a demonstration whose conclusion is the predication of some attribute of that subject. This middle term expresses the cause, or reason why the conclusion holds (2.1-2). But a series of aporetic chapters (2.2-7) muddies the waters considerably, and, in the chapters that follow, 2.8-10, Aristotle argues that in a sense a demonstration can serve to reveal or express what something is, a task previously reserved for a definition, considered as a kind of definitional first principle. It is wholly obscure what Aristotle means by saying that in some cases there is, in a sense, a demonstration of a definition. The text is ambiguous in several crucial lines, on which pivots the choice between radically different interpretations. According to one, that apparently favoured by Alexander of Aphrodisias and his followers, there can be a demonstration of a definition only in the case of a certain kind of entity (a complex of the simple, basic entities that make up the genus studied by a science). This line of interpretation has continued to find champions, for example, in Ross, Deslauriers, and myself. According to another, there can be a demonstration of a definition only in the case of a certain kind of incomplete definition: a demonstration allows one to explain why one part of a complete definition follows from another, indemonstrable part of a complete definition. It is this interpretation that is found in the commentary of Philoponus(?), and, indirectly from him, within the scholastic tradition. In Philoponus(?)’ version of this interpretation, Aristotle believes that there are certain dialectical inferences, which do not strictly speaking meet the standards of demonstration, but nonetheless, like true demonstrations, play a crucial role in rendering intelligible certain regularly recurring features of the world. These ‘demonstrations’ show how a ‘material definition’ of a certain kind is shown to follow logically from the kind in question, by virtue of the ‘formal definition’ as a middle term. As an example, Philoponus(?) appeals to the definitions of anger presented in *DA* 1.1. The material definition of anger is the boiling of the blood around the heart and the indemonstrable formal definition of anger is the desire for retribution in return for perceived injury. Phi-
Philoponus(?) does not clearly spell out what formal and material definitions are, and why, on his account, Aristotle restricts the sort of demonstration that he has in mind to cases in which these two kinds of definitions do not convert. Within the notes to the translation, I argue for the following interpretation. A material definition is ‘material’ insofar as it expresses the essence of the kind in question in an indeterminate way. (It may make reference to the ontologically material substrate, but need not.) The formal definition is that which determines the indeterminate material definition. When supplementing the material definition, it yields the full, scientifically adequate definition. While the minor premise of this definition, the formal definition, is indeemonstrable, the major premise, by which the material definition is predicated of the formal definition, is at best reputable.

Philoponus(?) gives a clue concerning what he means when he interprets Aristotle as saying that this sort of ‘demonstration’ is possible only when the formal and material definitions do not convert. His examples (lunar eclipse and thunder) show that he has in mind deductions that reveal the essences of temporal events, in which the ‘formal definition’ expresses the efficient cause of that phenomenon that is expressed in the ‘material definition’ of that event. Philoponus(?) does not explain why in such a case the efficient cause fails to convert with that phenomenon identified in the material definition.

Within the same chapter in which he outlines how there can, in a sense, be a demonstration of a definition, Aristotle outlines steps by which one who engages in certain scientific investigations can proceed to a fully adequate scientific account of the essence of a kind. Aristotle tells us that we start from an ‘accident’ which is ‘something of the thing itself’; grasping this is a first step that is the prerequisite for success in such an investigation. Within his commentary on 2.10 Philoponus(?) shows that this accident will be a material definition of the kind in question. He suggests that the sort of dialectical deduction discussed in 2.8, called a ‘demonstration’ only in a loose sense (such as ‘a lunar eclipse is the blocking of the sun from the moon by the earth; the blocking of the moon from the sun by the earth is a privation of the light from the moon; therefore a lunar eclipse is the privation of the light from the moon’) makes possible a closely associated sort of scientific demonstration of the material definition of its proper subject, from which there can be derived a scientifically adequate definition of the sort of event in question. (Thus, the above example yields the demonstration ‘the moon has the earth interposed between it and the sun; what has the earth blocking the sun from it undergoes a privation of light; therefore, the moon undergoes a privation of light’ from which there can be derived the definition ‘the lunar eclipse is a privation of light from the moon on account of the earth’s blocking the sun from it’.)

Philoponus(?)’ main points here can be summarized as follows. A key area of inquiry concerns events, where what is identified as the efficient
cause of that event usually leads to the effect – the event – though it does not necessarily do so. Although we might recognize the event by certain phenomenal features, these features do not constitute the whole of the essence of the event (since they do not include the cause). Accordingly, a definition that expresses only these phenomenal features is like the matter for a complete, determinate definition. Those elements that are missing, which express the efficient cause, are like the form for the whole definition, and hence they are expressed in a ‘formal definition’, even though they express an efficient, not a formal cause. A completely adequate definition of the event in question will mention both elements. This sort of definition is to be distinguished from the sort of definition that is an indemonstrable first principle of the sciences.

Although many of the details of Philoponus(?)’ account remain unclear (and, in my view, it is to be rejected in favour of an alternative line of interpretation, having its origin in the lost commentary of Alexander), his general strategy continues to prove influential.

3. Causes, middle terms, intellect

Another important part of the commentary is Philoponus(?)’ attempt to make sense of Aristotle’s argument that all four kinds of causes (formal, efficient, material21 and final) are expressed as middle terms of demonstrations. This is especially problematic in the case of the final cause. Philoponus(?) pioneers a line of interpretation according to which Aristotle’s exposition is simply confused, and the final cause appears as a minor term, not middle term, in the demonstration that explains a fact by virtue of the final cause. This reading of Aristotle still predominates among Aristotle scholars, although it is also being questioned.

Philoponus(?)’ commentary offers the earliest surviving Neoplatonic interpretation of An. Post. 2.19, in which Aristotle explains how it is that people are able to grasp the first principles of the sciences. Although a coherent and comprehensive interpretation of this important and difficult chapter does not emerge from the commentary, it provides a number of important clues concerning how Neoplatonists were reading Aristotle, and provides evidence for the history of Neoplatonic epistemology and metaphysics. Specifically, it lays out the distinction between three kinds of universal (Forms as paradigms, shared characteristics of things, and concepts in the mind) and asserts that within An. Post. 2.19 Aristotle is concerned with the genesis of the last variety of universal. Philoponus(?) understands Aristotle to be claiming that this sort of universal only arises after the accumulation of a sufficient number of perceptions. According to Philoponus(?), the information that perception conveys to human beings is not exhausted by sensible forms; this information also includes the content of the universal concept in the mind. (For example, when we perceive a horse, we do not only
perceive brown, horse-smell, and whinny, we also in a sense perceive a universal concept: horse.) Even though this content is conveyed by perception, it is not to be identified with a single perception itself, or with a number of them. (The universal ‘horse’ is something over and above a single perception of a horse, or a multitude of them.) Somehow a rational being is able to isolate and recognize the conceptual universal conveyed by perception, but Philoponus(?) does not say how he thinks this occurs, except to follow Aristotle in identifying intellect (nous) as the disposition by which this is possible. He subscribes to a version of Plato’s theory of recollection, but does not appeal to it in explaining how concept acquisition is possible; indeed he tells us that the innate knowledge that the soul has of the Forms is destroyed through undue association with the body. Philoponus(?) appears to be claiming innate knowledge does not in any way survive the time at which the soul becomes enmeshed in bodily things. This would seem to preclude the possibility of recollecting that knowledge at some later time. If human beings nonetheless can always grasp universal concepts, regardless of embodiment or any moral failings, this must be through some means other than recollection, which allows us access to innate knowledge alone. Even if Philoponus(?) is speaking loosely, and does not mean to say that innate knowledge is utterly destroyed through undue association with the body, he does not take the steps that we see in other Neoplatonic texts, in more fully working through the details of the process by which people come to be aware of universal concepts and truths.

The Posterior Analytics is an extremely difficult text, full of difficulties concerning how to construe individual sentences, particular arguments, whole lines of argument, and different aspects of the comprehensive theory of scientific understanding that Aristotle works through. Any close reading of such a text is bound to offer a number of suggestions worthy of consideration, and perhaps acceptance. The present commentary offers such a close reading, and I hope that this translation will help advance the study of this key work of Aristotle. In addition, the ready availability of a translation of Philoponus(?)’ commentary will help historians of philosophy tell the story of how later Aristotelians worked through and developed the lines of interpretation it contains.

Acknowledgements

The present translation was made possible by a 2005 Summer Stipend from the National Endowment for the Humanities, supplemented by funding from Marquette University. I owe many thanks for this assistance, and also to all of those individuals who have helped with the project. I have benefited from the diligence and careful eye of four research assistants, Margaret Steele, Amy Whitworth, Daniel Farmer,
and Erik Leigh. I consulted my colleague Stephen Beall when the Greek struck me as particularly thorny. The geometric diagrams are the work of Victor Hugo Murillo, of Marquette University Information Technology Services. John Sellars, Anne Hewitt, Frans de Haas, Fiona Leigh and especially Martin Achard all helped with the preparation of this volume. I gratefully acknowledge the help offered by David Twetten and Bernard Dod in my efforts to understand the role played by the present commentary in the medieval tradition of *Posterior Analytics* commentaries. Thanks are especially due to the man at the helm of the Ancient Commentators series Richard Sorabji, ever helpful and ever patient. I owe deep debts to the team of vettors arranged by the Ancient Commentators project: Martin Achard, Richard McKirahan, Ian Mueller, Marije Martijn, Mossman Roueché, and one who is anonymous. (I have especially benefited from the notes to the last twenty pages of the commentary itself offered by the last vetter [Orna Harari – ed.]; many of my own notes are based on his or hers.) I have benefited enormously from the meticulous care evidenced in their review, their good sense of style, and their deep understanding of both the Greek language and the philosophical nuances of the text. Although I have not always followed their advice, I have always learned from it. All errors are of course my own.

Thanks of a different kind are due to my wife, Miriam Sushman. This volume would have taken much longer to complete without her loving help and encouragement.

My father, M. Stuart Goldin, died in the final stages of the preparation of this volume. He was a true *kalos k’agathos*. This translation is dedicated to his memory, with love.

**Notes**

2. That commentary is being translated in its entirety, for the present series; at the time of writing, the first third, McKirahan (2008), has been published.
3. Ammonius (440?-520?) made a specialty of the study of Aristotle. Three of his extant Aristotle commentaries have him as direct author; four are redacted by Philoponus (in three of these, they are presented as supplemented by observations of Philoponus’ own), and one was redacted by Asclepius.
4. Wallies (1909), v-vi. See also the introduction of Verrycken and Lohr to Gratiolus and Theodosius (1995), xii.
5. I am indebted to Ian Mueller for this point.
7. Wallies (1900).
8. This is printed in Wallies (1909).
11. For an example, see the discussion of his account of *An. Post.* 2.8 in Goldin (forthcoming).
12. See nn. 58, 141, 204, 309, 316, 376, 464, 504, 560, 563, and 565; on the other hand, see nn. 395, 412, and 549.
15. It also seemed desirable to achieve consistency with the index to Sorabji (2005).
17. See Ebbesen (1990), 445, according to whom Philoponus is ‘the diffident young assistant professor of logic charged with teaching a subject he has not quite mastered; he relies on notes taken during professor Ammonius’ lectures, but they are none too good, for though Ammonius taught lots of logic classes in his time, he never managed to become really interested in the discipline’.
20. James of Venice’s twelfth-century translation of the *Posterior Analytics*, which was for centuries the standard Latin translation of the work, includes a sentence which presents the distinction as if part of Aristotle’s original text (Minio-Paluello and Dod (1968), 83, lines 6-8); presumably this was in origin a Greek gloss. Grosseteste (1981), 322-44, also understands Aristotle himself to be appealing to this distinction in 2.8-10. This is because he used James’s translation. Rossi, in his introduction to Grosseteste (1981), 20-1, claims that Grosseteste made use of Philoponus’ *An. Post.* commentary. He would have seen this line of interpretation sketched at Philoponus, in *An. Post.* 109,8-33, and may well be indebted to the fuller version of this interpretation presented in the present commentary. Unlike Grosseteste, Aquinas made use of William of Moerbeke’s revision of James’s translation, which removed the interpolated sentence. It is therefore unclear whether Aquinas – in interpreting *An. Post.* 2.8-10 – took the distinction between material and formal definition from Grosseteste (or other Latin commentators), or solely from James’s standard text, with which he would no doubt been very familiar. Some influence from Grosseteste is thought to be likely by Gauthier (1989), 56-8.
21. Philoponus(?) understands Aristotle to be alluding to the material cause in *An. Post.* 2.11, but most scholars today reject this identification; see n. 284.
This is a translation of the text printed in Ioannis Philoponi in Aristotelis Analytica Posteriora Commentaria, ed. W. Wallies, CAG 13.3 (Berlin: Reimer, 1909), with the following emendations.

343,15 Emending τέν αυτόν διαμετρον to του αυτου διαστήμα.
343,16 Emending τῆς διαμετροῦ to του διαστήμου.
350,11 Emending asullogistous to asullogistós, as per Wallies’s tentative suggestion.
350,18 Accepting Wallies’s tentatively proposed emendment of badistikou for galastikou.
350,24 Rejecting Wallies’s emendment of kai hōs for hōs.
352,4 Correcting 91b31 to 91b32.
353,1 Correcting 91b32 to 91b33.
353,13 Following Wallies, supplying ane tôn mesôn, ἐγοῦν τὸν διὰ mesôn to the apparent lacuna.
354,8 Adding a period after labonta.
358,17 Rejecting Wallies’s emendment and changing anankês back to anankê ex.
358,18 Emending sunagousin to sunagein.
360,12 Inserting ou before sunapodeiknuetai.
361,21 Inserting ouk before esti.
372,32 Emending ou to oude.
377,8 Emending ἐ hé BAG ἐ hé GAD to ἐγοῦν hé BAG kai hé GAD, and repunctuating from the semicolon to a period.
377,9 Repunctuating from the period to a comma.
400,35 Adding to before τοί.
407,7 Emending to to τοί.
407,27 Inserting d’ before ek.
414,16 Reading eidei apóρizei for to zóion eidei apórisas.
415,13 Inserting dei before labein.
421,28 Retaining eph’ hōn and supplying a comma after anapheretai.
425,1 Adding de before the second zóion.
429,3 Reading dusin for tetrasin.
430,8 Correcting 99a28 to 99a29.
431,11 Correcting οἱ to ὁι.
433,5 Reading sunistatai for sunistantai, with CEF.
440,2 Adding arkhê before alla, not alla arkhê as does Wallies.

Notes on the text of Aristotle’s Posterior Analytics

The text of the Posterior Analytics employed by Philoponus(?) often differs from that of Ross; sometimes it is the only source for variant readings. Below I list those discrepancies for which the lemmata provide direct evidence for a variant reading. Other cases, in which the commentary itself provides evidence for his working with a different text, are signalled in the notes.

89b31 The lemma omits the oun of Ross’s text.
90a28 The lemma has aisthanesthai while Ross’s text has aisthesthai.
91a35 The lemma has oun for Ross’s dé.
91b3 The lemma reads aléthes ën eipein, with ABd, while Ross, following n, reads aléthes eipein estai.
91b25 The lemma has einai following men; Ross’s text reads men to pan einai.
91b32 The lemma omits ëdê.
92b4 The lemma adds anthrôpos after estin.
92b13 The lemma reads to de einai, while Ross’s text has to d’ einai.
92b33 The lemma omits apodeixis.
93a3 The lemma has tauton following estin.
93a11 The lemma reads tôn gar ti estin anankê kai to meson where Ross has tôn te gar ti estin anankê to meson.
93a21 The lemma has d’ for the first de in Ross’s text.
93a29 The lemma has d’ for Ross’s oun.
94b8 The lemma has de for Ross’s d’.
94b28 The lemma reads hoion dia ti dieisi dia tou lamptêros to phôs, while Ross’s text has hoion dia tou lamptêros to phôs.
95a10 The lemma has to d’auto for Ross’s to auto d’.
95a35 The lemma has esomenôn for Ross’s esomenou.
95b10 The lemma omits en.
95b23 The lemma closes with a period while Ross punctuates with a question mark.
96b28 The lemma omits g’.
96b34 The lemma has hotidépote for Ross’s ho ti dépote.
97a14 The lemma has ta antikeimena for Ross’s tantikeimena.
97a18 The lemma has ean for Ross’s an.
97a23 The lemma has theseôn for Ross’s diaireseôn.
97a35 The lemma reads de panta, for Ross’s d’ hapanta.
98a1 The lemma has legein for Ross’s eklegein.
98b25 The lemma has henos for Ross’s tou autou.
99a4 The lemma puts a comma after mé instead of after houtôs.
99a34 The lemma has estin after katholou.
100a6 The lemma reads de tês for Ross’s d’.
PHILOPONUS(?)

On Aristotle

Posterior Analytics 2

Translation
In the first book of *On the Science of Demonstration* he taught that demonstration exists, what demonstration is, through what premises it comes about, and further, how demonstrative syllogism differs from other syllogisms. He also [taught] that for the other syllogisms the middle term is the cause of the conclusion, but not of the fact as well, while in the demonstrative syllogism the middle term is the cause of both the conclusion and the fact. It was still incumbent on him to teach about the middle term too, [showing] how it is the cause of the fact. This is precisely why he gives the demonstrative middle term, too, its own treatment, since even the account of the four objects of investigation in the beginning of the book does nothing other than prepare for the need to investigate and examine the demonstrative middle term, so that this [middle term] too might be grasped with scientific understanding. For while there are in general four kinds of things that are investigated, in each of these cases, the investigation concerns the middle term. In addition, because the middle term is [something] necessary since, for every object of investigation, the investigation concerns this, he could not talk about this matter in passing but had to produce a special treatise devoted to it. Since the middle term in demonstration is a definition, his teaching is incidentally concerned with definition too. For his proper teaching concerning definition is in the seventh book of the treatise *Metaphysics*. But here his teaching concerns not definition but the cause and the middle term.

Since demonstration is called an analysis, and the present treatise is a part of [the teaching concerning] demonstration since it teaches about the middle term, it too has the title ‘Analytics’. The first book of *On the Science of Demonstration* does not have the title *Analytics* as the books that precede it do. For he called them *Analytics* from the more important part of the syllogistic method. The more important part of it is the exposition that teaches about the analysis of syllogisms into the figures. For we analyze the syllogism into the premises and these into the terms, and we take the middle term and we thereby discover in which sort of figure it has been syllogistically deduced. For if those matters are for the sake of the science of demonstration (as he himself said in the beginning of [his treatment of] the three figures), inasmuch as the inquiry concerns demonstration, and the purpose is more important than the matters...
that are for the sake of it, demonstration is more important than the matters that precede it. But since there is a kind of analysis by which we analyze that which is known into the principles and the causes from which it has its being and its being known, it is in reference to this kind of analysis that the science of demonstration is called analytic. For its principles are discovered for us from analysis, when we go up from the effects, which are prior to us, to the things that are prior by nature, that is, to the causes. For it is by perception that we first come to know that the moon is eclipsed. But when thought later re-examines [the matter] it discovers the cause. For it says 'the moon is eclipsed; that which is eclipsed is blocked; therefore the moon is blocked'. This is an analysis proceeding from effects to causes. Then demonstration goes down from causes to effects. 'The moon is blocked; what is blocked is eclipsed; therefore the moon is eclipsed'. And, again, we see the earth quake, and we say 'the earth quakes; when it is quaking, the wind in its hollows and caves is trapped in; wind within the earth is trapped in'; this is analysis. Then there is demonstration: Wind within the earth is trapped in; when the wind is trapped in, an earthquake occurs; therefore within the earth an earthquake occurs. So either it is entitled Analytics for this reason, or because in demonstration the middle term has primacy, this middle term is the definition of the thing, and the definition is discovered from analysis. For when I consider 'human being', I analyze this into the things from which its nature is constituted, (rational, mortal, receptive of intellect and scientific understanding) and when I take them in this way, I constitute the definition. [Analysis is a way up from the particulars and individuals to the universals right up to the most generic genus itself.] Analysis is also a way going over from something known to the principles and the causes, from which it has its being and its having come to be known. It is according to this sense of 'analysis' that the science of demonstration too is called analysis. Analysis is also a path from the effects and posterior things up to the principles and causes, by which the effects are constituted. The term is also taken metaphorically from expatriates who turn back towards their own [lands], for the way that goes from things that are foreign to things that are one's own is also called analysis. In addition, the way from the composites to the simples of which they were composed is also called analysis. There is also analysis of syllogisms into the figures, for we analyze syllogism into the premises and the terms.]

[Chapter 1]

89b23 The things that are investigated are equal in number [to the things of which we have scientific understanding. We inves-
tigate four things: the fact, the reason why, if it is, what it is. For whenever we investigate whether it is this or that, putting [them] into a number, for example, whether or not the sun is eclipsed, we investigate the fact. There is evidence for this, for when we discover that it is eclipsed our investigation is over. And if we know from the start that it is eclipsed, we do not investigate whether [it is eclipsed]. When we know the fact, we investigate the reason why. For example, when we know that it is eclipsed and that the earth moves, we investigate why it is eclipsed and why it moves.

He says that there are as many problems that are investigated as there are ways by which we have scientific understanding and know. There are four things that are investigated; therefore there are four ways by which we know. For just as a problem and a conclusion are the same in content but different in regard to expression (for example ‘the soul is immortal’ is both a problem and a conclusion, for when it is put forward to be investigated and we ask [someone] to demonstrate this, it is called a problem, but when it has been demonstrated, it is called a conclusion), in this way both the objects of investigation and the things known are the same in content, but different in regard to expression. For if I do not know that there is a god or a centaur, it is called an object of investigation, for I investigate whether there is a nature of a god or a centaur. But when I learn that there is, I am finished with this sort of investigation, for what was just now unknown to me and for this reason an object of investigation has become known. And again I turn to another object of investigation which is unknown, for I investigate what a god is or what a centaur is. And when I have learned this too I have ended the investigation for that which was investigated became known to me. Therefore the things that are investigated are reduced to four and all of the things that are known [are reduced] to four. For as we said, these are the same in content. These are the if it is and the what it is, the fact and the reason why. Of these the if it is and the what it is are simple, but the fact and the reason why are composite. For those [(the if it is and the what it is)] involve an investigation into a certain simple and single term, for example, whether there is a cause of the existence of the moon. On the other hand, the fact and the reason why involve an investigation into a composite, for we investigate whether there is a cause on account of which being eclipsed belongs to the moon, and when we discover that there is, we investigate the reason why being eclipsed belongs to the moon. Since they involve an investigation into a composite, he dealt with the fact and the reason why before [he dealt with] the if it is and the what it is, which involve an investigation into simples. For composites are prior and better known to us, as simples are [prior
and better known] by nature. But instead of saying that the problems being investigated are composite he says ‘putting [them] into a number’, for number is constituted out of a composition and multitude of monads, as are the dyad and the triad. But the monad is simple, and for this reason the simple problems are called monadic and unitary.

‘Whenever we investigate whether it is this or that’, or whether eclipsing or sphericity belongs to the moon, ‘we investigate the fact’. ‘There is evidence of this’, that we investigate the fact. ‘For when we discover’ this we no longer investigate it.

89b31 These things [we investigate] in this way. [but some things we investigate in a different way, for example, whether or not there is a centaur or god.]

In other words, this is how we investigate the fact and the reason why, that is, [how we investigate] in the case of a composite problem. A composite problem is one having a subject and a predicate.

‘But some things [we investigate] in a different way’, that is to say, the investigation into the if it is and [the investigation into] the what it is arise in the case of a simple and single term; examples are [investigations into] whether there is a centaur, or what a centaur is.

89b33 I mean ‘whether or not it is’, without qualification [but not whether or not it is pale. For when we know that it is, we investigate what it is, for example, ‘so what is a god?’, or ‘what is a human being?’

So these are the things that we investigate, and things which we know, when we discover them, and this is how many [of these things there are].]

He said this in order to distinguish the fact from the if it is, for it seems even when we are concerned with the fact we are investigating the if it is, that is, whether there is a cause of the moon’s being eclipsed. And he says that even though both investigate the if it is, nonetheless the fact investigates whether or not there is a cause of paleness belonging to the human being, where the ‘is’ is something added in predication, but in the case of the if it is we do not investigate whether there is a cause of this belonging to that, but we take a single term, for example god or soul, and, with an eye to this, we investigate whether there is a god or soul, where the ‘is’ is the predicate, and when we discover this we investigate what it is.
Chapter 2

89b37 When we investigate the fact [or the if it is without qualification], we investigate [whether or not there is a middle term for it.] Having shown above that there are four objects of investigation, and having divided them into simples and composites, he now divides them further, for the sake of a clearer account of them. He employs ‘the if it is’ and ‘the that it is’ as being the same and groups them under a single [heading], by which both investigate whether there is a cause of the thing, even if [the investigation into] ‘if it is’ investigates a cause of a certain single subject term, intellect or soul, and [the investigation into] ‘the that it is’ investigates a cause of some thing that is observed to be in a subject, for example whether there is a cause of the eclipse’s belonging to the sun or the moon. Again, he employs ‘what it is’ and ‘why it is’ as being the same, on account of the fact that [the investigation into] ‘what it is’ investigates the definition of the thing, of the eclipse itself taken by itself, and [the investigation into] the reason why takes this definition as a middle term in the demonstration of why the moon is eclipsed. At the same time he shows that the four objects of investigation have a use in demonstration. For all investigate the cause, and the cause is the middle term. He presents this first figure syllogism: for all of the things being investigated the cause is investigated. This is the middle term. Therefore for all of the things that are investigated there is the middle term.

89b39 ... [But when we know either the fact or if it is ...] – either partially or without qualification – [and we again investigate the reason why or the what it is, at that time we investigate what is the middle term. This is what I mean by ‘that it is partially’ and ‘(that it is) without qualification’. Partially: Is the moon eclipsed, or [is it] waxing? For in these cases we investigate whether there is something or is not something. Without qualification: is there or is there not moon or night? So in all of these investigations it happens that one investigates whether there is a middle term or what the middle term is. For the middle term is the cause, and in all of these cases this is investigated. Is it eclipsed? Is there a cause or not? After these matters, when we know that there is a [cause], we investigate what this is.] By ‘partially’ he refers to the composite problems that are investigated by means of [an investigation into] the fact, for the composites are divided into subjects and predicates and have subjects and predi-
cates as parts. Alternatively, he calls composites ‘partials’ because the composition particularizes the thing. For in the case of both perceptible and intelligible substances, the substance that is called the most generic is particularized if it takes on the additional [feature of] ‘body’, and is [now] taken as applying only to perceptible [substances]. But since perceptible substances are either living or inanimate, when [perceptible substance] took on the additional [feature of] ‘living’ it was particularized to living substances alone. If [it took on the feature of] ‘rational’, it is further particularized. By ‘without qualification’ he refers to the simple thing, whose cause [the investigation into] the if it is investigates.

For we investigate whether there is something, the cause of the moon’s being eclipsed or waxing. But you investigate without qualification whether there is a cause of a single term, for example, what is a cause of the being of moon or night.

90a9 The middle term is the cause of its being not this [or that, but of its being the essence without qualification, or [of its being] that which is, not in an unqualified way, but one of the things that are per se or accidentally. By that which is a subject in an unqualified way I mean this sort of thing: moon or earth or sun or triangle.

[He is], in other words, [speaking of] investigating whether there is a cause of its being, not this or that, that is, not of [its being] a certain composite, but investigating without qualification an essence of a single subject term, [the] earth or [the] sun. And if you are investigating (not without qualification) the cause not of a single absolutely simple thing, but of something observed [to be] in a subject either per se or accidentally, that is, of a certain composite, what is being investigated is the middle term.

90a13 [I mean this sort of thing] by ‘one of the things’: eclipse, [equality, inequality, either in the middle or not]. For in all of these cases it is clear that the what it is and the reason why are the same. What is an eclipse? A privation of light from the moon on account of the earth’s blocking. Why is there an eclipse? Or, why is the moon eclipsed? Because of the diminishment of the light when the earth is blocking. What is a harmony? A numerical ratio in the high and low. Why does high harmonize with low? Because the high and low have a numerical ratio. Can the high and low be in harmony? Is there a numerical ratio between them? When we grasp that there is: what then is the ratio?

All of the cases in which the middle term is perceptible make clear that the investigation concerns the middle term. For we
investigate when we do not perceive [it]. For example, in the case of the eclipse, we investigate whether it exists or not. But if we were on the moon, we would investigate neither whether it occurs nor why, but it would be apparent at the same time.]

‘One of the things’ refers to the accidents and attributes that belong in something. For example, an eclipse is observed as an accident in the moon, but sphericity is a shape [which belongs to it] per se.53 ‘Either in the middle or not’: this refers to the question: is there or is there not a cause of the earth’s being in the middle? For it has the role of being in the centre. Perceptible is predicated accidentally of the earth referred to,54 but being in the central place is predicated per se [of it].55 And, again, equal belongs per se to triangle. For [triangle] has three angles equal to two right angles, per se, but having two sides unequal [to the other one], that is, greater than [the other] one, is accidental.56 For he numbered triangle among substances since it is a mathematical substance.57 For among substances, some are intelligible, such as intellect and soul, some are perceptible, such as Socrates and Plato, and others are dianoetic,58 such as triangle and square. So he taught that for all objects of investigation it is the middle term that is investigated. But someone might have the following difficulty: since some objects of investigation are simple and some are composite, you might well say that for composites the middle term is investigated, if every middle term is between two extremes, and the composite is divided into two terms, the subject and that which is predicated, between which it is possible to take a middle term. But how is it possible to take a middle term for simple objects of investigation, for which the cause of a single term is being investigated?59 We even say that for the simple substances, the intelligible [substances] like intellect and soul, which are observed to be without matter, the form, that is, the definition, is never anything else besides that which is defined.60 [For example], a definition of intellect is ‘a faculty of soul able to apprehend divine and intelligible things’. Now this definition and intellect are the same. And if they are one and the same, how is it possible to take a middle term for them? In the case of things that are composite and observed along with matter, for example, human being, even if its definition, ‘animal rational mortal’61 has been coordinated with human being and is observed in it, nonetheless it is possible to take this separately, and once it has been taken separately, it seems to be something else, besides human being.62 It is for precisely this reason that in such cases the cause can be taken as a middle term. In addition, since he knows that a middle term cannot be taken for simple substances, intellect and soul, he also takes up certain attributes as examples of the four and works through his account as applied to them, and thereupon shows that ‘the what it is and the reason why are the same.’ For even though the
what it is and the reason why are different, insofar as the one is investigated for a simple and the other [is investigated] for a composite, these would nonetheless be the same in content, though different in the way they are employed. For both the what and the reason why are observed in the eclipse, which is an attribute of the moon. But we make different use of these, the what and the reason why, in each case. If we take the eclipse itself by itself, we investigate what is the cause of the eclipse, and we say that it is ‘a privation of light from the moon on account of the blocking by the earth’. And if we investigate whether the eclipse belongs to the moon, that is, why it belongs, we take as middle term the what it is, for example, the privation of light from the moon that comes about from the blocking by the earth. And in the same way harmony is an attribute that is observed in the high and the low note. The only difference is that if you investigate ‘what is a harmony’, you say that it is ‘a numerical ratio in the high and low’. And the epitritos, the hemiolo, and the octave are each a ratio observed in numbers. I mean the octave is the ratio two to one, when the low note includes twice the high note, and the epitritos involves a ratio that occurs when [the low note] includes the whole high note plus a third of it.

‘That the investigation concerns the middle term’ is clear from what is itself evident, the activity of perception. For in the case of facts that are objects of scientific understanding (I call the moon’s being eclipsed an object of scientific understanding), in all of those cases in which the middle cause is <not> perceptible, that is, [that has not] come to be known by perception, ‘we investigate’ whether there is a certain cause of the eclipse, since we dwell far from the moon and for this reason have not perceived and are not noticing its cause, for we do not notice how the moon is blocked and has something in the way so as not to receive the rays of the sun. ‘But if we were on the moon’, we would notice how it is blocked by the earth, and accordingly we would not have been investigating whether or not the eclipse occurred, ‘but it would be apparent at the same time’, that is to say, we would also come to know the cause, the same time that we see how it is blocked when it falls into the cone and something gets in the way of its receiving the rays of the sun.

90a28 For from perceiving, [knowledge of] the universal, too, [would arise within us. For there would be perception that [the earth] now blocks, since it would be apparent that [the moon] is now eclipsed. From this there would arise the universal.] This is a solution to an objection. For perhaps someone had the following difficulty: if the eclipse of the moon is a fact that is an object of scientific understanding, and what is an object of scientific understanding and what is perceptible are different (as scientific under-
standing and perception are different), how can you say that the eclipse, which is an object of scientific understanding, is also perceptible? So he says ‘I do not call perceptible the universal eclipse that always occurs on account of the blocking, but I call perceptible an eclipse that I now see occurring’. ‘For from perceiving’, that is, from perception, and from often seeing this occur the knowledge of the universal is assembled in us. For sight notices that the moon is now blocked and ‘is eclipsed’, and from this particular [event], which we have often seen occur, there emerges in us the scientific understanding of the universal, namely, that every eclipse of the moon always occurs on account of the relationship of blocking.

90a31 As we say, to know the what it is [and [to know] why it is are the same, and this [is true] whether [you grasp what is] without qualification and is not one of the things that belong, or for the things that belong, such as two right [angles], or that it is greater or less.]

In other words, I say that the perceptible and the object of scientific understanding are the same in the same way in which the what it is and the why are the same. For just as the what and the why are the same in subject but are different in expression and the way in which they are employed, since one can see that both are studied in the case of the eclipse (for if you were to take the eclipse itself by itself, you would know its nature through the what it is, but if you study it as inherent in the moon, you prove [that] this [occurs] through the why, when you take blocking as the middle term), so the perceptible and the object of scientific understanding, too, are the same in content but different in expression. For both are studied in the case of the moon’s being eclipsed. Now the moon’s being eclipsed is a perceptible occurrence, if you were to take the eclipse that is occurring now, but it is an object of scientific understanding, if [you were to take] the eclipse that is universal and is always occurring. ‘And this’, that the what and the why are the same, [is true] whether you grasp one of the things that are observed [to be] without qualification and is not among ‘the things that belong’ in something else, that is, the things that subsist per se, as do intellect and soul, or whether you take one ‘of the things that belong’ in something else and are observed [in something else], as are the eclipse in the moon and ‘two right angles’ (that is, the [attribute of] having three angles equal to two right [angles]) in the triangle. ‘Greater and less’ too are in triangle in this way, for the two sides are greater than the [other] one.
[Chapter 3]

90a35 [Clearly,] all things that are investigated are an investigation into the middle term. [Now let us say how the what it is is proven, and what is the manner of the reduction, and what is definition and what are its objects, having first worked through the difficulties about them.]

Having shown that the four objects of investigation investigate the middle term, he investigates definition too, whether it can be demonstrated that this is the definition of that, and ‘what is the manner of the reduction’, that is, how these are reduced to demonstration, and what is definition and of what things there is definition. Before investigating the things that we have mentioned he first works through the difficulties concerning whether definition and demonstration are the same, and whether the same thing is definable and demonstrable.67 One might inquire: if he was investigating the objects of investigation and the middle term, what was the point in changing the subject to investigating whether definition and demonstration, and the definable and the demonstrable, are the same or different? We say that since he just said that the what and the why are the same, and definition indicates the what it is, and demonstration indicates the why, in order to prevent someone from taking definition and demonstration to be the same thing, he is compelled to first present the difference between these. He went back to what is more general, to deduction. For if he were to show that definition and deduction are different, and that the definable and the deducible are different, it follows that demonstration and definition must be different, and that the definable and the demonstrable [must be different], for demonstration is a kind of deduction. So after he asked and presented difficulties concerning whether it is possible to know one and the same thing both through definition and through demonstration, inasmuch as the same thing is at the same time definable and demonstrable, he adds the response, ‘On the contrary, this is impossible’.68 And he presents the following first figure syllogism: definition signifies the what it is, every ‘what it is’ is universal and affirmative, therefore every definition is universal and affirmative. But not all syllogisms are universal and affirmative, for those in the second figure are negative and those in the third [figure] are particular. He presents the following second figure syllogism: Every ‘what it is’, that is, definition, is universal and affirmative, but not every syllogism is universal and affirmative; therefore not every syllogism indicates the what it is.

90a38 Let the beginning of the things to come [be the beginning that is most appropriate to the neighbouring discussions. For then someone might offer a difficulty: is it possible to know the
same thing, in the same respect, by a definition and by a demonstration? Or is it impossible? For definition is apparently of the what it is, but in every case the what it is is universal and affirmative. But some syllogisms are privative, and some are not universal. For example, all of those in the second figure are privative, and those in the third figure are not universal.

On one alternative, understand ‘the neighbouring [discussion]’ as ‘the preceding discussion’ and [the text] is understood as follows: ‘Let the beginning of the things to come’ that are said about definition and demonstration be that which is appropriate to the neighbouring discussion, that is, the preceding discussion. [If this alternative is accepted] the text makes the most sense. For in what precedes he said that the what and the why are the same. Alternatively, understand ‘the neighbouring’ [discussion] as the [matters] that are going to be discussed next. So, [on this interpretation] he says, ‘let the beginning of the things that are about to be said about definition and demonstration be appropriate to the things that will be discussed next’. For, prior to investigating what is definition and of what things [there is definition] and whether there is demonstration of it, he first investigates whether the definable and the deducible are the same, and whether definition and deduction are the same.

90b7 Next, there is not [a definition for all] of the affirmatives in the first figure, for example, that every triangle has [angles] equal to two right [angles]. The reason for this is that to have scientific understanding of that which is demonstrable is to have a demonstration, so if for such things69 there is a demonstration, it is clear that there would not also be a definition of them. For someone might have scientific understanding of them by a definition, even though he does not have the demonstration.

Having shown that syllogisms in the second and third figure are not definitions, he shows that the affirmative syllogisms in the first figure are not definitions either, because syllogism shows that some attribute belongs in some subject, for example, having three angles equal to two right angles belongs to triangle. He proves this through the middle term ‘are equal to the two adjacent [angles]’.70 But definition shows not that some attribute belongs to some subject but <it shows> an essence of a single subject. For we call [the figure] enclosed by three lines a triangle. But if someone says ‘How is it that you say that a definition indicates an essence? For it also indicates an accident, for example, “pale is a colour that disperses the sight” ’,71 we respond that ‘pale is a colour that disperses the sight’, too, indicates the species of pale, but ‘species’ signifies a nature and essence, for every existence is called an essence.
But the ‘reason for this’, that definition and demonstration are
different is that ‘to have scientific understanding’ of that which is
demonstrable is nothing other than ‘to have a demonstration’, or in
other words, to know it through demonstration.

So ‘if for such things’, namely, demonstrable things, ‘there is a
demonstration’ which establishes these things, it is clear that there
will not be a definition of them, that is to say, we will not know them
through definition. For if we were to grant that something demon-
strable is known through definition, someone would have scientific
understanding of that which is demonstrable through definition, but
not through demonstration, which is impossible.

90b13 For nothing prevents [him] from [having them] not at the
same time. [There is sufficient evidence for this by induction.
For we have never known by defining – neither of the things
that belong per se nor the accidents.]

This is a solution to an objection and a difficulty. Perhaps someone
might ask, ‘isn’t it possible to know the same thing through definition
and demonstration?’ For to solve the difficulty, he says ‘For nothing
prevents him from having knowledge of one and the same thing
through definition and <through> demonstration, but not at the
same time’, that is, in the same way, but <in the one case> for one
reason and <in another case> for another reason. For even if an
eclipse is observed in the moon, nonetheless we are able to separate
it [i.e. the eclipse] from it [i.e. the moon] and to take it by itself, in our
conceptualization alone. We will know it to be a blocking by the earth
through definition. But if we study72 the eclipse as being in the moon,
we will, through demonstration, demonstrate that it belongs to the
moon. It is likewise possible to know equilateral triangle through
both definition and demonstration, but in one way here and in
another way there. [It is possible to know it] through definition, when
I say ‘an equilateral triangle is the [triangle] consisting of three equal
sides’. It is also possible to demonstratively prove that it has three
equal sides, in this way: whenever two circles cut one another, having
been drawn through [each other’s] centres, and share a radius,73 then
the triangle that is made up of the radius74 and the two straight lines
that are drawn from the intersection to the centres is equilateral, for
the straight lines that are produced from the centre are equal to each
other.75 [See figure opposite.]

It is possible to make this plausible and to confirm it through
induction as well. For we have never known through definition any
of the things that belong in something per se or accidentally, that is,
any of the demonstrable things. For the spherical shape is in the
moon per se,76 and to be eclipsed [is in the moon] accidentally.
Another point is: if definition is something by which one comes to know a substance, [clearly such things will not be substances.]

Clearly, there is not definition of everything of which there is demonstration. Well, is there or is there not demonstration of everything of which there is definition? Now one argument concerning this is the same [as before]. For there is one [kind of] scientific understanding of one thing, insofar as it is one. So if to have scientific understanding of that which is demonstrable is to have a demonstration, something impossible will result. For the one who has the definition will have scientific understanding without a demonstration.]

In other words, if definition indicates a substance, but ‘such things’, demonstrable things, are ‘not substances’ but are attributes studied in some subject, it follows that demonstration is not definition nor is what is demonstrable known through definition.

So it is clear that it is not possible to know what is demonstrable through definition as well. Then he goes back and converts [the question] and investigates ‘Well, is it or is it not also possible to know through demonstration that which it is possible to know through definition, namely, what is definable?’ So he says, ‘Now one argument concerning this is the same as before’. For just as we proved that it is not possible to know what is demonstrable through definition, so it will be proven that what is definable cannot be known through demonstration, by assuming as a matter of agreement that for every single thing, insofar as it is one, there is a single science and kind of knowledge, either that which is through definition or that which is through demonstration. So if ‘to have scientific understanding of that which is demonstrable’ is to know it through demonstration, [then] if the definable and the demonstrable are the same, ‘something impossible will result’: that ‘the one who has the definition’, that is, the one
who knows something through a definition, ‘will have scientific understanding’ of it ‘without a demonstration’, which is absurd.

90b24 Another point is that the principles of demonstrations [are definitions, and it has been proven earlier that there will be no demonstrations of these. Either the principles will be demonstrable, and there will be principles of principles, and this will go on indefinitely, or the primary items will be inde- monstrable definitions.

But, if the things that are defined and the things that are demonstrated are not all the same, is there nonetheless anything of which there is both a definition and a demonstration? Or is this impossible? For definition is of the what it is and the essence. But all definitions apparently hypothesize and assume the what it is, for example, mathematical demonstrations [hypothesize and assume] what is the monad and what is the odd, and the others, likewise.]

5 If definitions are principles of demonstrations and principles are indemonstrable, it follows that definitions too will be indemonstrable. But if definitions are demonstrable, it is necessary to assume things different from the definitions that are more of the nature of a principle (at least if all demonstration comes about from certain principles and primary items) and something else which is prior to them, and so indefinitely. But if it is not possible to assume principles since one always discovers things more of the nature of a principle, demonstration is eliminated and there will be no [such thing]. Now if there is going to be demonstration, the things that are first and at the beginning, the definitions, must be indemonstrable. And if these are indemonstrable, it follows that definition and demonstration are different. But if they are different, how will it be possible to know the same thing through both definition and demonstration? Then he raises a new difficulty: if it is not possible for everything that is knowable by means of definition to be known through demonstration as well, will there be anything which must be known through both definition and demonstration, with the result that the same thing is both definable and demonstrable? He says, ‘Or is this impossible?’ for it is not possible for there to be a demonstration of a definable. For definition establishes the what it is and the essence of the thing, but demonstrations and all the mathematical [sciences] ‘hypothesize and assume the what it is’ as a matter of agreement, but they do not also demonstrate it. For example, geometry assumes as a matter of agreement that the point is that which has no part and that a line is breadthless length, and arithmetic [assumes as a matter of agreement] that the monad is the principle of number.
Further, every demonstration proves that one thing [belongs] to another, [for example, that it is or that it is not. But in definition one thing is not predicated of another. For example, animal is not [predicated] of biped, nor is this [predicated] of animal, nor is shape [predicated] of plane. For plane is not shape, and shape is not plane. Further, to prove what it is and that it is are different. For definition indicates the what it is, but demonstration [shows] that this is or is not of that.]

This is yet another argument showing that definition is different from demonstration. He says that every demonstration proves either something affirmative or something negative, but none of the things that are present in a definition are predicated or denied of another. For in ‘animal terrestrial biped’ ‘animal’ is neither predicated nor denied of ‘biped’, nor vice versa. And, again, the definition of triangle is ‘plane figure’. Well, figure is neither predicated of plane, nor vice versa. Therefore a definition is not a demonstration.

Another point is that ‘definition indicates the what it is’, that is, the essence of a thing. But demonstration [indicates the fact], that is, it does not establish an essence, but it proves that this attribute, having the three angles equal to two right angles, does or does not belong to triangle.

The demonstration of something different is different ...

Here he takes the knowledge [in question] to be demonstration. Now if there are different kinds of knowledge for things that are different and distinct, and different things are definable and demonstrable, and that which is definable is known through definition and that which is demonstrable through demonstration, it follows that definition and demonstration are different.

Unless it is [related] as a part [to the whole. I mean this, that it has been proven that the isosceles [has] two right [angles], if it has been proven that every triangle does. For the one is a part, and the other is a whole. But these things, the fact and the what it is, are not related in this way. For the one is not a part of the other.

So clearly, there is not a demonstration of everything of which there is a definition; nor is there a definition of everything of which there is a demonstration. Nor, in general, is it possible to have both of the same thing. So it is clear that definition and demonstration are not the same thing, nor is the one present in the other. For the subjects would be related in the same way. Let us have gone through the difficulties up to this point.]
This is a solution to an objection. For perhaps someone might have raised an objection and said 'How can you say that there are different kinds of knowledge for different things?' Notice that isosceles and triangle are different. But we know that triangle has two right [angles] in the same manner as we know that an isosceles [triangle] too has this property, and we know them by the same demonstration. As a solution to the objection he says 'even if these are different things, nonetheless triangle is a whole and isosceles is a part, and for this reason they have one demonstration'. For this attribute belongs to triangle per se, and it belongs to isosceles since [it belongs] to triangle; 'but these, the that it is and the what it is, are not related' as whole and part. It is for precisely this reason that we know that which is definable through definition and that which is demonstrable through demonstration, for there cannot be both demonstration and definition of one and the same thing, the definable, nor is it possible for that which is demonstrable to be known through both definition and demonstration. Therefore demonstration and definition are not the same, nor is one comprehended by the other, for if they were the same, definable and demonstrable things, which are the subjects, would be the same.

But let this be how we have gone through these difficulties, [to the effect] that definition and demonstration are not the same. In other words, let these things have been proven from having gone through the difficulties dialectically and at a general level. For very general dialectical arguments are said to be [a matter of] working through difficulties, for working through difficulties is proper to the dialectician. For example, if it is proposed [as a matter for dialectical argument] that pleasure is a good, since it is possible to try to prove either side, that is, to use arguments to show that it is a good and to use some to show that it is not a good, for this reason one might encounter a difficulty concerning whether he ought to declare that pleasure is a good or rather that it is not a good.

[Chapter 4]

91a12 Is there a syllogism [and demonstration] of the what it is, [or is there not, as has been assumed by the present argument?] He proposed investigating different things throughout the treatise. First, 'is it possible <to demonstrate> that this is a definition of that?' Next, 'how is it possible to reduce this [definition] to demonstration?', and then 'what is definition?', and likewise 'of what things is there definition'? But prior to the investigation of these things he investigated whether definition and demonstration are the same. Having proven that they are different he investigates what he first proposed. And having asked whether it is possible to demonstrate that this is the definition of that, he answered, 'no, it is not'.

346,1
For a syllogism [proves that something [belongs] to something through the middle term. But the what it is is a property, and it is predicated in the what it is. These must convert.]

Before undertaking the investigation of what we mentioned, he assumes two lemmas useful for demonstrating what was proposed. One deals with syllogism; it is that every ‘syllogism proves that something [belongs] to something through’ a ‘middle term’. The other lemma deals with definition; it is that ‘the what it is’, that is, the definition, expresses a ‘property’ of what is defined, ‘and is predicated of it in the what it is’. If these things, [being] a property and being predicated in the what it is both come together in one and the same definition, the definition can convert with what is defined and what is defined can convert with the definition and they can be mutually predicated of each other. In this way ‘animal rational mortal’ is both a property of human being (for it is [predicated] of it alone) and is predicated in its what it is, for when someone is asked what a human being is, he answers ‘animal rational’ etc. But ‘capable of laughter’ is a property of human being and is mutually predicated [of it], but it is not a definition, because it is not predicated in the what it is. ‘Substance living able to perceive’ is predicated in the what it is of human being, but it is not a definition because this by itself is not a property of it.

For if A is a property of C ...

If you were to take the received text as [a sentence] completed at ‘convert’, the ‘for’ here is to be taken in the sense of ‘and’ or ‘then’. But if you take it as completed at ‘is predicated in the what it is’, you need to take the ‘for’ [clause] as giving support for what precedes it. But this must be first considered: if someone is going to demonstrate that A is the definition of C through the middle term B, he needs to assume that both A and B are definitions. Let A be biped terrestrial animal; let B be mortal rational etc. animal, and let C be human being. For there is no other way that it can be proven that A is the definition of C, unless the middle term is also taken as a definition, for a definition is a principle of demonstration.

These must convert. [For if A is a property of C, clearly it is a property of B too, and this of C, so that all are [properties] of one another. But if A belongs in the what it is of every B, and B is universally said of every C in the what it is, A too must be said in the what it is of C. But if someone were not to take them in this way, as doubled, A need not be predicated of C in the
what it is, if A belongs to every B in the what it is, but [B] is not
in the what it is for all of the things to which B [belongs]. But
both of these will have the what it is. Therefore B will be
[predicated] of C as the what it is. So if both have the what it is
and the essence, the essence will come before, in the middle
term. And, in general, if it is possible to prove what is a human
being, let C be human being, A the what it is, whether biped
animal or something else. So if it will be syllogistically deduced,
A must be predicated of every B. There will be another account
that is a middle term for this, so that this too will be what is
a human being. So it assumes what it was necessary to prove.
For B too will be what is a human being.]

If it is to be going to be proven that this is the definition of that,
‘these’, the things that are going to be assumed in its demonstration,
‘must convert’, that is, they must be definitions. ‘For if A is a property’
and definition of C, it is clear that A will also be a definition of B, ‘and
this’, B, a definition ‘of C’, so that all of the terms must convert and
be mutually predicated. And ‘if A’ is ‘in the what it is’, that is, if it is
a definition, and is predicated of every B, and if B is predicated of C
as a definition, A must also be ‘in the what it is’, that is, the definition
of C. Unless one should double [things] in this way, that is to say,
unless one should assume two definitions, for both A and B, he will
never demonstrate that A is the definition of C. This is because for
every demonstration a definition will be taken as the middle term, as
you will learn. For if A is predicated of B as its definition, and B is
not predicated as the definition of all of the things of which it is
predicated, that is, of C, there will be no demonstration of A in
respect to C. Now ‘both of these’, that is, both premises, A and B,
ought to contain the what it is and the definitions. So if both are the
what it is, that is, the essence, and [both] are definitions, the one who
proves that A is the definition of C will beg the question, which would
be absurd. For while he sought to demonstrate that A is the definition
of C, for the middle term he assumed the essence, that is, a definition
of C, as a matter of agreement, prior to the demonstration. It follows
that it would be superfluous to prove that A is the definition of C. For
there is a single definition for every definable thing, and he assumed
this in the minor premise. Therefore there is no demonstration of
definition.

‘In general, if it is possible to prove’ the ‘what it is’, that is, the
definition of human being.

For this, B, there will be another definition that is a middle
term, rational animal. So what needed proof, what he sought, he
assumed prior to the demonstration, when he said that B is the
definition of C.
91a33 [We] must [inquire] into the case of two premises, that is [premises that are] primary and immediate. For [in that case] what was said [to occur] is especially clear.

Some people who tried to demonstrate that A is the definition of C, by assuming a definition as the middle term too, and so begged the question while being unaware of it, mixed together the properties of human being, being capable of laughter and walking upright, in both the major and the minor premise. So one ought not assume these properties in a way that bridges the premises but he ought to assume that A holds immediately of B and B of C. This allows it to be 'clear' that there occurs 'what was said [to occur]': begging the question.

91a35 Surely those who prove through conversion [what is soul or what is a human being, or anything else whatsoever among things that are, beg the question, for example, if someone were to hold that soul is itself the cause of its own life, and this is number itself moving itself. For one must assume that soul is precisely self-moving number, in such a manner that they are the same. For it is not the case that if A follows B and this [follows] C, A will be the essence for C.]

Having proven that there cannot be a demonstration of a definition, even if there are definitions in the major and middle terms, he now proves that, even if you were to take converting accounts, this is not how you will demonstrate that this is a definition of that. For in this way too you beg the question. In this way Xenocrates, who wanted to prove that number itself moving itself is the definition of soul, took as a middle term [what is] ‘itself the cause of its own life’. But these terms convert. For if something is soul, this is itself the cause of its own life, and if something is itself the cause of its own life, this is also soul, for [the terms] are employed as being the same. And likewise, if something is soul, it is number itself moving itself, and if something is number itself moving itself, it is soul. Also, if something is itself the cause of its own life, it is number itself moving itself, and vice versa.

For just as he begs the question who infers that pain [belongs to] no joy, as follows: pain [belongs to] no pleasure; but pleasure [belongs to] every joy; therefore pain [belongs to] no joy, because pleasure and joy are the same things, so that what he assumes is the same as that of which there is demonstration, so too what is itself the cause of its own life is the same as soul, so the person who says that number itself moving itself belongs to everything that is itself the cause of its own life says nothing other than ‘number itself moving itself belongs to soul on the grounds that it is the same thing (since what is itself the cause of its own life is the same as soul)’.
91b3 But it is true to say [only that [A] will be [C] …]

That is, it is true to say that ‘number itself moving itself’ follows soul and belongs to it, however it is not also its definition.

… but even if A is precisely what something is [and it is also predicated of every B], this is not so. For the being of animal is predicated of the being of human being (for it is true that every [instance of the] being of human being is the being of animal, as every human being is an animal too), nonetheless, [they are] not [predicated] in such a way that they are one thing. Now if you do not assume [things] in this manner, you will not syllogistically deduce that A is the essence, that is, the essence for C. But if you assume [things] in this manner, you will have already assumed what is the essence for C, so that it has not been demonstrated, for it was assumed at the beginning.

He takes up substances in order to support what he has to say, because the discussion concerns definitions, and these are of substances, not accidents. So he says: ‘if you were to take A to be animal or the definition of animal: “substance living, able to perceive”, and B to be human being or the definition of human being …’ He chooses [the idiom] ‘precisely’ instead of ‘essentially’. So he says ‘just as animal or its definition is predicated as ‘precisely’ [what something is], that is, essentially, of every human being or of the definition of human being, ‘nonetheless they are not predicated in such a way that they are one thing’, that is, so that animal or the definition of animal is the definition of human being.

But unless you assume converting terms in this way, it begs the question. For when investigating whether ‘number itself moving itself’ is the definition of soul, prior to the demonstration, you assumed as a matter of agreement that B, what is itself the cause of its own life, is the essence, that is, the definition of C.

[Chapter 5]

91b12 But the procedure that employs divisions does not deduce either [as was stated in the analysis concerning the figures. For it is in no way necessary that there be that fact when those things are the case.]

The followers of Plato tried to syllogistically deduce and demonstrate that this is the definition of that by means of the method of division, by saying that if definition is made up of a genus and constitutive differentiae, then, if we should prove through division that both animal and each differentia, namely, terrestrial and biped, belong to
human being, it follows that we will have also demonstrated that ‘animal terrestrial biped’ is the definition of human being.\textsuperscript{106} For they tried to argue in this way: a human being is either animal or inanimate.\textsuperscript{107} But he is an animal, therefore he is not inanimate. And again, a human being is an animal; every animal is either terrestrial or winged or aquatic; therefore a human being is terrestrial, and is surely not winged or aquatic. And again, a human being is an animal, but every animal is either a polyped or a quadruped or a biped; therefore a human being is a biped. So when they had proven in this way that each of these belongs to human being, they said that they have demonstrated that the whole too, namely, ‘animal terrestrial biped’ is the definition of human being. But, by assuming that which is proper to a deduction and by presenting a second figure syllogism, Aristotle proves that they too fail to deduce and demonstrate.\textsuperscript{108} He assumes that the property of a syllogistic deduction is for ‘the fact’ to come about, that is, for the conclusion to be necessarily inferred from the premises that are posited and have been assumed. But those who demonstrate by means of the method of division that animal or terrestrial or the whole definition belongs to human being do not infer [that] these things [hold] by necessity from the [premises that are] posited, since someone who wants to investigate why a human being is an animal or terrestrial has the occasion [to do so].

\textit{91b15} Rather, [it does not deduce] just as someone doing induction does not [demonstrate].

Just as the one who proves by induction from particulars does not demonstrate the universal\textsuperscript{109} (for it’s not the case that, if a human being and a horse move the lower jaw, every animal too must move its lower jaw), likewise the definition cannot be syllogistically deduced through division.

\textit{91b15} For one must not ask [whether] the conclusion [holds], [nor does it depend on conceding that it is the case, but when those things are, it must be, even if the one who is answering denies it. Is a human being an animal or inanimate? If he assumed ‘animal’ it has not been syllogistically deduced. Again, every animal is either terrestrial or aquatic. He assumed ‘terrestrial’. And that human being is the whole thing, ‘animal terrestrial’, is not necessary from the things that have been said, but he assumes this too.]

In other words, in all cases in which a certain conclusion is inferred by means of a syllogistic deduction and demonstration, there is no place for the one who wishes to ask why the conclusion has been inferred, nor is there place to either grant and agree with the inferred
conclusion or to not accept it. For since it has been inferred by necessity, everyone, even if he is unwilling, will accept it. But this is not so in the case of [the method of] division; rather, it is possible for someone who wishes to ask why a human being is an animal, why he is terrestrial, and if he is willing, he will accept these things, but if not, he will not agree.

Next he describes how they proved these things by means of division.

91b21 It makes no difference whether [this is done] in many [steps] or in few, [for the same thing occurs. (For the use [of division] by those who proceed in this way, even in matters that admit of being deduced, is nondeductive.)]

Since what he took [as an example of] a definition of human being happened to have two differentiae, terrestrial and biped, he says that even if you were to take a definition which has more differentiae, just as you assumed the first differentiae without deducing them, so in the case of many differentiae, as well.111 So, for ‘those who proceed in this way’, that is, for those who try to demonstrate and deduce definitions by means of the method of division, ‘the use’ of division ‘is nondeductive’, that is, it is incapable of deduction. And not only will it not deduce the immediate premises which do not have a nature permitting them to be proven, but he will not deduce those that do admit [proof] and can be proven by means of a deduction. For [the fact] that a human being is terrestrial will be proven through the middle term ‘capable of walking’, and that he is a biped will be proven through the middle term ‘upright by nature’, but division is not able to deduce these things.

91b24 For what prevents this from being true [of human being, though it indicates neither the what it is nor the essence]? The ‘for’ must be taken as meaning ‘and’. For [the clause] is there to support not what was previously taken up but a different argument. So he says that even if we were to grant that each part of the definition ‘animal terrestrial biped’ is truly predicated of human being, and likewise the whole definition, nonetheless it is not necessary that it be said of it as a definition. For not every account that is truly said of something is thereby also its definition. For it is possible to posit an account made up of accidents, such as ‘animal walking-upright flatnailed’, and to truly predicate it of human being, but it is not its definition. Further if you took terrestrial on its own and biped on its own and you truly predicated these of human being, it does not follow that when taken together they can be truly predi-
cated of human being. For not all of the things that are truly predicated by themselves can also be truly predicated when they are taken together. For ‘leatherworker’ and ‘good’ will be truly predicated of Simon on their own, but that is impossible when they are taken together.\textsuperscript{118}

**91b26** Further, what is to prevent either adding something or taking something away [or having skipped something in the essence]? If you take these [words] in reference to what was said about definition just above, they will be taken as in support of those [points]. For since he said that the account that has been compounded is truly said of what is defined yet is not its definition, he puts forward some ways in which it is possible for that which is truly predicated of something to not be its definition. For, he says, in ‘animal rational mortal receptive of intellect and scientific understanding’ ‘what is to prevent adding something’ to the essence, such as an accident that goes beyond what essentially belongs in the definition, for example, literate or capable of laughter?\textsuperscript{119} For when the definition given has taken on one or the other of these it ceased to be a definition. Likewise if you were to take away one of the things that essentially belong in the definition and say ‘rational animal’, this is not a definition since it indicates not only human being but other things too.\textsuperscript{120} Likewise if you were to skip the intermediate [terms] and say ‘animal receptive of intellect and scientific understanding’ this too is not a definition. For the definition must [be composed] of more differentiae.\textsuperscript{121}

**91b28** These points are ignored … That is, they ‘are ignored’,\textsuperscript{122} and it happens that ‘these things’ (addition, subtraction, and skipping), which are faults occurring in definition, do occur in definition.

**91b28** … but it is possible to come to a solution [by taking everything in the what it is and making the division consecutive by postulating that which is primitive, and leaving nothing out. This is necessary.\textsuperscript{123}]

That is, [it is possible] to teach the ways by which this fault [observed] in definition will be solved, and by which there will occur in it neither addition nor skipping nor subtraction. Addition will not occur if you, sequentially and in turn, take all and only the essential characteristics and those that are posited in the division. For first animal is posited. You will in turn divide this into rational, and rational into mortal and so on in order. If you take these sequentially
in the definition, as they are posited in the division, you would avoid skipping. Likewise you will not leave something out, if you take the first [item], animal, and then 'leave nothing out' of what is essentially present in that which is defined.124

30 ‘This is necessary’, or in other words, if you take in the division all of the things that essentially belong in the defined, you will discover these things and take them in the definition. And this, leaving out of the definition none of the things that we mentioned, will necessarily result.

352,1 This, the avoiding of all these three things in division, is the necessary result if altogether all things that are must fall within the division. ‘This’, that everything falls within the division, is necessary.

91b32125 For it must be indivisible.126 [Nonetheless it is not a syllogistic deduction …]

5 That is to say, if you take in the definition all of the things that constitute the definition, you will make definition indivisible, that is, fitting the defined alone and nothing else.127 But even if the definition is on a firm footing and without blame, since it avoids its faults, nonetheless it is not a syllogistic deduction.

Now these remarks have been construed as concerning definition.

10 But if you were to take ‘Further, what is to prevent either adding something …?’ as a different argument, you will construe his words in this way: since the doctrine that definition is demonstrated through division had to do with division, he is now saying that even if division does contribute to the discovery of a definition, it nonetheless does not contribute to its being syllogistically deduced, but it could well be that there has been some mistake and that the division was not well conducted.128 But if division did not proceed well and in a manner free from reproach, it will not contribute to the discovery of the syllogism. Now, addition occurs in division when, in the process of dividing, you take not only the essential and formal differences but the material and accidental [differences].129 For if you divide animal into clawed130 and flat nailed, then you take the material differences, into which not every animal falls. For fish and snakes are neither of these. And again, if you divide animal into male and female, you do not include all animals, for there is no male and female among eels.131 Something is said to be left out when you do not take in the division all of the things that have been distinguished from one another, but you divide animal into terrestrial and winged, and leave out aquatic. Skipping occurs if you will divide animal into footed and footless. For you skipped terrestrial. For you should have first divided animal into terrestrial, winged, and aquatic, and then terrestrial into footed and footless.

‘For it must be indivisible’. He says this as though he were speak-
ing to someone who is as it were bringing up a difficulty concerning how far the division should proceed and then stop. And he says: 'when you are dividing if you should descend to something indivisible, for example, if it is that which is receptive of intellect and of scientific understanding, and that cannot be divided into other species, then one should stop the division. But even if the division were to proceed in a manner without blame and a definition were to proceed from this, nonetheless this will not be a syllogism, that is, he did not discover the definition by means of a syllogism.

91b33 But if it makes one come to know at all, it does so in some other manner. [And this is nothing strange. For presumably the one who does an induction does not demonstrate, but he nonetheless indicates something. For the one who relates a definition on the basis of division does not relate a syllogistic deduction. For just as in the case of conclusions without middle terms, if someone were to say that when these things are, that must be, one could ask 'why?' so in the case of definitions from division. What is a human being? 'Animal mortal footed biped wingless'. At each addition: 'why?' For he will declare, and, as he thinks, will prove by division that everything is either mortal or immortal. But the whole account is not a definition, so even if it should be demonstrated by division, nonetheless the definition is not a deduction.]

This [phrase] should be construed in this way: but if it really is the case that division 'makes one come to know' and constitute the definition and does instil in us knowledge of the parts within it, it makes one come to know it not by means of syllogistic deduction but by virtue of 'some other manner' of knowledge. For we do not always know the things that are unknown by means of syllogistic deductions, but [we also know them] by means of definition or by means of analysis or by means of division.

'And this', that knowing is not always by means of a syllogistic deduction, 'is nothing strange', since the one who makes use of induction demonstrates and instils in us knowledge of the universal, by means of the particulars.

'But he nonetheless indicates something', namely, the universal, 'but the one who relates' and infers it 'on the basis of division does not relate a syllogistic deduction', that is, does not establish a definition by means of a syllogistic deduction.

For just as in the case of conclusions [reached] <without middle terms, that is,> inferred <through middle terms> which are not causes, 'if someone were to say that when these things are' that is to say, when the premises are [true], 'that', the conclusion, 'must be [true]', for example if he were to infer that the moon is eclipsed
through the middle term ‘not shining’ or that thunder has occurred through the middle term ‘noise’ (for noise is not the cause of the thunder, nor is not shining the cause of the eclipse, but the blocking is the cause of the one, and the quenching of fire is the cause of thunder), there is an opportunity for the listener to ask why it eclipses or thunders, ‘so in the case of definitions from division’, that is, the definitions that have been discovered from division. For example, if the definition of human being is ‘animal mortal footed biped wingless’, it is possible for the listener to ask [a question] when presented with each addition, that is, each part of the definition. For example, why is [animal] mortal, or footed? ‘For’ the one who divides

‘will declare and as he thinks, will prove that every’ animal ‘is either mortal or immortal’, but a human being is mortal; therefore [a human being] is not immortal. But since [the one dividing] does not grasp these things in a deductive manner, [the questioner] will ask him, ‘why is a human being mortal and not immortal?’ ‘But the whole account’ that is assembled from division ‘is not a definition’. For even if one has been demonstrated from division, nonetheless ‘the definition is not a deduction’, that is, it was not discovered by means of a deduction.

[Chapter 6]

92a6 But is it possible to demonstrate the what it is [in respect to the essence] …?

‘What it is in respect to the essence’ refers to the formal definition. For this alone establishes the form and the essence of that which is defined since it includes the essential differentiae, as ‘animal rational mortal’ does. For it is possible to render the what it is and the definition but not ‘in respect to the essence’, that is, [a definition] which is not indicative of the nature and the essence of what is defined, since it is constituted out of accidents. This would happen if someone were to say that a human being is an animal [that is] walking upright flat-nailed [and] literate.

92a7 … but by assuming by way of hypothesis [that the essence is the property that is made up of the items in the what it is, and that only these things are in the what it is, and that the totality comes from the properties? For this is its being. Or, again, has he assumed the essence in this, too?] Do not understand ‘by way of hypothesis’ as [meaning] ‘from a hypothetical syllogism’ but ‘by assuming a certain hypothesis’. A hypothesis is that which the learner must possess not on his own but by virtue of taking it from the teacher. For example, in geometry
there are ‘it is possible to draw a straight line from any point to any point’\textsuperscript{142} and ‘it is possible to describe a circle with any centre and radius’.\textsuperscript{143} So one should assume as a hypothesis that ‘the essence’, that is, the definition, has this definition: that which ‘is made up’ of the properties ‘in the what it is’. For definition is constituted out of the properties that essentially belong to that which is defined, as is ‘animal mortal rational’. For we also have certain properties that do not contribute to the essence of that which is defined, such as ‘capable of laughter’ and ‘walking upright’.\textsuperscript{144} So a definition of definition is ‘an account that is made up of the properties in the what it is’. ‘But only these things’, namely animal, terrestrial, [and] biped, ‘are in the what it is’, that is, they come from the properties in the what it is. This is the minor premise. And ‘the totality’, ‘animal terrestrial biped’, is the definition. This is the conclusion. For ‘this’, the account that ‘comes from the properties’ in the what it is, is the ‘being’, that is, the definition, of that, of definition. So if someone trying to prove the definition through a syllogism were to take as a middle term the definition of definition and were to present the following syllogism: ‘animal terrestrial biped’ is an account that is made up of the properties in the what it is, but the account that is made up of the properties in the what it is is a definition, he has again assumed [the conclusion] from the beginning. For he has assumed as agreed upon the thing that he was seeking. For to say that ‘animal terrestrial biped’ is an account that is made up of the properties in the what it is is to say nothing other than ‘it is the definition’.

92a10 For it is necessary to prove [it] through the middle term. That is, it is necessary to take as a middle term not the definition of definition but something else.

92a11 Further, just as in a syllogism [what it is to have been syllogistically deduced] is not assumed ...

All of the ways by which some people tried to demonstrate definition he subjected to a common criticism: that they begged the question. But this argument established the reason why those people did not do well when they tried to prove the definition by assuming as a middle term the definition of definition. Now he says that there are many ways by which the things that are unknown are revealed to us. We know that which is unknown through either the method of division, definition, demonstration, analysis or syllogistic deduction. Now in none of these methods is there assumed the definition of that method by which we knew the unknown. He leaves aside [the task of] proving this in regard to all of the methods, and takes up the method of syllogistic deduction alone. He says: ‘just as when we
syllogistically deduce that a human being is a substance we take animal as a middle term and we say “a human being is an animal, an animal is a substance”, and the definition of syllogism is present in neither of the two premises, likewise the one who demonstrates that this is the definition of that does not need to take as a middle term the definition of definition’.

92a12 … for [the proposition on the basis of which the syllogism [is completed]] is always a whole [or part],

By saying ‘whole’ he referred to the major premise, since it comprehends the minor, and by saying ‘part’ he referred to the minor [premise] since it is comprehended by the major. Now there are two premises ‘on the basis of which the syllogism’ is completed.¹⁴⁵ Now the definition of syllogism, which is ‘an account in which, when some things are posited …’¹⁴⁶ is present in neither of these two.

92a13 … likewise the essence must not¹⁴⁷ [be in the deduction, but this must be separate from the things that are posited, and one must counter anyone who disputes whether or not something has been syllogistically deduced by saying this: ‘for this is what a deduction is’, and one must counter the one who says that the essence has not been syllogistically deduced by saying ‘Yes it has, for this was posited by us as the essence’. So something must be syllogistically deduced without [the assumption of] what deduction or the essence is.]

In other words, the definition of definition [‘must not’] ‘be in’ or be assumed in ‘the deduction’ that proves that this is a definition of this.

‘But this must be separate’, that is to say, the definition of definition or the definition of syllogistic deduction must be outside of the premises that are posited and are assumed. ‘One must counter’ and defend oneself against ‘anyone who disputes’ this and objects that this syllogistic deduction did not correctly proceed or that ‘you did not demonstrate that this is the definition of that’, by [saying] ‘this’, ‘my deduction was correct’. ‘For this is what a deduction is’: ‘an account in which, when some things are posited something different from the things that are posited is inferred by necessity’.¹⁴⁸ Alternatively, one [must counter the other and say in defence] that he correctly demonstrated that this is the definition of that. For definition is a summary account establishing the nature of a thing on the basis of the things that belong essentially to it.¹⁴⁹

So deduction must come about without assuming the what it is and the definition of deduction, and demonstration that this is the definition of that must come about without assuming the definition of definition.
92a20 [This is so] even if one were to prove on the basis of a hypothesis, [for example, if to be bad is to be divisible, and, for all of those things that have a contrary, the being for the contrary is to be contrary,\textsuperscript{150} and the good is contrary to the bad and the indivisible to the divisible, then to be good is to be indivisible.]

Since there were some who tried to demonstrate that this is a definition of that by means of a hypothetical syllogism, he refutes them too, on the grounds that they beg the question. He gives an example of how they tried to prove the definition by means of a hypothetical syllogism. Since the good and the bad are contraries, and the definitions of contraries are contrary (as [the definition] of pale is ‘a colour that dilates the ray of sight’, while that of black is ‘a colour that contracts the ray of sight’\textsuperscript{151}) they proved that the definition of the good is the indivisible, as follows: if the bad is contrary to the good, and the definition of the bad is the divisible,\textsuperscript{152} it follows that the definition of the good will be the indivisible. And the bad is called divisible as is seen in [cases of] excess and defect. For both rashness and cowardice are something bad, but the good is indivisible, because it is observed in the mean, and there is a single mean,\textsuperscript{153} and that which is one is indivisible.

‘For the contrary’, that is to say, for the good, the being, that is, the definition is to be contrary, that is, [to be] indivisible. This is because ‘for all of those things’ in which there appears ‘a contrary’, that is, a certain contrary state, the definitions of these [contraries] are also contrary.

92a24 For here too [he proves] by assuming [the essence.]

This, that it too begs the question, is the fault [observed] in the hypothetical syllogism. For here too, in the hypothetical syllogism, one proves that the indivisible is the definition of the good ‘by assuming the essence’, that is, the definition, of the bad, and this is the very thing that is unclear and unknown. For how would it have become clear that the divisible is the definition of the bad? Now the one who proves the unclear by means of the unclear begs the question. For there are many ways to beg the question.

92a25 ... and he assumes it in order to prove the essence. [‘But [what he assumes] is something different’. That may be so. For even in demonstrations one assumes that this [belongs to] that, but not [that which is demonstrated] itself ...]

This is how he meets the objection. For perhaps someone raised an objection saying ‘Why do you criticize the one who proves that the indivisible is the definition of the good on the basis of the assumption
that the divisible is the definition of the bad? Isn't it necessary in
demonstrations to assume certain things by which we demon-
strate that which is investigated? So to meet this objection he
says: in the demonstration of the essence, that is, the indivisible
as the definition of the good, it is necessary to assume something,
but not the same thing as that put forward in advance as under
investigation, but something different. But now this person
begged the question, because when he tried to prove that the
indivisible is the definition of the good, he assumed in its demon-
stration nothing other than the definition of the bad. So, since
what was under investigation was whether the definition of the
good is the indivisible, whether the definition of the bad is the
divisible is accordingly under investigation and unknown. For
both definitions include the same formula and are analogous, and
this is why they are both unknown.

‘For even in demonstrations’, in which we demonstrate that this
attribute belongs to that, we assume something, but not the same
thing as what is investigated.

... and not that of which there is the same account [and
which converts. But there is the same difficulty for both, the one
proving by division and the one who is proving by syllogism in
this way: why will a human being be an animal [which is]
terrestrial bipedal, but not animal and terrestrial and bipedal?
For from the things that are assumed there is no necessity that
what is predicated turn out to be one thing.]

That is to say, [that which is assumed] is not exactly analo
gous to what is investigated nor does it convert with it. But the good and bad
are exactly analogous, as we showed, and they convert, that is,
[their definitions] are proven by means of each other. For you will
prove the definition of the bad by means of the definition of the good
in the same manner by which you proved the definition of the good
by means of the definition of the bad.

‘But for both’, ‘the one proving’ the definition ‘by’ the method of
‘division’ and ‘the one proving’ the definition by hypothetical syllo-
gism, there is ‘the same difficulty’, in other words, we inquire about
and are investigating the same things. For just as the method of
division, by itself, assumed that a human being is an animal, by
itself, [that it is] terrestrial, by itself, and [that it is] a biped, by itself,
and then because it predicates these jointly of human being, we
investigate why you jointly predicated ‘animal terrestrial biped’ of
human being, and not each one by itself (for not all of the things that
are predicated by themselves can be predicated jointly), so in the
case of the hypothetical syllogism that by itself infers the things that
belong by themselves to what is defined, and then assumes these
things jointly, too, we investigate why you jointly predicated these things. For example, they say, if being at variance with oneself belongs to the bad, not being at variance belongs to the good and if being divisible belongs to the bad, being indivisible belongs to the good, and if that which is contrary to nature belongs to the bad, that which is in accordance with nature belongs to the good. Then they too assumed [things] jointly, so that being in accordance with nature, not being at variance, and being indivisible belong to the good. ‘For from the things that are assumed’ by themselves, ‘no necessity’ also appears, by itself, by which all of these things will have been jointly predicated as a unity.159

92a32 But it could be just as if the same human being were [cultured and literate. So how will the one who defines prove the essence or the what it is?]

That is, Socrates is said to be cultured by itself and able to use language by itself, and when they are taken together they will be predicated truly of Socrates, but this will not be its definition (for these things are not essential), in this way being in accordance with nature and not being at variance and being indivisible belong by themselves to the good, but they cannot be taken jointly as its definition, even if they are truly predicated of it. And since one can demonstrate a definition neither by means of a hypothetical syllogism nor by means of a demonstration nor by means of division nor by means of a syllogistic deduction, ‘how will the one who defines’ and teaches the definition ‘prove’ that this is ‘the essence’, that is, the definition, of that? He called ‘the what it is’ ‘essence’ on the grounds that it is indicative of substance.160

[Chapter 7]

92a35 For he will not [make clear], as does the one who demonstrates [on the basis of things that are agreed to be the case, that when those things are, something else must be (for this is a demonstration) ...]

Here he considers demonstration as having much in common with syllogistic deduction. He says, ‘For it is not possible to demonstrate, that is, to deduce, that this is the definition of that, “on the basis of” premises that are “matters of agreement”. For, on the basis of these things,161 which they assumed in the demonstration of the definition, they are not compelled to infer162 “something else”, but they beg the question. “For this” is a “demonstration”, that is, a deduction, to infer something else on the basis of things that are assumed.’
Nor [will he prove by means of evident particulars,] as does one who does an induction, [that what holds in all cases is like this, because nothing is otherwise. For it does not prove what it is, but that it is or is not. So what other way is left? For he will not prove it by means of perception or [by pointing] his finger.]

In other words, it is not possible to prove that this is a definition of that by means of induction. For induction proves the universal when it works through an induction of all of the particulars and it leaves nothing out, as 'every animal moves its lower jaw downwards' will be proven by induction when it takes up all of the species, for example human being and horse etc. But it is impossible to go through all of the individuals since they are indefinite. For precisely this reason induction does not involve a necessary demonstration of the universal. Therefore, if someone is going to prove the definition of human being by means of induction, he must take up the definitions of every single species as follows: [the definition] of ox is this, [the definition] of horse is that, and [so], in general, for all of the species. Therefore what is left is that the definition of human being is 'animal mortal rational'. If you want, make an induction of the particular human beings, and in this way you will infer that 'animal rational mortal' is the definition of every human being. Since it is impossible to go through all of the individuals so that we might establish the universal through them or so that we might establish the definitions of all of the definable things, it follows that the definition cannot be proven through induction. And, besides, induction does not prove what it is, that is, [what] a single thing [is], but [it proves] that this does or does not belong to that. Therefore, if induction proves an affirmation or a negation, and definition is neither an affirmation nor a negation, then it is not possible to prove the definition by means of induction. But it is not possible to prove by perception that this is the definition of that, since perception is apprehensive of particulars, among which there are many things to which we point our fingers [to indicate] that 'I am talking about that', but definition is of the universal.

Further, how will you prove what a human being is? [For the one who knows what a human being or anything else is must also know that it is ...]

Having proven that it is impossible to prove that this is the definition of that by means of either a demonstrative syllogism or a syllogistic deduction in general, or by means of a hypothetical syllogism, or by means of induction, or by means of perception, now he presents his argument here in an aporetic way. So 'how', he says, 'will' someone
'prove the what it is', that is to say, the definition? Will he prove only the what it is, that is, the definition? And if this is so, there will be a definition of things that are not. For should he prove that 'animal terrestrial biped' is the definition of human being or the definition of some other thing, then, hypothetically, if I do not know that there is a human being, that is, if I am unaware that the human being is numbered at all among the things that are, it follows that it is not a being. So he proved the definition of that which might not be. But there is no definition of that which is not. But if he jointly demonstrated this, that there is a human being along with the definition of human being, it turns out that he knows both that it is and what it is by means of demonstration.

92b5 For in regard to that which is not, no one knows that which something is; [nonetheless one can know what the expression or the word means, when I say 'goatstag', but it is impossible to know what a goatstag is. But, to be sure, if someone will prove the what it is and the that it is, how will he prove it by the same argument?] In other words, there is no what it is, that is [no] definition, of that which is not. But perhaps someone objected to what was said, and said: how can you say there is no definition of what is not? A goatstag is what is not, but it is possible to give a definition of it: 'an animal made up of a goat and a stag'. So when he meets the objection he adds 'it is “nonetheless” possible “to know what the expression or the word means”’. In other words, since there are words and expressions that are interpretative of words for things that are not, 'goatstag' is a word for that which is not, and the account of it is 'an animal made up of a goat and a stag'. 'Hippocentaur' is a word for something else that is not, and the account of it is 'an animal made up of a horse and a centaur'. Now such an account, 'an animal made up of a goat and a stag', is a nominal definition, for it does not establish the nature, essence and existence of a goatstag, but it is interpretative of what the word 'goatstag' means. For it is indeed possible to know what is the meaning of the word 'goatstag' or the expression that goes 'an animal made up of a goat and a stag', but it is impossible to know what is the nature and the cause of a goatstag, for this is not an existent and is a mere imaginary product of thought. 

‘But, to be sure, if someone will prove the what it is’, that is, the definition, it is impossible for the that it is, too, to have jointly been demonstrated with it. This, [the conclusion] that it is is not jointly demonstrated with the what it is, applies to the one with scientific understanding. For how can both the what it is and the that it is, which are different from each other, be proven by means of the same argument and the same mode of demonstration? For the modes
of demonstration\textsuperscript{181} are different for different things. For as he showed above,\textsuperscript{182} while the what it is is established by a definition, the that it is and the if it is [are established] by a demonstration.

\textbf{92b9} For both definition [and demonstration] indicate some single thing ...

That is, it establishes one thing, a thing’s nature, and demonstration establishes something else, the if it is or the that it is. For these are the same, since they [both] investigate whether a human being or a goatstag is numbered among the things that are. And if definition and demonstration are different, and this is also true for the things that are shown by them,\textsuperscript{183} the that it is and the what it is, how can one know both the that it is and the what it is either by means of definition or by means of demonstration?

\textbf{92b10} But what is a human being and that there is a human being [are different.]

That is, ‘what is a human being’ or whether there is [a human being] are different from each other.\textsuperscript{184}

\textbf{92b12} And next, we say that it is necessarily by means of demonstration [that every that it is\textsuperscript{185} is proven, if it is not an essence ]

Above it has been shown that ‘every’ fact must be shown to be [so]\textsuperscript{186} by means of demonstration.

‘If it is not an essence’. Instead of saying ‘definition’ he says ‘essence’. That is to say, definition alone is not demonstrated by means of demonstration.

\textbf{361,1 92b13} But to be\textsuperscript{187} [is the essence of nothing, for being is not a genus. Therefore there will be a demonstration that it is ]

That is, the if it is is the essence of nothing, that is to say, it is not a definition of anything. For if being is not a genus, which would make it part of a definition (for the genus in a definition is a part of it), then\textit{ a fortiori} it is not a definition, for definition comes from the genus and the constitutive differentiae. But ‘being’ is a single term. And it is clear that being is not a genus.\textsuperscript{188} For you learned that being is predicated equivocally of the ten most generic genera, for genera are predicated univocally of the things of which they are predicated. Therefore demonstration, not definition, is that which makes one come to know that it is, and establishes it.
92b15 ... which is the very thing that the sciences even now do.  
[For the geometrician assumed what ‘triangle’ means, but that  
it is, he demonstrates. What then will the one who defines prove  
except what is triangle? So while someone knows the what it  
is by a definition, he will not know whether it is. But that is  
impossible.]

For up to the present day we see that the sciences (music, geometry  
etc.) know the that it is by means of demonstration. For while ‘the  
geometrician assumed’, by means of a nominal definition, even with-  
out a demonstration, ‘what “triangle” means’, saying that a triangle  
is a plane figure having three angles, it is by means of demonstration  
that he establishes that what has been constructed and drawn on the  
given straight line is a triangle. For the geometrician investigates  
whether it will be possible for a triangle to be constructed on a given  
straight line, and whether for every centre and diameter it is possible  
to describe a circle. So then, what will the one who defines and  
teaches a definition prove? Isn’t it certainly the case that he estab-  
ishes what a triangle is insofar as it is a triangle, that is, what is the  
nature of a triangle? For a definition (in the strict sense) of triangle  
is not ‘a plane figure having the three angles equal to two right  
angles’.

‘So, while [someone] knows the what it is’, that is, the nature of  
the thing, through definition, whether there is a triangle will be  
known not through definition but through demonstration. But this,  
knowing what a triangle is while not knowing whether there is a  
triangle at all, has been shown to be impossible.

92b19 It is clear that by even the current modes of definition  
[the ones who define do not prove that it is.]

That is to say, the definitions of things that are taught by the wise  
even up to the present day show that those who define do not  
demonstrate that it is but only the what it is, that is, the nature of  
the thing.

92b20 For even if there is something equidistant from the  
middle [nonetheless, why is that which is defined [like this]?  
And why is this a circle? For one might say that it is [a defini-  
tion] of mountain copper. For definitions do not in addition  
indicate that what is mentioned can be [such], nor that it is that  
[thing] of which they say they are definitions, but it is always  
possible to say ‘why?’]

A definition of ‘circle’ is this: a circle is a plane figure whose edge is  
everywhere an equal distance from the centre, and the centre is the
middle of the circle. So, he says, even if there is something having [the characteristic of] being an equal distance from the middle, that is, being equidistant from the centre, nonetheless this definition does not prove why that which is defined extends equally from the centre, nor does it show ‘why’ [it is] ‘this’, that is, [why] this definition establishes [what] a circle [is]. For on the basis of the definition alone, this is not proven to be the definition of a circle. For perhaps it could be [a definition] not of a circle but of mountain copper. Mountain copper is a type of matter not found these days. Rather mountain copper is white copper, as Hesiod in the *Shield* says:

‘Saying this, the greaves of shining mountain copper
He donned’.196

‘For definitions do not in addition indicate’ and show ‘that what is mentioned’, namely, the defined, ‘can be’ such a thing. For on the basis of the definition ‘animal terrestrial biped’ alone it is not shown that a human being necessarily is such a thing, nor that [the definition] necessarily indicates human being, of which this is said to be the definition, but ‘it is always possible’ for one who wishes to ask ‘why?’, that is, ‘from whence is it clear that it indicates a human being or that a human being is such a thing?’

92b26 So if the one who defines [shows either the what it is or what the word means, then if there is no sense in which definition is of the what it is, it would be an account that means the same thing as a word. But that would be strange.]

20 That is to say, the one who teaches a definition establishes either ‘the what it is’, that is, the nature of the thing, ‘or what the word means’ (for definition is twofold, either that which establishes the essence or what is interpretative of the name). So if definition is not indicative of the what it is, that is, of the nature of the thing (‘indicative’ must be supplied to clarify the meaning197), it would follow that definition is an ‘account that means the same thing as a word’, that is, a nominal [definition]. But it is impossible to grant that definition is nominal, for in this way there will be a definition even of things that are not, if even things that are not, too, have words [for them] and nominal definitions, that is, [definitions] that establish what the word means.

92b28 For first, there would be [a definition] even of what are not essences and of things that are not ...

30 ‘Of what are not substances’ and ‘of things that are not’ mean the same thing.198
... for it is possible to mean even [things] that are not.

That is, there are words that signify even [things] that are not. For example, ‘goatstag’ is said as a significant word, not because it signifies a certain nature, but because it seems to signify, insofar as the terms that make it up (‘goat’ and ‘stag’) are significant expressions, but what is composed of these signifies nothing anywhere.

Further, all accounts would be definitions. [For one might posit a name for any account whatsoever, so that we might all be saying definitions to each other and the Iliad would be a definition.]

Further another impossible result, that ‘all accounts would be definitions’, would follow from saying that a definition and a word signify the same thing. For there is a title for each account, for example for the work of Homer that takes up the things [that happened] in Iliia there is the title Iliad, just as for the [work] that takes up the things that happened to Odysseus there is the title Odyssey, and to ‘For, oh! Zeus and Father’, there is the word ‘prayer’, and to ‘Swift Iris, come here’ the word ‘command’. These words came together to mean the same thing as the definition. Both words and sentences (logoi) in which words are present will themselves be definitions too if the words have been assigned in conformity with nature. For this word ‘human being’ belongs to a human being in conformity with nature because of his ‘looking upwards’. Likewise too something is called ‘articulate’ from its having its voice divided, that is, articulated. And in general, if we say something, everything will be a definition.

Further nothing would demonstrate [that this name indicates this; definitions, then, do not indicate this in addition.]

Another point is that just as when words such as ‘human being’ and ‘horse’ are spoken, there are no demonstrations in which they demonstrate that they refer to human being and horse, so definitions do not also indicate and show whether they are definitions of those things of which they speak and not of others.

So from these [things that we said] [it is apparent that definition and deduction are not the same, and there is not deduction and definition of the same thing, and, in addition, that definition neither demonstrates nor proves anything …]
the same’ (for things whose definitions are different are themselves different) and that the same thing is not proven through syllogism and [through] definition, and that definition does not demonstrate anything. By ‘demonstrate’ he refers to the demonstrative syllogism, and by ‘proves’ he refers to deduction in general.

92b38 ... and [that it is not possible to know] the what it is either by a definition [or by a demonstration.] That is, that the given is a definition of this is shown neither by a demonstration nor by a definition.

[Chapter 8]

364,1 93a1 We must investigate again which of these things has been said correctly [and which has not [been said] correctly, and what definition is and whether there is in some sense a demonstration and definition of the what it is, or whether there is no sense in which this is so.]

These were the things that he said: that there cannot be a demonstration of definition in the manner in which some try to demonstrate, that one cannot know the same thing through both definition and demonstration, and that definition neither proves nor demonstrates. So, he says, it is necessary to consider whether or not these things that we said before are correct. For he is going to show that it is not in every respect true or false to say that there is a demonstration of definition, but it is true in one respect and false in another. How this is so, we will show. He is going to say both ‘what definition is’ (for the investigation is concerned with it: whether there is a demonstration of it, and with the fact that one must know that ‘definition’ [is said in] many ways, and what this [i.e. definition] is) and ‘whether there is in some sense’, that is, in some respect, ‘a demonstration’ of definition, or whether there is no such thing at all, and whether definition makes a contribution to demonstration or does not [do so] at all.

93a3 Since [to know what it is and to know the cause of whether it is] are the same, as we said [(and the account of this is that there is something that is the cause, and this is either the same or different, and if it is different, it is either demonstrable or inde-monstrable), if then it is different and it is possible to demonstrate [it], the cause must be a middle term and must be proven in the first figure. For what is proven is both universal and affirmative. So one way is that which has just now been considered, proving the what it is by means of another.]
At this point he begins to study how it is possible for a demonstration of a definition to come about. For there to be a clearer interpretative account of the text at hand, we must consider in how many ways ‘definition’ [is said]. Now definition is either material, when it is taken from the [things] that belong to matter, or it is formal, when it is taken from the things that essentially belong to the thing. A material definition either converts or does not convert, and is either the same as what is defined or is different. Now a material definition that converts and is the same as what is defined is ‘a human being is animal walking-upright flat-nailed able to laugh’. One that does not convert and is not the same as that which is defined is ‘anger is a boiling of the blood around the heart’. It is not the same as what is defined, since it does not convert. For if it converted, it would be the same. For every [instance of] anger is a boiling of the blood around the heart, but not every boiling of the blood around the heart is anger, for those who are feverish have blood around the heart boil, but they are not angry. On the other hand, the formal definition either converts with and is the same as what is defined, as is the case with ‘a human being is animal rational mortal’ (for it either has differentiae that are all essential and constitutive of form or it has one of them [that comes] from the matter, such as ‘mortal’) or it does not convert and for this reason is not the same as what is defined, as is the case for ‘anger is a desire for revenge’. For every angry person is angry because of a desire for revenge, but not everyone who desires revenge is angry. For there are some people who mentally desire revenge on their enemy, but are not angry; rather they are calm and collected and feign friendship. These, the material and formal definitions, are not definitions in the strict sense. Rather, they seem to be [definitions], but are not. That is the reason why they do not have the property of definition: to convert with that which is defined and being the same as it. For a definition in the strict sense for each thing is one, not many. Since the formal [definition] is prior to the material [definition], which is why those who are angry first desire revenge, and then accordingly boil the blood around the heart, and further, every demonstration comes from the things that are prior, the demonstration of the material [definition] must come about through the middle term of the formal [definition] like this: one who is angry desires revenge; but the one who desires revenge boils the blood around the heart; therefore the one who is angry boils the blood around the heart. Definition in the strict sense comes from both, that is, it is made up of both matter and form (for example, anger is a boiling of blood around the heart that comes about from a desire for revenge) and there cannot be a demonstration of this.

But we must also clarify the text at hand. Since ‘to know’ the what it is and to know the cause of whether the thing ‘is’ are the same (for the what it is is a definition, and the definition is a form, and the
form is a cause\textsuperscript{223}, the what it is is therefore a cause, for the definition indicates the cause of whether there really is or is not the thing that is the object of investigation. We should supply in addition to this ‘there can be a demonstration of a definition’\textsuperscript{224} [His] whole [account goes] like this: if the what it is is a cause, it is possible for there to be a demonstration of the definition. ‘The account of this’, that is, the cause [of this], that there is a demonstration of a definition, [is this: this is the case] because ‘there is something’, namely, a certain definition, the formal [definition], which is taken as ‘a cause’ in the middle term. ‘And this’ cause is ‘either the same or different’, that is, it is either the same as what is defined or is something else. And if it is something else ‘it is [either] demonstrable’, as is the material definition, ‘or it is indemonstrable’, as is the formal definition. For the material definition belongs to anger through the middle term of the formal [definition], from which it is demonstrated. But the formal [definition] belongs immediately to anger. For as we said, the one who is angry first desires revenge, and then accordingly boils the blood around his heart, and demonstration comes from things that are prior\textsuperscript{225} ‘If then the cause’, that is, the material definition, is different from what is defined ‘and it is possible to demonstrate it’, it is necessary to take ‘the cause’, that is, the formal definition, ‘as middle term’ in the syllogism, and for it to be syllogistically deduced in the first figure. because what is demonstrated is both ‘universal’ and ‘affirmative’. ‘Every [instance of] anger is a boiling of the blood around the heart’ is what is demonstrated. So this ‘which has been considered’ and discussed is ‘one way’ in which it is possible to demonstrate the what it is, the material definition, ‘by means of another’ definition, namely, the formal [definition]\textsuperscript{226}

\textbf{93a11} For in cases of the what it is, the middle term too\textsuperscript{227} must [be what it is, and in the case of properties [the middle term must be] a property.]

In other words, in syllogistic deductions that demonstrate the what it is, that is, the definition, the middle term must be a definition, just as ‘in the case of properties [the middle term must be] a property’. In other words, [this is] just as, if someone proves that being capable of laughter belongs to human being, he needed to take as middle term a property, for example, walking upright or employing reason.

\textbf{93a12} So he will prove the one [but will not prove the other [instance] of the essence, for the same thing.] That is, since there are many definitions of the same thing, one material and one formal, he will demonstrate the one ‘[instance] of what it was to be’, that is, one of the thing’s definitions, the material
[definition], but he will not demonstrate the other, the formal [definition], since it is immediate. 228

93a14 Now [that] this way [would not be a demonstration, has been stated earlier. Rather it is a dialectical deduction of the what it is. But let us relate the way in which it is possible, by once more turning 229 [to the things that we investigated] from the beginning. For just as we investigate the reason why when we grasp the fact, and sometimes these even become clear at the same time, but it is not possible to come to know the reason why before the fact, clearly, it is likewise [not possible to come to know] the essence without the that it is. For it is impossible to know what it is when unaware of whether it is.]

It has been shown above that the [account], by which, as we showed, there is a demonstration of the material definition by means of the middle term of the formal definition, is not a demonstration in the strict sense. For it begs the question. For when he investigates whether ‘boiling of the blood around the heart’ is a definition of anger, he assumes in the demonstration of it another definition, the formal [definition], of the same thing, and it too is investigated as to whether it is a definition of anger. But to prove what is unclear through things that are unclear is to beg the question. 230 So let this syllogism be called ‘dialectical’ 231 but not demonstrative. For there are many charges against it: one, that it deduces on the basis of reputable [premises], 232 another [that it deduces] on the basis of [premises] that are not necessary. For it is not necessarily the case that one who desires revenge boils the blood around the heart. 233 But demonstration is based on [premises] that are necessary and true, and not on reputable [premises]. 234 There is another way in which he apparently demonstrated a definition, but did not [do so] in the strict sense. We should investigate how there can be a demonstration of a definition ‘by turning to’ and taking up ‘once more’ the things that we investigated ‘from the beginning’, namely, the that it is and the why it is and the if it is and the what it is. 235 Now he says that, just as when we first grasp and learn that the moon is eclipsed, we later investigate why it is eclipsed, in other words, what is its cause (for it is impossible to investigate the why prior to the fact), 236 and often these become ‘clear at the same time’ (for in cases in which I demonstrate why it is eclipsed through the middle term, being blocked by the earth, it also becomes apparent that it is eclipsed), 237 so it is impossible to know what it is when we do not know whether it is. ‘For it is impossible to know what is’ a human being, not knowing whether there is [a human being] at all, that is, whether it has been numbered among things that are. He mentions the fact and the reason why before the others 238 because they are better known to us, since they are composites.
93a21 But sometimes [we grasp] whether it is, in an accidental way, ...

This is what he says. Since we first know whether it is, and then, accordingly, the what it is, how we are disposed in regard to knowledge of whether it is, is how we are disposed in regard to knowledge of the what it is. If we have clear knowledge of whether it is, we would for that reason be more easily led to knowledge of what it is. But if [we have] vague [knowledge], the knowledge of whether it is fails to make a contribution towards our knowledge of what it is. For not all of the things that are grasped with an eye to revealing whether it is have equal value in establishing the existence of the thing. Rather, some of them establish it in a clear manner and some do so vaguely. In other words, knowledge of whether it is comes about either on the basis of certain accidents or on the basis of [things] that belong essentially to the thing. Some of the accidents too make one come to know the thing (that the thing is) in a vague manner, since they belong to it and not to something else, even if they are not essential, such as walking upright, being tame by nature and being capable of laughter. Some of the accidents do not establish the thing at all since they are not observed in it alone but also in many other things, such as white, black, walking. For the one who tries to know whether it is on the basis of accidents, either does not know it at all (and it follows that he does not know what it is) or he has a vague knowledge of whether it is. And if this is so, he will have vague knowledge of the what it is, too. But if we come to know whether it is from the things that belong essentially, since some of them are observed in more things and are farther away, such as substance [and] living, while others are observed in fewer things and are closer, as are animal [and] rational, while others are seen in [the subjects] alone, as is being receptive of intellect and scientific understanding, if we come to know whether it is from the things that belong essentially and are farther away since they are more common, the knowledge that we will have on their basis will be vague, and we will not easily know what it is from it, but if we should have knowledge of the being [of the thing] from the things that essentially belong [to it] more closely and that belong to it alone, we would be easily led to clear knowledge of what it is.

93a21 … and sometimes [we grasp whether it is] by grasping something of the thing itself, [for example, for thunder, that it is a certain noise of the clouds, and for eclipse, that it is a certain privation of light, and for human being, that he is a certain animal, and soul, that it is that which moves itself. For all of those things for which we have accidental knowledge of the
that it is, we are necessarily not in any way disposed in regard
to the what it is. For we do not know that it is. But to investi-
gate what it is when not grasping that it is to investigate
nothing. In every case in which we grasp something, it is easier.
So how we grasp the that it is is also how we are disposed to the
what it is.]

That is, when we ‘have’ knowledge ‘of the thing’ from one of the things
that essentially belong to it. He begins by presenting examples of how
there emerges in us knowledge of whether it is from the things that
essentially belong to it. For if we should have knowledge of whether
there is ‘thunder’ from the occurrence of ‘noise of clouds’, and again
if we know whether there is an ‘eclipse’ from an occurrence of the
‘privation of light’, and if we know whether there is a ‘human being’
from [the fact] that there is an ‘animal’, and a ‘soul’ from its being
‘that which moves itself’, then it is on account of these things that we
will be more easily led to knowing what each [of them] is, too. These
are examples of knowing whether it is, from accidents: we come to
know that there is thunder from how certain people become, and are,
thunderstruck from the noise. The thunderstruck are those who lose
their minds on account of the noise. And we know that there is an
eclipse because the moon suddenly becomes invisible even though it
is full and is not obscured by clouds, and that there is a human being
from [the fact] that there is something walking around or something
social, and we come to know that there is soul on account of [the fact]
that a living body moves around from place to place although
nothing external is moving it. Since it is from such things that we
have knowledge of whether it is, which [knowledge] does not estab-
lish it for us at all, by this means we will not have knowledge of the
what it is.

93a29 In the case of those things of which we have a grasp of
something directed towards what it is, let things first be like
this. A for eclipse, C for moon, B for blocking of the earth. [To
investigate] whether it is eclipsed or not is to investigate
whether or not there is B. This is no different from investigating
whether it is an account of it. And should there be this, we say
that there is that too.

He said that how we are disposed to knowledge of the if it is and the
that it is is how we grasp knowledge of the what it is or the reason
why, too, and that, if we know the if it is and the that it is from
accidents, we also have vague knowledge about these things, because
when we do not know the <if it is or the that it is>, we investigate
the what it is and the reason why, but if you know these things from
essential causes, for these the knowledge of the what it is and [the
knowledge] of the reason why come to light at the same time. He presents examples of these too, first, [of] when the cause is essential, and then similarly when it is accidental. So he says, in regard to things that are effects of which we grasp the essential cause that is proximate to them,\textsuperscript{249} when we have clear knowledge of whether it is or of the that it is, we have something of the what it is, too, that is, we have also knowledge of the what it is, coming to light at the same time as the knowledge of whether it is. So to investigate whether the moon is eclipsed or not is no different from [investigating] whether B (the middle term, blocking) is the cause of the eclipse of the moon.

But investigating whether B is a cause of the eclipse ‘is no different from investigating whether B is an account’ and definition ‘of it’, the major term: the eclipse.\textsuperscript{250} And if this, the blocking, is a definition of A, we say this too, namely, that it is by means of this, B, that we knew that there is an eclipse. You notice how you knew both the if it is and the what it is at the same time, but not if both the if it is and the what it are considered in the case of substances, for example whether there is intellect and what is intellect.\textsuperscript{251} But the fact and the why are investigated in the case of attributes that are observed in other things, as\textsuperscript{252} the eclipse belongs to the moon. But since what is being sought by Aristotle is how there is a demonstration of the what it is, and demonstration is observed in the case of attributes that are observed in and subsist in other things, but not in the case of substances, he thinks it makes no difference if one takes up the if it is for the that it is and the what it is for the reason why, because all four are observed in the same things.\textsuperscript{253} For there are examples of these in the case of the eclipse. When the eclipse is considered as in the moon, the that it is and the why it is are investigated in respect to it. But if you should separate it from the moon,\textsuperscript{254} you will study the if it is and the what it is for it.

\textbf{93a33} Alternately, of which [side] of the contradiction [is the account: whether of having two right [angles] or of not having [them]. When we discover this, we know\textsuperscript{a} the fact and the reason why at the same time, in case it is through middle terms.\textsuperscript{255}]

When he said ‘contradiction’ he referred to an affirmation or a negation, for these are parts of a contradiction. And again, if we investigate whether there is a cause of a contradiction, we investigate this, whether there is a cause of [the fact] that the triangle has its three angles equal to two right angles, or [of the fact] that it does not have them so.\textsuperscript{256} At any rate, there will be a cause of the affirmation, but not of the negation, for there is no cause of what is not. But the cause of the affirmation is having the three angles equal to the two adjacent angles. But if we were to discover the cause, we would know ‘both the fact and the reason why at the same time’. The
knowledge of these comes about at the same time, if it were explained that to be eclipsed belongs to the moon and two right angles belongs to the triangle, ‘through middle terms’ that are causes not only of the conclusion but also of the fact, that is, [through] essential causes.

93a36 But if not [we know o the fact but not the reason why. Moon C, eclipse A, B for not being able to make a shadow even though it is a full moon and there is nothing apparent between us [and the moon]. Then if B, not being able to make a shadow even though there is nothing evident between us, belongs to C, and A, having been eclipsed, belongs to it, it is clear that it is eclipsed, but it is not yet clear why, and we knowo that there is an eclipse, but we do not know what it is. Although it is clear that A belongs to C, nonetheless [to investigate] why it belongs is to investigate ‘what is B?’ ...

If the middle term is not the essential cause and hence is the cause of the conclusion, but not of the fact, we know only the fact, but we do not know the reason why.

93b5 ... whether a blocking or a turning [or quenching] of the moon. This is the account of the other extreme, for example, in the case of these [terms], A. For the eclipse is a blocking by the earth. What is thunder? A quenching of fire in a cloud. Why does it thunder? Because of the quenching of fire in the cloud. Cloud C, thunder A, quenching of fire B. B belongs to C, cloud (for fire is quenched in it), and A, noise, to it. And B is the account of the first extreme A.]

These examples concern the eclipse. The quenching of fire is thunder. For he uses these examples since he is still coming out of the [discussion] confirming [that] if the middle term is the essential cause, we know both the that it is and the reason why at the same time, and the knowledge of what it is is also shown together with them. But if he took up more causes of the eclipse, you should not be surprised. For since it is not yet clear how the eclipse occurs, he takes up many causes, in order that the [one that is] more significant might be selected from many. For those who investigate concerning an effect are wont to take up as many things as is reasonable to suspect to be its causes and then to select one of them that is more significant. Some people say that the eclipse occurs on account of the turning of the moon. For they say that the part of it that faces us is illuminated by the rays of the sun behind the earth but that the part of it facing the sky is unilluminated, and it is this that produces the eclipse when it turns toward us. He first presents the definition of thunder and of eclipse. He then produces the demonstration that the
moon is eclipsed or [the demonstration] that there is thunder (noise) in the cloud, so that, when you have each of the definitions you might more easily see how the what it is is hunted and is discovered by means of demonstration.

‘This’, that is, the middle term, ‘is the account’ and definition ‘of the other extreme’ [term], the major [term] A.

93b12 And, again, if there should be another middle term for this [it will be from the remaining accounts.]

He says this because of [the following question]: if the middle term in demonstration is often not assumed as a definition, how will the definition of the major term be discovered? For example, suppose that someone who demonstrates that a human being is a substance by means of the middle term animal did not assume [it as] a definition.258 He even offers a rule on how you will you discover definitions in such a demonstration. He says ‘since the two premises are mediated, take ‘substance living able to perceive’, which is the definition of animal, for the demonstration of the minor term, but for the demonstration of the major term take as middle term ‘being receptive of opposites in succession’ which is a property of substance.259

93b15 So how the what it is is taken [and comes to be known has been stated, so that there is neither deduction nor demonstration of the what it is, however, it comes to be apparent by means of deduction and demonstration. So it is not possible to know the what it is without a demonstration, for that of which there is another cause, yet there is no demonstration of it, as we said when going through the difficulties.]

That is, how the what it is and the definition are known by means of a demonstration has been stated. For when someone proves that the eclipse belongs to the moon, the middle term will be found to be the definition of the eclipse in this [very] demonstration. But ‘there is not’ a ‘deduction’, that is, a demonstration ‘of the what it is’: that is to say, a definition does not occur as the conclusion of a demonstration.260 So there is and is not a demonstration of a definition. There is a definition of it insofar as it is discovered by means of a demonstration, for the middle term is the definition of the major term. But there is no demonstration of it, because it is not a conclusion that comes about by means of demonstration.

[Chapter 9]

93b21 Of some things there is some other cause [and of some there is not. So it is apparent that in some cases the [instances
In the case of some things that are effects, the cause is different from the effect, for there are some causes which follow after certain prior principle causes that belong proximately to the effect. For example, the cause of the eclipse of the moon is [the fact that] the moon comes to be unilluminated, but it follows afterwards, for the blocking precedes it.\textsuperscript{261} For first the moon is blocked by the earth and is eclipsed, then, accordingly, being unilluminated follows it.\textsuperscript{262} Likewise in the case of thunder, the noise [that comes] afterwards follows the quenching of fire that was previously occurring in the cloud. Now the blocking, which is the cause, is different from the effect, the eclipse of the moon, and the quenching of fire is different from thunder, and the boiling of the blood around the heart is different from anger.\textsuperscript{263} But some causes are not different from the effect but are the same, like mortal rational animal and human being. So in the case of some effects the cause is something different from them, while in the case of some effects, the cause is not different but is the same as them. He says these things in order to show that not every definition, that is, not every cause, is discovered by means of demonstration and not every definition occurs as a conclusion. But all of those definitions that immediately belong to the things defined and are effects, as the blocking by the earth belongs immediately to the eclipse and the quenching of fire to thunder and the desire for revenge to anger,\textsuperscript{264} are principles which are indemonstrable and we hypothesize them and assume them as matters of agreement, and in these cases we do [not] investigate the if it is or the what it is. Such definitions are indemonstrable, for they do not occur as conclusions of a demonstration. But they are known in some other way, for example, by means of induction or by means of demonstration, for the middle term in demonstrations is discovered as the definition of the major [term].

\textsuperscript{93b24} which is the very thing that the arithmetician does. [For he hypothesizes both what a monad is and that it is. But for those things that have a middle term, that is,\textsuperscript{265} of which there is a cause different from the essence, it is possible to indicate [the what it is] by means of demonstration, as we said, but not by demonstrating the what it is.]

Since he holds that the monad is a principle, he assumes it as agreed upon in respect to the that it is and the what it is.\textsuperscript{266} A monad is that according to which each of the things that are is said to be one. In the case of the things that can be defined that are also effects ‘and have’ the ‘middle term’, that is, the cause, ‘different from the essence’ and
considered as mediately in the subject, ‘it is possible to indicate’ and
to prove the what it is ‘by means of demonstration’, but ‘not by
demonstrating the what it is’, that is, not by producing the definition
as a conclusion. For example, the privation of light is the cause of the
eclipse, but it is mediated, and for this reason you will take the
blocking by the earth, as a middle term between the moon and the
privation of light, and consequently the blocking will be discovered
to be the definition of the privation of light, that is, of the eclipse.

[Chapter 10]

93b29 Since definition is said to be an account [of the what it
is, clearly one [kind of definition] will be an account of what the
name means, or a nominal account that is different. For exam-
ple, what does ‘triangle’ mean?267]

He here defines ‘definition’, and says that definition is ‘an account of
the what it is’. All the kinds of definition have been included in this,
even the nominal definition itself, for this too is an account of the
what it is.268 But also notice how it differs: the other kinds of defini-
tion are accounts of the what it is, that is, they are indicative of the
nature of the thing, but the nominal definition is an account of what
something means, that is, it is interpretative of the word. After
defining definition he also gives an account of the meanings of
‘definition’ and says, a different [kind of] definition is called nominal,
which is also an account of what the word means, or, if you prefer,
say that this is a nominal account, for these are the same.269 For
example, it establishes what the word ‘triangle’ means, insofar as it
is ‘triangle’, for the one saying ‘a triangle is a shape constituted out
of three angles’ said a nominal account.

93b32 When we grasp that this very thing is, [we investigate why
it is. It is difficult to grasp in this manner the things of which we
do not even knowo that they are. The cause of the difficulty was
stated earlier, that we do not know o whether it is or not …]
... except accidentally.

That is, we do not have knowledge of the nature of a triangle as a triangle, that is, from the things that belong essentially to it, but we know this accidentally, that is, from an accident (from the word), for words are by convention, that is, they were posited on the basis of human conceptualization, but have not been fashioned from nature, and for this reason a human being is called [a ‘human being’] among the Greeks, something else among the Latins, and something else among the Persians, and things that are by convention are accidents.

There are two senses in which an account is said to be one, [one, through its being tied together, like the Iliad] ...

That is, there are two ways in which an account is said to be one. For either it is said to be one ‘through its being tied together’, even if there should be many [accounts] and they mean many things, such as ‘Socrates walks and Plato discusses and Aristotle says’. In this way someone might say that even the Iliad, that is, the whole work by Homer, is a single account through its being tied together. For [the words] are mutually dependent on each other for their sense, and they seem to be one account through their being tied together, for by saying ‘Iliad’ he referred to the whole book since it deals with the events that occurred in Ilia.

... and another way, by indicating one thing in respect to one thing, [in a way that is not accidental. One definition of definition is what has been stated, but another [kind of] definition is an account that indicates why it is. So the first signifies but does not prove, but clearly the latter will be as it were a demonstration of the what it is, differing from a demonstration in arrangement.]

That is to say, even a formal definition, such as ‘anger is a desire for revenge’, which reveals ‘one thing in respect to one thing in a way that is not accidental’ is called a single account for this involves one predicated [term] (for even if there are two words: ‘desire for-revenge’, from which [comes] the predicated [term], they are nonetheless one insofar as they are interwoven into a single thing) and it is predicated in respect to one thing, namely, anger, and it is predicated not accidentally but per se. So such an account is one per se since it has both predicate and subject that are one. But the proposition ‘Socrates is a philosopher’ is said to be a single account, but accidentally, because the items that make up that which is predicated are different, since some mean some things and others mean other
things. For ‘is’ refers to existence, and ‘philosopher’ [refers to] an accident. It is said to be accidentally one, insofar as being a philosopher happened to be observed [to be] in Socrates.

So one definition of definition (in the strict sense) is ‘an account predicating one thing of another in a way that is not accidental’. Another definition of definition is ‘an account that indicates why it is’, that is, that includes the cause of the thing together with the effect. Such is the composite definition, which is also a definition in the strict sense and is complete insofar as it converts with what is defined and is the same as it. An example is ‘anger is the boiling of the blood around the heart on account of a desire for revenge’. For within it there is both the effect, the boiling of the blood around the heart, and the cause of the boiling, for example, ‘desire for revenge’.

So the first [kind of definition], the formal [definition], ‘signifies’ the nature of the thing, ‘but does not prove’ [it], that is to say, it is not a demonstration; in other words, it has not been fashioned to be like a demonstration, for in demonstration both the cause and the effect are grasped, but the definition we have been discussing includes only the cause. But the second [kind of] definition, which is an account that says and reveals why [the thing] is ‘is as it were a demonstration of the what it is’, that is, it is like a demonstration and as it were demonstrates the definition. But it differs from demonstration in its arrangement. For in demonstration the first to be posited is the cause, and then the effect is accordingly reached as a conclusion. For example: one who is angry desires revenge; one who desires revenge has the blood boiling around his heart; therefore one who is angry has the blood boiling around his heart. And again, fire is quenched in the cloud, and when fire is quenched a noise occurs, therefore a noise, namely, thunder, occurs in the cloud. But in the composite definition they are posited in the reverse order, first, the effect, and afterwards, the cause, for example, ‘anger is a boiling of the blood around the heart [that occurs] because of desire for revenge’ and ‘thunder is a noise of fire being quenched in the cloud’. So this very way [of putting things] is called a definition [when expressed] in one way, namely, if it has the effect first and the cause afterwards, but when it is like that, that is, [when expressed] in another way, it is called a continuous demonstration, if the cause is posited first and the effect afterwards. He called it ‘continuous’, because demonstration proves that which [holds] for all, and this is proven in the first figure alone, but in the first figure the terms are posited in a continuous and linear way and the middle term is not posited outside of the extremes as it is in the second or third figure.

94a3 For saying why it thunders and what thunder is are different. [For [put] this way, you will say ‘because fire is
quenched in the clouds’. What is thunder? A noise of fire being quenched in clouds. So the same account is given in a different way, and while in this way it is a continuous demonstration, in that way it is a definition. (Another point is that noise in clouds is a definition of thunder, and this is the conclusion of a demonstration of the what it is.) But the definition of things that are immediate is an indemonstrable posit of the what it is.]

After saying that demonstration differs from definition on account of the order of the cause and the effect, he indicated that demonstration [comes about] through the why, but definition [comes about] through the what it is.

Another point is that a definition of thunder that says it is a noise in the clouds is material. This occurs as the conclusion of a demonstration, and such a definition is demonstrable through the formal definition as a middle term. But the formal definition, which belongs immediately to that which is defined, is also an indemonstrable posit indicative of what the thing is, that is, of the essence of the thing. For the immediate premise is divided into the axioms and into the posit. But the posit, as we said above, is divided into the hypothesis and the posit.

94a11 Therefore [one] definition [is an indemonstrable account of what the it is; one is a syllogism of what the it is, different from demonstration in how the terms fall; third is the conclusion of a demonstration of what the it is.]

Now a tally is taken of the meanings of ‘definition’. He says that ‘one definition is’ an ‘indemonstrable account’ indicative ‘of what’ a thing ‘is’, which sort of definition is formal. ‘One’, namely, a different one, is a ‘syllogism of what it is’, ‘different from demonstration in how the terms fall’, that is, in their order, which sort of definition is the composite [definition]. ‘Third’ is the material definition, which is demonstrated and occurs as the ‘conclusion of a demonstration of the what it is’, that is, something which is also demonstrable, for it is demonstrated through the middle term, the formal [definition].

94a14 So it is clear from what has been said [both in what sense there is a demonstration of what it is and in what sense there is not, and of which [definitions] there is [such a demonstration] and of which there is not, and, further, in how many ways [an account] is said to be a definition, and how it proves the what it is and how it does not, and of which things it does and of which things it does not, and further, how it relates to demonstration, and how it is possible for them to be of the same thing, and how it is not possible.]
He now comes up with a summary of the things that he said. So it is clear ‘in what sense there is’ a demonstration of the definition ‘and in what sense there is not’, that is to say, the formal definition is demonstrable insofar as it is shown by means of a demonstration. For it is posited as a middle term inasmuch as it is a definition of the major term. But there is no demonstration of it, insofar as it is not a conclusion. It is also [clear] in what sense it shows the what it is, that is, how definition shows the nature of a thing, and in what sense it does not show it, that is, it does not show some attribute inhering in some subject. It is also [clear] ‘of which things there is a’ definition, of the simples, intellect and soul, ‘and of which there is not’, the composites. Further, [it is clear] how the composite definition stands in regard to demonstration, that is, in what respect it is different from it. It is also clear how there can be a definition of a certain single thing, and how it is not possible for there to be a definition, but rather [only] a demonstration. For example, there is both a demonstration and a definition of an eclipse, in different ways. For if you in [your] conceptualization separate the eclipse from the moon, you will reveal it by means of definition. But if you consider it in the moon, you will show that it is in the moon by means of demonstration.

[Chapter 11]

94a20 Since we think that we have scientific understanding [when we know the cause, and there are four causes (one, the essence, one, when certain things are, this must be, another, what first moved, and fourth, the ‘for sake of what?’), all of these are shown by the middle term.]

There are four causes: formal, material, efficient, and final. So we are said to have scientific understanding of a thing just when we know the cause through which [the thing] is, whether its material cause or its formal cause or any of the others. Instead of saying ‘formal cause’ he said ‘essence’. For the what it was to be is the essential definition. But the essential definition is the formal cause since it establishes the form and the essence of the thing. Therefore the essence is the formal cause. Instead of saying ‘material’ he said ‘when certain things are, this’, the form, ‘must be’. For ‘when some things are’ establishes matter [as its referent]. We come to require matter because of the existence of form. For matter itself does not obtain its necessity per se; it is rather [necessary] on account of form. So we come to need certain materials, such as stones and lumber, so that the form of the house might exist. Again, we come to need the balance of the hot and the cold, and the wet and the dry [materials], so that the form of health might exist within us. Another cause is that which ‘first moved’, that is, the efficient [cause], as
the father is the efficient cause of the child when he initiates the shooting of seed into the mother. Instead of saying ‘final cause’ he says ‘the “for the sake of what?”’, which emerges afterwards. For the foundation and the walls have come to be for the sake of the house. For the final cause of these is the form of the house. Now ‘all’ four ‘of these’ causes ‘are shown by the middle term’, that is, they are grasped as middle terms in demonstrations and are discovered and culled by means of demonstration.

94a24 For, the case in which, when one thing is, that must be [does not hold when one premise has been assumed, rather, there must be at least two. This happens, when they have one middle term. When this single thing has been taken the conclusion must hold. It is clear in this way, too. Why is the [angle] in the semicircle right? It is right when there is what? Let \( A \) be right, \( B \) be half of two right angles, \( C \) be the [angle] in the semicircle. \( B \) is the cause of [the fact that \( A \), the right [angle] belongs to \( C \), the [angle] in the semicircle. For this is equal to \( A \) and \( C \) to \( B \), for it is half of two right [angles]. Now when there is \( B \), half of two right [angles], \( A \) belongs to \( C \).

He enumerated the four causes, said that each of these is taken as a middle term in demonstration, and showed [how] this [is so] in the case of the formal [cause]. By means of examples he now shows that the others too are middle terms in demonstration. Also put forward is the material cause, to which he referred by saying ‘when one thing is, that must be’. For we said that matter involves necessity via the existence of the form. For the stones and the lumber are necessary on account of the form of the house. He as it were interprets himself, and says, ‘when you hear me saying that “when one thing is, that, (the conclusion) must be”, don’t understand “when one thing is” [to indicate] a single premise. For it is impossible for a conclusion to come from a single premise, rather, [it comes from] at least two’. And it follows that ‘when one thing is’ refers to the middle term. For when a single middle term has been taken there must come to be a conclusion. For the middle term is that which ties together the premises and is a cause of the conclusion. For every middle term is also called a material cause in the context of a syllogism. For if the premises play the role of matter in a syllogism, just as the conclusion [plays the role of] form, and the middle is the cause of the combination of the premises, it follows that it too plays the role of matter, albeit in [the context of] a syllogism. The middle term will be a formal cause or a material or some other [cause] of the fact. So up to this point he takes the middle term to be the fact’s material cause, which is half of two right [angles]. For two right angles [taken] as a whole is something divided into two parts, halves, each of which is a
right angle. The parts are like matter for the whole. So, since the half of two right [angles] is a part, it is taken as a material cause. Euclid too in the third book of his *Geometry* proves how the angle in the semicircle is right. And since it is difficult to establish this for those who do not know geometry, on the basis of the things that he [i.e. Aristotle] said, well then, let us take this [matter] up insofar as it bears on the text at hand. He constructs circle BCDE and in the middle draws a diameter BD dividing the circle into two semicircles. He also draws a straight [line] CA perpendicular to BD. Since a straight line standing on a straight line makes two right angles, it follows that the angle in the semicircle, BAC and CAD [taken together], is half of two right angles. Because one is half of two, it has been proven that the angle in the semicircle is right, by means of the middle term ‘half of two right angles’.

What cause is present when the angle in the semicircle is right? Clearly, B. That is, B, half of two right angles is the cause of [the fact] that A, right, belongs to C, the angle in the semicircle.

94a3 [For the angle in the semicircle] was this: [to be right. And this is the same as the essence, because the account has this meaning.]}

That is, ‘the’ right ‘[angle] in the semicircle was this’ thing, half of two right angles. ‘And this’, namely, the right [angle], ‘is the same as the essence’, that is, its definition. For the account and the definition of it means this, the right [angle]. For a definition in the strict sense and that which is defined are the same. This is because the word is an implicit definition, and a definition is an explicit word.
But the essence [was shown to be] [the middle term].

Why was the Median war waged against the Athenians? What was the cause of war being waged against the Athenians? Because, together with the Eretrians, they attacked Sardis. This first set things in motion. A is war, B is attacking first, C is Athenians. B belongs to C (attacking belongs to the Athenians, who were the first [to do this]), and A belongs to B, for people make war against those who have previously done them injustice. Therefore A belongs to B (to have war made against one belongs to those who previously initiated [things]). This B belongs to the Athenians. For they previously initiated [things]. Therefore even here the cause is a middle term, first going [to war].

That is: but the material definition was shown to be taken as a middle term in the demonstration.

‘The middle term’. Here ‘the’ must be taken as superfluous.

‘Why did the Medeans make war against the Athenians?’ – this is an investigation into what is the efficient cause of the Athenians having waged war against the Medians. Even here he is going to show that the efficient cause is taken as a middle term in demonstration. The efficient cause of the war is the first strike against Sardis by the Athenians, together with the Eretrians. This is the story: the city Sardis was a tributary of the Medians. The Athenians, together with the Eretrians, besieged it, and this is why the Medians went to war against the Athenians.

And for all of those for which the cause is the ‘for the sake of something’ [– for example, why does he take a walk? So that he might be healthy. And why is there a house? So that possessions might be sheltered. In the one case that for the sake of which is to be healthy; in the other case, that for the sake of which is to be sheltered. Why must one take a walk after dinner? This is no different from asking for the sake of what, must one [take a walk after dinner]. To take a walk after dinner is C, B is for having the food not rise to the surface, A for being healthy. Let it be the case that to bring it about that the food does not rise to the opening of the belly belongs to taking a walk after dinner, and this is something healthy. For it seems that B, for the food not being vomited up, belongs to C, taking a walk, and A, healthy, to this. So what is the cause of [the fact that] A belongs, as that for the sake of which, to C? B, to not rise to the surface. This is as it were its account. For A will have been rendered in this way.]

‘And for all of those’ things for which ‘the cause’, that is, the final
cause, is ‘that which is for the sake of something’: he is about to say what sort of thing such things are. It is necessary to add to the apodosis of the sentence ‘are such [things]’. For example, ‘why does’ Socrates ‘walk’ after dinner? So that ‘he might be healthy’. This is the final cause. And ‘why is there a house?’ In order that the possessions might be preserved; it is the final cause. Asking ‘why must one take a walk’ is the same as saying ‘for the sake of what must one take a walk?’ That is to say, here there is an investigation into the final [cause]. For, in general, the one who asks why is investigating the efficient or material or some other cause. Here he is investigating the final [cause]. First the food rests in the front part of the belly, in the stomach, and this is why it is necessary to take a walk after dinner: in order that it might be allowed to pass into the belly. This is how [the food] is best digested and in this way it turns into nourishment for the whole body. But if it lingers in the front part of the belly, it remains undigested and becomes all rancid. This leads to bad breath in people’s mouths as well as acidic and meaty belchings, and a person becomes ill from this. And since for some reason the syllogism was presented by Aristotle in a confusing manner, well then, let us clarify it, so that we don’t encounter some steep and difficult [stretch] in the exposition of the passage at hand. Possessions need protection. Things that need protection require shelter. Therefore, possessions require shelter, that is, a house. The minor term is possessions; the major term is ‘requires shelter’. And again, Socrates needs to be healthy. Taking a walk after dinner belongs to the one who needs to be healthy. Therefore taking a walk after dinner belongs to Socrates. See how in this syllogism the middle term is the final cause, health, and in the former [syllogism] the middle term is preservation. Then he goes on to syllogistically deduce the major premise by switching the terms of the major premise and taking to be healthy as the major term, and to take a walk after dinner as the minor term, C. He switched the terms because they are employed as being the same, and it is the same in the case of being capable of laughter and human being. Since [the terms] are employed as being the same, it makes no difference which of them one takes as subject or predicate. He takes as the middle term B, for the food in the front part of the belly to be not vomited up. He presents the following syllogism. The one who takes a walk after dinner must have the food in the front part of the belly not vomited up. To be healthy belongs to the one who needs this [to not occur]. For the food in the front part of the belly to not be vomited up is not a final definition of health; rather it is formal. He is speaking not of health in general but of the health that results from nutrition. The definition of health in general is a balance of the four humors.

To be healthy is A, the major term. Perhaps one will raise the
difficulty that if to be healthy is the final cause of taking a walk after dinner, and [the task] before him was to show that the final cause is taken as a middle term in demonstration, how is it that he here took to be healthy as the major term? We say that this is a supplementary syllogism of the major premise of the syllogism. For to be healthy is present as a middle term of the syllogism. Take ‘let it be the case that’ as instead of ‘let ... be predicated as’.

And this, for food to be not vomited up, is healthy. ‘For it seems’, that is, it is agreed by all, that for food to not be vomited up is a definition of health.

‘So what the cause of [the fact that] A’, namely, that for the sake of which, health, which is present in the syllogism as the final cause, ‘belongs to C’, taking a walk? And he says that it is B, that the food is not vomited up. This, that it is not vomited up, is as it were a definition of that, health. For this is how A ‘will have been rendered’, that is to say, if someone is going to render a definition of A, of being healthy, he will render this, that it is not vomited up.

94b20 Why is B in C?306 [Because this, to be in such a condition, is to be healthy.]

Just as he proved that health belongs to C (taking a walk after dinner) through the middle term B, that the food is not vomited up, in this same way he tries to prove that B, that the food is not vomited up, belongs to C, taking a walk after dinner, through the middle term A, healthy. For things [that is, terms] that are employed as the same are proven of each other. As we said,307 ‘taking a walk after dinner’ and ‘being healthy’ are employed as the same. And just as someone will prove that the moon is eclipsed through the blocking, [so one will] also [prove] that the moon is blocked, through the eclipse. There is a difference: whenever the demonstration is through the first cause, it is a demonstration in the strict sense. But whenever the cause is proven through the effect, there is a demonstration, but not [a demonstration] in the strict sense.308 It conforms to a secondary standard309 and falls short of being a demonstration.

94b21 One must take the accounts one at a time,310 [and in this way each of them will be more apparent.]

That is, ‘[one must take] the syllogistic deductions [one at a time]’. Since he presented the syllogisms in a confusing manner and did not present the syllogism and the supplementary syllogism of the major premise by themselves, he said ‘take them by themselves,’311 and in this way each will become clear to you.
94b23 How things come to be here [and in the case of causes of motion are in opposite directions. For in the one case the middle term must come first, but here C, which is last, [comes first] and that which [something is] for the sake of is last.]

Well then, prior to the exegesis of the passage at hand, we ought to philosophize a little about what occurs by chance and by luck, so that we might not lose the train of thought in the exegesis of the text at hand. This is how chance is found in [events] that occur on account of [a thing’s] nature. For whatever comes about according to the aim of nature is said to be natural and by nature in that respect in which it has moved. But that which occurs contrary to the aim of nature is said to be by chance since it is itself random, that is, occurring contrary to the aim of nature. For example a stone split off from a hill by the internal natural power of moving, which it had from its matter, that is, from its weight, has been moved by nature to come to take its proper place. The proper place of heavy things is down, just as [the proper place] of light things is up. For when it occupied the place down [below], it ceased its motion. The goal which is the ultimate aim of the nature in the stone, for the sake of which it [i.e. the nature] moves it [i.e. the stone], is the occupation of its proper place, and this is called natural. But if somehow, when occupying the place down below, the stone came to be [shaped in a way that is] suitable for a chair, on account of having its protuberances removed from around it during its descent and it were to be formed into a square, this very process of becoming [shaped in a way that is] suitable for a chair is said to be by chance since it is something that occurs as [what is] itself random and not in accordance with the aim of its nature. Luck is found in the things that occur by choice and by virtue of thought, that is to say, in the things that occur by art. For all things that involve art, for example, an entire house, occur by art. The arts have been discovered from human conceptualization. Taking a bath, going down to the agora, and in general all of the things that have happened on account of choice are said to happen by choice. Now if someone chose to take a bath and took a walk for the sake of this, this is a chosen goal. For that which he chose culminated in its very goal, but if when going down to the bathhouse he happened upon a debtor and got [back] what he had given to him as a loan, this taking [back] what was lent is called lucky and [a matter of] luck since it occurred contrary to the aim of the choice. For this turned out differently from the choice that was proposed, namely, taking a bath. Similarly luck is found in the things that occur as a result of art. For example, health occurs as a result of the medical craft and is its goal. Likewise the preservation of the boat is the goal of navigation. So if health comes to be present in the sick
person as a result of the drugs that are administered by the doctor, the goal is said to be by art. For the art had health as its target. But if someone who was burning up with a fever and had become exceedingly thirsty got for himself cold water in order to relieve the thirst, and this led to the abatement of the illness and the acquisition of health, then health would not be said to be by art but [would be said to be] lucky and [a matter of] luck. Likewise if by the art of navigation the pilot should provide safety to the ship tossed by the waves, in this circumstance the ship’s safety is said to be a goal which is by art, since it proceeds in accordance with the aim of art. But if perchance the pilot gave up in the face of the raging waves, the sail was ripped on account of the vehemence of the wind, the rudder snapped, and the boat was carried by the waves without a pilot and ran into a harbour and was saved, in this circumstance the safety of the boat is called lucky and not a consequence of art. For luck too is called by chance (automaton) since it itself has randomness in its very constitution and not according to the aim of choice or art. So everything lucky is also by chance, but not everything by chance is also a matter of luck. Therefore chance is more general than luck. But it is time to begin the exegesis of the text at hand.

‘How things come to be here ... are in opposite directions.’ By ‘here’ he refers to final causes, but by ‘in the case of causes of motion’ he refers to efficient causes. He calls the temporal order of cause and the effect ‘the way something comes to be’ because he is studying the order of things that come to be. And this is why he calls the order ‘how something comes to be’. For now that he has said how many causes there are and what they are, he talks about how they differ from one another. So he says that how things come to be, that is, [how things stand for] the final and efficient causes, are contrary in respect to their entailment. ‘For in the one case’, namely, in the efficient causes, there must first come to be the middle term, that is, the efficient cause, which is present as the middle term in demonstration; then accordingly there comes to be C, that is, what comes last, with ‘C’. For ‘Athenians’ is posited by C, the middle term is to be the first to attack Sardis (along with the Eretrians), and the major term is the Median war. So first came the middle term, and then there accordingly followed C, the Medians’ making war against the Athenians. But ‘here’, in the case of final causes, there first came that which is posited by the last term, C. Socrates’ taking a walk after dinner is posited. Then there also came later that which it is for the sake of, namely the final cause, health. For it is posited in the demonstration as a middle term.

94b27 It is possible for the same thing to be for the sake of something and to be by necessity.
Here Aristotle discusses a different topic. He is speaking loosely, and instead of saying ‘that for the sake of which’ he says ‘for the sake of something’, for that ‘for the sake of which’ and that which is ‘for the sake of something’ are different from each other. For all things that come to be prior to the end and with an eye to the accomplishment of the end, are said to be for the sake of something. In this way the foundation, walls, and the roof are for the sake of the end which is the house. But the final cause is said to be that for the sake of which, that is, the house. For it is for the sake of the house that the walls and the foundations come to be beforehand. Understand ‘by necessity’ as the material cause because matter is said to be necessary. For the stones, lumber, and bricks, which are the matter of a house, are necessary because someone who builds a house comes to need them. So he says that ‘it is possible’ to prove one and ‘the same thing’ through that which is ‘for the sake of something’, namely the final cause, ‘and by necessity’, that is, through the material cause.

For example, why does light pass through the lantern? [For that which has relatively small parts, must go through the pores, which are bigger, if it is in fact the case that light emerges on account of its passing through. It is also for the sake of something, so that we might not stumble.]

Consider lamps or window glass, which thanks to the art of plastering are installed in houses so that they might have better lighting, or that which human invention prepares from parchment to keep those who walk at night from stumbling on rocks. Now the parchment and the glass are natural [things] with large pores made by nature. Things that are due to the art of plastering, by which mirrors are installed, are by art. That which has been prepared from a skin too is likewise [by art]. Now fire is made up of very fine particles. So if someone were to ask the reason why light passes through lanterns, we would state [the cause that is] by necessity, the material cause, [the fact] that, since the fire is made up of particles smaller [than the pores], it passes through the invisible pores in them [i.e. the lanterns], since [the latter] are larger. He says ‘if light emerges on account of its passing through’ because it is not his present task to show how the illuminating fire passes through lamps. For just this reason he does not say with precision what the cause is. We will say that ‘it is for the sake of something’, that is, [it is] a final cause, not stumbling on rocks at night. In these cases the material cause has been rendered as [something] natural, and the final cause [has been rendered as] by art. In certain other cases both causes are rendered as by nature. For example, why are the front teeth sharp? We will say that the natural, material cause, is that their constitution comes from [a] finer [kind of] matter, or [the fact] that the bone is finer in
the front of the upper and lower platforms out of which the front teeth grow. We will say that the natural final cause is to divide the food.\(^{320}\)

94b31 Now if it is possible for something to be [this way], is it also possible for it to come to be [this way]? [Are things like this: if it thunders because, when the fire is quenched, it must sizzle and make a sound, it is, as the Pythagoreans say, also for the sake of threatening those in Hades, so that they might be frightened? Most [cases] are like this, especially among things that are constituted by nature and constitute [something] by nature.]

Things either are or are coming to be. Things that are constituted as complete in all parts, that is, things whose parts subsist at the same time, for example, human being, stone, lumber, are called ‘things that are’.\(^{321}\) Things that are constituted as not complete in all parts, but [are constituted] part by part, and perish with every part that has passed away, and are not yet, with every part that is not yet, and have being only in respect to what currently holds and the present, are called ‘coming to be’. For example, there is a day and [there is] a contest. The parts of the day do not all constitute [a day] at the same time, but as many [parts] slip away as there are [parts] that come to be, and no part of it stays around at the same time as the fulfilment of the whole day. This is how things are in the case of the contest, as well. So he investigates whether it is possible for both material and final causes to be given for things that come to be and are not constituted as complete in all parts just as both material and final causes are given for things that are and things that are constituted as complete in all parts. Thunder too is a thing that comes to be, on account of its being constituted part by part. He shows by example that in these cases both material and final causes are given. For example, in response to someone investigating ‘whether it thunders’, that is to say, why it thunders, you relate a material cause, that fire is quenched and accordingly it necessarily sizzles, that is, a noise [necessarily] occurs, when it is quenched. The Pythagoreans gave a final cause of thunder: by means of the noise, Zeus threatens and frightens the Titans in Tartarus. Among natural things, you will discover that ‘most [cases] are like this’, in which both material and final causes are given. He mentions natural things because the example of lanterns that he offered was drawn from things that are by art.

94b36 One sort of nature acts for the sake of something, and another, by necessity. [Necessity is twofold. For on the one hand there is necessity by nature and by impulse, and on the other
[there is necessity] that is by compulsion and contrary to nature, as a stone is by necessity moved both upwards and downwards, but on account of the same [sort of] necessity. Among the things that have their origin in thought, some, for example a house and a statute, never exist by chance ...]

He here gives the reason why we give two sorts of natural cause for natural things, the material and final causes. And he says: since each of the natural things is made up of matter and form (since both that which is for the sake of something, that for the sake of which, is called nature, and that which is by necessity, that is, matter, is called nature) among natural things the form and the goal are the same. For a human being is called form, insofar as it is the form, that is, the definition, of human being, which, when applied by the nature to the matter, that is, to the menstrual fluid (which has no form, whether that of a human being or a horse or anything else, but is without form), gave it shape and produced a human being. This very thing, the form of the human being, is also said to be the goal. For nature did not set in motion and activate the menstrual fluid at random, but in order that it might come to be suitable as a receptacle for the human form. But it is time to go back to a continuous [exposition] of the argument. Since every natural thing both has a form (which is both its end and that which it is called) and also is constituted out of matter, it is with an eye to this that we granted that there is proposed for investigation both a certain material cause and a certain final cause for natural things, in order that we establish by means of both causes the parts from which they are constituted, namely, the matter and the form. Since he called matter necessary, he divides the necessary into the motion that is ‘by nature and impulse’ and the motion that is ‘by compulsion and contrary to’ impulse and ‘nature’. In his other treatises he divides the necessary into the necessary without qualification and in the strict sense, and into the hypothetically necessary, which he here left out. Now the necessary in the strict sense is that which is said unconditionally and without further qualification. Examples are ‘the sun necessarily moves’ and ‘Day necessarily comes when the sun is over the earth’. ‘Necessary’ in the strict sense is also said without qualification of [things] that are eternal. But in the case of things that are involved with generation and destruction ‘necessary’ is said hypothetically, with a qualification and a supplemental condition, as in ‘a human being necessarily breathes, as long as he or she lives’. For it is impossible to say this unconditionally since the human being does not always exist.

‘As “the stone by necessity” moves “both upwards and downwards”, but not “on account of the same” cause’, that is, not according to the same meaning of ‘necessary’. For it is does not move, upwards and downwards by nature or contrary to nature, but moves downwards
by nature, that is, by the natural matter that belongs to it, by
weight. For [something] is said [to be moved] by nature when it is
moved by itself, by the matter that belongs to it. For weight is the
cause of its downward motion, as the lightness of fire is the cause
of its upward motion. But a motion that is imparted not from the
inherent natural potentiality and matter but from external things
is contrary to nature and violent. For when the stone is carried
upwards, it has been moved by something else and not from its
own nature.

Chance is never observed ‘among the things that have their origin
from thought’, that is, among things that are by art and things that
are chosen. For the maker of statues who softens the bronze and
concentrates on making the statue cannot fail to achieve his aim and
make anything else. Likewise the builder who sets for himself the
aim of making a house never fails to achieve his aim.

95a4 ... or by necessity ...

As we said, he says that matter is necessary. Bronze is the matter of
the statue, and stones and lumber [are the matter] of the house. So
he says that the stones and lumber cannot be moved and are not able
to finish [building] a house by virtue of their natural potentiality,
unless they should be moved by the builder and attain a fitting
composition.

95a5 ... but for the sake of something, [and some exist by luck,
such as health and shelter. But it is especially in all of those
things that can turn out this one way or otherwise, when the
process of coming to be is not by luck, so that the end is good,
that they come to be for the sake of something, and [such things]
are either by nature or by art. But nothing by luck comes to be
for the sake of something.]

That is: but these things are moved by the artisan in order that there
come to be a house or statue or something else, which he posited as
his ultimate goal. Chance appears not among things that are by art
or by choice but among natural things alone. But there are also some
things by luck among the things that come from thought; that is to
say, that which comes from luck, or luck, appears both among things
that are by art and those that are chosen. For some arts, such as
medicine and navigation, are stochastic. For [medicine] tries to
predict whether the sick person will or will not achieve health, by
means of urinations, bowel movements, the pulse, the colour of the
face and good breath and bad breath. For precisely this reason it
often achieves its aim when it does everything that is prescribed
by art. But it often fails to achieve it too, since bodies are so easily
disturbed and because they are moved and altered in so many ways. Indeed health itself will arise not only from the medical art but also from luck. The art of navigation too is called stochastic, in the same way: because from predictions concerning the rising of the stars and the winds it accomplishes the preservation of the boat, and this is why it can also fail to accomplish this. Now ‘in all of those’ arts and things that are by art, that are such that things ‘can turn out’ just ‘this one way’, that is, the aim is successfully achieved, ‘or otherwise’, that is, [there is] failure [to achieve it], ‘when’ things come about ‘not by luck’, that is to say, when the goal comes about not by luck but by art, ‘the end is good’ and ‘comes about for the sake of something’, namely, the final cause. For when health or preservation come about by luck, it is not said to be a final cause. The end, which is the good, either occurs by nature, as in the natural things, or from art, as in the case of the things that are made by art. But ‘nothing by luck comes to be for the sake of something’. For example, the health or the preservation of the boat which comes to be by luck is not said to be a final cause.

[Chapter 12]

The cause for things that are coming to be [and those that are past and those that are future] is the very same as [that for present things that are] ... Having proven that it is possible to prove the same thing by means of different causes, he now turns to another topic: that the cause and the proposed object of investigation change together and show variation in regard to time, but this is not so in respect to kind; rather, [the cause] must remain unchanged in kind, as does the proposed object of investigation, but when the object of investigation changes in respect to time the cause too changes with it. For example, the cause of the ice is the solidification of the water that comes from total depletion of heat. Now if one were to propose the object of investigation by reference to it in the present tense, its cause too will be rendered in the present. And if the fact is coming to be, the cause too in each case will be rendered similarly. And if that which is proposed is past or future, the cause too will be rendered as this sort of thing. For example, why does ice exist? Because water is solidified on account of the total disappearance of heat. Why did it come to be? Because the water became solidified on account of its total disappearance of heat, and likewise in the other cases.

... (for the middle term is the cause), [except that in the case of present things, it is present, in the case of things that are coming to be it is coming to be, and in the case of things past
it is past, and in the case of future things it is future. For example, why did an eclipse occur? Because the earth came to be in the middle. It comes to be because it comes to be [in the middle], it will be because it will be in the middle, and it is because it is [in the middle]. What is ice? Let it be assumed that it is frozen water. C for water, A for frozen, B for the middle term, which is the cause, total disappearance of heat. So B belongs to C, and A, having frozen, to this. Ice comes to be when B comes to be, [ice] came to be when [B] came to be, and it will be when [B] will be.

For the middle term too, the cause, is the same in kind for things that are, things that are past etc., even if it changes in regard to time.

95a22 Now that which is a cause in this way [and that of which it is a cause come to be at the same time, when they come to be, and are [at the same time], when they are. And things work the same way in the case of things that are past and things that are future.]

Here he speaks about the formal [cause], which [occurs] at the same time as the effect. And there is a necessary entailment between the cause and the effect, from whichever one might begin, whether from the cause or from the effect, for they convert with each other. For if water has solidified on account of the disappearance of heat, ice too must have come to be, and if ice came to be, there must have been a disappearance of heat when the water solidified. However, even if there is a necessary entailment between the cause and the effect (from whichever one might begin, whether from the cause or from the effect), there is nonetheless this distinction [to be made] in the [two] cases. For if when the cause is posited the effect will follow, there is demonstration in the strict sense, because demonstration comes from things that are prior and are causes. But if, when the effect is posited the cause will follow, there is a sign-demonstration. For the syllogism proceeded from posterior [premises]. Such a demonstration which is based on posterior premises meets standards of a lower order than those of demonstration, since it falls short of being a demonstration. He first taught about the formal cause, because it was said to be an immediate principle (that is, premise), or because in the present book we are investigating about the formal cause, whether or not there can be a demonstration of it.

95a24 But in the case of things that are not at the same time, [are things in a continuous time...]

He is speaking of the material and efficient causes that are not at the
same time as the effects but temporally precede them. For stones and lumber, as well as the four elements of bodies, are pre-existent material causes of the house. In addition, Sophronicos is the pre-existent efficient cause of Socrates, and the abduction of Helen is an efficient cause that precedes the effect, namely, the destruction of Troy. So, in the case of such causes, that are not at the same time as the effects, there is no necessary entailment, from whichever side one starts. For if someone begins from that which is prior, the cause, the effect, which comes afterwards, will not necessarily follow. For it is not the case that, if there are stones and boards, there must be a house too, nor is it the case that if there is Sophroniscus, there must be Socrates too. But we must also consider the [text] at hand: ‘but in the case’ of the causes ‘that are not’ observed ‘at the same time as’ the effects, that is to say, the efficient and material [causes].

That is, since we suppose that these things are not observed to be at the same time as their effects, we investigate whether it is possible to render as cause of [the fact] that this (a house) came to be in a continuous time, something else that came to be, for example, that there were stones and lumber, and as cause of the future house something else that is future, such as future stones and lumber, and, as cause of the coming to be of a house, ‘if something [else] came to be before that’, that is, things that already came to be, whether someone mentions a wall or foundation or stones or lumber. For every [process of] coming to be and motion is in time. Time is continuous for this reason: because it is a measure of motion, that is, it is measured by the motion of the sun, which proceeds in a circle. Circular motion is continuous and uninterrupted. But rectilinear motion is interrupted. For what moves rectilinearly moves until it comes to its proper place, and then accordingly stops. The motion upwards and [the motion] downwards are the rectilinear motions. For fire moves until it comes to the ether, and then it stops. Also, a stone moves downwards, until it arrives at the earth.

Now, the deduction is from the later of the things in the past, [and past things are the starting point of these, too] ...

After having presented these difficulties he says that, even if (in the case of the coming to be of things) there must first be that which has come to be before the effect (for there must first be Sophroniscus, and
then from him, Socrates was born, and [there must] first [be] stones and lumber, and then, accordingly, a house), and even if in the case of the coming to be of things the causes must exist before the effects, nonetheless, in a deduction, it is necessary to assume in advance the later things, in order that, accordingly, there will necessarily follow that which is earlier. For if someone begins from what is earlier, there is no necessary entailment of what is later. For there is a deduction that begins from what came to be later, so that, accordingly, what is earlier will necessarily follow. Nonetheless, even if, in a deduction, we should begin from what is later, we must nonetheless not for this reason think that that which is later is the cause of that which is earlier. For clearly, the principles and causes of [the fact] that things have come to be have come to be before these effects.

95a29 Which is why this is how things are for things that are coming to be, as well. [For [the deduction] is not on the basis of what is earlier, for example, since this has come to be, that has come to be, later.]

That is to say, just when we are deducing about the things that have come to be, we begin from what comes later, so when we are deducing about what is coming to be and what will be, we ought to begin from what comes later. But if someone will begin ‘from what is earlier’, that which comes later will not necessarily follow. An example of this is ‘since that one, Sophroniscus, came to be [i.e. was born], that one, Socrates, also must have been born’.

95a31 And this is how things are for the future, too.

In other words, begin syllogistically deducing from what is later. For example, if Socrates will be, necessarily Sophroniscus will be.

95a31 For whether [the time] has been determined or whether it is indeterminate, it [will] not be the case [that since it is true to say that this has come to be, it is true to say that that, which is later, has come to be. For it will be false to say it during the intervening time, when one of them has already come to be.]

He works through his account in regard to past events, and supposes both that Socrates and Sophroniscus have been born. And he says, if in the case of things for which both the cause and the effect already came to be, the deduction must begin from the things that came to be after, a fortiori in the case of future things [the syllogism] must begin from the things that come after. For if Socrates has been born Sophroniscus too must have been born. But if someone begins from that which is prior, the one who says this, on the grounds that when
that which is prior has been posited, that which comes afterward follows, will [only] seem to speak the truth but he does not speak truly per se but accidentally. This is because the one who begins from what is prior seems to speak the truth to the extent to which the thing resulted and came to be. For if the account were true, but on account of the result, it necessarily follows that he was always speaking truly, whether Socrates was born a determinate or indeterminate number of years after the birth of Sophronicos. For suppose that the birth of Socrates was ten or twenty years after the birth of Sophroniscus, or, if you like, say indeterminately that Socrates was born after the passage of years. So if the one who said that Socrates was born after the birth of Sophroniscus had been speaking truly per se, the one who is saying this would have been speaking truly even during the intervening period of the determinate number of years. But he is not speaking truly. For whether the time it took for Socrates to have been born, after the birth of Sophroniscus, has been determined or whether it has been taken as undetermined, it is not true to say that since Sophroniscus has been born, it is true that 'that, which is later', namely Socrates, 'has' also 'come to be'. 'For during the intervening' interval of the determined time it is false to say that this one, Socrates, is born 'when one of them has come to be', that is, on account of the birth of Sophroniscus.

95a35 The same account [holds] for what is future, too: [it's not that, since this has come to be, that will be. For the middle term must be akin, past for things that are past, future for things that are future, coming to be for things that are coming to be, present for things that are present. For it is not possible for something to be akin to past and future.]

95a39 Further, [the intervening time] can be neither indeterminate [nor determinate, for it will be false to say [this] during the intervening time.]
For after the birth of Sophroniscus, the one who says ‘Socrates will exist’ during the intervening twenty years will speak falsely, whether you take a certain determinate time, such as ‘after ten [years] Socrates will be born’, or even if you take an indeterminate time, such as ‘Socrates will exist after the passage of years’.

95b1 We must investigate what renders things continuous [so that, among things, there is coming to be after having come to be. But isn’t it clear that what comes to be is not next to what has come to be? Nor is what has come to be [next to] what has come to be. For they are limits and are indivisible.]

The proposed object of investigation is more appropriate to the discussions concerning motion in the fourth book of the Physics, where he treats coming to be in greater depth. But here he digresses a little from the matters that he took up and teaches about the entailment between causes and effects. And since he said that causes differ in time (for causes are given as being or as having come to be, and so on) since after such causes come to be we see the effects come to be, for example after the birth of Sophroniscus we see the birth of Socrates also follow, or after the abduction of Helen came to be [we see] the occurrence of the destruction of Troy follow, we investigate whether, among things that are involved with coming to be and passing away, the coming to be of the causes and the coming to be of the effects are something continuous (so that after Sophroniscus was born the birth of Socrates follows) and whether there is something that renders them continuous, that is, whether there is a boundary by which these two instances of coming to be, I mean of the cause and the effect, become continuous. So he offers his reply in the form of a question and vehemently denies that there is a difficulty by saying ‘isn’t it clear that there is not a boundary that renders continuous these instances of coming to be?’ And this is how he establishes this point. Limits are not continuous. The limit of a line is a point. Now one point is neither continuous with nor next to another. For we call continuous those things whose limits are together. Now if, insofar as they are limits, points are without parts and are indivisible, then if we should grant that they are next to one another and are rendered continuous, and continuous things are those whose limits are together, we consequently grant that these points too have limits. And if a point has a limit, and a limit is different from that of which it is a limit, the point will have been broken into parts and will be divisible into the limit and that which is limited by it, which would be impossible. By using this argument he shows that it is impossible for a thing that comes to be and has not yet been completed and finished, and has not yet taken the form appropriate to it, to be next to and continuous with what has
come to be.\textsuperscript{359} For how will the birth of Socrates be continuous with
the birth of Sophroniscus? For [on this account] Sophroniscus has
been born, but Socrates is still coming to be and developing in the
mother of his mother.\textsuperscript{360} So that which has come to be is a limit and
is without parts. So how will the limit be rendered continuous with
what comes to be? For if we grant that it is rendered continuous with
it, that which has come to be, which is a limit, will have another limit
which is limited by it, and the limit will be divisible and broken into
parts, as has been proven for the point. So if it is impossible for two
things that have come to be to be rendered continuous with each
other (for as we said, they are limits), if the things that are akin and
of the same time are not continuous, how will that which is coming
to be be rendered continuous with that which has come to be, given
that they are not akin to the same thing? But we must say how that
which has come to be and the movement are [each] a limit. For just
as when a motion is occurring\textsuperscript{361} the briefest momentary stop of
motion is said to be a movement since it is a partless limit of
motion,\textsuperscript{362} so too the stop of the house (it is the comprehensive
assembly of the whole house) [in the process of] coming to be is said
to have come to be and is a limit of the [process of] coming to be.

95b5 Just as points are not [next to each other, neither are
things that have come to be. For both are indivisible. Nor, for
the same reason, is what comes to be [next to] what has come
to be. For that which comes to be is divisible, but that which has
come to be is indivisible. So just as a line is related to a point,
so is that which is coming to be to that which has come to be.]

By means of this [discussion] he establishes how [it is the case that]
what has come to be is not rendered continuous with what has come
to be. And he says: The point and that which has come to be are the
same by analogy. For, just as the point is a limit of a line and is
without parts and is indivisible, so that which has come to be is a
limit of [the process of] coming to be and is without parts and is
indivisible. So, just as points are not rendered continuous with each
other, so two things that have come to be will not be rendered
continuous. For both, the point and that which has come to be, are
indivisible since they are limits.\textsuperscript{363} Accordingly, for the same reason,
that which is coming to be will not be rendered continuous with what
came to be. For that which has come to be is also an indivisible limit.

95b9 For an infinite number of things that have come to be
belong in what is coming to be.

For ‘what is coming to be’ think of the house that is being built, for
which while it is coming to be there are an infinite number of things
that came to be beforehand. For first there came to be an excavation and [then] a foundation and a wall.\footnote{364}

\textbf{95b10} [These matters need to be discussed] more clearly in\footnote{365} the general writings [concerning change].

Here what we have said about coming to be and things that have come to be is vague, only as much as suffices for us in the present treatise. We talk about these things in a way that is more general and in greater depth in the \textit{Physics}, in which he presents a general teaching about every motion. For coming to be is a kind of motion.

\textbf{95b13} Now [let this much be assumed] concerning how [things might be for the middle term (the cause)] of a process of coming to be that consecutively comes to be.

It was not in vain that Aristotle proved that causes and effects that are not at the same time, and the [processes] by which they come to be (the births of Sophroniscus and Socrates) are not continuous. Rather [he proved this] in order to prove that they are consecutive. For if they were continuous, the causes would not immediately follow the effects, nor would the coming to be [of one have immediately followed] the coming to be [of the other], but it would have been possible to have taken middle [terms] between them without end, and the cutting of the premises would never have ceased. But demonstration does not come from mediated [premises]. Since the processes by which causes and effects come to be are consecutive, and things that are consecutive are immediate, and demonstration come from immediate [premises], it follows that causes necessarily and immediately follow things that have been posited as the effects [of these causes]. For even if in reality\footnote{366} the causes come to be prior to the effects\footnote{367} (for first Sophroniscus was born, and then, accordingly, Socrates, and first the foundation, then the house), nonetheless in a deduction you need to first take the coming to be of the effect so that the coming to be of the cause would accordingly necessarily follow. For if Socrates has been born, Sophroniscus too necessarily [has been born]. We say that consecutive things are those between which there is nothing of the same kind.\footnote{368} For example, Socrates will be said to stand next to Plato, if between them there enters no man or horse or anything else that is of the same kind. But if someone will say ‘Surely there is air between them’ this will not refute the definition of the consecutive, that has been stated. For air is not of the same kind as they are. For air is not classified\footnote{369} under the genus of living thing but under inanimate substance. Now let there be ‘this much’ discussion concerning how the middle term, the cause, stands in the case of processes of coming to be that are consecutive and are not continu-
ous, that is, we say [only] this much, as much as is pertinent to the present treatise. For it suffices to know on the basis of these [considerations] that causes immediately follow the effects. His teachings on these matters will be in greater depth in the *Physics*.

95b14 For in the case of these things too it is necessary [that the middle term and the first term be immediate. For example, A has come to be, since C has come to be (C has come to be later, and A, earlier, ...]

That is, in the case of [situations in which] the causes and the effects are not at the same time, ‘the middle term’ (the effect) ‘and the first term’ (the cause) ‘are immediate’. For take A to be a cause (a foundation) and C, to be the middle term, [which is the] effect (a wall), and D the minor term (a house). Now the coming to be of the foundation immediately follows the coming to be of the wall, and that of the wall [immediately follows] that of the house. For example, since C has come to be, A too necessarily came to be. In the syllogism C has been taken first, then A, but in regard to how ‘things’ come to be, first A came to be; then C.

95b17 ... and C is the beginning since it is nearer the present, [which is the starting point for time]. But C has come to be if D has come to be. So if D came to be, then A must have come to be. The cause is C. For if D came to be, C must have come to be, and when C has come to be, A must have earlier come to be.

Just as the line is divided at a point, which point, where the division of the line occurred, was the end of the one segment but was the beginning of the other segment, so, although it is continuous, time is divided at the present. By ‘time’ understand this very day. Now while the day is occurring continuously, whenever and in whatever part of the day you conceive the present to be, you right away divide it into two segments, and the present is the end of the past part of the day, but the beginning of those of its parts that have not yet come to be.

So if the processes by which things come to be are in time, nonetheless time has continuity because the sun always moves, for, as we often said, time is measured by the motion of the sun. Since the processes by which things come to be are observed as in time, they too seem themselves to be continuous, on account of the continuity of time; but they are not. For they are divided from another. And it is clear that the birth of Sophroniscus has come first, and then, that of Socrates accordingly followed, and the foundation [came] first, and then the wall. For they are consecutive, and consecutive things are divided. So also in the case of processes of coming to be, for example, for the building of a house, that which has come to be later, for
example, the wall, is near the present, but the coming to be of the foundation is far from this present, when the wall was assembled. And this is why one must take C as first in the syllogism; then A will follow this. For just as the present, since it is the end of the time that has passed, necessarily also carries with it those parts that have come to be of past time, so too the wall that has now been assembled is the end of those processes of coming to be that have come to be beforehand. When the end has been posited the things before the end are necessarily carried with it. In [the context of] a syllogism, C should be taken as a beginning on account of its being near the present, and this very present is [the] beginning of future time and [the] end of past time.

95b22 Will someone who takes the middle term in this way [stop at something immediate] ...

That is, if you take what is later as first in [the context of] a syllogism, that which is first will necessarily immediately follow. For the foundation immediately follows the coming to be of the wall, and that of the wall [immediately follows] the coming to be of the house. If for some reason the causes do not immediately follow the effects, you must take their middle terms, and by doing this you would stop at immediate premises. For example, if someone were to take A to be cutting of stone, C to be foundation, and D to be house, the causes do not immediately follow the effects. But if you were to take digging to be between [the terms] of the major premise, and the wall as a middle term for the minor [premise], you would discover the immediate premises.

95b23 ... or there will always be something in between because of the infinitude.\[375\] [For, as we said, what has come to be is not next to what has come to be.]

Now that he has said that we should go down to immediate premises when taking the middle terms for both the major and the minor premise, he added ‘or will there always be something in between’ in order to eliminate a certain suspicion.\[376\] For perhaps someone supposed that causes and the effects never stop at immediate premises since they are in time, time is continuous, the continuous is infinitely divisible, and it is always possible to conceive of a time different from the time taken. He says [this] for this reason: otherwise, because of the infinitude possessed\[377\] by time on account of its continuity, you will think that the causes and effects and processes by which they come to be are infinite, and that it is always possible to take middle terms for these, into infinity. So he eliminates this suspicion by saying that even if time is continuous and for this reason is infinitely
divisible, nevertheless the things in it are not continuous but are divided. For it has been proven that what has come to be is not next to and is not continuous with another thing that has come to be. Since the syllogism proceeds not according to time but according to [how] things [are], there is nothing amiss in taking immediate premises in demonstrations, even if time is continuous.

95b24 But nonetheless [one must] begin [from what is a middle term378 and that which is first [in order] from the present [instant].]

That is to say, even if it has been proven that the processes by which causes and effects come to be are immediate, nonetheless in [the context of] a syllogism one must begin from the first middle term, that is, the one that is near the present,379 and accordingly, there will necessarily follow that which has come to be beforehand.

95b25 Things are similar in regard to the future. [For if it is true to say that D will be, before this it must have been true to say that A will be. C is the cause of this. For if D will be, C will be, earlier. And if C will be, before this, A will be.]

Just as when you are making a deduction about things that have come to be you begin from things that are later, so [when you are making a syllogistic deduction] about future things you must begin from the things that are later, so that what is first will follow. For if there will be a house, there will be a wall, and if a wall, there will be a foundation too.

95b29 Similarly the cutting is indefinite [in these cases, as well. For future things are not adjacent to one another. But in these cases too an immediate principle must be assumed.] The middle term of the premise is a cut. For if the premise that ‘a human being is an animal’ is taken, [then] since it is mediated, you will divide it in two when you take ‘rational’ as a middle term.380 So likewise in the case of future causes and effects it would seem that the cutting of the premises by means of taking a middle term goes on indefinitely. This is because these things are in time, and this is continuous. But it is not so. For among them too there are immediate premises. For just as the things that have come to be are not continuous, likewise one thing that is future is not adjacent to and continuous with what is future, but they have been divided. For precisely this reason the future causes and effects are immediate. So one must discover a principle and immediate premise ‘among these’ future [events], ‘too’.
This is how things are among events. [If a house has come to be, stones must have been cut and must have come to be. Why is this? Because a foundation must have come to be, if a house too has come to be. If a foundation has come to be, stones must have previously come to be. Again, if a house will be, in the same way, before that, there will be stones. This is proven in like manner through the middle term. For before that, there will be a foundation.]

Now that he has given examples of what he is saying by using letters, he now gives examples of these things ‘among events’ themselves, that is, among things. First he offers examples of past [events], and then of future [events].

Since among things that come to be we see [a certain cyclical generation, this is possible if the middle term and the extremes follow one another. For in such cases conversion is possible. This, that the conclusions convert, has been shown in the first [chapters]. And this is cyclical. This is apparent among events. For when the earth has gotten wet a mist must come to be, and cloud necessarily came to be] when this came to be, and water, when this came to be. And when this came to be, the earth necessarily has gotten wet. But this was what happened at the beginning, so things have gone round in a circle. So when there is any one of these whatever, there is another, and when that is, another, and when this is, the first thing.]

He proved that, when causes and effects are not at the same time, if that which is later has been taken as the first in a syllogism, the cause immediately follows. But since we see ‘a certain cyclical generation’, ‘among’ natural ‘things that come to be’ (he calls ‘coming to be’ the things that are not beings and are not constituted by virtue of completeness in all parts but have their being in their always naturally coming to be at one time or another) and when there is cyclical coming to be, it is possible for the extreme terms and their middle term to follow each other. For there is a circular proof for these coextensive and converting terms. It was also shown by means of a more general argument earlier, in the second book of the Prior Analytics, that conclusions convert with premises and premises with conclusions, when one takes terms that are properties and coextensive. For sometimes the conclusion is an effect, and sometimes it is the cause and the premises are effects. In the case of individual naturally occurring events, what makes cyclical coming to be is this: taking cases of coming to be that are coextensive and convert with one another and [taking] the cause and the effect as one and the same whichever one you take. For example, ‘when the earth has gotten wet’
from the rain (this [is taken as] the cause) ‘a mist must’ be given off by the earth (this is the effect). ‘And when this came to be’, that is, when vapour given off by the earth goes up and is out of the reach of the reflections from the sun, a thickening of it occurs. And when it has been thickened a cloud comes to be. Water is condensed when a cloud comes to be. Since a condensation of water is heavy and cannot stay up it is again born downwards, and the result is that the earth gets wet. That which at the beginning was taken as a cause has now become the effect and it came around in a circle. For just as the circle begins at the very same point where it stopped, so also in these cases which we mentioned, where we began, there we stopped. But also in regard to some other [point] of the [processes] we mentioned, where you begin, there you will stop, since [the process of] coming is cyclical. For example, when clouds come to be, water comes to be. But when water comes to be, the earth gets wet. And when this has gotten wet a vapour is given off and forms a cloud.

396,1 96a8 There are some things that come to be universally [(for they hold or come to be in a certain way both always and in every case), and some things do not always [hold or come to be], but [do so] for the most part, for example, not every male human being grows a beard, but [this happens] for the most part.]

Again he presents a distinction [to be made] among the middle terms taken in demonstration. And he says that since there are things or processes of coming to be that are eternal and necessary, or are for the most part, if that which is proposed for demonstration is among the things that always and necessarily hold in such and such a way, the middle term too must be such a thing, that is, it must necessarily and always hold in such and such a way. For example, if someone is seeking a demonstration of [the fact] that heaven moves in a circle, ‘imitating intellect’ must be taken as a middle term. Let the following be an example of what always comes to be. If the reason why autumn comes after summer is under investigation, you must take as middle term [the fact] that the sun turns towards the [parts that are] antipodal to our region, that is, [it turns] around the southern parts (for we live around the northern zone), and say ‘after summer the sun turns towards the parts that are antipodal to our region, and when it turns towards this zone it becomes autumn’. Now Aristotle mentions two [kinds of things], those that always hold in such and such a way and those that are always coming to be. And we say that the circular motion of the heavenly body or of the sun or another star always holds in such and such a way because it is uninterrupted and is continuous. But we say that those things are always coming to be for which the process of coming to be involves some interruption, as autumn [comes to be] after summer and after
this, winter, and after winter, spring, and they always come to be in this way. This is an example of things that are for the most part: if it was proposed to demonstrate why the chin of a male grows hair (for this does not always occur but it occurs for the most part, for we see that up to their old age certain males never grow hair in their beard) take as middle term: the exuding out of the beard of a sooty and smoky exudation during the drier time of the life of a male, which [exudation] also produces hair. Here ‘universally’ is to be taken in the sense of ‘necessarily and always and in every case’ as was said in the book prior to this.

96a11 Now, in such cases [the middle term too must be for the most part. For if A is predicated universally of B, and this universally of C, it is also necessary that A be predicated of C always and in every case. For this is the universal, that which is in every case and always. But it was supposed to be for the most part. The middle term B must therefore also be for the most part. So there will be immediate principles for things that are for the most part, too, which are or come to be in this way, as for the most part.]

For things that are for the most part one should take the middle term too as for the most part. He proves that the middle term in these cases must be such a thing, by reductio ad impossibile. Let AC be the conclusion that is inferred through the middle term B as for the most part. I also say that B too has been taken as for the most part. But suppose someone objects: let B, the middle term, be one of the things that are always and by necessity. Since the middle term is the cause of the combination of the two premises by virtue of [the fact that] it is the subject of the major term and is predicated of the minor term, the premises too must be necessary. If these are necessary, the conclusion AC will also be necessary. However, the conclusion was posited as being for the most part. Now it is impossible for the same conclusion to be both necessary and for the most part. But since the impossible [conclusion] was inferred from the supposition that B is necessary, it necessarily follows that B is for the most part. So this is how, he used a reductio ad impossibile applied to letters to prove that when things are demonstrated [to hold] for the most part the middle term too is for the most part.

[Chapter 13]

96a20 So how the what it is is rendered in definitions [and in what way there is or is not a demonstration or definition of it, has been previously stated.]
Above he made many inquiries into definition. Since he found that the middle term taken in demonstrations is not only the definition but is also the other causes (efficient, final, and material), it was with an eye to this that he taught about the other causes as well, how middle terms are taken, in what respect they differ from each other, and what sort of entailment there is for them within a syllogism. Now that he has completed [his account of] these matters he again turns back to definition, and after he sums up the things that he had said about it he adds even more things that he said about definition. ‘Now how the what it is’ and the definition are ‘rendered in definitions?’ Three terms are taken in a demonstrative syllogism. In which of the three terms is the definition laid out? He said that it is taken as a middle term. ‘And in what way is there demonstration’ of it? For there is no demonstration of it since it does not occur as a conclusion of a demonstration. But there is, insofar it is culled from the demonstration. And in what way is there a definition of it, and in what way is there not? There are four ways in which he gave definitions of definition. One says ‘a definition is an account interpretative of what the word means’, which is called a nominal [definition]. Another is ‘an indemonstrable account of the what it is’. And another is ‘a conclusion of the demonstration of the what it is’. Moreover there is this: ‘a syllogistic deduction of the what it is differing from demonstration in how the terms fall’. Now of the four definitions of definition that have been given, the one, the nominal [definition], is not a definition of definition. But the [other] three are definitions of it. But we should first talk about number, so that the argument in the passages before us might be easy for us to follow. Some numbers are prime and incomposite, some are prime and composite, and some are secondary and composite. Sixteen is both secondary and composite. For it is divided when split in two into its smallest parts, eight and eight. But it is also divided into smaller parts, four [parts of] four. Now sixteen is composite insofar as it is made up of two eights. It is called secondary because it is measured by four, four times. For that which measures is prime in respect to that which is measured. Nine too is secondary and composite. For by splitting it in two it is divided into its two largest parts, four and five, out of which it was composed. You will divide it into its smaller, that is, three threes. Now nine is secondary because three measures it three times. Seven is said to be prime and composite, prime because it does not have any number that measures it by multiplication, and composite insofar as it is divided into its two largest parts, three and four, which are also [numbers] out of which it is composed. Eleven is also this sort [of number]. Three is prime and incomposite, prime because it does not have a number that measures it, except for the monad (which is not a number) taken three times. Nor is it made up of two
numbers. For it is made up of a dyad and a monad. But the dyad too is prime and incomposite.398

96a22 [We should now state] how one must hunt the things [predicated] in the what it is.

Instead of saying ‘definitions’ he said ‘the things predicated in the what it is’.
For in fact the definition too is predicated in the what it is of the defined.

96a24 <Of the things that always belong to each [particular], some extend> [more widely than, but not outside the genus. By ‘belong more widely [than it]’ I refer to all of the things that belong to each thing universally, but also [belong] to something else. For example there is something that belongs to every triad, but also to what is not a triad, as being belongs to triad, but also to what is not a number, yet odd also belongs to every triad, and belongs more widely than it (for it belongs to five too) but it does not [belong] outside of the genus. For five is a number but there is nothing odd outside of number. Such things ought to be taken up to this point, until there is first taken all of those things of which each will belong more widely than it, but all of them together do not [belong] more widely than it. For this must be the essence of the thing. For example, to every triad there belongs number, odd, prime in both ways (as not being measured by a number and as not being composed of numbers). Now this is actually what a triad is: a number that is odd, prime … ]

There are some things that are predicated of what is defined which do not go beyond and extend more ‘widely than the genus’ under which the defined is classified. For example, let triad be defined, and let being be predicated of it in the what it is. This ‘being’ goes beyond number, the genus of triad. For being is predicated not only of triad and four and the other numbers but also of intellect and soul and of human being, which are not numbers. Odd too, which is not observed to extend more widely than number but is predicated of things that are included in number, such as triad, five, [and] seven, is predicated of triad in the what it is. Now if something is proposed to be defined and you intend to discover its definition, you must take some of the things that are always, that is, necessarily, predicated of what is defined in the what it is, yet are not observed outside of the genus under which the thing to be defined is classified and [are not observed to] extend more widely than it. By ‘more widely than the genus’ and ‘going beyond the compass of it’ I refer to all of those things that belong universally, that is, necessarily, to each thing that is defined, but not to that alone but also to other things. Now one must take as
first all of those things that are such as to extend more widely than what is defined but do not go beyond its genus, and are predicated in the what it is, up to the point where that which is composed of all of the parts is coextensive with what is defined. For while each part of the definition extends more widely than that which is defined, all of them when taken together as a unity, would establish that which is defined alone, and are not observed to extend more widely than it. This composition of the parts of the definition, which is predicated in the what it is of the defined, must be the essence and the definition of the thing that is defined, since it is coextensive and converts [with it].

\[96a38\] ... and prime in this way. [For each of these [belongs]: those belong to all of the odd [numbers], and the last to the dyad as well, but all of them [belong to] nothing [else].]

That is to say, [it is] prime in both ways, as not being made up of numbers and not being measured by number.

‘The last’ is that which is prime in both senses.

\[96b1\] Since we have shown [above that the things predicated in the what it is are necessary\[399\]...]

He proved that if someone should take all of the things predicated of the defined in the what it is and will put them together so that they are coextensive with what is defined, he will complete the definition. This is how he proved that the things taken in the what it is for the completion of the definition necessarily belong to what is defined. He will prove this by means of a first figure syllogism, as follows. All of the things in the what it is are predicated universally of that of which they are predicated. Things predicated universally are necessary. So all of the things in the what it is are necessary.

\[96b3\] (and things that are universal are necessary), [and since for the triad and for anything else that is [defined] in this way, the things that are in the what it is are taken in the what it is, accordingly these things must be a triad. It is clear from these [considerations] that [they are the] essence. For if this is not being a triad, it must be a sort of genus, either with or without a name. So it will belong more widely than triad. For let it be supposed that the genus is the sort of thing that by virtue of its power belongs more widely. So if it belongs to nothing else but the indivisible triads, this would be the being for triad (for let this too be posited: the essence of each thing is the ultimate such predicate for the indivisibles. So this is how things will be for
the being of a thing, for anything else that has been shown in this way.]

‘And’ has the sense of ‘for’. ‘For things that are universal are necessary’.400

[Since ‘for the triad’, that is to say, for the definition of triad, ‘or for anything else’, that is, in the case of something else which is defined,401 whether human being or horse, all of ‘the things that are in the what it is’ are taken as in this way: as essentially and necessarily predicated of what is defined, the triad would of necessity be like this: prime (in both senses) odd number. It ‘is clear from these [considerations] that the things we said are the essence and the definition of triad. For if the being of triad, that is, this definition, is not this, in other words, if ‘a number that is odd etc.’ is not its definition, it will be a ‘genus, with or without a name’. For only definitions and genera are predicated of the things of which they are predicated in the what it is.402 So if ‘number odd prime (in both senses)’ is not the definition of triad, it would be a nameless genus of it. For a genus with a name is one referred to by a single word, for example, animal, number, colour. But a nameless genus is one which is referred to by two or more words, such as rational animal. So if the definition that is rendered is a genus, it would extend more widely than triad, that is, it establishes not only that but also something else.

‘For let it be supposed’, that is, let it be assumed as a matter of agreement, that ‘the genus is the sort of thing that by virtue of its power ...’ that is, is potentially403 predicated more widely than that of which it is said to be a genus. For example, animal is said to be the genus of human being, but it potentially comprehends within it horse and ox etc., since it extends more widely than human being. So if the stated account belongs to nothing else ‘but’ only ‘to the indivisible triads’, the particulars, it follows that this is the being and the definition of triad. ‘For let this too be posited’ and assumed as agreed upon: that ‘the essence’ and ‘definition of each thing is the ultimate predicate’ observed ‘in the indivisibles’ that are under the species for which the definition was given. For example, animal rational mortal, which is the definition of human being, is ultimately predicated of the particular human beings alone.

Not only for the triad will you discover the definition in this way. Likewise, for any other thing whatsoever, too, its being and definition, which is hunted, will come from ‘the things that are shown in this way’, from the things predicated in the what it is. (In some manuscripts, you will find ‘from the things that have been taken in this way’.404) But if someone were to say, ‘Aristotle, how can you say that definition is made up of all of the things in the what it is? You said that definition is made up of a genus and constitutive differen-
But the differentiae are predicated in the “what sort of thing it is”, we say to him that the differentiae are predicated in the what sort of thing it is, but [this is so when these are] taken themselves by themselves apart from the genus. But if they are taken with the genus, they are no longer called differentiae but nameless genera, and genera are predicated in the what it is. For example, ‘rational’ and ‘mortal’, considered as rationality and mortality, are differentiae and qualities predicated in the what sort of thing it is, but when they have been taken with animal they are nameless genera.

When someone is dealing with a whole, he should [divide the genus into the primary things that are indivisible in species, for example, number into triad and dyad, and then in this way try to take their definitions, for example of straight line and circle, and of right angle ...]

By ‘whole’ understand the genus, as it was called in ‘The Five Terms’, and the most specific species are parts of it. The most specific [species] are called ‘indivisible in species’ on account of [the fact] that they are divided into neither differentiae nor species. It makes sense that ‘in species’ was added, [this was] in order to distinguish the most specific species from particulars. For these are called indivisible in number. For Socrates too is indivisible and one in number, but the universal human being is indivisible in species. For it is one in species, even if it is divided into many particulars. Now that he has taught a method by which you will discover the definitions of the most specific species, he teaches another by which one can discover the definitions of the genera. The method goes like this. Take the genus, he says, and divide it into the most specific species. For example, [taking] line as genus, divide [it] into straight line, circular, helix and the [line] that is called ‘crooked’. Then take their definitions, and the part of the definition that you will discover to be observed common to all of the species is the definition of the genus. For example, a straight line is a breadthless length of which the parts are in front of the extremities. A circular [line] is a breadthless length of which the straight lines that extend from the centre to the circumference are equal to each other. A crooked [line] is a breadthless length made up of a straight and circular line. So since ‘breadthless length’ is observed to be common in all of these, this is [the] definition of the genus. And, again, number is the genus of dyad and triad. Now the definition of triad is a multitude of monads divided into unequals when split in two. Dyad is a multitude of monads divided into equals. So since ‘multitude of monads’ is common in both, it follows that this is [the definition] of number.

‘When someone is dealing with the whole’, that is to say, when he tries to acquire a definition of the genus, he must ‘divide the genus’
whose definition he is seeking to discover into the things that are ‘indivisible in species’, for example, angle into right angle and into acute and into obtuse. A right angle is an inclination of a straight line on a straight line that is perpendicular. An obtuse [angle] is an inclination of a straight line on a straight [line], that is not perpendicular but makes an angle larger than a right [angle]. <An acute [angle] is an inclination of a straight line on a straight [line] that is not perpendicular but makes an angle less than a right [angle].> Since ‘inclination of a straight line on a straight [line]’ is common in these, this is [the] definition of angle.

96b19 And, after this, taking what is the genus, [for example, whether it is of quantities or qualities ...]

In other words, after dividing the genus into species and taking from their definitions that which is observed in them to be common, just as we took breadthless length, so you must also take the genus under which line is classified. It is quantity. So bring together with quantity that which is observed to be common to the species and say ‘a line is a quantity [which is] breadthless length’. For such things you will discover that the genus is quality or another of the categories.

96b20 ... one must consider the proper attributes [by means of the common [attributes] that are first [observed].]

The attributes observed to be common in the species are proper [attributes] of the genus, which also constitute its definition. Now the proper attributes of the genus are discovered from ‘the common attributes that are observed’ in the species. Understand ‘first’ as follows: these common attributes are observed to be first among the species, since they belong later, to the genera, through the species.

96b21 [For the things that hold] of the things composed of indivisibles [will be clear from the definitions ...]

That is, <the things that hold <of the things composed> of most specific species (we said that the genus is a whole made up of the species as parts) – the proper attributes of the genera, their definitions – ‘will be clear from the definitions’ of the species.

96b22 ...because definition and the simple are the principle of everything [and the things that hold belong per se to the simples alone, but to the other things by virtue of them.]

Understand by ‘simples’ the most specific species. For while a genus is a whole, they are parts of the whole, and the part is simpler than
the whole. Now the definition of the species, and the most specific
species themselves, which he also calls simples, are assumed by us
as principles that lead to the discovery of the definitions of the
genera. For every simple is said to be a principle of the composite and
that by which we are led to the discovery of something. Now the
attributes that hold of the simples, that is, of the most specific
species, belong in themselves to them both as primary [subjects] and
[to them] alone, ‘but’ [they belong] ‘to the other things’, to the genera,
in a secondary way ‘by virtue of them’, that is, because of those
species.\textsuperscript{419}

96b25 The divisions in respect to the differentiae [are useful in
this pursuit. Now how they prove has been discussed above.
They could be useful for deducing the what it is only as follows.]
First, in the \textit{Analytics} and in this book he repudiated division on the
grounds that it makes no contribution to and is useless for the
discovery of definitions, in the manner in which the Platonists used
[it] for them.\textsuperscript{420} But here he accepts division as contributing to the
discovery of definitions. Still, if someone were to employ [it] in the
manner he is about to describe, that is nonetheless not how the
Platonists employed it.

To say ‘divisions in respect to the differentiae’ is the same thing as
to say ‘[divisions] through the differentiae’. For the genera are di-
vided into the most specific species through the differentiae, which
are middle terms.\textsuperscript{421} Now divisions are useful in regard to definitions
when in pursuit of them in the manner that he is going to describe.
How the Platonists prove definitions from divisions was described
above. Divisions ‘could be useful’ in this way: ‘for deducing’ and
inferring the parts in ‘the what it is’, that is, [the things] that make
up the definition. For definition comes from genus and differentiae.
And these are discovered from division.

96b28 And yet they might seem to be of no worth\textsuperscript{422} [but [might
seem to be a matter of] assuming everything right away, as if
one assumed [them] from the beginning without division.]

After he described the usefulness of division, he again repudiates
Plato for saying that it is by means of division that he deduced and
demonstrated the parts of definition that are observed in the things
defined. And yet it would seem that division does not deductively
demonstrate that the parts of definition belong to the things that are
deﬁned, but it begs the question and starts off by assuming them all
as matters of agreement, as ‘if one assumed’ them ‘from the begin-
ning without division’. For just as this one does not demonstrate,
neither does that one.
96b30 But it makes a difference which [of the things predicated are predicated] first or later, [for example, [it matters whether one] says ‘animal tame biped’ or ‘biped animal tame’.] He is here speaking of the usefulness of division. By ‘first’ he means the universal inclusive differentiae, and by ‘later’ those that are included, as rational includes mortal and terrestrial and bipedal. Now division contributes to knowing what sort of differentiae are more general and what sort are more particular, so that, in good order, the universal ones are first taken in a definition and after these the particular. For taking one of the predicated differentiae first and another one later, in a <non>random manner, makes no insignificant difference. For example, the one who says that human being is ‘animal tame biped’ has spoken well. But the one who says ‘biped animal tame’ says things that make no sense. For he makes one suspect that there are certain bipeds that are not animals. For the differentiae that come second particularize those that come first. For example, when the differentia mortal was added to rational animal it particularized the latter. So when biped comes before animal, it seems to be more universal than it.

96b32 For if everything comes from two things [and ‘animal tame biped’ is a single thing, and, again, from this and the differentia [there is] human being …] [This is an] a fortiori argument. And he says: ‘for if definition is made up of two parts, namely, of a genus and a single differentia, and division cannot take these through demonstration, but when it assumes these as agreed upon it begs the question, a fortiori, if the definition has many parts, it would not have been possible to take these demonstratively and by means of a deduction’.

Concerning the same text: ‘For if everything’, that is, [if] every definition is made up of two particular terms, for example, ‘animal tame biped’. Now, tame animal is to be taken as ‘a single thing’, a nameless genus, and biped [is to be taken] as a differentia. And again, the definition of human being is made up of this, that is, that which is taken as a genus, tame animal, and a single differentia, biped.

96b34 … or whatever is the unity that comes to be, [the one who engages in discussion must beg the question.] That is to say, when there is any other thing to be defined, the one engaging in discussion, in other words, the one who takes these things from division, ‘must beg the question’.
Further, [in this way alone is it possible to] leave out none of the things [in the what it is].

Further, division is useful in regard to leaving out none of the differentiae in the what it is, that is, none of the things that contribute to the definition.

‘In this way alone’ that is, by means of division.

For whenever the first genus is taken [if someone takes one of the lower divisions, not everything will fall in it, for example, not every animal is either whole-winged or feathered, but every winged animal is. For it is a differentia of this. The first differentia of animal is that under which falls every animal. Things are like this for each of the others, both the genera outside of it and those under it, for example, for bird, it is that into which every bird [falls], and for fish, that into which every fish [falls]. So one who proceeds in this way can know that nothing has been left out. But one who proceeds otherwise must leave things out, and not know it.]

First, take as genus animal, presented without a differentia. But that which is presented along with a differentia, as is tame animal, is not the first genus, because of its being classified under animal without qualification. For example, the first differentia of raven is not winged animal, but animal, and of human being it is not rational animal but animal. Here he intends to teach how we might be able to know whether the one who is dividing left aside a differentia, and says, if the first genus, animal, is taken in a division, and if it is divided into the proximate differentiae, terrestrial, winged, and swimming, all of the species of animal must fall into one of these. But if in the course of dividing those [differentiae] that are proximate to animal, you should also take not these differentiae, but certain other differentiae, which are not [proximate differentiae] of animal but are of one of the proximate differentiae of animal, not all of the species of animal will fall into these differentiae. For if animal were divided into whole-winged and split-winged, not every species of animal will fall into these. For human being and horse are neither whole-winged nor split-winged [animals]. And it is clear that the whole-winged and the split-winged are not proximate differentiae of animal but of winged.

For [the animals] called whole winged are either the [species that are] membrane-winged such as bat, or those that are sheath-winged, such as cicadas and flies.

Concerning the same text: ‘For whenever the first genus is taken’. If the one who is making a division takes not proximate differentiae of animal but some [differentiae] which belong to ‘the lower divisions’, that is, some of the differentiae discovered from the division
and below the differentiae proximate to animal, such as whole-winged and split-winged, not every species of animal will fall into these; rather, all of the winged animals fall under these differentiae. For they are differentiae of winged animal, not of animal.

‘The first’ and proximate ‘differentia of animal is that under which’ fall all of the species of animal. You should note that instead of saying ‘differentiae’ he says ‘differentia’. For every genus is divided into at least two differentiae. In the case of each of the others he likewise took up animal in presenting the division of the genus, and says, if you like, also take another genus observed to be either external or internal to animal. External to animal is the genus inanimate or [the genus] plant, which is contradistinguished from animal. For plants are alive, but have no perception. Take bird as a genus which is classified under animal itself. Should you divide into its proximate differentiae a genus of the sort that you are taking all of the species that are under it will fall under them. But if you should divide not into the proximate [differentiae] but into other differentiae that are beneath those that are proximate, the species that are under it will not fall into them.

When you proceed in this way, that is, when you employ this rule while dividing, it will allow you to know whether you left out any of the differentiae proximate to the genus. When you divide in a different way and not according to this rule you will necessarily leave out differentiae, and you will be unaware that you left [them] out.

97a6 It is not necessary for the one who defines and divides [to know⁰ altogether everything that is. Yet some say that it is impossible to know⁰ the differentiae in regard to each thing if he does not know⁰ each thing.]

He says this when he does away with the arguments by which Speusippus⁴²⁹ tried to do away with both division and definitions. For he tried to prove that it is not possible to give a definition of something, when he said that the one who wants to establish through definition the nature of a human being or horse or anything else needs to know all beings and their differentiae, by which they are different from each other. For in this way the nature of human being or horse or anything else is established, by their being separated from all other things. But what is separated must be separated through certain differentiae. But since it is impossible to know all things that are or their differentiae, it follows that it is impossible to establish something through definition.⁴³⁰

97a9 But without [knowing⁰] the differentiae it is not possible [to know⁰ each thing,] ...
That is, it is not possible for someone ‘to know’ each thing’ that is to be defined if he does not know the differentiae by which it differs from all other things.

97a10 … for that from which it does not differ [is the same as it, and that from which it does differ is different from it.]

That is, if there is not some differentia by which Theaetetus differs from Dion, they will be the same things and the same people. Or, if you like, take as examples horse and ox. But of different things, such as stone and human being, there are differentiae, by which they are distinguished from one another.

[The most specific species are called primary (we neglected to give an exegesis of this point at the proper place). This is because someone who goes up from the individuals to the genera through analysis first comes to the most specific species, and then in this way proceeds to those above them.] 431

97a11 First, this is false. [For it is not different by virtue of every differentia, for many differentiae belong to things the same in species, but not in substance nor per se.]

After relating these arguments, by which Speusippus overturned both definitions and divisions, he now proceeds to overturn each one of his arguments. For he said: everyone who defines or divides must know all things that are and how they differ from one another. For if the definition separates the thing from all things that are, the one who defines must know the differentiae by which each of the things that are is different from that which is defined. For everything that differs from something is other than that [thing]. He first refutes him on the grounds that he is saying things that are false, since he does not know the things signified by the differentia. For it is ‘not by virtue of every differentia’ that things are distinguished but [on the basis of] only the essential ones. 432 For example, human being and horse are different since they differ from one another in essential differentiae, while Theaetetus and Dion differ from one another in that one is pale and the other is dark, or the one bald and the other with long hair; however they are not different but are the same in species. For they differ in respect to accidents, not essential [attributes].

97a14 Next, when someone assumes the opposites 433 and the differentia [and the fact that everything falls either here or there, and assumes that what is being investigated falls into the one of these, and knows this, it makes no difference whether one
knows or does not know all of the other things of which the differentiae are predicated.]

This argument is for the sake of overturning the argument of Speusippus that says that the one who defines must know all of the things that are and their differentiae by virtue of which they differ from what is defined. He calls ‘opposites’ the opposed differentiae by which animal is divided, namely, rational and irrational. He calls these ‘differentia’ in the singular and not ‘differentiae’ because they are both classified under the differentia. And just as affirmation and denial, which are opposed as contradictories, despite being two, nonetheless have a single name, on account of <the fact> that they are called a contradiction, so too the two opposed terms, rational and irrational, are referred to by a single name, differentia, since they are classified under the same [differentia]. Then when someone takes the genus and divides it into the opposites (which he also calls ‘a differentia’) and assumes ‘that everything’ must fall either ‘here or there’, for example, under rational or irrational, and assumes that what is under investigation, in other words, what is proposed to be defined, is in one of the two, for example, under rational, and knows this (that a human being is rational) with precision, by virtue of syllogistically deducing as follows: ‘human beings practise arts and sciences; everything that practises arts and sciences is rational; therefore a human being is rational’, knowing whether these differentiae, rational and irrational, are or are not observed in the case of other beings, as well, and [if so,] which things that are these are, makes no difference, that is to say, it contributes nothing to it [what is under investigation]. For example, if you are going to define human being and you assume that it is an animal, and every animal is either rational or irrational, and you assume that a human being is rational, it is besides the point to know of ‘all’ things that are, whether they fall under rational or irrational.

For it is clear that if one is proceeding in this way [and arrives at those things of which there is no further differentia, he will have the account of the substance.]

That is, when you descend by means of division, and in turn divide rational into mortal and immortal, and mortal into <receptive of> intellect and scientific understanding <and not receptive of intellect and scientific understanding>, you arrive at the sort of things ‘of which there is no further differentia’, that is, the very thing that cannot be divided into further differentiae, for example, being receptive of intellect and scientific understanding, and from the differentiae that have been divided you will be able to infer ‘the account’ and definition of the substance that is proposed for definition.
That everything falls under the division, [if they are opposites of which there is nothing in between, is not a postulate. For everything must be in one or the other of these, if it is indeed its differentia.]

After doing away with the arguments of Speusippus, by which he [i.e. Speusippus] established that there is neither definition nor division, since he [i.e. Aristotle] too says that definitions are inferred from division, which he himself repudiated when he said that the parts of definition are not inferred from division [to belong] of necessity but that [the one dividing] begs the question,\(^439\) in order that no one might repudiate him on the grounds that we described above, that he falls into the same [mistakes] and that he begs the question when he infers the parts of the definition from division, he takes care of this suspicion. And he says that the one who says that a human being is classified under either rational or irrational does not beg the question. But, to be sure, [a human being] is rational, for a human being must fall under one or the other of these. Clearly, in this case necessity is observed. For the opposed differentiae, rational and irrational, are equivalent to things opposed as contradictories, for [saying rational and irrational] is the same as saying rational and not rational. Now if in the case of things opposed as contradictories, one or the other will necessarily be true of each of the things that are,\(^440\) it follows that in the case of opposite differentiae each thing that is will fall under one or the other of these. But a postulate is not by necessity. That which a pupil does not know on his own, but learns now for the first time when the teacher says it, is called a postulate.\(^441\) For example, ‘the soul is self-moving’.\(^442\) For he will ask the teacher to prove this. Further, it lies outside of the competence of the pupil to grant that this is [the case] or not, and it is not necessary that he be able to grant this. It was reasonable for him to have added ‘of which there is nothing in between’. For if the opposed [terms] are mediated, [as for example [are] pale and dark, it is not necessarily the case that every thing will be pale or dark, but [a thing] can be neither of these, but yellow or grey or golden instead. ‘If it is indeed its differentia’ is added, in order to show that if the opposites are proximate differentiae of animal, such as terrestrial, winged, and aquatic, each of the things that are necessarily falls into one or another of them. But if they are not differentiae of animal but of one of the things beneath it, as are whole-winged and split-winged are of winged, it is not necessarily the case that every animal is either whole-winged or split-winged. For when you arrange it in this way, you will compile the account saying ‘for this will be necessary’. But we ought to understand ‘everything falls under the division’ as having the sense of ‘everything falls under the opposed differentiae that are discovered from the division’.

\(^{439}\) For example, ‘the soul is self-moving’.\(^442\) For he will ask the teacher to prove this. Further, it lies outside of the competence of the pupil to grant that this is [the case] or not, and it is not necessary that he be able to grant this. It was reasonable for him to have added ‘of which there is nothing in between’. For if the opposed [terms] are mediated, [as for example [are] pale and dark, it is not necessarily the case that every thing will be pale or dark, but [a thing] can be neither of these, but yellow or grey or golden instead. ‘If it is indeed its differentia’ is added, in order to show that if the opposites are proximate differentiae of animal, such as terrestrial, winged, and aquatic, each of the things that are necessarily falls into one or another of them. But if they are not differentiae of animal but of one of the things beneath it, as are whole-winged and split-winged are of winged, it is not necessarily the case that every animal is either whole-winged or split-winged. For when you arrange it in this way, you will compile the account saying ‘for this will be necessary’. But we ought to understand ‘everything falls under the division’ as having the sense of ‘everything falls under the opposed differentiae that are discovered from the division’.

\(^{440}\) For example, ‘the soul is self-moving’.\(^442\) For he will ask the teacher to prove this. Further, it lies outside of the competence of the pupil to grant that this is [the case] or not, and it is not necessary that he be able to grant this. It was reasonable for him to have added ‘of which there is nothing in between’. For if the opposed [terms] are mediated, [as for example [are] pale and dark, it is not necessarily the case that every thing will be pale or dark, but [a thing] can be neither of these, but yellow or grey or golden instead. ‘If it is indeed its differentia’ is added, in order to show that if the opposites are proximate differentiae of animal, such as terrestrial, winged, and aquatic, each of the things that are necessarily falls into one or another of them. But if they are not differentiae of animal but of one of the things beneath it, as are whole-winged and split-winged are of winged, it is not necessarily the case that every animal is either whole-winged or split-winged. For when you arrange it in this way, you will compile the account saying ‘for this will be necessary’. But we ought to understand ‘everything falls under the division’ as having the sense of ‘everything falls under the opposed differentiae that are discovered from the division’.
For the purpose of establishing a definition through the theses, one must aim for three things: taking the things predicated in what it is, arranging them in regard to which is first or second, and [making sure that] these are all.

While some of the manuscripts read ‘through the theses’, others read ‘through the divisions’. For opposed differentiae are called theses, insofar as each of the things that are is posited as classified under one of them.

Having shown how definition is hunted, and how division is useful in regard to definitions, he now investigates how it is possible to establish and prove that the definition is not open to criticism, insofar as it is complete and neither has more than is needed nor leaves anything out. It was reasonable for him to say ‘establish’ and not ‘deduce’ or ‘demonstrate’. For not everyone who establishes something establishes it through a syllogistic deduction or demonstration, but a thing can be established by analysis or by division. Since he showed that definitions are neither syllogistically deduced nor demonstrated, he used the term ‘establish’. For he said that definition is discovered from analysis. For the definitions of the most specific species are discovered from the definitions of the individuals and the definitions of the genera are discovered from the definitions of the most specific species.

‘One must aim for three things’ is instead of ‘one must observe three conditions’. The first is taking in the definition ‘the things that are predicated’ of what is defined ‘in the what it is’, that is, [that are predicated] essentially. If someone were to say ‘And yet definition is constituted out of differentiae, and differentiae are predicated in what sort of thing something is; how can he say here that the parts of definition are predicated in the what it is?’ we will say to him what we have often said, that differentiae that have been taken together with a genus are no longer differentiae but are nameless genera. The second is to order the more universal things first, and the more particular things after them. In this way the parts of the definition will be ordered well. The third is that all of these essential [things that are], taken together in the definition, fit only the defined.

The first one of these comes about through being able [to deduce that they belong, just as for an accident, and by means of establishing [this] through the genus. [They] will be ordered as required if one takes the first one, and this will happen if there is taken that which follows all but is not followed by all of them. For there must be some such thing. Now once this has been taken the same thing is done for the lower ones, for the second will be the first of the others …]
You need to know that there are four [kinds of] dialectical problems: generic, which are those under which the differentiae are all classified (for you learned that when these have been taken together with a genus they are no longer differentiae but are nameless genera), definitional, specific, and accidental. For the investigation [observed] in discourses concerns either a genus, for example, whether this is a genus of that, or a definition or species or accident. He immediately went on to separately teach the rules and the points of departure for arguments, as well as to separately [teach] the means by which to establish that this is an accident of that (if the investigation concerns an accident) or that that is a genus or definition or species of that. Since the genus comes first in definitions, you must demonstrate in advance that that which precedes the other parts of the definition is the genus and not an equivocal term. Of these three [conditions] the one condition is stated before the others in order to establish that what comes first in definition, namely the genus, is a genus. You will also prove this by means of the genus, that is, by means of the arguments by which people establish for themselves and prove that these things are genera, just as it is possible to deduce and demonstrate that this is an accident of that, by means of the arguments dedicated to the accident, that is, [dedicated to] the demonstration of the accident. So after proving that that which comes first in definition is a genus, you must arrange its other parts so that they are in good order. You will arrange these things so that they are in good order if after the genus you place the first of the others. The first is the one that follows all of those that come after it. But they do not follow it conversely. For the universals follow the things that are more particular, but the things that are more particular do not follow the universals. Order as second that which in turn is first since it is more universal than the things that come after it and since it follows them, but not the other way around. Order the third and the fourth in the same way, by means of the same method. Just as, in the case of ‘animal rational mortal receptive of intellect and scientific understanding’, after the genus, animal, rational comes first insofar as it follows mortal, but mortal does not also follow it, in the same way mortal follows receptive of intellect and scientific understanding, but not the other way around.

97a32 And third will be the [first] of the things that follow, [for when it has been removed, what follows will be first of the others. And similarly in regard to the others, too.]

That is, the first of the things that are next.
That these are all [is clear from taking the first [thing] in division, that every animal is either this or that, and it is this, and again, [from taking] the differentia of this whole, and assuming that there is no longer a differentia of the last one, or that there is no longer a difference in species, or [assuming] that in fact directly after the final differentia of the whole, this is no longer different in species. For clearly there is nothing additional present beyond that (for all have been taken in the what it is), nor is anything left out, for it would be a genus or a differentia. Now the first one, and that which is taken in addition along with the differentiae, is a genus, but all of the differentiae are possessed, for there is no longer anything afterwards. For the last one would have differed in species, but this was said to not differ.]

This is the third condition. You will prove that all of these parts of the definition fit only that which is defined and not anything else, ‘from taking the first [thing]’, that is, the genus, ‘in the division’ and dividing it (let it be animal) into the opposed differentiae, into rational and irrational. Then you would accordingly say ‘that every thing is either this’ (that is, is either a rational animal) ‘or that’ (that is, an irrational animal), ‘and’ a human being ‘is this’, a rational animal. ‘And, again’, you would take ‘the differentia’, that is, the opposed differentiae (I mean mortal and immortal) ‘of this whole’, rational animal, and you would say ‘everything is either an ‘animal rational mortal’ or an ‘animal rational immortal’. But a human being is an ‘animal rational mortal’. It is nothing new if he referred to the opposed differentiae by means of the singular term ‘differentia’. This too has been explained above. Then take the differentia of mortal, being receptive of intellect and scientific understanding. Let the division go this far. For I call that which can no longer be divided into any other differentia the last differentia, for example, being receptive of intellect and scientific understanding. The definition of human being has accordingly been completed since it [i.e. the definition of human being] belongs to it [i.e. human being] alone and not to anything else. And if you should assume that certain mortal rational animals are natures with knowledge that they learned by themselves, that is, that do not derive sciences and arts from a teacher but are by their nature self-taught, as a hippocentaur or satyr or some Pans are said to be and the corpse of the Neriad is said to have been cast ashore and discovered by Plato, so if there are such natures, ‘being receptive of intellect and scientific understanding’ must be added to the definition of human being in order to distinguish a human being from these. For a human being is a mortal rational animal, but is not a self taught [animal] since its possession of art and scientific understanding comes from having acquired this
from a teacher. But if there are no such natures, its presence in the
definition is superfluous, for it is enough to say that a human being
is a mortal rational animal. And this is how definitions of the most
specific species are established. Since we also have other subordinate
species, he teaches you how you will establish their definitions, too.
And for this reason he adds ‘or, in fact directly after the final
differentia’. For if you propose to establish the definition of animal,
and this is ‘substance living, able to perceive’, you must take the
genus, that is, substance, and divide it into living and inanimate, and
say ‘every thing is either living or inanimate, and an animal is a
living substance’, and again divide living substance into able to
perceive and unable to perceive. For everything is either able to
perceive or unable to perceive, and an animal is a living substance
that is able to perceive. Even if able to perceive can be again divided
into animal and zoophyte, it is nonetheless necessary to set the
division up to able to perceive since the definition of animal is
completed through it. That the definition of animal, substance living
able to perceive, is completed, is clear from [the fact] that this, the
thing defined [i.e. animal] is not different from the whole, ‘substance
living able to perceive’, when the whole thing itself is taken ‘with
the final differentia’, that is, with ability to perceive. ‘That this is not
different in species’,458 that is to say that this whole definition that
was stated does not extend more widely than animal on account of
referring to other species as well, but refers to animal alone and
‘does not differ’ from it, that is to say, it does not extend more
widely than it.

‘Clearly’ in the definition ‘there is nothing additional present
beyond that’, that is there is nothing superfluous which does not
contribute to the essence of the thing (this sort of thing is an acci-
dent), as a result of taking in the definition ‘all’ of the things ‘in the
what it is’, that is, the things that belong essentially to what is
defined, and it did not take on any accident by extending more widely
than and beyond these things. Nor does it leave anything out, that
is, the definition is not deficient. For the definition is [made up] of
genus and differentiae. Now if any part of the definition was left out,
it is either ‘a genus or a differentia’. But the genus was not left out,
for it comes first in the definition and was taken together with the
differentiae. But that which was left out is not a differentia either.
For all of the differentiae are included, that is, they are taken. For
the later differentia,459 for example, being receptive of intellect and
scientific understanding is no longer left out. For if the last one, that
is, this last differentia, has been left out, ‘animal rational mortal’
would be different in species from what is defined, in other words, it
would no longer refer to human being alone but also to those other
natures that we said learn by themselves.
One must look to the things that are similar [and undifferentiated] and investigate, [first, what all of these have that is the same; next we should again [do this] for others, which are in the same genus as them, and are the same in species with those [similar things], but are different from those others. But whenever for these things what is the same for all has been taken, and likewise for these others, we must see whether there is something the same for the things taken, until it proceeds to a single account, for this will be the definition of the thing.]

Having said how the definitions of the most specific species and of the genera must be hunted by means of analysis (for the common natures of the particulars are definitions of the most specific species, and the common natures of the most specific [species] are definitions of the genera) he concerns himself some more with what ensures that a definition is not open to objection. Since a definition is made up of a genus and constitutive differentiae, and the genus is common since it is observed in many things, and since equivocal terms seem to be common features on account of [the fact] that they are taken in respect to many [things], to keep one from the error of taking the equivocal term as a genus in a definition, he presents a method by which you might know what sort of thing is a common feature in the manner of a genus and what sort of thing [is a common feature] in the manner of an equivocal term. For example, if you want to show that animal is a genus, take the particular human beings, then their definitions, and make one list ‘Socrates, Plato, and Alcibiades’, and see in what respect they are said to be the same in species. And surely you will discover [that they are the same] insofar as they are animals, rational, mortal, etc. Again, take another list, of particular horses, for example, write down a chestnut and other particular horses, and for these, too, see in what respect these are said to be the same: [they are the same] insofar as they are all neighing mortal irrational animals. If you like, write down yet another list of certain particulars, for example oxen, and see if there is a common feature in their definitions. And if you discover any common nature, you have what is sought. But should you not discover it, go back to the most specific species, and take human being, horse, and ox, and then their definitions. And when a common feature, ‘living substance that is able to perceive’ is found in their definitions (for we say that a human being is a receptive of intellect and scientific understanding living substance that is able to perceive, as [we say that] a horse is a neighing living substance that is able to perceive, and for the ox we have ‘mooing’), and this common feature is not only a word but signifies a thing and a substance, namely animal, it follows that animal is not an equivocal term but is a genus. And while pride is a common feature observed in many [people], by the method that has been
described you will discover that it not a genus but an equivocal term. For take certain particular [people] in whom pride is apparent, such as Achilles, Ajax, and Alcibiades, and in virtue of what they are all said to be proud: on account of their ‘not being able to endure being insulted’. Then take some other list of particular proud people, who are the same as each other insofar as they are proud. For these are proud by virtue of the same manner of pride, but are different from Ajax and the rest. Then see in virtue of what they are called proud: on account of being indifferent and without passion concerning both success and failure due to fortune. For when they were fortunate they did not brag about it and, again, when they fared badly they were not humbled but remained the same. And take these as two definitions of pride. And since in these two no common nature comes to light, it follows that the pride observed as common to these is an equivocal term. For if it was a genus, the things falling under it would certainly have things in common with one another by virtue of certain common natures. But it is also necessary to consider the text before us. Someone who is defining must investigate whether that which is taken as genus in definitions is an equivocal term or is a genus, by first taking certain particulars that are similar and undifferentiated in species, and seeing in what respect all of these particulars are the same and have things in common with one other. For particular human beings are similar and undifferentiated in species, insofar as they are human beings. Then, again, take other particulars, for example, particular horses, which are themselves under the same genus under which those particular human beings were classified. For the horses are the same as themselves in species, insofar as they are horses, but they are different in species from those particular human beings. ‘But whenever for these things’, namely, the list of particular human beings and of horses, there is taken and discovered some common feature by virtue of which they are all the same, you have that which was sought, because the feature common to them is the genus. But should you not discover a common feature in these, you need to look at certain other things that were taken, that is, [to] the most specific species, for example, human being, horse, and ox, and you need to [look] again [to] seek whether there is something the same and common among them. And if you should come to, that is, arrive at a single account, as in the case of human being, horse, and ox we arrived at ‘substance living able to perceive’, this is the definition ‘of the thing’, that is, of the genus. So then, from these [definitions] you discovered that what was taken in the definition of human being is the genus.

97b13 But if it does not proceed to one account [but to two or more, it is clear that what is under investigation is not some one
thing, but is more [than one]. I mean, for example, that if we were investigating pride we should for certain proud people whom we know seek what single thing all of them have, insofar as they are that sort of person. For example, if Alcibiades or Achilles and Ajax are proud, what single thing do they all [have in common]? Not being able to endure being insulted. For one went to war, another vented his wrath, and another killed himself. Again, for others, such as Lysander or Socrates. So if [in this case] it is being indifferent whether fortunate or faring badly, I will take these two and seek what being without passion concerning fortune and not standing being dishonoured have in common. Should there be nothing, there would be two species of pride.

In other words, if we do not arrive at a single common account, as occurred for those in whom pride is observed, but at ‘two or more’ (say, three or four) accounts that are totally different from each other, and if there are also three or even four lists of particulars that are taken, clearly that which is being investigated as to whether it is a genus is not a single thing, that is, a genus, but is more [than one thing], namely, an equivocal term signifying different things. For example, [this is what happens] if we are investigating what is pride, whether it exists as a genus or an equivocal term.

97b26 Every definition is always universal, [for the doctor does not say what is healthy for some [individual] eye, but for every eye, or when determining it by species. It is easier to define the individual than the universal, which is why one must cross over from the individuals to the universals. For we are more prone to be unaware of equivocals among universals than among things that are not differentiated.]

Since he said that definitions of the most specific [species], which are universal, are discovered on the basis of individuals (for the common natures of the particulars are definitions of the universals) and [since] the definitions of the genera are discovered on the basis of the most specific [species], perhaps someone might have suspected that there are definitions (in the strict sense) of particulars, on account of how particulars fit universals, too. 464 In order to eliminate this suspicion, he says ‘Properly speaking, every definition is of universals’. This is clear from the arts. For when a doctor is defining health for the eye he does not define health in a particular eye, but ‘in every eye or he determines it by species’, that is, [he determines] the health of the eye in a human being.

‘It is easier to define the individual’, that is, to pick out the definition from the individuals (understand by individuals either the
particulars or the most specific species) than to pick them out from universals. This ‘is why one must cross over’ and transfer definitions ‘from the individuals to the universals’, for this is easier. Then he relates the reason why we pick out definitions from individuals, and he says, a definition needs to be clear. If an equivocal term is present in the definition, the equivocal [term] that is present renders the definition unclear. And since equivocity does not occur among individuals, it is impossible to be led astray by them. For since they are perceptible and strike our senses they render perspicacious the differentiae of natures that are seen. But in the case of universals, equivocity always causes trouble and introduces ambiguity and unclarity, [concerning] whether this term signifies this such-and-such \(^{467}\) and whether it does not. For universals are objects of thought. But in the case of objects of thought we are not active by virtue of perception but by virtue of thought or belief. Now definition will be assembled from individuals because of [the fact] that equivocity does not occur among individuals, which he called undifferentiated since they do not differ in species.

\[97b31\] Just as in demonstrations it is necessary [for deduction to be present, so also, in definitions, clarity.]

[This is] another topic closely related to the first topic. For, he says, ‘just as in the demonstrations’ deduction is entailed \(^{468}\) (for syllogistic deduction is their genus, and the genera follow the species), then, just as it is not possible for there to be demonstration without syllogistic deduction, so it is not possible for definition to occur without what is clear, for clarity follows definitions. Now, given that the aim of definition is to present the thing’s essence of the thing, how will it reveal the thing’s essence, if it is unclear?

\[97b33\] And there will be [clarity] [if, by means of the individuals that have been mentioned, \(^{469}\) it were possible to define separately in each genus, for example, not all similarity [would be defined], but that in colours and that in shapes …]

That is to say [there will be] the clarity of the definition, if you assemble it not from the universals but from the individuals.

Then, ‘by means of the individuals that have been mentioned’, that is, on the basis of defining a single individual among the particulars, one must take \(^{470}\) the commonality by virtue of which these things have something in common. For this commonality is the definition of the universals. For example, if it is proposed to define the similar, [then,] since the genus of the similar is quality, don’t be concerned with discovering the definition of the similar from the universals, that is, from quality, but take the species observed in each genus one
at a time. Now he calls this a universal. In order to clarify the
meaning I took the similar to be a single genus, and I practise the
account on it. Then you must define each species that is classified
under the similar. And if you discover in their definitions a common
feature, this is the definition of the similar, which as a genus is
divided into things that are similar among colours and into things
that are [similar] among shapes. Now things that are similar among
colours are those that participate in a colour that is specifically the
same, as one might say that snow and white lead and milk are similar
as pale things. Things that are similar among shapes are those that
participate in a shape specifically the same. For example, should you
construct three triangles, these are similar since they are classified
under the universal triangle. In both of these definitions there is
found the common feature ‘participation in what is specifically the
same’, which is the definition of the genus, namely, the similar.

97b35 ... and sharpness, in sound ...

‘Sharp’ is an example of an equivocal term. Now ‘sharp’ is something
that is held in common, which, as an equivocal term, is divided into
‘sharp’ in the case of sound and ‘sharp’ in the case of flavours.471
Someone might define the sharp in sound in this way: ‘that to which
the flat472 in sound is opposed’. And the sharp in flavours, in this way;
‘that to which a bland flavour is opposed’. We say that a sharp flavour
is that which is distributed, altered and digested more quickly, and
a bland [flavour] is distributed and altered slowly.473 So since nothing
is found to be in common in these two definitions of the kinds of
sharpness, ‘sharp’ is an equivocal term. One must ‘in this way’
discover definitions on the basis of individuals and ‘to proceed to-
wards’ and reduce them to ‘what is common’, the universal.

97b36 ... and to proceed in this way towards what is common
[being careful not to encounter equivocity].

This is how someone who defines must proceed from the individuals
to that which they have in common, being careful not to somehow
encounter an equivocity when trying to discover definitions on the
basis of universals. For as we said, [when dealing] with universals,
the occurrence of equivocity is unnoticed.

97b37 If metaphors ought not be used in dialectical discussions,
[clearly one ought not define by means of metaphors, nor ought
one define all of those that are said by way of metaphors. For
engaging in dialectical discussion by means of metaphors would
necessarily follow.]
Figures of speech which are said in a way by which they mean one thing in the strict sense, but are transferred (metapherontai) by us to mean something else, are called metaphorical terms. Examples are ‘waiting for a man’ and adze. There are also terms that are said ‘by similarity and analogy’. For example, the feet of a bed have a similarity and are analogous in respect to the feet of animals. For just as among animals the upper part of the body is supported and held up by the feet, so the bed too is held up by its feet. Instead of saying ‘terms conveyed by equivocity and analogy’, he said ‘all of those that are said by way of metaphors’. Now since metaphorical terms (which also includes the figures of speech that are by similarity) bring about unclarity, the definer must not use such terms. For if in dialectical discussions the one who dialectically answers does not use such terms, a fortiori the definer does not use them. For sometimes when he is losing, the one who dialectically answers needs to use metaphors. There is nothing wrong with using such terms then. For since he is intent on victory he is quick to confound the discussion and render it unclear by means of such arguments. For when there is a battle, there are both defeat and victory. But since the one who defines is not engaging in eristic nor is looking to victory but is intent on making known that which is to be defined, there is no need for him to use such terms, lest he make things more unclear.

[Chapter 14]

417,1 98a1 In order to get a grip on problems, one must pick [the dissections and divisions] ...
intestines’, understand the four cavities and receptacles for food observed in the whole body of the intestine.

98a2 [One must] pick [them] out in this way, by hypothesizing [the genus that is common to all of them, for example, if the things that have been under consideration are animals, the characteristics that belong to every animal, and when these have been taken, again, the characteristics that follow every instance of the first one of those that are left, for example, if this is bird, the characteristics that follow every bird, and in this way, [always take the characteristics that follow] what is closest. Clearly, we will now be able to say why there are the things that follow the things under the common feature, for example, why it belongs to human being or horse. Let A be animal, B the things that follow every animal, CDE certain animals. It is clear why B belongs to D. For it is because of A. Similarly in the other cases, too. For the same account always holds for the things below.]

If [the question] why a human being or horse or ox or some other species perceives or moves is proposed as a problem, you must hypothesize and take the genus that is common to them, for example, animal, if ‘the things that have been under consideration’ in the problem and are proposed in it are indeed ‘animals’. Then from the division discover what sorts of things follow ‘animal’, saying, ‘Animal is a substance; every substance is either alive or inanimate; and animal is alive’. And again, ‘What is alive is either able to perceive or unable to perceive, and animal is able to perceive’. And again, ‘the percipient either moves in place or is motionless, as are oysters’. Now since they follow animal, you will prove that perceiving and moving belong to human being and the others through the middle term ‘animal’. Once these, the things that follow animal, have been taken, you must do the same thing again for the ones that are left, and pick out from the division the things that follow the first [thing], the proximate subject, animal. For example, there is bird, which is a species of winged animal, and is the genus of its most specific species, such as raven, hawk, and the rest. So if [the question] why the eagle or the raven is split-winged is proposed as a problem, take their genus, bird. Then see from the division the things that follow bird and say: bird is a winged animal, and a winged animal is either whole-winged or split-winged. Then from the division you discovered that split-winged follows bird, and syllogistically deduce as follows: eagle is a bird; split-winged belongs to bird; therefore eagle is split-winged. So this is how you would always discover the causes, by taking the nearest things, the species that are proximate to the genus, as has been shown by the example of bird. So when we act in this way, we
will be able to ‘pick’, that is, to pick out the causes and the middle terms, by which there are demonstrated ‘the things that follow the things under the common feature’, that is, [which follow] human being and horse, which are classified under the common feature, namely animal.

A is to be taken as a middle term, which is animal, B as the major term, to which the things that follow, namely perceiving and moving, are assigned, and C, D, and E, as minor terms, to which the species, namely human being, horse, or ox are assigned.

98a13 So now [we speak] with common words that have been handed down [but we must inquire not only about these; rather, if anything else is seen to belong as a common feature, after taking that up we must investigate what things this follows and what characteristics follow it, …]

Since some genera have got names from the ancient philosophers, but some have not been given names by them, we must give them names and use the same method for the discovery of the things that follow them (the things whose names have been given by us) as we used for the named genera too. Alternatively, [the text is] also [to be taken] as follows. Since the genera are either named, since they are referred to by a single name, or nameless, since they are referred to by means of a phrase and not a word (for example the genus of having horns is nameless) he says that surely, even in the case of such genera one must take the things that follow them in the same manner as [is done] for the named genera.

98a17 […] for example,] having a reticulum [and not having incisors on both jaws follow things that have horns; again, what things does having horns follow? It is clear why the aforemen- tioned will belong to them: it will belong because of having horns. Yet another way is to pick them out by analogy. For it is not possible to take one and the same thing which pounce, backbone, and bone must be called, but there will be things that follow them too, just as if such a thing were a certain single nature.]

If [someone] proposes as a problem ‘why does an ox have a reticulum or why does it not have incisors on both jaws?’ you must take the genus, and state an attribute that is more proper to it, having horns. Then look for which things this follows, such as ox, goat, sheep, and other such things. Then look for the things that follow the things having horns, and it is not having incisors on both jaws, having a reticulum. You would know these from the dissections. In this way take as middle term having horns and syllogistically deduce: an ox
has horns; that which has horns has a reticulum; therefore an ox has a reticulum.

‘Yet another way is to pick out’ the things that follow the species ‘by analogy’. <For example>, whenever there are certain differences, such as pounce, fishbone, and bone, which serve the same need in animals, since it is not possible to refer to them by one word, we classify them under that which is analogous. And it is this that, as a common name, refers to all of these. And if [someone] proposes as a problem ‘how is the flesh of the cuttlefish supported?’ that is, ‘what is the cause that supports it, which is moist and soft?’, take as middle term that which is analogous to the pounce, and say: the relation that bone has to flesh in a human being (it is a support for the flesh, which is soft), and that which the backbone has to the [flesh] in fish (for it supports this) is the very same relation by which the pounce supports the flesh of the cuttlefish.

‘Yet another way is to pick out’ the things that follow the species ‘by analogy’. For when we take that which is analogous as a middle term we will demonstrate those things that follow those species in which the analogous is observed: human being, fish, and cuttlefish. For it is not possible to find a single word referring to the pounce and the rest, and for this reason we posit the analogous as a common word for them.

‘There will be things that follow them too’: that is to say, it is possible to find things that follow even in these cases too, namely, pounce, backbone, and bone, on the basis of this kind of nature, that is, from the analogy of supporting the flesh, ‘just as if it were a certain nature’. For just as among horned [animals], having horns is as it were a certain common nature, so also that which is analogous seems to be like a certain nature referring to pounce and the rest.

[Chapter 15]

98a24 Some problems are the same because they have the same middle term, [for example, because all are cases of mutual displacement. Some of these are generically the same, all of those that have differences by virtue of belonging to different things or belonging in different ways. For example, why is there an echo, or why is there a mirror image? And why is there a rainbow? For all of these are generically the same problem (for all are a reflection) but they are different in species. But some problems differ because they have the one middle term under the other middle term ...]

Since some problems are different and some are the same, he passed over the ones that are different since they are clear. For different problems are those whose subjects, predicates and middle terms
(that is, causes) are different. For example, animal is a middle term and cause for the [problem] ‘why does a human being perceive?’ Not having lungs is the middle term and cause for the [problem] ‘why doesn’t a fish breathe?’ Problems that are called the same are those whose middle term is the same, even if they are different in [their] subjects and predicates. For example, why do we more easily digest [food] in winter? And why do we breathe stertorously when we sleep? And why are wells, that is, the waters in wells, warm in the winter? For even though these three problems are different in respect to subjects and predicates, nonetheless for all of them there is a cause which is one in species. It is the mutual displacement and contraction of the heat. For we digest [food] more easily in winter on account of [the fact] that the pores in [our] bodies are drawn close together on account of the surrounding cold, that is, air. For when the pores have been drawn close together the innate heat within us is contracted and goes deep into the solid parts of the body, and since it is not dispersed outwards through the pores of bodies, it is concentrated within and [there] it becomes exceedingly great. But when there is great [heat] it is more easily able to break down and digest the food. Likewise the waters in wells are warm in winter on account of the mutual displacement and contraction of the heat and its descent into the cavities of the earth on account of the coldness of the air. We breathe stertorously when we sleep because an animal needs what is breathed in from the air for the sake of the chilling of the innate heat within the heart, in order that heat which remains untempered does not burn up the animal. Now since sleep occurs as a result of the heart’s being encased by thick vapours descending from the head, and when the heart becomes encased they contract the heat within it and do not allow it to be borne upwards, when it is contracted, the heat becomes concentrated and gains force. So during the hours of sleep our inhalation of the external air is stertorous, in order that the innards of the animal should not become inflamed from the caustic power of the heat. This is in order that the causticity and lack of balance of the innate heat might be checked and brought into balance by the cold. Now these aforementioned problems are said to be the same by virtue of [the fact] that they have their middle term, the cause, the same in species. For they have as their cause the mutual displacement and contraction of the heat.

Some of these problems are called the same in genus, even though they are different in their subjects and predicates, because their causes and middle terms are different in species but the same in genus. Causes that are the same in genus are ‘all of those that have differences’, that is to say, all of those that differ in species, ‘by virtue of belonging to different things or belonging in different ways’ that is, through being observed in some subjects in some cases and in
other subjects in other cases, and through occurring in some ways in some cases and in other ways in other cases. An example of [problems] the same in genus is: why does the echo occur? And ‘why is there a mirror-image’, that is, why do we see ourselves in mirrors? And ‘why is a rainbow’ formed? For all of these three problems are the same thing. That is to say, the problems are said to be one in genus. For all of these causes involve reflection, which, is observed as the genus in all of them. Nonetheless, even if the three [problems] are one in genus on account of [the fact] that their causes too are one in genus, still, these causes are ‘different in species’ on account of [the fact] that the reflection is observed in some subjects in some cases and in other subjects in other cases. For in the case of the echo there occurs a reflection of air, in the case of the rainbow [there occurs] a reflection of the rays of the sun, and in the case of the mirror-image [there occurs] a reflection of the rays of sight. But these things must be explained in greater detail. The echo occurs in this way: someone who shouts strikes the adjacent air with the shout and inscribes in it what is shouted. This adjacent air strikes the air adjacent to it and inscribes in it the very things that were inscribed in it, and this air [does the same to] that which is adjacent to it. And in the same way, when the masses of air adjacent to [other] adjacent masses of air which were struck and took on well preserved inscriptions, are in turn struck and things are accurately inscribed within them, then, when they fall on certain hollows of solid rocks, and the hollows are in the right condition, they are reflected and are in turn turned back towards our ears.\footnote{490} We see ourselves in mirrors which are smooth and solid and shiny. Now the rays of sight which go out from our eyes\footnote{491} and have the power of sight fall on the mirror which is smooth and solid and shiny, and when they are reflected (\textit{antanaklômenai}) they make us see ourselves, just as the tip of a spear too bounces back (\textit{paskhei tina antanaklasin}) when it meets a solid body and forcefully hits it.\footnote{492} The rainbow occurs as follows. Whenever clouds attain a certain thickness sufficient for making mist or even rain, while the sun is shining, then the rays of the sun that fall on the clouds that are making mist or even drizzle break up into a circle, since the motion of the sun too occurs in a spherical body, and in this way the circle of the rainbow is formed.\footnote{493} Some problems are called the same because the cause, that is, the middle term, of the one problem is referred ‘under <the> other middle term’. Although he intends to say that such problems are the same, he does not say that they are the same, but that they ‘differ’, that is, are different. He should have said that these are not different and do not differ but are rather the same, because here he is not investigating which problems are different but which are the same. Since, in the case of these problems for which\footnote{494} the cause of the one is referred to the cause of the other above it, we say that for this reason such
problems seem identical, for this reason he was compelled to talk about the difference between them.\textsuperscript{495}

\textbf{98a31} For example, why does the Nile flow more towards the end of the month? [Because there are more storms towards the end of the month. Why are there more storms towards the end of the month? Because the moon becomes less full. For this is how these things are related to one another.]

The span of time throughout which there occur the birth of the new moon and the moon’s various waxings and wanings is called a month.\textsuperscript{496}

‘For example, why does the Nile flow more towards the end of the month’, that is as it declines and proceeds towards its end? Now we give as the cause that this is the time when it becomes stormier, by saying ‘The Nile flows more when it gets to be a stormier time; it gets to be a stormier time towards the end of the month; therefore the Nile flows towards the end of the month’. Again, yet another problem: why does it get to be a stormier time towards the end of the month? And we give as the cause thewaning\textsuperscript{497} of the moon, by saying, ‘It gets to be a stormier time when the moon wanes; it wanes towards the end of the month; therefore it gets to be a stormier time towards the end of the month’. See how the cause of the first problem has been more [fully] demonstrated by means of the cause of the second problem. There is yet another problem, too, which Aristotle passed over in silence but necessarily comes to mind in its own right, like this: why does the moon wane towards the end of the month? And we say that the cause of this is that the moon is in conjunction with the sun. For the moon wanes when it is in conjunction with the sun, and it is in conjunction with the sun towards the end of the month. Therefore the moon wanes towards the end of the month. Now these three problems are the same insofar as the cause of the first is established under the cause of the second, and the cause of the second is established under the cause of the third. For, since the moon takes its light from the sun, when the moon is full it takes from it much light and more heat. The vaporous exhalations in the air are dispersed by the heat, and the air is clear. Whenever the moon is waning the result is that it has little heat, too. For insofar as it has less light there is less heat in it.\textsuperscript{498} And when there is less [light] it cannot disperse the vaporous exhalations and it follows that they are compounded and thickened, and rain forms. This is the precise reason why rivers flow more at that time. ‘For this is how these’ causes ‘are related to <one another’, that is, [how] one [is related] to another: that one is established under another, that is to say, the first is set under the second and this under the third.
Concerning the cause and that of which it is the cause [one might encounter a difficulty concerning whether, when there is the effect, the cause is present as well (as, if the leaves are shed or it is eclipsed, there will also be the cause of the eclipse or the shedding of the leaves, if, for example, this is having flat leaves, and, of being eclipsed, this is the earth’s being in the middle; ...]

This is a different topic. For since in what precedes he spoke about causes and effects, both those that are at the same time and those that are not like that, and how there is necessary entailment among these things, he now initiates a certain difficulty concerning these cases: whether, in the case of causes and effects that are at the same time, when there is the cause, there is necessarily the effect, and, whether when there is the effect, there is necessarily the cause. For example, if the cause of the eclipse of the moon is ‘the earth’s being in the middle’ and [the cause] of shedding leaves is having flat-leaves, then if [the fact] that trees shed their lives is demonstrated when having flat leaves is the middle term, and [the fact] that trees have flat leaves is demonstrated through the middle term shedding, it would follow that demonstration could not occur through these [middle terms]. For if certain things are proven through each other, they make a circular proof, which is not a demonstration. But if causes and effects are not at the same time, it happens that when there is the cause, the effect necessarily accompanies it, but when there is the effect, this cause that has been hypothesized does not necessarily accompany it. For example, fire is a cause of ashes and smoke. But the effect and the cause are not at the same time; rather first comes fire, then ashes and smoke follow afterwards. And, again, a cause of [the fact] that a vine sheds its leaves is the thickening of the moisture in the juncture. Now this is a better example than the example that is put forward, since the fire is hidden from view. So when there is the cause, namely, the congealing of the moisture in the juncture, there necessarily also follows [the fact] that the tree sheds its leaves, which is the effect. But when there is the shedding of the leaves of the trees, there is no necessity that there is what he supposed as the cause, namely, the congealing of the moisture, but there will be some other cause, being flat-leaved, and besides that, the shrivelling of the leaves. So if it is proven that trees shed their leaves because of both the congealing of the moisture and the shrivelling of the leaves, it therefore follows that this is not a demonstration. For every demonstration comes about through one cause, which is the middle term. For, as we learned, in demonstration the middle term is the definition of the major [term]. But the definition of each
thing is one. Therefore, in this way each side of the difficulty has some strength.

98b1 ... for if there are not these things, there will be some other [cause for them] [and [one might encounter a difficulty concerning whether] if the cause holds, there is the effect at the same time (for example, if the earth is in the middle, [the moon] is eclipsed, or, if it is flat-leaved, it sheds). If this is how things are, they could be present at the same time, and they could be proven through each other. For let A be shedding of leaves, B be flat-leaved, and C be vine. So if A belongs to B (for everything flat-leaved sheds its leaves), and B to C (for every vine is flat-leaved), A belongs to C, and every vine sheds its leaves. The middle term B is the cause. But it is also possible to demonstrate that a vine is something flat-leaved, by means of shedding of leaves. For let D be flat-leaved, E be shedding of leaves, and F be vine. So E belongs to F (for every vine sheds its leaves), and D belongs to E (for everything that sheds its leaves is something flat-leaved). Therefore every vine is flat-leaved. Shedding leaves is the cause.

For if, when there is the effect, the trees’ shedding their leaves, the cause that has been first supposed, the congealing of the sap, does not hold, its cause will be something else, namely the shrivelling of the leaves, and it follows that [the fact] that trees shed their leaves is apparently demonstrated through two causes, and this is not a demonstration. But if the cause and the effect hold at the same time, it follows that they are proven through each other. But reciprocal proof is not demonstration. For there will be a proof both of the effect, that the vine sheds its leaves (through the middle term flat-leaved, since it is the cause) and, in turn, of the cause, that the vine is flat-leaved, through the middle term which is the effect, shedding leaves.

98b16 If there cannot be reciprocal causes [(for the cause is prior to that of which it is the cause, and the earth’s being in the middle is the cause of its being eclipsed, but being eclipsed is not the cause of the earth’s being in the middle) – so if the demonstration of the reason why is through the cause, but the demonstration of the fact is not through the cause, he knows that it is in the middle, but not why. It is clear that being eclipsed is not the cause of [being] in the middle, but this [is the cause of] being eclipsed. For being in the middle is present in the account of being eclipsed, so clearly this comes to be known through that, but not that through this.]
Now that he has shown the aporia has equal strength on either side, he continues by giving its solution: that here there is not reciprocal demonstration. For if the cause and the effect are of the same time, and one does not temporally precede the other (for you think about the cause, that the earth is in the middle, and the effect too, that the moon is eclipsed, is brought [to mind] at the same time), but to be sure the cause precedes the effect by nature and in one’s conceptualization and in definition (τοί λόγοι). For we first conceive of [the fact] that the earth is in the middle, and then later [the fact] that the moon is eclipsed. But nature too first knows the cause and then accordingly the effect. And since the cause precedes the effect, if a syllogistic deduction that the moon is eclipsed or that the trees shed their leaves should come about through a middle term that is the cause, for example, the earth’s being in the middle or the moisture congealing, it is a demonstration in the strict sense. For it is based on causes and things that are prior. But if the syllogism proceeds through a middle term which is the effect, it is not a demonstration but a sign-deduction. For we judge that there is the first on the basis of [using] the later one as a sign.

‘For if the cause and the effect cannot be causes of each other (for the cause is always prior to the effect) ...’ Then, as a supplement to the exposition of his account, he again continues: if demonstration through the cause is of the reason why, that is, it gives the cause of the thing, and [if] the demonstration through the effect is not a deduction of the reason why, that is, it does not show the cause of the thing, but merely infers the fact ... Then, throughout the exposition of what he says, take [the following] from outside [of the text] as having been left out: Reciprocal proof is nothing strange, but when the syllogistic deduction is through the cause, it is a demonstration in the strict sense, but when it is through the effect, as middle term, it is not a demonstration in the strict sense but is a sign-deduction. That being eclipsed is not the cause of [the fact] that the earth is in the middle but [the fact] that the earth in the middle is the cause of the eclipse is clear from this: causes are taken in the definition of the effects, and [the fact] that the earth is in the middle etc. is taken in the definition of the eclipse. For an eclipse is a privation of light from the moon on account of the blocking by the earth. But eclipse is not taken in the definition of the earth’s being in the middle.

98b25 Or is it possible for there to be more [than one] cause of the same thing? [Yes, and if it is possible for the same thing to be predicated of more than one primary [subject], let A belong to the primary [subject] B, and to another primary [subject] C, and these to D E. Therefore A will belong to D E. B is the cause for D and C for E. So when the cause holds, there must also hold
the thing, but when there is the thing there need not be every-
thing which could be the cause; rather, [there must be] a cause,
but not every [such thing]. Alternatively, if the problem is
always universal, is the cause a certain whole and is that of
which it is the cause a universal? For example, it is in respect
to some whole that shedding leaves is determined, even if there
are species of it, and it belongs universally to these, either to
plants or to plants of this sort, so in these cases the middle
term and that of which it is a cause must be equal and
convert. For example, why do trees shed their leaves? So if it
is on account of the congealing of the moisture, if a tree sheds
its leaves, there must be congealing, and if there is congealing,
not in anything at all but in a tree, there must be shedding of
leaves.]

Now that he has solved the difficulty and has said that when the
cause and the effect are at the same time, there is not reciprocal
proof, but that a deduction through a middle term which is a cause
is a demonstration in the strict sense and is of the reason why, while
a deduction through the effect is a sign-deduction, he continues by
giving yet another solution: that whenever a deduction is through the
cause, the effect necessarily follows and there is a demonstration in
the strict sense, but when the effect is taken as a middle term, the
cause does not necessarily follow. For example, a human being is an
animal; but an animal is not necessarily rational, rather, it can be
either rational or irrational; in other words, there can be more [than
one] cause of a single thing. For the same thing, animal, is predicated
primarily, that is, immediately, of more than one middle term. For
A, animal, is predicated of B, rational, primarily and immediately,
and of C immediately, and these, B and C, are predicated of DE
immediately. ‘Therefore A will belong to DE’. The cause of A being in
D is B, and C [is the cause] of A belonging to E. ‘So when the cause’,
either rational or irrational, ‘holds, there must also hold the thing’,
animal, but when the thing, animal, is taken as a middle term, not
every cause, for instance, rational and irrational, necessarily accom-
panies it; rather one cause accompanies it, but there is no way that
[this is so for] every [cause], that is, both causes. Even though he
suggested this solution, he is in turn unhappy with it, and deems the
first [solution] to be superior. This is how he proves that it is not
well [argued]. The second solution is not demonstratively demon-
strated, because every demonstration is universal. For the one who
demonstrates that animal belongs to the species under it proves this
universally of all of the species. For example, human being, horse,
and all the rest undergo motion in respect to desire and also in place;
all things that undergo motion both in respect to desire and in place
are animals; therefore human being, horse, and the rest are animals.
In this case the demonstration was not universal but was partial, and was not through the same middle term but through different ones. But we must consider the text at hand. Rather, if every demonstrative problem is always universal, ‘both the cause’ must be ‘a certain whole’, that is, a universal, and so must be the effect, ‘that of which it is the cause’. ‘For example, it is in respect to some whole’, that is, [some] universal, ‘that shedding leaves is determined’ and predicated. For even if its\textsuperscript{509} species (trees or plants) are different, nevertheless leaf-shedding is ‘universally’ observed\textsuperscript{510} ‘in things of this sort’, for example, ‘in’ all ‘plants’, ‘or in’ the ‘plants of this sort’, for example, in flat-leaved trees. ‘So in these cases’, trees or plants, ‘the middle term’, the cause, ‘must be equal coextensive with these’ that is it is universally predicated of all of these, which are equal to the major term shedding leaves, of which it is a cause. For the middle term, the cause, ought to convert with and be equal to the major term, the effect. For if congealing of the moisture is a cause of shedding leaves, then if there is leaf shedding, there must also be congealing of the moisture, and if the moisture congeals, there must also be leaf shedding. He is referring not to [the congealing] of any moisture whatsoever, that is, to any chance [moisture]. For it is also not necessary that the trees shed their leaves if the water in the river freezes, but the congealing of the moisture in the trees leads to the shedding of leaves.\textsuperscript{511}

\textbf{[Chapter 17]}

\textbf{99a1} Is it possible for there not to be the same [cause for the same thing, in every case, but [for it to be] something else, or not? Or, if it has been demonstrated \textit{per se} and [if the cause is]\textsuperscript{512} not by way of a sign or an accident, this sort of thing does not happen. For the account of the extreme term is the middle term.]

He moves on to another topic,\textsuperscript{513} and investigates whether, for one and the same thing, namely, for the trees shedding their leaves, there can be one and the same cause, or whether [there is] one [cause for this] and another [cause for that], that is, whether there can be either one cause or many [causes] of the same thing.\textsuperscript{514} So he says that if the cause belongs \textit{per se} to the effect, there must be one [cause]. For example, the \textit{per se} cause of the shedding of the leaves is the congealing of the sap. Then he also gives the cause: how, if the \textit{per se} cause is given, the cause, too, can be some one thing. He says that the \textit{per se} cause is the definition of the effect,\textsuperscript{515} and the definition of each thing is one. For precisely this reason the \textit{per se} cause of even the lunar eclipse too is one: the blocking of the earth. But if the cause that is given is ‘by way of a sign or is an accident’, there can be many causes of the same thing. For example, ashes and smoke are signs of
fire. In this case I will also prove that there is fire by taking as middle term either ashes or smoke. Let this be an example of the accidental. Trees shed their leaves, because their leaves become shrivelled or lose their colour. Or [let the example be] that a human being is a rational animal, because he is capable of laughter and flatnailed.

99a4 But if not, it is possible in this way. That is, if the cause will not be per se and converting with the effect, this is how there can be many causes.

99a5 It is possible to inquire into that of which it is the cause and that to which [it belongs accidentally, but these do not seem to be problems. If this is not so, the middle term will have the same status: if they are equivocal, the middle term is equivocal, and if they are in a genus, it will have the same status.]

Instead of saying ‘the effect’ he said ‘of which it is the cause’. Instead of saying ‘minor term’ he said ‘that to which it belongs’, that is, ‘whatever it, the minor term, is, to which the major term belongs, through a cause that is a certain middle term’. So he teaches that, if the extremes are accidents and the major term is accidentally predicated of the minor [term], the middle term too must be an accident. But if the extremes are essences, the middle term too must be an essence. And if the major extreme is the genus of the minor [extreme], the middle term too will be the genus of the minor [term]. And if the major [term] is predicated equivocally of the minor [term], it is this way that the middle term too will be predicated of it. Now it is possible to inquire into whether that of which it is a cause, that is, the effect, is an accident, and whether it is predicated accidentally of the minor term, in which it inheres. Now it does not seem to be a demonstrative problem, if both the major and the middle term are predicated accidentally of the minor [term]. ‘But if it is not’ the case that it does not seem [to be like this], which is the same as ‘if it seems to be a problem’, it follows that the middle term too will be an accident like the major [term]. And if the major exists ‘in a genus’, that is, a genus of the minor [term], the middle term too will be [a genus] of the minor [term].

99a8 For example, why does a proportion also alternate? [For the cause in lines and in numbers is different, and yet it is the same: insofar as they are lines, it is different, but insofar as it is involved with this sort of increase, it is the same. All cases are like this.]
This is an example of the major [term] when it has been taken as a genus. 'If four [terms] are proportional, the alternates are also proportional' also takes its major extreme as a genus. For this [genus] is observed in many things: in lines, numbers, and other magnitudes. It is like this: you should take 12 and 6 (and people call the greater the antecedent, and the smaller, the consequent) and also 8 and 4. And say that as the antecedent is related to the consequent, that is, as 12 is to 6, so the antecedent is to the consequent, 8 is to 4. For they have the ratio of two to one. The alternates are also proportional, that is to say, as the antecedent is to the antecedent, namely, 12 to 8, so is the consequent to the consequent, for they have [the ratio of] three to two. And it follows that the cause, the middle term, must be the genus, which is equal-times-equal. This very thing is one thing [in one case] and another thing [in another], insofar as [one thing] is observed in some subjects and [another thing] in other subjects, that is to say, [one thing is observed] 'in lines and' [one thing] 'in numbers'. But it is one and the same in respect to its ratio. For things that are said to have the same ratio are called equals-times-equals. Now such a thing, an equal-times-equal, insofar as [the things] are lines, that is, by virtue of their being observed in lines and in numbers, is different in one case and in another. But it is one and the same thing insofar as it has such an increase, that is, insofar as you make sure that in all cases the definition is in this way the same. In addition, arithmeticians call 16 an equal-times-equal, since it is generated from the number 4 multiplied by itself. And in the same way 25 is an equal-times-equal since it is generated from 5 multiplied by itself. But here he calls equal-times-equals numbers that have the same ratio. So say: 12, 6, 8, and 4 are equal-times-equals, or, since they have the same ratio, equal-times-equals have an alternating proportion, and 12, 6, 8, and 4 have an alternating proportion.

99a11 [The cause] of [the fact] that a colour is similar to a colour [and a shape to a shape ...]

'Similar' is an equivocal term. So he takes this as an example of a problem that has an equivocal major extreme term. And 'if four [terms] are in a certain proportion, the alternates are also proportional' was taken generically, because even if it [the genus] is observed in different species, lines and numbers and certain other things, nonetheless its definition is one: for the numbers to be equal-times-equals. But the similar is not this sort of thing. For even if the similar is observed in different species, for example, in colours and in shapes, it is not in respect to one and the same definition but in respect to one [definition in one case] and another definition [in another case]. For [on the one hand] shapes are said to be similar. For example, if you were to construct two triangles, these
will be said to be similar if the sides are proportional and the angles are equal. Colours are said to be similar in respect to a different definition (logos). For example, the pale [colour] in snow and in white lead are said to be similar because they are distinguished and apprehended by the same sense.

99a12 ... is different in different cases. ['Similar' is equivocal in these cases. For in one case it is, perhaps, having the sides proportional and the angles equal, but in the case of colours it is involving a single perception or some other such thing.]

That is, one triangle will be said to be similar to another triangle according to the definition that we stated. The same is true for how one colour will be said to be similar to another colour. Now the similar that is observed in these, in colours and shapes, is equivocal because shapes are called similar by one definition and colours are called similar by another definition. For here, in the case of shapes, triangles are called similar when they have their sides in a ratio, that is, when [their sides are] proportional. But in the case of colours, pale [colour]s are called similar when they involve the same [kind of] apprehensive perception.

99a15 Things that are the same by analogy [will have an analogous middle term, too.]

If the major extreme term 'things that are the same' is analogous, the middle term too is analogous. For example, human being and fish and cuttlefish are said to be things that are the same by analogy, that is, by virtue of not flopping over. For a human being does not flop over insofar as he is supported by bones. In the same way a cuttlefish and a fish do not flop over, in being supported from beneath, the one by the spine and the other by the backbone. So the middle term, namely, having supports, must be analogous. The syllogism is like this: human being, fish, and cuttlefish have supports; [animals] that have supports do not flop over; therefore human being, fish, and cuttlefish do not flop over.

99a16 This is how there is mutual entailment among the cause [and that of which it is the cause and that for which it is the cause. For someone who takes them individually, the effect extends more widely, for example, having the external [angles] equal to four [right angles] extends more widely than triangle or quadrilateral, but for all of them it extends equally (for they are all of those that have the external [angles] equal to four right [angles]), and likewise in regard to the middle term. The middle term is the account
of the first extreme, which is why all of the sciences come about by means of definition. For example, shedding leaves follows vine and extends beyond it, and at the same time, extends beyond fig. But this is not true for all of them, but it is equal.]

'That of which it is the cause' refers to the major extreme term. 'That for which it is the cause' refers to the minor [extreme] term. This is another topic. Since the demonstrative syllogistic deduction has three terms, he here teaches how the three terms follow one another. So he says that, if you take in the minor term all of the species that are under the major extreme, all three universal terms will be coextensive and convert, but if you take in the minor term a single species of those classified under the major, there is no demonstration. For the minor term is not coextensive with the middle term or the major term. But we must consider the very text at hand. Now for the one who takes an individual, that is, a single species, in the minor term, ‘that of which it is the cause’, namely, the major extreme, extends more widely than the minor term. For example, let the major extreme be having the exterior angles equal to four right angles. Now this is observed both in triangles and in quadrilaterals. Then if you take as minor term triangle or quadrilateral alone, the major term extends more widely and is more universal than it. But if you take both triangle and quadrilateral together, for both of them the major term is observed [to extend] equally, that is, it is coextensive [with them]. For all of the species of shapes that have their exterior angles equal to four right angles were taken in the minor term, and it follows that they are also coextensive with the major term. Further, the middle term likewise is equivalent to both extreme terms, and it is having three internal angles equal to the two adjacent [angles.] The middle term, being equal to the two adjacent angles, is a definition of the first extreme term, being equal to two right angles. This is ‘why all sciences come about through a definition’, which is the middle term. For each science produces its demonstrations through a definition, which is the middle term. This will be better understood as follows: ‘therefore all sciences and kinds of demonstrative knowledge come about through a definition which is the middle term’. ‘For example, leaf-shedding follows vine by itself and extends more widely and is more universal than it. And it follows fig tree and exceeds it and extends more widely than it. But if all of the things that fall under leaf-shedding are taken together, they are coextensive with it.

99a25 So if you should take the first [middle term, it is the account of leaf-shedding. For there will be a middle term that is first in the other direction, that all such things [are so and so]. Then the middle term of this is that the sap is congealed or some other such thing. What is leaf-shedding?]
He calls ‘first’ the congealing of the sap, which is ‘the account of leaf-shedding’. Now there is a middle term in respect to each of the extremes. In regard to the major term, leaf-shedding, the first is the congealing of the sap. In regard to the minor term, the fig and the vine, the first middle term is that which is proximate and next to it, namely, being flat-leaved. Indeed, in regard to the minor extreme term the first middle term is also what is next to ‘all of such things’, namely, being flat-leaved. The sap is congealed’ is the middle term for this i.e., flat leaved, and the major extreme. He said ‘or some such thing’ because it is not now pertinent for him to say with precision what is the definition of shedding leaves.

99a29 [The congealing of the] sap [at the connection] of the seed.

The extremity of the petiole by which [the seed] is attached to the leaf is called a ‘seed’. The extremity is called the seed (sperma) since there lies within it the spermatic principle and power, from which the leaf grows.

99a30 Schematically, this is how it will work out [for someone who investigates the mutual entailment between cause and that of which it is the cause. Let A belong to every B, and B to each of the Ds, but applying to more things. Now B would belong universally to the Ds.]

He says that we showed how terms in demonstrations follow each other, in the case of things. But we will show it ‘schematically’ too <through> letters.

It is ‘applying to more things’; that is, B is more universal than D. For it includes not only elephant and deer, but also human being and horse. For all of these have no gall bladder.

99a33 For I call a universal [that with which it does not convert …]

There are two kinds of universal, that which converts and that which does not convert. On the one hand, the universal * * * not converting, as animal is predicated of human being. While animal is in every human being, human is not in every animal.

99a34 … but a primary universal is [that with which each individual [term] does not convert, but all of them together convert and are coextensive. Now B is the cause of A for the Ds. Therefore A must extend more widely than B. If not, why would
this be the cause rather than that? So if A belongs to all of the Es, all of those things together will be some one thing different from B. For if not, how will it be possible to say that A belongs to everything to which E belongs, but that to which A belongs does not belong to every E? For why will there not be some cause, for example, A belongs to all of the Ds? But will the Es be some one thing? We must look into this; let it be C. So it is possible for there to be more [than one] cause of the same thing, but not for things that are the same in species, for example, not having bile [is the cause] of the longevity of quadrupeds, but [of that] of birds it is being dry or something else.}

That is, [that universal] is pre-eminently useful in demonstration, which is such that, when one of the things under it is taken, that thing does not convert with it. For example, the sap’s congealing belongs to the vine, but does not convert; rather all flat-leaved things taken together are equivalent to the congealing of the sap, and convert and are coextensive with it, that is, both are equivalent. Now A belongs to all of the things that lie in D through the middle term B. Since B, which is the cause, need not be equivalent to the effect (since, as we said above, there is no reciprocal proof), A must reach and extend even more widely than B. For if it does not extend more widely than it, ‘why would’ (that is to say, why wouldn’t) ‘this’, B, ‘be the cause rather than that’, A? For A could occur as the cause of B. For things that are coextensive are causes of each other. Now if A belongs more widely than B, it will therefore belong to all of the Es of which B is not said. There will therefore be some one thing, that is, there will be some cause other than and different from B, namely C, by which C all of those things that are in E will be connected to A. ‘For if not’, that is, if there is not a certain cause that connects the things in E to A but these are connected through the middle term B, too, how will A extend more widely than E so that it does not convert with it? For A belongs to everything ‘to which E’ [belongs], that is, to every E. But E does not belong to everything ‘to which A’ [belongs], that is, to every A. For ‘why will there not be some cause’ between A and E different from B, for example, ‘A is in all Ds”? In other words, just as B is the cause of [the fact] that A belongs to the Ds, why will there not be some cause by which A will belong to the Es? Instead of saying ‘some cause’, he says ‘some one thing’. But one must look into what is the cause of AE, ‘so let it be C’. Now ‘it is possible for there to be more than one cause’, B and C, ‘of the same thing’, A, ‘but not for things that are the same in species’. For the things that are present in D and the things [that are present] in E are different in species from each other. For Ds are terrestrial [animals], and Es are winged [animals].
[Chapter 18]

99b7 If [they do not come] right away to what is indivisible [and they come not to only one middle term but to more than one, there is more than one cause, too. But which of the middle terms is the cause: that which is first in the direction of the universal, or the [first] in the direction of the individuals?]

In what he just said, he took as cause and middle term B and C, that is, without a gall bladder and dry, which do not convert with the major extreme term and are not coextensive with it. But now he takes B to be a cause that converts with A, and he says, if B, the cause, and A, the effect, should convert, and neither does the middle term right away come and descend to indivisibles, the most specific species, nor does the major term descend to indivisibles, that is, the most specific species, through the middle term itself, it must necessarily do so through yet another middle term, so that through it both A and B belong to the Ds, that is, if A, shedding leaves, and the cause B, the congealing of the sap, do not immediately descend to indivisibles, there must be another middle term, C, flat-leaved, by which the two will be connected to the Ds. And if the middle term and the cause are not only one thing, B, but there is yet another middle term, C, which is included under B, ‘which’ (that is, which of the two middle terms) is the cause of [the fact] that A belongs to the individuals: ‘the first in the direction of the universal’, B, which is the cause proximate to the universal, ‘or the [first] in the direction of the individual’, that is, which is the cause proximate to the individuals?

99b10 So, clearly [it is the things that are closest to each thing for which they are the cause.]

This is the resolution of the [issue that has been an] object of investigation. He says that ‘those’ middle terms ‘that are closest’ to the individuals are causes of [the fact] that A belongs ‘to each thing for which they are the cause’, that is, to the individuals, of which C is the proximate cause.

99b11 For this is the cause of [the fact] that the primitive belongs under the universal, [for example, C is the cause of [the fact] that B belongs to D. C is the cause of A [belonging] to D, and B, for C, and for this, [the cause is] itself.]

B should be considered a ‘primitive under the universal’. For although above he said that this B was said to be a primitive in regard to the universal, A, now he calls it ‘a primitive under the universal’, [using] ‘under’ (hupo) as the same as ‘in regard to’ (pros). So when he
investigates which of the two middle terms is cause of [the fact] that A belongs to the Ds, he continues with the resolution of [the issue that has been an] object of investigation by arguing *a fortiori*. For he says ‘if B, which is the definition of A, is connected to the Ds through the middle term C, the defined, A, must also belong to the Ds through the middle term C’. Now C is a cause of [the fact] that A belongs to the Ds. B in turn is a cause of [the fact] that A belongs to C. And it, B, is a cause of [the fact that] A belongs to it, B, immediately and not through some other cause. For B is a definition of A, and the formal definition is an immediate and indemonstrable principle.\textsuperscript{537}

[Chapter 19]

99b15 So concerning syllogism and demonstration [it is clear what each is and how it comes about, and this is at the same time so concerning demonstrative scientific understanding, for they are the same. But concerning the principles, how they become known and what is the disposition that comes to know [them] will become clear from this, for those who first go through the difficulties.

It has already been stated that it is not possible for one who does not know the primary immediate principles to have scientific understanding by means of demonstration. But someone might encounter a difficulty concerning the knowledge of immediates: whether it is the same or not the same, and whether there is scientific understanding of each of these or not,\textsuperscript{538} or whether there is scientific understanding of the one but of the other some other kind of thing, and whether the dispositions come to be, since they are not already within [us] or whether they are within [us] but we are unaware of them. Now it would be impossible if we have them. For it would happen that although we have forms of knowledge more precise than demonstration we are unaware of this. But if we get them, not previously having them, how might we come to know them and learn them when there is no pre-existing knowledge as their basis? For that is impossible, as we said in *Demonstration*. So clearly it is not possible to have them, but it is not possible for the disposition to come about in us when we are ignorant and have no disposition at all. Therefore we must have a faculty, but not that we have one that is such as to be preferable to these in precision.]

It was earlier said that the very activity by which we are active and demonstrate is called a demonstration, and demonstrative scientific understanding is the disposition for it within our soul, from which the activity proceeds.\textsuperscript{539} He says, ‘so, having proposed to teach about
demonstration in its own right, and it is for the sake of this that we began by teaching about syllogism too, and we rendered [an account of] what is the definition of syllogism and [what is the definition] of demonstration, and how demonstration comes about (that it comes from premises that are immediate and per se and primary), we went through our whole teaching concerning demonstration’.540 But now we still have to teach about the principles, which we say are premises that are immediate and per se and primary. So we must say how the principles of demonstration become known, and what is the disposition and science that comes to know and establishes them. It is necessary to first present a few difficulties about these things. We earlier said that a demonstration cannot occur if we do not know the first principles, the immediate premises from which it is constituted.541 But now we are investigating the source from which we get the knowledge of these immediate premises, and (1) whether the knowledge of the immediate premises is the same as the knowledge that comes about in us by means of demonstration or is different, and (2) whether knowledge of each of them, that which comes about by means of demonstration and the knowledge of principles, [are the same] since they are classified in the same genus in respect to the science [to which they belong] or scientific understanding is the genus of one thing, demonstration, but scientific understanding is not the genus of the other, that is, the knowledge of the principles, but something else is, and (3) whether, because they are not within us from birth and are not innate, the dispositions by which we know the principles come to be in us later, from some learning, or whether they are in us from birth, but we are unaware that they are in us, and we work them up unaware that we have them. ‘Now it would be impossible if we have them’ in the soul but are unaware of having them. For how would it not be impossible to be unaware of what we have? And a result is that we are unaware that we have instances of knowing the principles, which are more precise than demonstrations.542 For demonstration is scientific understanding that demonstrates the fact on the basis of other things. But knowledge of the principles is more powerful than that which is by a demonstration, that is, it does not come about by means of demonstration but is more precise and valuable than it. But if, although we do not have the dispositions by which we know the principles, we by nature take them later, from learning, [then], since all learning comes about from pre-existent knowledge, it is impossible to find a [kind of knowledge] prior to and more of the nature of a principle than the principles, from which one can be led to knowledge of the principles. For, as we said from the beginning of Demonstration, learning or teaching cannot come about without some pre-existing knowledge.543 After putting forward these preliminary difficulties, he continues: Clearly, it is not possible to have them from birth and [as something] innate, and it
is surely not possible for the learning of them to come about in us later when we are unaware of them and when we have no disposition, that is, knowledge of them. And it follows that since we do not have these as innate and, if we do not have them, we cannot learn them later, we must have a certain faculty of the soul which provides us with points of departure for knowing them. This faculty is not itself more valuable and precise than the knowledge of the principles, even we know them by virtue of taking from it certain points of departure.

**99b34** And this, at least, seems to belong to all animals. For they have an innate discriminative faculty, which people call perception. Although there is perception within them, in some animals there comes to be a retention of the percept, and in some there does not. For all of those in which this does not come to be, there is no knowledge outside of [the act of] perceiving, either not at all or in regard to those things [for which this does not come about]. But for some perceivers there is the possession of something in the soul.

Having said that we have a certain ‘innate faculty’, he now also says what it is. And he says that it is the faculty of perception, which is observed in all animals and not in human beings alone. For animals too have this innate faculty of perception which is able to discriminate and apprehend things that are perceptible. However, even if this faculty is observed in all animals, nonetheless some animals not only perceive, but have the impression of that which is perceptible imprinted and inscribed within them. Yet some perceive, but no imprint of the percept comes to be within them. Rather, as long as they see or hear that which is perceptible, they as it were are aware of it, but whenever they come to be beyond [the reach of] the percept, they are totally ignorant of it. Such are worms and flies and maggots, for in these the retention of the perception, that is, the imprint is not retained. This is why someone might see flies and worms that have left the nest in which they burrow, running around and wandering here and there since they do not know how to return back from whence they emerged. In some animals there is a retention of the percept, but it is something murky and brief since they have little in the way of the imagination, in which percepts are engraved and imprinted. For example, magpies and parrots perceive the sounds made by speakers, but there arises within them a murky impression of them. This is the precise reason why they mimic the sounds of human beings or other animals, albeit not clearly. But in some [animals] there is a clear retention of the percept because their imagination has greater clarity. Human beings are an example, but so are some animals, such as bees and pigeons. For these often go out
from their nests and hives for a period of three or four days and return back from whence they emerged. But, furthermore, if an ass that [once] was out walking and happened on a hole and fell entirely within it, perchance happens to be going along the [road] that leads to the hole, then, even after no small passage of time, it can never be persuaded to go out walking along that [road], even when beaten. But it is time to consider the very text at hand. For some ‘animals there comes to be a retention of the percept, and for some there does not’. And in all of those in which there does not come about a retention of the percept, ‘either’ not ‘at all, or in regard to those things about which’ [this does not come about], – <that is>, [in the case in which] there does come about a retention of the percepts, about which percepts [the animal] was active, but [the retention] is not clear but is something murky – among such animals there is no knowledge outside of perception. That is to say, outside of the percept of their perception, when the percept is occurring, they are not able to know and grasp that they ever saw or heard something. But for some perceivers there is, that is, in some perceivers, in addition to a retention within them, there is also the possession within their soul of a unity, that is, a certain faculty that connects together similar percepts of which they had the perception. For example, in the case of human beings, I once saw that when Socrates drank hellebore it carried the humour away. And I saw this happen for Plato too. These percepts were imprinted in the imagination. Then after the passage of a certain [amount of] time, when I saw hellebore I was able to connect this to the cases that I have seen, on account of how they were [all] similar, and from this I was able to know that it can carry the humour away.

100a1 And when many such things occur [there now arises a certain difference, so that for some [animals] an account comes to be, from the retention of such things, and for some this does not occur. So from perception there comes about memory, as we say, and from a frequently occurring memory of the same thing [there comes about] experience. For memories that are many in number are one experience.]

Having said that there are some animals that have a clear retention of percepts, he in turn divides such animals into those, like human beings, that have a faculty of assembling an account, that is, a universal, on the basis of the retention of many such occurrent percepts. But for some animals the universal is not assembled, even if many percepts are gathered within them, as in the case of the bee and asses and parrots. So from perception many percepts are assembled in the imagination, and from these memory arises. ‘And from a frequently occurring memory of the same thing’, that is, from
many memories that have been gathered together, ‘there comes about experience’, that is, a certain knowledge of the power of a thing. For example, I saw countless times that hellebore carries away the humour, and many such percepts have been imprinted in my imagination, and from these many memories could be gathered up together. And from the many memories there came to be within me experience and knowledge that hellebore has the power to carry the humour away. When there comes to a stand and is fixed and stabilized in my soul this knowledge that hellebore is like this and is not otherwise, it assembles the universal, for example, ‘all hellebore purifies’ which universal is a principle of demonstrations. Since there are three kinds of universal, that which is prior to the many, which is what Plato’s Ideas are, and that which follows the many, and that which is in the many, in order to interpret what sort of thing is signified by ‘a universal is fixed and stabilized in the soul from experience’, he continues ‘I call a universal “the one” that is different and “apart from the many”’, that is, the particulars (for the meaning (logos) is this, the particular bodies) and it appears and is observed in all of these particulars’ since, while ‘human being’ is a universal concept (logos) that is different from the particular human beings, it appears in them. But we must also consider the text at hand.

100a6 And from the experience or [from the whole universal that comes to a stand in the soul, the one apart from the many, that which is one and the same in all of those things, there is a principle of art and scientific understanding, art, if in the realm of coming to be, and science, if in the realm of being.] The ‘or’ should be taken as having the sense of ‘and’. Things are like this. ‘From the experience and from the whole’ percept that comes to a stand and is stabilized ‘in the soul’ there comes the knowledge of ‘the universal, the one apart from the many’, that is, of something else, which is apart from the particulars. This one universal is in [them], that is, it appears as one and the same in all of those particulars. Such a universal which, while something different, apart from the particulars, is observed in them, is a principle of art and scientific understanding. So if this universal was assembled from things ‘in the realm of coming to be’, that is, from the things that are in [the processes of] coming to be and passing away, it is a principle of art, ‘but if [from things] in the realm of being’, that is, if it was assembled from the things that are always disposed in the same way, namely, from eternal things, it is a principle of scientific understanding.
Now [these dispositions] do not exist in us as determinate, nor do they come about from other dispositions that are more knowing, but from perception, ...

That is to say, there are not in our souls certain determinate knowing dispositions for the principles, that is, dispositions that exist and occur in actuality, nor does the knowledge of the principles emerge from certain other kinds of knowledge and certain 'other dispositions that are more knowing', that is, from principles more precise than knowledge (for what would be that which is more knowing and more precise than knowledge of principles?) but, as has been shown, there are instilled in us from perception points of departure from which we assemble and are aware of the universal.

As when there is a rout in a battle [and there was one who took a stand, and someone else took a stand, and then another, and then they came to a [new] beginning.]

By this example he establishes how the universal is assembled for us from perception. So he says: let this be expressed in an example: let there be many men waging an attack against their enemies. They turned and scattered, and then the attack fell apart. Then one of those who were fleeing girded his strength, turned from his flight, and stood before the enemies. Then another one who was fleeing saw him standing and came to his aid. And when each of those fleeing did this, the many men, too, took a stand in the battle that was being routed just a little earlier. So just as in the case of the battle that was being finished off, it happened that this [battle] once again came together as a result of the assemblage of a unity out of those taking flight, things happened this way in the case of the soul too. For when the irrational powers of the soul (I mean thumos and desire) rule over the rational soul, it turns out that the knowledge within it of the universal is destroyed. Then from a perception of a single percept imprinted in the imagination and again from another such thing and accordingly from many assembled percepts many memories come to be. And from memories [comes] a single experience. And again from experience there emerges in the soul the knowledge of the universal.

The soul is such a thing as to be able to undergo this.

That is to say, the rational soul undergoes this: assembling the universal from many memories.

What was just said, but not clearly [we should say again.]
Having said that the universal is assembled from percepts, he clarifies this yet again since it has not been clearly stated. He calls ‘undifferentiated’ the things that are undifferentiated and similar in species, as Socrates and Plato are undifferentiated and similar in species. In the same way both human being and horse are called undifferentiated in species. For they are both animals. And just as the most specific species is assembled from the particulars, so in turn is the genus from the species. So he clarifies how this comes about. When perception acted on certain particulars that are undifferentiated in species, then all at once this single percept came to a stand in the imagination and made an imprint in it. This percept not only takes on the stamp of certain properties and accidents out of which the particulars are constituted and on the basis of which they come to be known, but it is also stamped by the universal. A universal is a common nature which all of the particulars have in common. The particular human beings have animal, rational, and mortal as common features. Now when perception sees Socrates and Alcibiades and is stamped with the particular properties in them (the particular properties are that the one [man] is long-haired and pale, and that another [man] is not like this) and one of the common features observed in them, for example, that they are animals or that they are rational or some such thing, it transmitted this first to the imagination. When this ‘primitive’ percept is imprinted in it, it also instilled ‘in the soul’ a certain murky knowledge of the ‘universal’. In the same way, too, the second, third and fourth percepts, which are similar and, since they have something of the common features within them too, are imprinted with the properties and accidents of things among the particulars, both instil these things in the imagination and these things in the imagination also instil in the soul the knowledge of the universal. For perception apprehends not only individuals, that is, accidents and properties, out of which the particulars are constituted, but also the universal human being. That is to say, also certain things out of which the universal human being is constituted.

... but not of Callias the human being).

That is to say, nonetheless, it apprehends not only the things that constitute the particular human beings but also some of the things that belong to the universal, for example, that the things seen are rational or mortal or animals.
Again, among them, [things] make a stand [until partless and universal things stand, for example, just this sort of animal [stands], until animal [does], ...

When one percept is imprinted in the soul, and then two and three and four and then many other things that also have a stamp of the universal, as we said, other percepts in turn make a stand among them, until they arrive at the assembly of the [things that are] partless, that is, the universals. For example when perception sees Callias, it first discerns him to be 'just this sort of animal', for instance, one who has become pale and has grown his hair long. Then after a little time it discerns him as an animal, too, and after these things, as this sort of animal, namely a rational [one].

and in this case, [things work out] in the same way.

That is to say, when [perception] discerns him as a rational animal it is later aware of him as mortal, too, and proceeding in due course it finally assembles in the soul the common universal human being.

So it is clear that we [must come to know] the primitives [by induction. For this is how perception instils the universal.]

He calls ‘primitives’ the principles, that is, the immediate premises, which have come to be known and are assembled in the soul from induction. For the way in which we assemble the universal by means of the particulars, is also the way in which intellect assembles the universal, that is, the immediate premises or even the definitions.

Since of the dispositions for thought [by which we grasp truth, some are always true, while some admit of falsehood, such as belief and reasoning, but scientific understanding and intellect are always true, and there is no kind more precise than scientific understanding besides intellect, but the principles of demonstrations are more known than are demonstrations, ...

Some faculties of soul, like those responsible for nutrition and growth, are in all respects irrational, some, like thumos and desire, are obedient to reason, and some are rational. Further, of the rational, some, like intellect and scientific understanding, are always true, and some, like belief and reasoning, are sometimes true and sometimes false, and some, like perception and imagination, are rational [powers] in which neither the false nor the true are observed. He calls ‘reasoning’ the practical intellect, called ‘potential intellect’, which subjects matters to reasoning and discernment and examination. For intellect is called intellect in the strict sense when it is active concern-
ing the things that are eternally in the same state, which are also those things that are in the strict sense present before it for intellection. But when intellect withdraws from considering the things that really are, and it is pulled outside of itself and sinks to the realm of things involved with generation and corruption which are involved with [the processes of] flowing [in] and flowing out and encounter many changes, and to the realm of those things that are practical and political, which can either come about or not come about, then it is said to be reasoning and practical intellect. For it reasons and discerns, that should I accomplish this, for example, a depletion of the turbulent humours, I would not fall into illness, but if not, I would fall into serious illness. For I say that the dispositions for thought are faculties of the rational soul, of which some, like belief and reasoning, are sometimes true and sometimes false, and some, like intellect and scientific understanding, are always true. But apart from intellect ‘there is no other kind’, that is, species, ‘more precise’ and valuable ‘than scientific understanding’, the [disposition] that knows things by means of demonstration. ‘The principles of demonstrations’, the immediate premises, ‘are more known’ than that which is demonstrated by scientific understanding, that is, by a demonstration. For what is demonstrable has been demonstrated and has become known by means of the principles.

100b10 ... and every case of scientific understanding involves an account, [there will not be scientific understanding of the principles, and since nothing besides intellect can be truer than scientific understanding, intellect will be for the principles, both for those who are looking into this on the basis of these considerations, and because the principle of demonstration is not demonstration, so that scientific understanding is not [a principle] of scientific understanding, either. Since we have no other true kind [of rational faculty] apart from scientific understanding, intellect will be the principle of scientific understanding. And the principle will be of the principle, and the totality [of scientific understanding] will be similarly disposed in regard to the totality of things.]

All scientific understanding and demonstration comes about by means of an account, that is, [by means of] a deduction. But there cannot be scientific understanding and knowledge of the principles by means of a syllogistic deduction. Since among the rational faculties of the soul scientific understanding and intellect are truer than the others, if the scientific understanding that comes about through demonstration cannot demonstrate the premises, that is, the principles, on account of [the fact] that one cannot take anything from which a syllogism might proceed that is more of the nature of a
principle than these things, it would therefore be intellect that knows the principles. For how could it be that belief and reasoning, which are concerned with the possible and what is sometimes true and sometimes false are able to come to know and know the immediate premises, which are always true? Now regarding things that are known on the basis of those things of which we have spoken, one can know that just as it is not demonstration but an immediate premise that is a principle of demonstration, so neither ‘scientific understanding’ nor demonstration is ‘a principle of demonstration’ and knowledge of the principles; rather, intellect is. So if there is no other kind, no other species of knowledge, that is truer than scientific understanding and demonstration apart from intellect alone, that is to say, if no faculty of the rational soul, by which we grasp truth, is something truer, intellect would therefore be the principle of scientific understanding and knowledge of the principles. And the principle of the knowledge of the principle, that is of the immediate premises, would be intellect. All scientific understanding through demonstration is aware of the things that are objects of scientific understanding, that is to say, just as intellect knows the principles of demonstration, so demonstration knows the things that are objects of scientific understanding and are objects of demonstration.
Notes

1. The prefaces to Neoplatonic commentaries on Aristotle tended to conform to a standard structure, which had six parts: (1) the purpose of the book, (2) its usefulness, (3) its authenticity, (4) its place in the curriculum of Aristotelian studies, (5) the meaning of its title, and (6) its division into chapters. (On this see Hadot (1987), 99-122, who traces the structure back to Proclus.) Carouros (1998), 252, points out that the introduction to the present commentary lacks treatments of some of these points, most significantly, the fourth and the sixth, and takes this to be additional evidence against the authenticity of the attribution to Philoponus.


4. An. Post. 1.2-4, 6, 7, 10.

5. I sometimes translate *sullogismos* as ‘deduction’, sometimes as ‘syllogism’ and sometimes as ‘syllogistic deduction’. For both Aristotle and Philoponus(?) use the term to refer to a valid inference in general, not attending specifically to syllogistic form, as discussed in the Prior Analytics. Indeed, in many such cases, it is hard to see how the deduction in question could be expressed syllogistically, and neither Aristotle nor his commentator are concerned with whether and how it is possible to do this. However, in some contexts, such as the present one, there is reference to the middle or other term, or to other features of syllogistic form. I restrict ‘syllogism’ or ‘syllogistic deduction’ to such contexts. (I have applied the same principles to the translation of the verb *sullogizesthai*: ‘to deduce’ or ‘to syllogistically deduce’.)


7. Philoponus(?) is here giving a loose summary of the first book of the Posterior Analytics. Aristotle’s fullest and most explicit identification of the middle term with the cause of the conclusion is in fact presented in Book 2 (see especially 2.2, 90a6-7) but the identification is implicit in the theory of demonstration presented in Book 1 and is explicitly mentioned in passing at 1.33, 89a16 and 1.34, 89b15. In 1.13, 78a22-b13 Aristotle discusses those deductions (called ‘deductions of the fact’) in which the premises show that a certain conclusion holds, but not why it holds; but here Aristotle does not explicitly mention either the middle term or how the premises (or middle term) are logical causes of the fact proven.

8. Philoponus(?) is saying that in Book 1 Aristotle declared that the middle term of a demonstration expresses the cause of the conclusion, but that he has not yet shown precisely how this is. He understands this as a central task of Book 2.


10. Within Book 1 Aristotle has identified definition as a kind of first principle, with a crucial role to play in grounding demonstrations (see especially 1.2, 72a18-24; 10, 76a10-b16). If the minor term of a demonstration is the definiendum, and the definition is a basic premise (or has such a premise as a conjunct making it up) it stands to reason that the definiendum of the subject, as a whole or in part, will be a middle term of the demonstration. But this is not made explicit until 2.2,
90a14-15: ‘For in all of these cases it is clear that the what it is and the reason why are the same’.

11. This whole section, 334.2-19, is the part of a preface of a commentary commonly called the skopos, in which there is discussed the question of what constitutes the aim of the treatise under consideration. See Cacouros (1998), 253.

12. This is an odd claim. From Alcinous (Didask. 5.5,1-5) on, through the Neoplatonic tradition, one variety of analysis is the process of reasoning by which one attains demonstrative first principles, but, so far as I can tell, it is unprecedented to say that demonstration itself (an inference in the opposite direction from analysis as commonly understood) is an analysis. (Admittedly, in the passage cited above, Alcinous calls such an upward inference to premises prior to the conclusion a ‘demonstration’, but Philoponus(?) never uses the term ‘demonstration’ in this way.) Presumably what Philoponus(?) means is that a demonstration is a result of a process of analysis, of one of the sorts that he is about to distinguish (either an analysis of an argument into syllogistic form or an analysis of a conclusion into the basic premises by which it can be demonstrated). On this passage, see Goldin (2009).

13. This is Philoponus(?)’ title for the Posterior Analytics.

14. As Cacouros (1998), 262-3, 269, points out, this point, that the Prior and Posterior Analytics are called ‘Analytics’ for different reasons, is a standard point made in the Byzantine An. Post. commentaries.

15. On syllogistic analysis as one kind of analysis, see Alexander in An. Pr. 7,23-8,2, translated in Barnes et al. (1991), 50; Ammonius in An. Pr. 6,2-9, Philoponus in An. Pr. 5,27-30.


17. On logic as having its primary value as preparatory to writings on demonstration, see Ammonius in Cat. 5.4-10. Similarly, Philoponus(?) writes that the species of syllogism called demonstration is of central interest throughout the study of logic. He compares the situation to that of a farmer who would say that the goal of his art is the production of bread. For just as the farmer produces the matter for bread, so the one who has mastered the Prior Analytics can give us the matter for demonstration (9,24-10,25).

18. On analysis as a path leading upwards to basic causes, see Alcinous Didask. 5. In contrast, this sense of ‘analysis’ is not appealed to in the accounts of why the Analytics are analytic, in the corresponding discussions in the Prior Analytics commentaries of Alexander, Ammonius, and Philoponus. On this see Goldin (2009).

19. On how an investigation into whether there is some kind is followed by the investigation into why there is that kind, see An. Post. 2.1, 89b29-31.

20. Aristotle’s primary explanation of earthquakes is the rushing of wind into the earth (Meteor. 2.8, 366a3-5), but he also recognizes earthquakes that are resultant from wind shut up within the earth rushing upwards (366b7-14).

21. For Porphyry and Neoplatonic philosophers who followed him, the most generic genera are the ten categories. See Porphyry Isag. 6,6-11.

22. 335,26-32 (but not 335,32-336,2 which are part of the same continuous exposition) are out of place, repeating points already made, for which reason Wallies brackets 335,26-336,2, no doubt considering the whole passage a gloss that was mistakenly copied into the text.

23. For an example of this Hellenistic usage of analuein (LSJ, s.v. 3,2), see the Wisdom of Solomon 16,14: anthrôpos de apoktennei men têi kakiai autou exelthon de pneuma ouk anastrepehei oude analuei psukhên paralêmphtheisan, ‘A man kills
on account of his wickedness, and when the spirit leaves it does not turn back
\((\text{anastrepheî})\), nor does the soul come back \((\text{analueî})\) once it has been taken over’.

24. This (334,20-336,2) is the part of the standard division of the preface that

25. Aristotle tells us that the objects of investigation are equal in number to the
things known; Philoponus(?) understands this as meaning that they are equal in
number to the ways in which we know things. See Tricot (1979), 11.

26. ‘Content’ here renders \(\text{hupokeimenon}\) (elsewhere, ‘subject’). Philoponus(?)
might mean that the problem and the conclusion are the same in subject matter,
but I think it more likely that the meaning is that the problem and the conclusion
share a certain predication that is a sort of substrate which persists through
different modes of expression (in different contexts).

27. cf. Aristotle Top. 1.4, 101b29, where the kinds of propositions \(\text{protaseis}\) are
said to be equal to the kinds of problems, since they differ only in the way they are
said (\(\text{tropos}\)).

28. ‘Put forward’ renders \(\text{proballeîai}\), which is etymologically related to the
term for ‘problem’, \(\text{probêma}\). A problem is that which is put forward for investiga-
tion.

29. As Pellegrin (2005), 396 n. 1, points out, Philoponus(?) changes the order in
which Aristotle lists the objects of inquiry: in order that the list begin with the
simple questions.

30. Most likely Philoponus(?) is understanding Aristotle as here referring to the
inquiry as to whether there is \(\text{any}\) cause of the moon’s existence, but the phrase
could also be ‘whether there is a certain cause …’.

31. See previous note.

32. As Ross (1949), 610 points out, Philoponus(?)’ idea is that in the case of such
problems, the inquiry concerns a proposition that ascribes a particular attribute
to the subject, in contrast to a problem concerning whether certain subject exists.

33. At An. Post. 1.2, 71b33-72a5 Aristotle says that universals are better known
by nature, while particulars, which are perceptible, are better known to us.
Philoponus(?) apparently takes this to be an instance of a more general principle
that a composite is better known to us, while a simple is better known by nature.
For, as 437,3-438,6 makes clear (see n. 574), Philoponus(?) takes perceptible
particulars to be composites assembled out of simple universal predicates. He no
doubt thinks that the simple is better known by nature on the grounds that, when
the composite is adequately known, it is known as a composite made up of its
constituent simples.

34. On the dyad, see n. 412.

35. The lemma in Philoponus(?)’ commentary omits \(\text{oun}\), which would give us
the translation ‘So we investigate things in this way’.

36. This could also be translated as ‘whether there is a certain cause’; cf. n. 30
above.

37. This could also be ‘whether there is a certain cause’; cf. n. 30 above.

38. On how the verb ‘to be’ is a third thing, in addition to subject and predicate,
added in predication, see Aristotle Int. 19b19-20. Whitaker (1996), 137, writes of
this, ‘The element is the copula, “a third thing predicated in addition” (19b19f.); it
does not signify anything, but indicates that what “just” signifies is supposed to
hold of man’.

39. This could also be translated as ‘whether there is a certain cause’; cf. n. 30
above.

40. It is odd that Philoponus(?) here considers \text{esti} (‘is’) as a predicate, since just
above, at 337,5-7, Philoponus (?) distinguished the simple problems ‘if it is’ and ‘what it is’ from composite problems on the basis that only the latter have both subject and predicate. He must here be speaking very loosely.

41. This could also be translated as ‘whether there is a certain cause’; cf. n. 30 above.

42. This example makes clear that for Philoponus (?) the distinction between simple and complex is not the distinction between two different kinds of things, but between two different ways of considering or talking about the same thing. The eclipse is ontologically complex, as it arises from a certain juxtaposition of a number of astronomical entities, but if the predicate ‘eclipse’ is (linguistically or) conceptually taken by itself (375,22-3), it is considered a simple, and the questions that are asked about it are thereby simple problems.

43. As Detel (1993), vol. 2, 556, points out, Philoponus (?) does not here discuss the vexed question of how the ‘if it is’ question is concerned with a middle term.

44. I translate in accordance with the interpretation given in the commentary. If we follow Ross’s accentuation and the usual interpretation, the text would be rendered ‘whether it is or is not something’.

45. The same phrase epi merous renders both the adverb ‘partially’ and the adjective ‘partial’. Philoponus (?) is pointing out that the phrases to epi merous and to haplôs at 89b9 can either be taken adverbially (in which case the sense is ‘… whether it is, either partially or without qualification’) or, in the attributive position, as an adjective forming a substantive that is the complement of the verb to be (in which case the sense is ‘whether it is a composite or a simple?’).

46. Philoponus (?) is exploring the second of the two interpretations of to epi merous and to haplôs presented in the previous note. On this reading, the question ‘why?’ concerns why there is a composite, and the question ‘what?’ concerns a simple. He supports this by showing a different case of how making something a composite makes it ‘partial’. Adding an additional feature to an account of a kind renders our account of that kind a composite (since it includes both the original kind and the additional feature). The original kind is thereby divided into a kind that has the new feature, and that which does not. The new kind, that has the feature, is a part of the original kind, hence it can be called a ‘partial’. But it is not immediately clear how this is relevant to the case at issue, where the composition in question is not a matter of adding an additional predicate to subdivide some other predicate, but is a matter of predicating some term of some subject.

47. Philoponus (?) often omits the definite article as understood. Hence, this can be rendered ‘whether there is the cause …’ and in this and other such contexts, it may well be that this is the correct translation. But throughout An. Post. 2 Aristotle raises the question as to whether or not there can be more than one cause that is such as can be revealed through demonstration. So as not to prejudice the issue as to whether the text is implicitly alluding to the possibility of a multiplicity of causes, I translate such cases with the indefinite article as here: ‘whether there is a cause’.

48. The term here is ousia, which can also be understood as ‘substance’; so Ross (1949), 611 takes the text. He understands Aristotle as saying the middle term is the cause of the fact that there is a certain kind that is substantial (or is at least considered as a basic subject, and hence as substantial, by the science that studies it). Philoponus (?), however, does not pursue this line of interpretation. On his account, Aristotle is here speaking of any kind, including such kinds as eclipse, understood as a simple, outside of the context of predication. On the translation of ousia as essence, see Deslauriers (2007), 59 n. 21.
49. Bonitz, and Ross following him, read *tou* for *to*. Philoponus(?)’ commentary is consistent with this emendation, but I translate the unemended text.

50. The adverb *haplōs* modifies ‘investigating’, so Philoponus(?) is speaking of an unqualified investigation of a thing, but he apparently takes this to be the same as an investigation into that which is, in an unqualified way.

51. As we have seen, Philoponus(?) takes a ‘simple’ (the sort of thing about which we ask whether it is and what it is), not to be what lacks ontological complexity, but what lacks a certain conceptual or linguistic complexity. Any term, including such a term as ‘eclipse’, can be such a simple. There will be a middle term that is sought when investigating the cause of such a simple item; this will be the middle term by which there can be demonstrated the fact that the term in question is predicated of its subject (as the eclipse is predicated of the moon). But now Aristotle denies that there is such a middle term in the case of investigating some items. These will be those that are not predicated of any subject (and hence there can be no demonstration having such a predication as a conclusion). Philoponus(?) calls such a basic thing ‘a single absolutely simple thing’, marking it off from the kind of simples he has just been discussing.

52. The commentary, below, shows that Philoponus(?) is here reading *ē* instead of *ei* (which would give us the translation ‘whether it is in the middle or not’).

53. Presumably Philoponus(?)’ point is that the moon’s sphericity will be mentioned as an element in its definition. See 1.4, 73a34-7. But cf. 343,19-22.

54. ‘Perceptible’ is not present in the definition of ‘earth’, and ‘earth’ is not present in the definition of ‘perceptible’. Hence there is a sense in which ‘perceptible’ is an accident of ‘earth’. See 1.4, 73b2-5. Of course, that is not to say that there is no causal connection between being earth and being perceptible.

55. Philoponus(?) is presuming that the natural place of the element earth will be expressed as part of its definition. See *Metaph.* 5.30, 1025a30-2.

56. Either Philoponus(?) is here confused, or I do not understand him, as the attribute of having interior angles equal to two right angles is Aristotle’s standard example of a demonstrated attribute, in contrast to a definitional attribute. (See for example, 1.5, 74a25-30 and 2.3, 90b7-8. Ross prints this as rhetorical question; Philoponus(?) understands it as a declaration. See also Euclid *Elements* 1,32.) Having the interior angles equal to two right angles belongs to triangle *per se* (*kath’ hauto*), not because either subject or predicate appear in each other’s definitions, but insofar as it belongs on account of the fact that its subject is triangle (1.4, 73b30-2). Philoponus(?)’ example of an accidental characteristic of a triangle is having two of its sides unequal to another side. The predication of this attribute of a triangle is either the same as, or a consequent of, the proposition that for any triangle, the sum of any two sides is greater than the remaining side (see Euclid *Elements* 1,20, and 341,7 below). But this too is a demonstrated attribute of triangle.

57. Aristotle nowhere speaks of mathematical substances; indeed, he would consider triangles, like all mathematical entities, as in the category of quantity. Even if he did posit mathematical substances, it is likely that he would have considered triangles as attributes inhering in their constituent lines; see Goldin (1996), 50-1.

58. ‘Dianoetic’ translates *dianoëtikê*, derived from *dianoia* (elsewhere in this translation rendered as ‘thought’), which Plato (*Republic* 511C-D) identified as the faculty of the soul by which mathematical entities are grasped. Philoponus(?) is here understanding mathematical entities as substances of a special kind, which exist in *dianoia* alone. This is third of the Neoplatonic understandings of ontological standing of mathematical entities discussed by Mueller (1990), 465-7. Mueller
finds this understanding in Ammonius and Philoponus, but not later Neoplatonists. So the mention of dianoetic substances here provides some confirmation that the present commentary derives from Ammonius or Philoponus.

59. Philoponus(?) is referring back to 89b8, where Aristotle says that when investigating the fact or the if it is without qualification, we are investigating the middle term. Pellegrin (2005), 307 n. 1, applauds Philoponus(?) for seeing that there is an issue, but faults his answer: ‘[S]a réponse ne peut s’appliquer à la question “Est-ce que X existe?”’ It is important to keep in mind that Philoponus(?) has, however unclearly, distinguished two kinds of simples, one, a term expressed or conceptualized apart from its subject, and another, the absolute simple, which is such as to have no subject. Philoponus(?) is raising the difficulty concerning all simples, and can answer Pellegrin’s worry in cases in which the existence of the simple can be reformulated in a composite manner, as a predication; Pellegrin’s worry applies only to the second kind of simple.

60. Aristotle begins with the difficulty as applied to an absolutely simple thing, which, as we have seen (n. 42), is an entity that is not considered as belonging to a more basic subject, since there is no more basic subject. We might think that composite substances are examples of such simples, but Philoponus(?) does not consider them such, since they can be analyzed as form in matter. His examples of absolute simples are intellect and soul. Aristotle would certainly agree that a divine or heavenly intellect is such a simple, since it does not inhere or belong in any matter, but would disagree concerning soul, as he rejects a dualistic analysis of animal souls, including human souls. Its use as an example here reflects the tendency of Neoplatonic commentators on Aristotle to unduly import Platonic presuppositions into the interpretation of Aristotle.

61. When I translate definitions, presented as definitions, I do so by putting the definition within quotation marks and giving the terms in the same order as given by Philoponus(?), even though this makes for awkward English. I do so because a major topic in what follows will be the order of the terms given in definition, and the need to have their order reflect the order of the terms taken through the method of division.

62. The point is that the form can be conceptualized apart from the matter in which that form is found, and hence that which is expressed in the definition is something different from the composite substance that is defined. For in-depth discussion of this passage, interpreted in the light of Aristotle’s Metaph. 7 and 8, see de Groot (1991), 102-11.

63. The lemma has aisthanesthai while Ross’s text has aisthesthai.

64. On how a universal premise is ‘assembled’ on the basis of repeated perceptions of particulars, see 436,1-12 below.

65. On the Aristotelian account, repeated perceptions of the earth’s blocking conjoined with the eclipse lead to experience (empeiría) that the lunar eclipse is always accompanied by the blocking of light by the earth, but this will only constitute scientific understanding of the eclipse if it is shown on the basis of first principles why the moon suffers its characteristic dimming when the earth blocks the sun’s light. As we shall see, Philoponus(?) (371,20-1) takes the connection between the eclipse and the earth’s blocking to be an immediate principle, and as soon as this principle is grasped, scientific understanding of the phenomena seen during the eclipse is possible. On the other hand, I hold that there are more fundamental first principles (concerning light and the motions of the heavenly bodies) on which such a demonstration, and accordingly, scientific understanding of the eclipse, must rest. See Goldin (1996), 123-6.
66. Philoponus(?) here explicitly makes the distinction between two kinds of simples indicated in n. 42 above (for which the questions ‘if it is’ and ‘what it is’ apply), those like eclipse that inhere within some more basic subject (which subject is not expressed or conceptualized when asking these questions), and those that do not inhere in such a subject, and are absolutely simple, like soul.

67. The problem arises for Aristotle because he is the one who innovated, giving ‘demonstration’ (apodeixis) the technical sense explicated in An. Post. 1; its non-technical sense is ‘show’, and definitions do indeed show the essence. The term maintains this nontechnical sense through the time of the writing of this commentary, see 424,16 below (where I translate it as ‘exposition’) and Roueché (2004), 105 n. 31.

68. An. Post. 2.3, 90b29. Ross prints this as rhetorical question; Philoponus(?) understands it as a declaration.

69. Reading εἰ ἐπί, on the basis of the commentary. Ross has επεί, for which we would translate ‘so since there is demonstration of such things ‘.

70. As in the proof of Elements 1.32.

71. Plato Tim. 60A6; Aristotle Top. 3.5, 119a30-1.

72. The verb, θέωρομεν, is the same as that rendered ‘observed’ just above (and elsewhere). But here what is at issue is not whether the eclipse can be found inherent in the moon, but whether we are actively considering it as so inherent. It is only by thinking about it in this way that we are in a position to demonstrate that the moon is eclipsed.

73. I emend τὴν αὐτὴν διαμετρὸν to τοῦ αὐτοῦ διαστήμα. How could two intersecting circles share a diameter?

74. I emend τῆς διαμετροῦ to τοῦ διαστῆμο. See the previous note.

75. What is being demonstrated? The proof (for which, see Euclid Elements 1,1) is not that any given triangle is equilateral, but that one constructed in a certain way is equilateral. In effect, by constructing it on any given straight line, one is proving that there are equilateral triangles.

76. This is a puzzling remark. If the moon is spherical per se, this will presumably be because the shape of the moon is a definitional characteristic of it. How could it be a demonstrated attribute? One could prove its spherical shape on the basis of the phenomena of the lunar phases, but this would not be a demonstration in the strict sense, since it would prove the cause on the basis of the effect. Perhaps Philoponus(?) is presenting the example aporetically. Cf. Philoponus in An. Post. 28,9-11.

77. Philoponus(?), like MS d, has τί, while Ross has τίνος. Ross’s text could be translated: ‘if definition makes one come to know a certain substance ‘.

78. The term ousia can mean ‘essence’ and Philoponus(?) often understands it in this way, but the commentary makes clear that he is here understanding it as signifying ‘substance’ as opposed to items in the other categories.

79. Euclid Elements 1, Def. 1.

80. Euclid Elements 1, Def. 2.

81. See, among other sources, Aristotle Top. 1.18, 108b30-3; Aristoxenus Fragment 23,7; Iamblichus Theological Principles of Arithmetic 1.4; Philoponus in Cat. 46,19; in EN 1.82.

82. I add δυνάτον αποδείξαι, following Wallies.


84. An. Post. 2.3, 90a38-b17.

85. An. Post. 2.3, 90b18-91a11.

86. See An. Pr. 1.4, 25b32-7. Philoponus(?) here commits himself to Aristotelian logic, according to which every deduction is a syllogism. Often, however, the term
sullogismos can and should be rendered ‘deduction’ as it is not clear that either Aristotle or Philoponus(?) has syllogistic structure in mind; nor is it even clear that such a structure is applicable for the deduction in question. See n. 5.

87. Strictly speaking, a property is that which is predicated of its subject, and is predicated only of its subject, and is not part of the definition or essence of its subject (Top. 1.5, 102a18-30). But insofar as Aristotle is here saying that an essence is a property, he is using the term in a less technical sense. The point is simply that an essence is counterpredicated of that of which it is the essence.

88. I read katêgoroumenon for katêgoreisthai.

89. For it is predicated of all animals, not just human beings.

90. ‘The received text’ renders ta lêmmata, ‘the things taken’, not, as at line 6 above, in the sense of ‘the assumptions’, but in the sense of ‘the text we take from the manuscript’.

91. At issue is whether one thought is completed at ‘convert’ (antistrephein) and a new one begun at ‘for if’ (ei gar), in which case the gar clause does not give a reason for what precedes, or whether a new thought is started at tauta, in which case the gar clause does give a reason.

92. The lemma indicates that Philoponus(?) is about to explain the phrase ‘these must convert’, even though in Aristotle’s text, the phrase precedes the previous lemma ‘For if A is a property of C’. In order to preserve the continuity of the exposition of Aristotle’s text, I likewise repeat in the translation of the present lemma ‘For if A is the property of C’.

93. Philoponus(?) is apparently reading toutou, while Ross hastoto. Ross’s text would be translated ‘so this will be another middle term ...’.

94. The commentary indicates that Philoponus(?) reads edei, instead of Ross’s dei, which would yield the translation ‘which it is necessary to prove’.

95. These are examples of attributes that are properties, in the strict sense, of human being, as they are not given in the definition. Even if they are demonstrable attributes (which I suspect they would be), for Philoponus(?), they are not immediately predicated of human being.

96. The Greek is metaxu tôn protaseôn, literally, ‘between the premises’.

97. Philoponus(?) identifies as begging the question to legomenon, ‘what was said’, not the general point that Aristotle is making.

98. The lemma has own, for Ross’s dê, according to which a translation of the sentence would begin ‘Now those who prove ...’.

99. On the example, see An. Post. 2.4, 91a36-8. Aristotle alludes to this view in DA 1.2, 404b27-30; 408b32; for other ancient attributions to Xenocrates, see frs 60 (Heinz) and 165-87 (Isnardi Parente) and Plutarch Moralia 1012D.

100. The lemma reads alêthes en eipein, with ABd, while Ross, following n, reads alêthes eipein estai.

101. I translate in accordance with Philoponus(?)’ understanding. Contrast Mure (1928): ‘Even if A is predicated of all B inasmuch as B is identical with a species of A, still it will not follow: being an animal is predicated of being a man’ and Barnes (1993): ‘Rather it is true to say only that A will hold of C – even if A is just what is some B and is predicated of every B. For what it is to be animal is predicated of every man ...’.

102. I render both to ti ên einai and ousia as essence (in the cases in which Aristotle and Philoponus(?) uses the term with this sense); in each case, the Greek-English Index can be consulted to determine which term is being used. Here, however, stylistic infelicity is unavoidable. The Greek is to ti ên einai kai hé ousia. Aristotle here explicates to ti ên einai as meaning the same as ousia.
103. Philoponus(?) says that *hoper* is used as equivalent to the adverb *ousiòdôs* (which, incidentally, is not a word that Aristotle uses).

104. Comparison with the text being paraphrased, 91b7-11 indicates that it is likely that some text has dropped out.

105. On the example, see *An. Post.* 2.4, 91a36-8. According to Plutarch (*Mor.* 1012D) the definition derives from Xenocrates, but at 348,2-3 Philoponus(?) attributes it to Speusippus.

106. Philoponus(?) tells us that some followers of Plato understood division to constitute a proof or demonstration (apodeixis) of the definition, but it is not clear whether he or his sources had evidence for this.

107. The term *zôion* can mean either ‘animal’ or ‘alive’. The division, as Philoponus(?) presents it, seems to have skipped a step, as *zôia* (in the sense of ‘living things’) has as a proximate division *zôia* (in the sense of ‘animals’ and plants).

108. The second figure syllogism would be of the form Camestres: All deductions prove that the conclusion necessarily follows from the premises. No divisions prove that the conclusion necessarily follows from the premises. Therefore, no divisions are deductions. To get the desired conclusion, *via* a chain of syllogisms, another premise is required: all demonstrations are deductions; another Camestres syllogism would follow, concluding that no divisions are demonstrations.

109. Philoponus(?) takes Aristotle’s point to be that division and induction fail to qualify as demonstrations for the same reason, and that since they are not deductions, and all demonstrations are deductions, they cannot be demonstrations. An inference must have certain features to qualify as a demonstration or a deduction. As we have seen, division falls short of demonstration on the grounds that it is not a deduction, and all demonstrations must be deductions. It failed to qualify as a deduction on the grounds that the conclusion did not necessarily follow from the premises. On Philoponus(?)’ account, Aristotle disqualifies induction as a deduction for the same reason. Just because something is predicated of a number of kinds falling under a genus, it does not necessarily follow that it is predicated of all members of that genus. However, in *An. Pr.* 2.23 Aristotle construes an induction as a deduction, by understanding induction to involve a premise that members of the genus are included among the enumerated kinds. Thus, to adapt Philoponus(?)’ example, the induction that would qualify as a deduction would be ‘a human being and horse etc. move their lower jaw, all animals belong to human being and horse etc.; therefore all animals move their lower jaws’. This deduction, though valid, is unsound. One or another of the enumerated premises (depending on what the full enumeration of animal species is) is false, as the ancients held that the crocodile does not move its lower jaw: see Hdt. 2.68; Aristotle *HA* 1.11, 492b23-6; *PA* 4.11, 691b5-16. Other references to this unsound inductive deduction can be found in Apuleius *Int.* 185,15-20; Ammonius in *An. Pr.* 43,26-44,2; Philoponus in *An. Pr.* 34,21-6 and Alexander in *An. Pr.* 43,28-44,2, the note to which, at Barnes et al. (1991), 104 n. 12, I am indebted.

110. I accept Wallies’s tentative suggestion of *asullogistikôs*.

111. Philoponus(?) understands ‘many steps’ as meaning ‘many differentiae’.

112. In other words, the division is incapable of being cast in the form of a syllogistic deduction.

113. I accept Wallies’s conjecture *badistikou* for *galastikou* (capable of laughing).

114. ‘Terrestrial’ and ‘biped’ are stock examples of definitional (and hence immediate) predicates of ‘human being’. Perhaps, on Philoponus(?)’ understanding, Aristotle is considering cases in which division is a method by which a
kind is classified, prior to establishing the definition that will serve as a source of first principles concerning that kind. On that understanding, human beings will be classified as terrestrial, since they live on land, in contrast with animals that live in the air or in the sea. But the more fundamental feature of human beings, which explains the fact that they live on land, is their means of locomotion (walking). Hence it can in principle be deduced that human being are terrestrial. But it was not deduced in the division, as division does not employ deduction at all. Likewise, the upright posture of human beings could be understood as more fundamental to, and explanatory of, the fact that we walk on two feet (cf. Plato Tim. 90A2-B1; 91E2-92A4 and Aristotle PA 4.10, 687a5-23, both of which posit the fact that human beings are rational as an even more basic feature, which explains the fact that we walk upright). On the Aristotelian account see Lennox (1999), 11-16.

115. Ross’s text has ta gar kôluei touto alêthes men to pan einai, which could be translated as ‘What prevents all of this from being true ...?’

116. The Greek term gar usually provides some support for what precedes, but sometimes it provides support for what follows, and so Philoponus (?) takes it here. He has just interpreted Aristotle’s point that division does not deduce what admits deduction as meaning that division can lead to presenting as a definition a conjunction of predicates, at least some of which are demonstrable on the basis of immediate predications (which would be the ones given in a definition). The gar clause could be understood as in support of this: what prevents division from arriving at demonstrable (and hence nondefinitional) predicates?

117. I do not add kai after anankê as does Wallies. With Wallies’s emendation, the text would read ‘it is not necessary that it be said of it as a definition, too’.

118. On this example, see Aristotle SE 20, 177b13-15 and Int. 12, 20b35-7. In such a case, the difficulty arises from the ambiguity of language (as the term ‘good leatherworker’ means something different from the conjunction of ‘good’ and ‘leatherworker’). It is unlikely that Aristotle here has this sort of improper inference in mind.

119. The first is a stock example of that which is wholly accidental to a subject: neither necessarily predicated of its subject nor present in its definition. The second is a stock example of a (nondefinitional) property of human being, which is necessarily predicated of its subject but is not present in the definition.

120. The only other rational things that can be said to be alive are gods. So in this case ‘living thing’ might be less misleading as a translation of zôion than ‘animal’.

121. However, the gist of Metaph. 7.12 is that in a properly formulated definition, the differentia is a determination of all higher differentiae (and the genera which those differentiae help to define). On this account, the genus, and all of the differentiae but the last are included for maximum clarity and explicitness, but, since they are entailed by the ultimate differentia, they need not be present in a definition for it to serve as a first principle of demonstration. The apparent discrepancy is likely a result of the development of Aristotle’s thought. But the ancient commentators did not appeal to developmental hypotheses to account for apparent discrepancies in an author’s text; it is not clear how Philoponus (?) would explain why Aristotle is so worried about the possibility of ‘skipping’, given what he says in Metaph. 7.12.

122. Philoponus (?) gives the more usual spelling pareitai, instead of parieitai of the text.

123. Ross, following Waitz, omits ‘This is necessary’. Philoponus (?) apparently puts a period after these words.
124. Here ‘leaving out’ (paralêpsis) is understood as a fault or deficiency that occurs when there is at least the genus present in the definition, but there is missing at least one other predicate that should be present in the definition. This includes, but might not be restricted to ‘skipping’.

125. Wallies mistakenly identifies the line number as 91b31.

126. Ross has atomon gar êdê einai, ‘it must now be ...’.

127. It is not clear what sense Aristotle’s term atomos (indivisible) has here. Philoponus(?) understands it as here referring to the characteristic of a definition’s being coextensive with the defined. The idea seems to be that a definition that comprehends more than the defined refers to a kind that can be divided into the kind in question, as well as another kind distinguished from it.

128. On Philoponus(?) understanding, Aristotle is responding to a more modest suggestion than the thesis that a definition is directly demonstrated by means of a division. This is that the division contributes to (sumballêtai eis) the demonstration of a definition. Philoponus(?) takes the response to be that the definitions employed by sciences must be true, but following the method of division cannot guarantee that the definition one achieves is free from the faults that can plague definitions. (As Philoponus(?)’ commentary on 2.13 below shows, he is aware that Aristotle does indeed believe that division is an important step in attaining the definitions of at least some of the kinds treated by sciences. He is likely considering the present argument aporetic and provisional, as no doubt it is. That said, Philoponus(?)’ treatment of the aporetic chapters 2.3-7 is lacking, as he does not take care to clarify the extent to which the arguments Aristotle puts forward are incomplete or deficient, and the extent to which their results will stand.)

129. ‘Addition’ is a matter of making divisions which result in more differentiae than are necessary to define the kind in question, so that as a result the definition one attains includes extraneous elements. Philoponus(?) here for the first time appeals to the distinction between matter and form in his explication of Aristotle’s teachings concerning definition in the Posterior Analytics. This distinction will feature prominently in his account of 2.8-10, even though it is not explicitly raised in the text of An. Post. itself (no doubt for the reason that Aristotle had not yet made that conceptual innovation; on this see Graham (1987), 156-66).

Philoponus(?) here says that a proper definition includes both formal and essential elements, as well as material and accidental elements. Although I do not prejudice the issue by reflecting this in my translation, I take both occurrences of kai here to have the sense of ‘that is’. (‘You take not only the essential, i.e. formal differences, but also the material, i.e. accidental differences’. ) After all, that the essence of a composite substance is its form is an Aristotelian commonplace (one however which causes Aristotle great difficulty in Metaph. 7.11 when he tries to reconcile this with the thought that matter must in a sense be included in a definition of a kind). Further, at 375,2-4, Philoponus(?) identifies a formal definition with the immediate premise that expresses a thing’s essence (what it is). If the first kai has the sense of ‘that is’ it would stand to reason that the second kai would too. For the Neoplatonic commentators, an accident, in one of its most important senses, is what, in the terminology of the Categories is not ‘said of’ a subject; that is, it is not definitional. (See Porphyry in Cat. 73,22-7; Philoponus in Cat. 29,4-5.) It stands to reason then, that the material differences are those that are not present in the definition of the kinds that truly divide the genus in question, and hence are ‘accidental’. Some differences among composite substances could arise because of the circumstances that stem from this or that particular material instantiation, but a definition that includes these would not be faulted for ‘addi-
tion; it would be faulted for the more severe flaw of incorrectly attributing to a kind a feature that does not necessarily belong to that kind. So I take the material differences to be those that necessarily belong to a kind, but are not included in the essence of that kind. (Cf. the sense of ‘accident’ delineated at Metaph. 5.30, 1025a30-4: an attribute that is kath' hauto but not contained in the definition. Aristotle’s example is ‘having the interior angles equal to two right angles’, of triangle. This, like Philoponus(?’ material differentiae, is demonstrable of its subject.) Rather they necessarily follow from that essence, and this can in principle be shown through demonstration. Philoponus(?) will later attribute to Aristotle the view that the complete definition attained by science will include both ‘formal’ and ‘material’ elements (in what is clearly an attempt to understand the An. Post. in light of DA 1.1, 403a3-b19), but he argues that the only definition that is immediate, and hence a first principle, is the formal definition, and that a material definition can in a sense be demonstrated on the basis of a formal definition. This is partial confirmation of the interpretation of the distinction between formal and material differences that I here present.

There are two more issues, however. The first is how to reconcile this account with Aristotle’s examples here. How are clawed and flat-nailed material differences of animal? Philoponus(?) has been presenting terrestrial, winged, and aquatic as true differentiae of animal. Clawed and flat-nailed are not here included, hence, because they are not present in the definitions of animals, they are accidental differentiae. Philoponus(?) however confuses matters by saying that these are material differences of animal insofar as they do not exhaustively cut the class of animals. This does not seem relevant, as it is conceivable that they could be differentiae of a subordinate kind, such as footed animal. In that case, the fault of the division would be skipping, not addition. There is a similar problem with Philoponus(?)’ example of male and female as material differences of animal. That every animal capable of locomotion is either male or female can presumably be explained on the basis of the definition of such animals. (For a sketch of how this might work, see GA 1.23.) But again, Philoponus(?) does not fault the definition with this, but simply with the observation that not all animals are either male or female, which would suggest that the fault is that the divider has skipped to dividing subordinate differentiae. Indeed, in his account of the relationship of the formal and material definitions of a kind, Philoponus(?) asserts that, at least in the context of the sciences, the material definition can be demonstrated to belong to the formal definition (and hence is entailed by it). This strongly suggests that the material differentiae are features that are logically entailed by the true, immediate (‘formal’) differentiae that define the subordinate kinds to which the material differentiae respectively belong.

Another problem is the sense in which such differentiae are material. There are two options. One is that they are the result of the material instantiation of form in matter. Thus the shape of the nails might result from material processes in the foot, and Aristotle is explicit that sexual differentiation results from material processes in the embryo (GA 4.1-2). But if this is what Philoponus(?) means by material differentiae, he would be placing them outside the pale of scientific demonstration, while in his commentary on 2.8-10 he is explicit that they can be shown to follow logically from the formal definitions. I therefore tentatively take ‘material’ here to have the sense by which it refers to what is not completely determined (see n. 214 below). A material differentia is a feature of a kind that provides partial information concerning what that kind is, but needs to be supplemented by insight into formal or essential features.
130. On the distinction between clawed and flat-nailed, see Aristotle HA 3.9, 517a33-b2; Aristotle uses the term *euthuônukhos* (straight-nailed) instead of *platuônukhos* (flat-nailed). The shape of the nail would surely admit of explanation via both final and material causes.

131. See Aristotle GA 2.5, 741a38-b3 and HA 4.11, 528a2-13.

132. Wallies mistakenly identifies the line number as 91b32.

133. On analysis in Philoponus(?), see Goldin (2009).

134. At 91b34-5, Aristotle says that induction does not demonstrate, so we would expect Philoponus(?) to say ‘does not demonstrate but does instil …’ But the text need not be amended, for it is likely that Philoponus(?) is alluding to 92a4-5, in which Aristotle concedes that even if there is a sense in which an induction demonstrates (perhaps in the nontechnical sense of ‘show’), nonetheless the definition itself is not a deduction.

135. I accept Wallies’s proposal for filling in the apparent lacuna in the text at 353,13: *aneu tôn mesón, êgoun tôn dia mesón*.

136. Both divisions and deductions of the fact in some sense reveal something, but do not do so in a way that makes it fully intelligible, as neither indicates the reason why what is shown to be the case is the case (see Achard (2004), 44).

137. Philoponus(?) takes *kat’ ousian* (‘in respect to the essence’) to clarify which kind of expression of the what it is is in question here: it indicates that we are asking about the formal definition. Such a forward reference to a distinction that is not even explicitly made is unlikely. I rather take the phrase to be pleonastic.

138. Ross reads *idion*, not *idiôn*, which would give the sense ‘the totality is a property’.

139. Aristotle appears willing to call hypothetical arguments *sullogismoi* at An. Pr. 2.43, 50a39-b4, but it seems to have been Theophrastus, followed by later Peripatetics, who first subjected them to serious study as syllogistic forms in their own right. See Fortenbaugh (1993), 62-6. Neoplatonic and later Peripatetic writers recognized the propositional logic of the Stoics, which is derived from the work of Theophrastus, but they claimed logic and epistemological priority to Aristotelian syllogistic. See for example Philoponus(?), in An. Post. 243,32-6; 244,16-18.

140. I add a period after *labonta* on 354,8.

141. The sense of *hypothesis*, which Philoponus(?) takes to be in play here, has no clear antecedent in An. Post. A hypothesis, on this sense, is similar to a thesis as defined at An. Post. 1.2, 72a15-16, but in this case there is no need that the assumption be on the basis of hearing it from a teacher; it could be assumed on one’s own. At An. Post. 1.10, 76b26-30 a hypothesis is said to be an assumption taken from a teacher, but such a hypothesis is said to be provable; it is simply pedagogical circumstances that require its being assumed. In contrast, here we are dealing with principles that *must* be accepted from a teacher. However, this sense of *hypothesis* is found in Philoponus’ commentary on An. Post. Book 1 (127,31-3; 129,3-5). On this see McKirahan (2008), 4-5. I take this to be strong evidence that either Philoponus is the ultimate source of the present commentary, or they share a common source in the lectures of Ammonius.

142. Euclid *Elements* Book 1, Post. 1, modified.

143. Euclid *Elements* Book 1, Post. 3, modified.

144. Philoponus(?) is here distinguishing a looser and stricter sense of *idion*, property. See n. 87.

145. Philoponus(?) is here explaining the plural of the relative pronoun *hón*.

146. Aristotle *Top. 1.1, 100a25-7; An. Pr. 1.2, 24b18-20.*
Philoponus(?) reads *dei to ti én einai* instead of *to ti én einai dei* but there is no difference in translation.  

Aristotle Top. 1.1, 100a25-7; An. Pr. 1.2, 24b18-20.

Definitions of definition very close to this are found in ps-Galen Def. Med. 19.349,6-7; Ammonius in Isag. 1.6-7.

Philoponus(?)’ commentary at 356,20 suggests that he reads *to d’ enantiói einai to enantion einai* (cf. Pellegrin's suggested emendation ad loc.), while the manuscripts read *tôi d’ enantiói to tôi enantiói einai* (<to be is> to be contrary to the contrary’) and Ross reads *tô d’ enantiói to tôi enantiói enantiói einai* (to be a contrary is to be contrary to the contrary).

Plato Tim. 67D.

The argument is attributed to Speucippus, see Ross (1949), 623-4.

Aristotle EN 2.6-9.

The objector says that all demonstrations rest on assumptions which, at least implicitly, express whatever it is that is being proven.

On Philoponus(?)’ understanding, Aristotle is saying that demonstrations do indeed rest on assumptions, but no single assumption amounts to exactly what it is that is to be demonstrated. But the assumption that the contrary of S is defined as the contrary of P is the very assumption that S is defined as P.

The term *logos* is variously translated as ‘account’, ‘phrase’, and ‘ratio’. Philoponus(?) understands Aristotle’s remark that the good and the bad have the same *logos* (account) not as meaning that they have the same definition (which they obviously do not) nor that the definitions of each contain the same phrase or term (which is true, as the proposed definitions of each contain the phrase ‘divisible’) but as meaning that they both stand in the same ratio (with certain things). In fact Philoponus(?) did not show how an analogy can be set up with good and bad as terms. (This is perhaps an indication that this commentary is an abridgement of a longer commentary.) An analogy is a proportion among terms (see Aristotle Poet. 21, 1457b16-19) such that the first has the same ratio to the second as the third has to the fourth. In this case, as good is to bad, so is indivisible to divisible.

Since they are contraries, good and bad are obviously not converting terms, in the ordinary sense. Philoponus(?) takes ‘convert’ to have a special sense here, whereby A converts with B if and only if the definition of A is proven on the basis of the definition of B, and *vice versa*.

See 357,30-4.

Philoponus(?) imagines a chain of hypothetical syllogisms, each of which concludes that a differentia is predicated of the subject. But how do we know that the differentiae taken together as a single subject are predicated of the subject? Philoponus(?) is not here understanding the predicate that results from the differentiae being taken together to be a conjunction of the differentiae; he is rather taking Aristotle to be making the same point that, at 357,30-4, he took Aristotle to be making in regard to definition arrived at through division: the separate differentiae, when expressed as a group, might mean something different from the conjunction of the differentiae, and the predicate that is expressed as a result might be falsely predicated of the definiendum.

The term *ousia* can have the sense of either ‘substance’ or ‘essence’. With few exceptions, I have been rendering it as the second. See n. 48. Philoponus(?) would agree that this is a proper translation, and that the term here is synonymous with ‘what it is’. Here he explains why the ‘what it is’ is sometimes called an *ousia*. The question ‘what it is’ is most appropriately asked in regard to a substance, and
the answer to the question identifies that aspect of the thing that is substance. See *Metaph.* 7.1, 1028a36-9.

161. I read *anankê ex* with the MSS.

162. I read *sunagein* instead of *sunagousin*.

163. Pellegrin (2005), 405 n. 1 adopts this interpretation, following Aquinas. Pellegrin finds support in Philoponus(?)’ use of *pan* at 359,3 (‘Since it is impossible to go through *all* of the individuals’). But the standard translation ‘that everything is this way’ is certainly compatible with the commentary.

164. Philoponus(?)’ example makes clear that he understands ‘particulars’ here to refer to particular species.

165. cf. 349,25-8 and n. 109.

166. In this section Philoponus(?) is using ‘individual’ (*kath’ hekaston*) as synonymous with ‘particular’ (*merikon*), and is understanding the term to refer to both infima species and particulars, since his examples show that he takes induction to generalize on the basis of a survey of either. I render *apeiros* as ‘indefinite’ since Aristotle does not hold that there are an infinite number of species that belong to a kind (otherwise scientific knowledge of that kind would be impossible). Rather, Philoponus(?)’ point is that the results of an induction of species could serve to ground definition only if one already had an exhaustive list of the species that belong to a genus, and this is possible only if a division of the genus (and hence the definitions of the genus and kinds under it) has already been successfully accomplished. So for the one doing an induction in order to achieve such definitions, the number of species under a kind, and which they are, is *indefinite*.

167. Philoponus(?) is arguing that the only way one can legitimately employ an induction to infer a definition of a species is if one already had a list of the definitions of all of the species under a kind, and then were to omit all of the species but the one sought through a process of elimination. Again, if one were in a position to do this, he or she would in effect already have the definition being sought.

168. Philoponus(?) interprets Aristotle as holding that a definition is neither an affirmation nor a negation. But why not? Perhaps Philoponus(?) has in mind *An.* *Post.* 1.2, 72a19-24, but this is an excessively problematic passage; after all definitions do entail predications, which are demonstrative principles. It is probably better here to see Aristotle as arguing that although induction can, in principle, yield conclusions that are affirmative (or negative) predications, it is incapable of identifying those predications as definitional.

169. Ross’s text omits *anthrôpos*, yielding the translation ‘Further, how will you prove the what it is?’

170. By explicitly remarking that the arguments he is about to discuss are aporetic, Philoponus(?)’ here signals that they may rest on dubious or misapplied premises.

171. If only what X is is proven, then it is unknown whether there is an X, so it is quite possible that one has proven the what it is for a kind that does not exist.

172. I understand *estin* as potential, with an understood *eînai*. Otherwise, Philoponus(?) is saying that there is definition of what is not, but this does not follow. Just because the definer does not know whether the defined exists, does not mean that it does not exist.

173. This follows from the existential presupposition of all predications, according to Aristotle’s semantics. On this see Goldin (1996), 41-71, but it is not clear that it is on such grounds that Philoponus(?) takes Aristotle to deny that there are definitions of nonbeings.
174. This is impossible, according to the aporetic argument, as Philoponus(?) understands it, since every demonstration has only one conclusion.

175. Philoponus(?) employs a word not found in Aristotle: onomatôdês, which literally has as its sense something like ‘having the form of a name’. As Detel (1993) vol. 2, 608, points out, Zabarella, unlike Philoponus(?), explicitly sees that the appeal to nominal definition at this point in the text is an indication of how Aristotle is going to resolve the whole difficulty of the relation between definition and demonstration – an explanatory demonstration that makes an essence clear needs to have the nominal definition as a kind of starting point.

176. The Greek here is anupostaton, lacking hupostasis (ontological standing).

177. This is another unusual term: anaplasma, an impression (in the imagination); see Sextus Empiricus Adv. Math. 8.354,5.

178. Thought (dianoia), for both Peripatetics and Platonists, is discursive reasoning, in which a plurality of conceptual items are joined or separated.

179. See n. 174 above.

180. I read hoti ou sunapodeiknutai.

181. ‘Demonstration’ here must have its loose sense, of displaying or showing.

See n. 67.

182. An. Post. 2.3-4.

183. This can also be translated ‘that are proven by them’.


185. Ross’s text has ho ti esti (‘everything that something is’) instead of hoti esti, the reading supported by Philoponus(?)’ commentary.

186. A literal translation would be ‘it must be shown of every fact that it is’.

187. The lemma reads to de einai, while Ross’s text has to d’einai.

188. Aristotle explicitly says that being is not a genus at Metaph. 3.4, 998b22-7; this is however an aporetic chapter. The thesis could be better supported from within the An. Post. itself. In 1.7 Aristotle argues that each science deals with its own genus, and has principles that concern only that genus. In 1.32 Aristotle argues that such principles (unlike the so-called axioms, which concern things of more than genus) cannot be shared. Hence there is no single genus that concerns things dealt with by more than one science. But instead of supporting the thesis that being is not a genus in this way, Philoponus(?) does so by indicating that Aristotle believe that the verb ‘to be’, as employed in each of the categories, is equivocal. As a matter of fact, Aristotle explicitly says that ‘being’ is not equivocal (Metaph. 4.2, 1003a33-b10), although it is not strictly speaking univocal either; the senses of the verb are all related by being said with reference to substantial being.

This passage constitutes a partial revision of the thesis of the teaching of the An. Post. that there is no science of everything, though no doubt Philoponus(?) would reject such a developmental account.

189. The text is problematic; I translate that of Ross, who mentions Philoponus(?) as one who ‘points to’ his reading. However, the term êgoun often (although not always) introduces Philoponus(?)’ reformulation of a difficult or obscure phrase in the text. If that is what is happening at 361,19-20, then at the difficult 92b17, Philoponus(?) is reading ê ti esti trigônon katho trigônon (‘or what is triangle insofar as it is triangle’).

190. On how what ‘triangle’ means is assumed, but the being (einai) of triangle must be proven, see An. Post. 1.10, 76a31-6. Philoponus(?) understands what is proven to be not that triangles exist, but that a particular figure that has been constructed is a triangle (although, certainly, once this has been proven, it has also been proven that there is at least one triangle).
191. As Philoponus(?) well knows, Euclid (Elements 1, Postulate 3) takes this to be a geometric principle, not something to be proven. This is additional evidence that Philoponus(?) is taking this whole stretch of text to be aporetic.

192. I read 
ouk esti for esti. Philoponus(?) is well aware that this is a demonstrated, not a definitional attribute of triangle.

193. By paraphrasing the ‘what it is’ as the nature of the defined, Philoponus(?) is signalling the error made in the development of the aporia. ‘What it is’ is not here the essence or nature of something that exists, but is what a word means (cf. An. Post. 1.1, 71a11-17).

194. This seems to be Philoponus(?)’ own off the cuff definition of circle, meant to conform to Aristotle’s text.

195. As Pellegrin (2005), 405 n. 10 points out, Philoponus(?) has in mind the references to mountain-copper in Plato Critias 114E5; 117C1-D7; 119D1. He says that Philoponus(?) is wrong in this; the term signifies a kind of lead.


197. Philoponus(?) is saying that in order to make sense of the genitive phrase ‘of the what it is’ (tou ti estin) we must supply ‘indicative’ (dêlôítikos) before it. This is not, however, a term that Aristotle uses.

198. While Barnes (1994), 216 understands ousiai as having the sense ‘substances’, and accordingly understands the objection in light of Aristotle’s teaching in Metaph. 7.5 that only items in the category of substances are definable, in the strict sense, Philoponus(?) takes the kai to be explicative, and understands ousia as ‘being’ or ‘essence’.

199. ‘Title’ renders onoma, usually translated as ‘word’.

200. This is a recurrent opening for prayers in the Homeric epics (Il. 2.371; 4.288; 7.132; 16.97; Od. 4.341; 7.311; 17.132; 18.235; 24.376).

201. Homer Il. 8.399; 11.186; 15.158; 24.144.

202. The reference is to Plato’s Cratylus, according to which words that are in accordance with nature are complexes whose etymology reveals a complex of simple linguistic units that expresses the complex that they denote. If any complex of linguistic items is a definition, then, and Plato is right about the constitution of words, then any word is (implicitly) a definition.

203. anthrôpos (human being) is said to derive from anô athrein (to look upwards). This false etymology derives from Plato Cratylus 399C1-6.

204. merops (articulate) is said to derive from memerismenê (divided) and ops (voice). This etymology is found in Ammonius in Int. 38,13-14, from which the author (if not ultimately Ammonius himself) likely derived it.

205. Ross’s text has oudemia apodeixis: ‘no demonstration would demonstrate’.

206. Words refer, but do not also demonstrate (whether in a technical or nontechnical sense) that they refer; likewise, a definition indicates (the definition) but does not also demonstrate (whether in a technical or nontechnical sense) that the definition is a definition.

207. Perhaps here deiknutai would be better translated as ‘shown’. The preceding inquiry in part concerned whether a definition proves the what it is. Aristotle’s response is that a definition shows the what it is but does not prove it. The aporia is in part generated by the fact that the same Greek verb deiknunai signifies both proving and showing.

208. An. Post. 2.4, 91a35-6; 92a33.

209. An. Post. 2.3, 90b1-2.4; 91a35.


211. This will be in An. Post. 2.10.
212. The lemma has *tauton* following *estin* at 93a3.

213. Ross emends the text from *to ti esti* to *tou ti esti*, yielding the translation ‘proving it through some other [instance of] what it is’.

214. Matter and form here may well refer to the two ontological components of composite substance. Philoponus would then be saying that a demonstration can be employed to prove, and explain, the full and adequate hylomorphic definition of a composite substance, or some aspect of that composite substance. In that case, Philoponus’ remarks have special application to physics and biology, and the present passage can shed light on how he understands the structure of scientific explanation in that realm of inquiry. But we should not rush to such an interpretation on the basis of his use of the terms ‘matter’ and ‘form’. For, from the time of Alexander of Aphrodisias on, ‘matter’ can refer to any sort of indeterminate substrate, and ‘form’ can refer to any principle of determination. See Fasso (2004), 10 n. 30: ‘The coupling of *hulê* (matter) and *eidos* (form) in Alexander, taken as opposite concepts, is a case in point [in developing a unified and unambiguous technical vocabulary]. “Matter” in Alexander is consistently called *hulê*, and this is not as obvious as it might appear. The comparison with Aristotle’s texts shows that the word *hulê* in Alexander translates a plurality of Aristotelian expressions, which indicate any kind of substrate, such as *to hupokeimenon* (in the coming-to-be process), *to ex hou* (in the physical theory of the four causes), *to dektikon* (the receptacle), *to dunamei* (in opposition to *to energeiai*). Hence the scholastic concept of “matter”, which is quite general and can be defined only negatively, by its lack of qualification and determination, and by its being therefore truly “susceptible of opposite determinations” (*to tôn enantiôn dektikon*). By contrast, the word *eidos* in Aristotle’s school implies any kind of determination and is thus used to translate, e.g., Aristotle’s *morphê, skhêma, to ti ên einai, ousia*; its definition is complementary to matter, and it is as broad as possible (“that in virtue of which everything is what it is”). The simplification of the two opposite concepts is reciprocally related. Hence the coupling of form and matter, that serves as a general explanatory scheme in the soul-body relation and in a whole range of other contexts where it was not directly introduced by Aristotle (whose original wording often had just one of the two terms, or neither of them).’ Accordingly, when Philoponus(?) speaks of a material definition that reveals aspects of a thing taken from the matter he can either be understood as speaking of an identification of a thing’s material substrate, or as a way of referring to a thing that does not reveal the essence in a fully determinate way. As we shall see, Philoponus(?)’ examples mostly support the second interpretation.

215. A crucial step in Philoponus(?)’ interpretation of these chapters is taking Aristotle’s ‘there is something that is the cause, and this is either the same or different, and if it is different’ not to refer to different kinds of things (those that have a cause that is different from them, and those that do not; for such a line of interpretation, see Themistius (50,19-28), on which see Goldin (1996), 134-6 and Goldin (forthcoming), Ross (1949), 629-33, Goldin (1996), 108-34, and Deslauriers (2007), 48-65; Goldin (forthcoming) traces it back to Alexander of Aphrodisias) but to refer to two different kinds of causes, or formulations of causes, of the same thing. A cause that converts with the effect is the same as the effect; one that does not convert is different from the effect. For several versions of such an interpretation of Aristotle’s strategy, see Le Blond (1970) 158-9; Mansion (1976), 183-97 (both of whom employ the distinction between material and formal definitions); and Bolton (1987), who does not talk of material and formal definitions, but acknowledges the debt to Philoponus(?) on 140 n. 34.
216. Walking upright and flatnailed are characteristics of the body, and hence might seem to be material differentiae by virtue of the fact that they refer to the material characteristics of a human being, but it is hard to see how this can be said of being capable of laughter. What all three characteristics have in common is (presumably) lying outside of the essence of human being. So they specify human being, but do so in an indeterminate way, without clarifying the aspects of human beings that have a central causal role. Flatnailed is apparently more extensive than human being (according to Aelian *Nat. An.* 11,37,21-2 (offered as Aristotle, fr. 7, 39; 281, 21-2 in Rose (1886)) swans and geese are flatnailed), however, being capable of laughter is a property of human being, and so, according to Philoponus(?) at 367,14, is walking upright (apparently being used here in a technical sense, as all bipeds are upright in some sense); hence the conjunction of all three characteristics is a property of human being, and converts with it. This definition must therefore be material in the second sense indicated in n. 214, as identifying a thing in a way that does not reveal its complete, determinate essence.

217. The examples of the formal and material definitions of anger are taken from Aristotle *DA* 1.1, 403a1-b3. This example supports the first of the two possible ways of understanding a material definition. What Aristotle called the (incomplete) definition of the physicist (that anger is the boiling of the blood around the heart) is here the material definition, and that which Aristotle called the definition of the dialectician (that anger is a desire for retaliation) is here called the formal definition. For the first definition relates the conditions within the matter of a human being, the human body, that are necessary for there to be anger. But there is a problem with understanding the second definition as expressing the form. For, since anger is not a substance, it does not, strictly speaking, have a form. But it does have an essence, and Philoponus has told us that the formal definition is that which is taken from things in the essence. In the case of a whole substance, the essence (in one sense of the term essence, *to ti ên einai*) will be the form. In the case of a passion or action, like anger, the formal definition does not give us the form that structures matter, since anger, as such, does not have a form, but perhaps we could say an adequate understanding of anger needs to appeal to the fact that human beings are social and rational animals (and hence are the sort of being that will think about the extent to which their standing in the *polis* rationally corresponds to their merit or other legitimate grounds for such standing), so to that extent, the desire for retribution in return for perceived injury appeals to the human form, in a way in which a purely physiological description of anger does not. (Such an interpretation also seems to be supported by Philoponus, *An. Post.* 109,8-33, where the ‘definition from the form’ of anger is said to be the immediate principle on the basis of which can be demonstrated the ‘definition from the matter’, understood as specifying the matter for the defined.) But because of the problems, outlined in the previous note, encountered by understanding the distinction between formal and material definitions in terms of hylomorphic metaphysics, it is more likely that here the material definition of anger expresses an indeterminate notion of anger, and the formal definition expresses that which it lacks to be fully determinate. It must be admitted, however, that it is hard to see how the internal boiling of the blood (as opposed to, say, the reddening of the face) would be the rough inchoate idea of anger from which a scientific investigation of anger would begin.

The point that neither its formal nor material definition convert with anger seems to be original to Philoponus(?) or his source, unless he is preceded by ps-David *Prolog.* 19,26-20,22 who offers a discussion that is in part parallel to the
present one. Ps-David writes that the complete definition will be the one taken from both the matter and the purpose (telos), since, for the most part, neither the definition taken from the matter nor that taken from the goal convert with what is defined. (Examples given are the definition of glassmaking, which would convert with the defined even if the purpose of glassmaking is omitted, and the definition of philosophy, which need not mention matter, as everything is included in its subject matter, and there is no kind of matter that underlies everything.) Ps-David mentions how the boiling of the blood around the heart does not convert with anger, but does not make the same point concerning the definition of anger that is drawn from its purpose.

218. Philoponus(?) appears to be saying that nothing that is a material or a formal definition is a true definition. It certainly makes sense to say that no material definition is a true definition. For a true definition is an expression of what something is, and this is not the role that a material definition will play (whether we understand a material definition as an account of the matter in which a form inheres, or whether we understand it as an indeterminate account of what something is). But why will not a formal definition be a true definition? After all, Philoponus(?)' example of a formal definition that converts with that which is defined, 'a human being is animal rational mortal', is Aristotle's stock example of a definition. I therefore understand Philoponus(?)' assertion to be poorly worded, and meant to be restricted to those material and formal definitions that do not convert with what is defined. Philoponus(?) makes clear that the failure to convert is a consequence of their deficiencies as definition, not the reason why they are not true definitions.

219. Philoponus(?) might be alluding to Aristotle's teaching that the definition of a thing must constitute a unity. Aristotle most explicitly lays out this condition at Metaph. 7.4, 1030b3-13. The fact that Aristotle makes this point by contrasting a definition, having the requisite unity, with the Iliad, which does not, suggests that this is what Philoponus(?) has in mind, since he too has just contrasted a definition with the Iliad. But it is hard to see how the necessary unity of the definition supports the thesis that a true definition must convert with that which is defined. Accordingly, I tentatively interpret Philoponus(?) as saying, not that each true definition is a unity, not a plurality, but as saying that there is only one true definition of a thing. There will always be a number of characterizations of the essence of a kind, drawn from both 'formal' and 'material' considerations, but these cannot be definitions, since there is only one true definition of a kind. The translation I have offered is noncommittal between these two alternatives, but the translation, 'For of each thing there is one definition in the strict sense, not many' would more clearly translate the text, according to the second interpretation.

220. Philoponus(?) is pointing to temporal priority as a sign of causal priority. In his commentary on 2.12, Philoponus(?) offers an extensive discussion of the logical relationship of cause and effect when they are not simultaneous. Following Aristotle (95a27-b1) he says that when the cause is temporally prior to the effect, the cause does not necessitate the effect (387,6-389,35). It is tempting to think that this is why Philoponus(?) and perhaps Aristotle too, denies that the demonstration of what Philoponus(?) calls 'the material definition' on the basis of 'the formal definition' has the standing of being a true demonstration (of which the conclusion must be necessary). But, since on the Aristotelian account (followed in this respect by Philoponus in DA 330,8-27, on which see De Groot (1983, 177-9)), the propagation of light is instantaneous, and 373,13-374,24, dealing with the parallel case of thunder, strongly suggests that the formal definition of the lunar eclipse is the
blocking of the sun from the moon by the earth, and the material definition the
privation of light from the moon, this cannot be what Philoponus(?) means when
he says that the formal and material definitions fail to convert, on account of the
causal priority of the former.

221. Philoponus(?) might mean that the deduction: S is FD (formal definition);
FD is MD (material definition); therefore S is FD and MD does not conform to
the structure required by Aristotelian syllogistic, and hence cannot be a demonstra-
tion. More likely, he is alluding to the fact that, since the major premise is not
universal and necessary, this deduction, although called a demonstration at 365,8,
is not a true demonstration, since the conclusion does not hold of necessity. A third
possibility is presented by 366,13-18, that such a deduction begs the question, but
see n. 230 below.

222. See Aristotle Metaph. 7.11, 1036a28-9.
223. It is the formal cause.
224. Aristotle begins a condition with the since (epei) clause at 93a3 but there
is no clear consequent. One possibility is that the consequent is the condition that
begins with the if clause at 93a6. Philoponus(?) rather takes it to be the understood
conclusion ‘there can be a demonstration of a definition’.
225. The ‘for’ clause gives the reason why the material definition is demonstra-
ble, not the reason why the formal definition is immediate.
226. Commonly, ‘that which has been considered’ (ho nun exêtasmenos) is
thought to refer to the purported demonstration of one definition on the basis of
another, discussed and rejected in 2.4 (see for example, the paraphrase at Ross
(1949), 628) but Philoponus(?) takes it to refer to purported demonstration of the
material definition on the basis of the formal definition.
227. The lemma reads tôn gar ti estin anankê kai to meson where Ross has tôn
tei gar ti estin anankê to meson: ‘For in cases of the what it is the middle term must
[be] ...’. 
228. If I am correct that Philoponus(?) is restricting himself to events, this sort
of demonstration that reveals a definition is impossible for mathematical entities.
229. Philoponus(?)’ commentary shows that he reads epiontes where Ross has
epontes: ‘by speaking again from the beginning’. 
230. If the formal definition is immediate (365,26-7; 366,10-11) then why is
assuming the formal definition a matter of begging the question? Why does its
status as a definition need to be investigated? It is the deduction that proves the
formal definition that would be dialectical, not the deduction that employs the
formal definition as middle term. I am at a loss to understand Philoponus(?) here;
perhaps the redactor is confused, taking remarks that the lecturer said about the
faults displayed by the deductions discussed in the aporetic chapters to apply to
the deduction under consideration.
231. The term for ‘dialectical’ in Aristotle’s text is logikos. Barnes (1994), 218
and Pellegrin (2005), 407 n. 14 understand the term as having the sense ‘logical’,
the point being that the proof is valid (or, perhaps, sound) but does not exhibit the
cause. But the term can also have the sense ‘dialectical’ and Philoponus(?)’
commentary shows that this is how he understands it.
232. Pellegrin (2005), 407 n. 14 suggests that Philoponus(?) says this because
at DA 1.1, 403a29 Aristotle says that the definition of anger as a desire for
retribution in response to perceived injury is dialectical. It is true that Phi-
loponus(?) has said that such a desire for retribution does not convert with anger
(364,29-365,1). But Philoponus(?) has also called this formal definition an imme-
diate premise, suggesting that it has the inviolable status of a first principle (see
n. 129). The apparent contradiction can only be dealt with by taking Philoponus(?) to be giving 'anger’ two senses, one, defined by its formal definition, and one defined by the conjunction of the formal and material definitions. I accordingly suggest that it is the major premise, that predicates the boiling of the blood around the heart of the desire for retribution for perceived insult, that is the reputable premise that renders the whole deduction dialectical, since this premise is not necessary but for the most part.

233. See 464,24-6.

234. An. Post. 1.6, 74b21-4.

235. As Pellegrin (2005), 407 n. 15 objects to Philoponus(?), ‘Mais on voit qu’ A. tient pour acquise la réduction de leur nombre à deux’.


237. When Aristotle at 93a17-19 says that sometimes we come to know the what it is at the same time that we come to know the that it is, he probably has in mind a case like that mentioned at 1.2, 90a24-30 (in which the cause is perceived concurrently with the effect) but Philoponus(?) takes him to be imagining a case in which the demonstration that explains the conclusion also serves to prove that the conclusion holds.

238. The fact and the reason why are mentioned at 93a18-19, while the essence and the ‘that it is’ are mentioned at 93a19-20.

239. The lemma has d’ for the first de in Ross’s text.

240. Philoponus(?) takes the pros (‘towards’) at 93a29 as directional, indicating a grasp that helps one along the way towards an epistemological goal, and he is alluding to that in his use of pros here. On this see Bolton (1987), 132 n. 26.

241. Such properties are accidents insofar as they are not included in the genus. However, they are presumably demonstrable, which is why they contribute to the discovery of the essence of the thing. The search for the essence is the search for the immediate premises by which they can be demonstrated.

242. Philoponus(?) understands ‘something of the thing itself’ at 93a22 to be a definitional predicate, whether genus or differentia, of that which is to be defined. (This is the point of the exegetical remark at 367,31-2.) The more generic the attribute is, the more difficult it will be to discover the essence of the subject, on its basis.

243. ‘Living’ translates empsukhon, literally ‘ensouled’.

244. All of these are examples of properties of the subject, which are both observable (and hence are likely starting points for investigation) and are apparently demonstrable of that subject, but are accidents insofar as they are not present in its definition.

245. This could also be translated ‘does not establish it for us as a whole’.

246. The lemma has d’ for Ross’s own, which would yield the translation ‘Now in the case ...’.

247. This is usually translated ‘whether there is an account of it’; I translate in accordance with Philoponus(?)’ commentary at 368,31 below.

248. These will be elements in the formal cause.

249. Philoponus(?) is speaking of the proximate genus.

250. What is at issue is the referent of autou (‘it’). Pacius (1966), 327, Treden- nick (1960), 203, and Barnes (1975), 63 take the referent to be B, but Barnes (1994), 57 and Pellegrin (2005), 407 n. 17, take the sense to demand that it be the eclipse C, and Philoponus(?) agrees.

251. The discovery of a new kind of substance would presumably begin with the discovery that there is something with certain observable features, which discov-
ery would initiate a process of inquiry resulting in learning its essence. In this case, what Philoponus(?) would call a vague grasp of the if it is precedes the scientific grasp of what it is. As Aristotle has made clear, this sequence of events can also occur in the case of an attribute like the eclipse. But at 366,28-31 Philoponus(?) suggested that when one follows a demonstration that the attribute exists, of which the middle term is the definition of that attribute, one has simultaneous (scientific) knowledge of the what it is and the if it is. (This can also be considered simultaneous scientific knowledge of the reason why the attribute is predicated of its subject, and of that fact that it is so predicated). It must be this sort of situation that Philoponus(?) here has in mind. And since this sort of demonstration is not possible in regard to a substance (since it is an ultimate substrate, and cannot be demonstrated to inhere in anything more basic), there will not be the same sort of simultaneous apprehension of the if it is and the what it is, in the case of a substance.

252. I omit ei with a.
253. In the case of an attribute P, inhering in a subject S, the question whether P is is the question whether it is a fact that S is P, and the question what P is is the question why S is P.
254. The separation here can only be linguistic (so, for example, we talk about the existence or essence of the eclipse, without explicitly mentioning the moon). For to understand what the eclipse is would be impossible unless one grasped that the eclipse is a certain kind of attribute of the moon.
255. The commentary makes clear that Philoponus(?) like many of the MSS has dia mesón, while Ross has dia amesón (through immediate [premises]).
256. This demonstration would prove either the affirmation or the negation of the major term of the minor term, through the middle term, the cause. See Tricot (1979), 191.
257. Heraclitus DK A12, 9-10.
258. The syllogism that Philoponus(?) has in mind is ‘all human beings are animals; all animals are substances; therefore all human beings are substances’. This sort of syllogism, which is a matter of showing that a kind belongs to a genus by taking a subgenus as a middle term, is not the sort of demonstration that Philoponus(?) thinks that Aristotle has been discussing. But he thinks that there is a parallel problem arising for both kinds of demonstrations: how is the major premise to be discovered? In the case of the deduction put forward as an example, the major premise ‘an animal is a substance’ is implicit in the definition of the minor term ‘human being’, since this definition cannot be understood unless one is in command of all of the definitions of the definable terms within it. But things are very different in the case of a demonstration of ‘the moon is eclipsed’. The definition of ‘eclipsed’ is not implicit in the definition of ‘moon’.
259. Philoponus(?) interprets Aristotle’s highly terse remarks as recommending a solution to the problem laid out in the previous note. The major premise is itself to be demonstrated, and this will be made possible by three additional premises. The first is ‘an animal is a substance that is living and able to perceive’, which is the definition of the middle term. The second is ‘what is receptive of opposites in succession is a substance’, where the new middle term is a property of the major term. To effect a demonstration, we also need a bridge premise: ‘a substance that is living and able to perceive is receptive of opposites in succession’. (This in turn could perhaps be demonstrated on the basis of an account that shows that perception requires a sort of qualitative alteration.) Of course at this point, Philoponus(?)’ example collapses under its own weight, as the first additional
premise includes the term ‘substance’ to be proven of the subject, but recall, the
eexample is meant to reveal the structure of a very different kind of demonstration.
When demonstrating that the moon is eclipsed, we are apparently to find two new
middle terms, one, a new property of the eclipse, and the other, a definition of a
term that is definition of the moon. Through this sort of pincer movement by which
middle terms are added from the sides of both the minor and major terms, Philoponus(?)
evisages attaining an adequate demonstration. These additional
premises need not have the major term of the whole demonstration as their
subject. Here he disagrees with Bolton (1987), 138-9 n. 22 who follows Pacius,
Waitz, and Ross.

260. The conclusion of the demonstration that Philoponus(?) has in mind here
will be ‘the moon is eclipsed’, not ‘an eclipse is a blocking of light caused by the
blocking by earth’. This is the second of the two ways of construing the demonstration
laid out by Ackrill (1997), 111-13. We see here that Philoponus(?) does not fall
into what Barnes (1994), 218 calls the ‘ancient error’ of identifying the logikos
sullogismos referred to at 93a15 with the deduction discussed at 94a16-35. However
374,29-35 shows that he does seem to understand the two deductions as
linked, so that armed with the deduction of which the conclusion is predication of
the material definiens of the subject in which it inheres (such as ‘the moon undergoes
a privation of light’) one is in a position to work through a deduction whose conclusion
predicates the material definiens of the definiendum. Bayer (1995) works through one
way in which the two sorts of deductions might be so linked.

261. The priority considered here must be causal not temporal; see n. 220.

262. Earlier (364,13-365,13), Philoponus(?) had distinguished those things with
a cause different from them from those without such a cause by saying that the
first kind of thing has a cause that fails to convert with them; now he says that the
cause of the first kind of thing is causally prior to the thing.

263. These are all cases of what Philoponus(?) has called the material definition.
In a material definition of the sort that Philoponus(?) has in mind the definiens
is something different from the definiendum.

264. These are all cases of what Philoponus(?) has called the formal definition.
In a formal definition of the sort that Philoponus(?) has in mind the definiens
is not something different from the definiendum.

265. Philoponus(?)’ interpretation requires taking the kai here to be epexegetical.

266. cf. An. Post. 1.1, 71a11-17.

267. I follow the text of Ross, hoion ti sêmainei tî estî trigônon, for which Ross
appeals to 272,17-18 below, for support. Ross also suggests that Philoponus(?) is
reading trigônon hêi trigônon.

268. Philoponus(?) takes the definition of 93b28 to be a generic definition,
embracing even the nominal definition.

269. Philoponus(?) interprets the ê at 93b30 as ‘i.e.’.

270. Philoponus(?) understands houtôs at 93b33 to refer to ‘through a nominal
definition’.

271. It is conceivable that a nominal definition would offer an essential charac-
teristic as one by which we fix the meaning of a word. However, in such a case, the
one who employs the nominal definition in this way would not realize that what is
given in the definition belongs to the essence of what is defined.

272. cf. Aristotle Int. 1.2, 16a19. Like Aristotle’s phrase kata sunthêkên, Phi-
loponus(?)’ term for convention (thesei) has at its root the verb tithenai, which is
translated as ‘posit’ later in this same sentence.

273. I read oude for ou at 372,32.
274. Ross’s text has eis esti dikhôs, yielding the translation ‘two ways in which an account is one’.

275. An account that is one by being tied together is not a mere conjunction of the senses of all of the different words; rather, each word has its sense only by standing in relation to the other words. The words in the Iliad relate the events of the Trojan War only through their standing in such relation to each other.

276. In a predication that is per se (kath’ hauto) in the relevant sense, the predicate is in the definition of the subject (An. Post. 1.4, 73a34-7). Accordingly, they denote the same thing, and are one.

277. Philoponus(?) earlier took the copulative einai to have a purely syntactic function (337,11-13 and n. 38) but here he takes it to refer to existence, presumably that of the predicate that inheres in the subject.

278. The term for ‘accident’ (sumbebêkos) is derived from the verb here translated as ‘happen to be’ (sumbainein).

279. This interpretation of Aristotle’s typology of definitions in the present chapter, is also presented at Philoponus in An. Post. 109,8-33. Its absence in any other extent ancient Greek commentary on An. Post. (except for the Byzantine commentary of Eustratius) is further evidence that the present commentary (ultimately) derives from Philoponus or Philoponus’ source Ammonius.

Presumably, in speaking of a demonstration of which ‘the material definition’ is the conclusion, Philoponus(?) is referring to the logikos sullogismos referred to at 93a15, which has the form: S is FD (formal definition); FD is MD (material definition); therefore S is MD (where S is the definiendum, see n. 221).

280. As Wallies points out, this seems to be a reference to 35,1 and following. Even if this commentary (or the original from which it is condensed) is not by Philoponus, this backwards reference is an indication that the An. Post. 2 commentary followed an An. Post. 1 commentary.

281. ‘Shows’ renders deiknusi, which I often translate ‘proves’. But the point of Aristotle and Philoponus(?) is precisely that the definition is not proven (as a conclusion of a deduction).

282. This is the major term of the demonstration.

283. The central Aristotelian text in which the canonical four causes are laid out and discussed is Phys. 2.3.

284. As Ross (1949), 639 points out, Philoponus(?) cannot be correct in taking A to be referring to the material cause here. ‘It does not necessitate that whose cause it is; it is only required to make this possible ... The premises necessitate but are not necessitated by the conclusion; the material cause is necessitated by and does not necessitate that whose aition it is’. See also Barnes (1994), 226-7; Graham (1987), 158-9.

285. On this, see Aristotle Phys. 2.9.

286. The term is poïêtikos, which can be rendered ‘making’ or ‘efficient’, but I maintain the traditional translation.

287. The example is from Phys. 2.3, 194b29-31.

288. The verb lambanesthai can also be translated as ‘assumed’, but that is not the sense here.

289. Note how, in order to understand Aristotle as referring to the material cause, Philoponus(?) substitutes the plural tinôn for the singular hou. While more than one premise renders the conclusion necessary, it is a single form that renders necessary the material constituents of a substance.

290. See Aristotle Phys. 2.3, 195a16-19.

292. The diagram and the proof as they are described in the text as given by Wallies make no sense. I emend the first ê to êgoun and the second ê at 377,8 to kai, and change the semicolon at 377,8 to a period, and the period at 377,9 to a comma. I take gar to be used in a possible but unusual manner, introducing the basis for subscribing to an assertion that follows.

293. I translate in accordance with how Philoponus(?) understands the text. The demonstrative pronoun touto (this) at 94a33 is usually taken to refer to the whole conclusion of the demonstration. Cf. Barnes (1994), 59: ‘that is, the angle in the semicircle is right’. Philoponus(?) however understands it to refer to the middle term of the demonstration.

294. Philoponus(?) needs to assign to each occurrence of touto (94a33 and 34) a different referent. That at 94a33 refers to the conclusion; that at 94a34 refers to the middle term.

295. The antecedent of its (autês) could either be ‘right angle’ or ‘half’. It is hard to see how the middle term of the demonstration would be the definition of ‘right angle’ given in Euclid Elements Book 1, Def. 10.

296. This account of a definition is unprecedented in extant Greek texts; the fifteenth Byzantine Isidorus Kiovjensis, Sermones inter concilium Florentinum conscipti (Or. 2, 10.30-1) cites this definition as ‘according to the wise’ (kata tous sophous).

297. Philoponus(?)’ paraphrase suggests that at 94a36 he reads aition dedeiktai for Ross’s aition dedeiktai to meson <on>.

298. Here, and in the commentary, ‘initiate’ translates kinein, normally ‘to move’. At 94a22 Aristotle referred to the efficient cause as ‘what first moved’ (ti próton ekinêse).

299. As Detel (1993) vol. 2, 694, points out, Philoponus(?) understands the middle term to be a singular term, so it is hard to see how the demonstration as here envisaged conforms to the canons of demonstration.

300. The reference is to Herodotus Histories 5.102.

301. The lemma has de for Ross’s d’.

302. Philoponus(?) thinks that the syllogisms are confused, insofar as the final cause is not in the middle term. On this see Leunissen (forthcoming).

303. Philoponus(?) recasts the demonstration so that the middle term expresses the final cause, as it does according to Aristotle, as he interprets him. There are severe problems with this, on which see Leunissen (forthcoming), who faults Philoponus(?) here with inaugurating a faulty line of interpretation, and proposes solving the problem by means of seeing Aristotle as making a distinction between an aitia and an aition, both of which terms I have been rendering as ‘cause’.

304. Strictly speaking, the two terms do not convert, since not everyone who is healthy takes a walk after dinner. Philoponus(?) must be understanding ‘to be healthy’ here as ‘to be healthy as a result of taking a walk after dinner’. Cf. 379,1-2, where the health in question is said to be the health that results from proper nutrition. Presumably other forms of exercise after dinner, too, could lead to such health.

305. See Galen in Hippocratis librum iii epidemicarum commentarii iii 506,7-8.

306. Barnes (1994), 60, 230, in contrast to Philoponus(?), understands the question to be ‘why is B explanatory [or, the cause] for C?’, and takes this, and its answer to repeat 94b18-20.


308. In An. Post. 1.13, 78a37, Aristotle calls such a deduction ‘a deduction of the fact’ (sullogismos tou hoti), but it is considered a kind of demonstration at 78a30.
This way of referring to a deficient kind of demonstration can be found elsewhere only in Philoponus’ commentary on *An. Post.* 1, 6,16 and 32,17. The verbal formula is used in a similar context in the Latin *Anonymous Aurelianis* 1, dated to 1140-1180. Ebbesen has established that this commentary is close in date to what he calls AA-II, which, he argues, has access to Philoponus on *An. Post.* 1. See Ebbesen (1976), 106-7. This is evidence that both books of the *Posterior Analytics* commentaries attributed to Philoponus were bound together as early as the twelfth century.

The commentary makes clear that Philoponus(?) takes the sense to be ‘instead of taking the accounts together, one must take them one at a time’. But a more usual sense of *metalambanein* is ‘to transpose’ or ‘to exchange’, and Aristotle is usually understood accordingly: the terms need to be exchanged.

Leunessin (forthcoming) helpfully paraphrases ‘Once you separate the “real” syllogism from the “further syllogism”, everything will be clear’.

The etymology derives from Aristotle *Phys.* 2, 197b30-1: *houtô dé to automaton kai kata to onoma hotan auto matên genêtai* (thus even according to its name chance occurs when [something] itself occurs at random).

The example seems to derive from Ammonius in *Int.* 142,31-143,1, according to whom it is the position (thesis) of the fallen rock that makes it fit to serve as a chair; it appears in Philoponus in *Cat.* 127,15-20; in *Phys.* 260,12-13; 269,13-17; 288,6-291,21, which cites both a change of position or, as in the present passage, the removal of protuberances, as what makes the rock fit to serve as a chair; Asclepius in *Metaph.* 372,8-10; 398,1-5 (who does not specify how the rock comes to be a chair); Simplicius in *Phys.* 261,15-17; 347,16-17 (giving both reasons) and Eustratius in *An. Post.* 155,35-156,3.

‘Happened’ renders *enetukhé*, closely related to *tukhé*, luck.

This is similar to the example given at Aristotle *Phys.* 2.5, 196b35-197a5 and 2.8, 199b18-22.

A similar example is given by Philoponus in *Phys.* 242,17-21.

See Aristotle *Phys.* 2.6, 197a36-b1.

Aristotle is usually taken to be saying that the same thing can have both a final cause, and whatever the sort of cause is that Aristotle labels at 94a21-2 as that involved in the case in which, when some things are, something else is (which Philoponus(?) understands as the material cause). (See for example Ross (1949), 637.) But Philoponus(?) understands Aristotle as saying that in some cases, the final and material causes are the same. He proceeds to justify this by saying that both final and material causes can appear as a middle terms for the same major term. Philoponus(?) must have in mind the thesis that the middle term converts with the major term (*An. Post.* 2.16, 98a35-b16); accordingly, the final and material causes are coextensive with the major term, and each other, and for this reason, they can be said to be ‘the same’.

The lemma reads *hoion dia ti dieisi dia tou lamptêros to phôs*, while Ross’s text has *hoion dia tou lamptêros to phôs* (for example, light through the lantern).

Aristotle *PA* 3.1, 661b6-12. Aristotle uses the sharpness of the front teeth as an example of the sort of natural regularity for which an explanation in terms of the material cause alone is inadequate at *Phys.* 2.8, 198b23-36.

A Platonist is likely to understand the distinction between what is and what comes to be as the distinction between Forms and things that come to be and pass away. Philoponus(?) is here taking pains to prevent this misunderstanding. In this context, he says, what is is what is *holoklêros*. This term, meaning ‘complete’ or ‘perfected’ has connotations of health and wholeness. I translate it as
‘complete in all its parts’, since ‘complete’, alone, has the connotation of being at the final temporal stage of a process or motion. Philoponus(?)’ point is that what is here said to be is ‘complete in all its parts’ in the sense that any feature of the thing that belongs to it per se is present throughout its existence. Such a thing, presumably, could either be a substance or an item in the other Aristotelian categories (with the exception of action and passion). What comes to be, on the other hand, is a motion or process whose stages are per se parts, but are not present all at once. Not all events fall into this class, since some, such as making contact, do occur all at once.

323. Aristotle Metaph. 8.4, 1044a32-b1.
324. Aristotle Phys. 2.9, 199b34-200a14; Metaph. 4.5, 1015a20-b9.
325. Philoponus(?) could be speaking of facts or states of affairs, as well as things.

326. Aristotle himself gives the example of the upward motion of fire to illustrate the proper usage of the phrase ‘by nature’ (kata phusin) at Phys. 2.1, 192b35-6.

327. Aristotle’s text is usually understood as to the effect that when an art is being exercised, and the goal of that art is accomplished, this does not occur by chance. (See, for example, Ross (1949), 638.) Philoponus(?) does not follow this line of interpretation, most likely because he recalls that just above, at 381,2-13, he has illustrated his account of one kind of chance event (that which occurs by luck) with the examples of a patient healed not by the medicines that are being administered but by a cold drink of water he happens to drink, and a pilot of a ship who helplessly watches the mast snap, and then sees the current lead the boat safely ashore. So Philoponus(?), implausibly, takes Aristotle to be saying that the exercise of a craft never fails to achieve its goal. Perhaps he has in mind Plato Republic 1, 340E. At 385,15-21 Philoponus(?) distinguishes those arts that cannot fail to achieve their goal with the stochastic arts, for which such failure is a real possibility.

328. Philoponus(?) is appealing to the Stoic notion of a stochastic art, one which, although it ought to be employed by one who aims at a goal, may on account of extraneous factors fail to reach that goal. See Alexander of Aphrodisias Questiones, 2.61 = SVF 3.19.

329. ‘Tries to predict’ renders stokhazetai. Because the arts do not afford certainty, they try to determine whether the goal will be achieved, and if so, how, and the possibility of failure alluded to here explains why they are stochastic.

330. ‘Achieves’ at 385,19 renders epitunkhanei, which, with its etymological connection with tukhê, might be translated as ‘chance upon’, except that, insofar as art here successfully achieves its aim, its success is not a matter of luck.

331. ‘Fails to achieve’ at 385,20 renders apotunkhanei, and has the sense of ‘by chance misses’. Cf. the previous note.

332. ‘From predications’ translates ek tês katastokhaseōs.
333. ‘Things that are past’ translates to gegenêmena, which can also be rendered ‘things that have come to be’. Translation is difficult because Aristotle (and Philoponus(?) are discussing the relations between cause and effect as they hold in regard to two distinctions: between things that are and things that are coming to be, and between things that are past, present, and future. It is not always clear what distinction is at play. I choose to employ the English terms for tense in translation, since that seems to more closely mirror Philoponus(?)’ understanding of the passage. For example, when dealing with past ‘things that have come to be’, the examples are the births of Sophroniscus and Socrates. Here what is referred to
is not the processes by which these people were born (since nothing hangs on the fact they their births were not ‘complete in all their parts’ (see 383.2-7, and n. 321) but the temporal relations of certain determinate events. Because a birth is in this context an example of what comes to be, when Aristotle (and Philoponus(?)) do make an untensed distinction between what is and what comes to be, the distinction is not between what is complete at an instant and what has temporally distended parts, but is rather something like the distinction between a substance or persistent attribute, on the one hand, and an event or occurrence, on the other hand.

334. ‘Those that are future’ translates ta esomena, which can also be rendered ‘things that will be’. On the issues of translation here, see the previous note.

335. The lemma has to d’ auto for Ross’s to auto d’.

336. ‘For present things that are’ renders tois ousi, literally, for things that are. As noted in n. 333, Aristotle and Philoponus(?) are drawing two contrasts: (1) between what is in the present (marked by the present tense) and what is in the past or future (marked by the perfect and future forms of the verb, respectively), and (2) between things that are and things that are (or were or will be) coming to be. ‘Present things that are’ does double duty in marking the one term of each contrast.

337. Variation in regard to time includes variation in tense, but also includes variation in respect to being and becoming; see n. 333. Philoponus(?)’ examples show that by saying that cause and investigated effect show variation in respect to time, he means that a certain kind of cause can be past, future, present being, or present becoming, and the same is true of the effect. By saying that cause and effect are the same in kind, Philoponus(?) says that a past cause will have a past effect, and so forth. On Philoponus(?)’ understanding, Aristotle first offers this as a general principle, and then restricts it to a special case: that in which the cause and effect are simultaneous.

338. Here there is an explicit mention of what we would call tense. ‘In the present tense’ renders kata ton enestôta khrona, a Stoic grammatical categorization.


340. A sign-deduction proceeds from effects to causes, and is valid when the cause is necessarily entailed by the effect (31,11-32,7; 49,12-14). The root of this notion is found in Aristotle’s account of sign-based enthymemes (An. Pr. 2.27, 70a6-b6; Rhet. 1.2, 1357b3-5; 2.25, 1402b12-20). Philoponus differs from Aristotle insofar as he does not consider such inferences rhetorical; in his commentary on Book 1 (31,11-32,7; 49,12-14; 168,19-169,9; 170,27; 297,19; 386,31) and in Phys. 9,6-23 and in DA 30,20-31,23 he is willing to give them the status of being a demonstration, albeit of a lesser kind. Thus he interprets the deduction of the fact, discussed by Aristotle in An. Post. 1.13, as such a sign-deduction (168,19-169,9). For Philoponus, such deductions have an indispensable role to play in gaining knowledge of what is more knowable by nature, but less knowable in relation to us. He appeals to the notion of such deductions again, at 424,12-29 below. See Morrison (1998), de Haas (1999), Sorabji (2005) vol. 3, 265-8.

341. See n. 309.

342. Philoponus(?) takes this, and not the continuity of time to be what is alluded to with ‘as it seems to us’.

343. Here as elsewhere, ginesthai (to come to be) can also have the sense of ‘to occur’.


345. As Ross (1949), 652-3 points out, Philoponus(?) sees Aristotle’s ‘past things
are the starting point of these, too' as a ‘parenthetical reminder’ that what is
earlier is the cause of what is later, even if it is inferred from what is later.

346. This could also be translated as ‘about things that are past . . .’.

347. ‘That one . . . must also have been born’ translated anankê tote genesthai.
genesthai is in the aorist, which indicates an action considered as completed, but
is neutral in respect to tense. According to Philoponus(‘), just because Sophronis-
cus was born, it does follow of necessity that Socrates was, is, or will be.

348. A literal rendering is ‘he supposes that both Sophroniscus and Socrates
has come to be’. ‘Suppose’ here renders hupotithêsi, which perhaps has its technical

349. pragma can perhaps be translated here as ‘fact’, but the example that
Philoponus(‘) takes up is an example of substantial generation.

350. genesthai touton is ambiguous. It could mean either ‘it occurs’ (in the case
of Philoponus(‘) example, the birth occurs) or ‘he comes to be’ (in the case of
Philoponus(‘) example, ‘he is born’).

351. Aristotle is apparently restricting himself to saying that, in a case in which
C is a temporally prior cause of an effect, E, one cannot legitimately infer that since
C has been the case, E has been the case. Thus, the touto (it) at 95a34 must refer
to the consequent of the conditional (that E has been the case). But Philoponus(‘)
interprets Aristotle differently. He takes Aristotle to be making a broader claim,
that during the intervening period, it if false to say that ‘because (dia) C has been
the case, E has been, is, or will be the case’. He accordingly understands the touto
at 95a34 to refer to the whole conditional. It is hard to understand why he
attributes to Aristotle such a strong claim. Certainly, in the case in which E is a
future contingent, E may or may not occur. Thus, Sophroniscus may have been
born, but may yet die before fathering Socrates. But for Aristotle there are efficient
causes that necessitate, even when the cause is temporally prior to the effect. For
example, if fire is quenched in the clouds (or if there occurs the clashing of clouds
that Aristotle did take to constitute the efficient cause of thunder; see Meteor.
2.9, 369a14-b4) there must follow the noise that is constitutive of thunder. During the
time that intervenes between cause and effect, it will be false to say that there has
been thunder, but the conditional (because C has occurred, E has occurred, is
occurring, or will occur) will nonetheless be true.

352. Ross has the singular tou esomenou: for what is future.

353. ‘Of the same time’ translates homokhronon. Events or states of affairs that
are of the same tense are included, but also included are pairs of cases in which
something is, or pairs of cases in which something comes to be. See n. 333.


355. Aristotle Top. 6.4, 141b14-29.

356. This is actually Aristotle’s definition of contact; things that are continuous
are such that their limits are one (Phys. 5.3, 226b21-3; 227a10-16; 6.1, 231a21-3).
Perhaps the problem is that it is occurrences or process of coming to be whose
continuity is being examined. It is not clear what continuity in this case would be.
Philoponus(‘) sidesteps the issue by understanding Aristotle’s concern here as
with the contiguity of occurrences of coming to be, for Aristotle himself makes clear
that what is at issue is whether such events, processes, or occurrences are such
that between any two of them within the temporal order, there is a third that
comes between them. Hence ‘continuous’ here must be taken in a special sense, in
which it is identified with its genus ‘contiguous’. It should be noted that the term
for ‘together’, hama, has a special temporal sense: ‘simultaneous’, or, as rendered
in this translation, ‘at the same time’.
357. On the point as without parts, see Aristotle *Phys.* 6.10, 241a5-6 and especially Euclid *Elements* Book 1, Def. 1.


359. As Ross (1949), 651 points out, Aristotle’s argument rests on an ambiguity. It holds if ‘what has come to be’ refers to the endpoint of a process of coming to be (which endpoint is a limit) but not if it refers to the whole temporally extended process of coming to be. Philoponus(?) follows Aristotle in this argument, but adds an additional consideration, on which, see the following note.

360. Philoponus(?) is saying that if efficient causes were continuous with their effects, there would be no gap between cause and effect. To show the absurdity of this, he employs his example of the birth of Sophroniscus as the efficient cause for the birth of Socrates. Were the two events continuous, then there would be no gap between the two events, and, at the very moment that Sophroniscus was born, the process by which Socrates is born has already begun, which is clearly not so. But all that this example shows is that not all efficient causes are continuous with their effects. Cause and effect will not be continuous in this case since we are not dealing with a proximate efficient cause. Many more events, such as the marriage of Sophroniscus and Phaenarete, must come between. The example does not exclude the possibility of a cause being continuous with its proximate efficient cause. However successful it is, Aristotle’s own argument against this is meant to exclude this possibility.

361. ‘Occurring’ translates *ginomenés*, ‘coming to be’. Strictly speaking, for Aristotle, a motion does not come to be (*Phys.* 5.2, 225a33-5).

362. On this technical sense of ‘motion’ (*kinêma*) as a partless part of motion (which derives from Aristotle *Phys.* 6.1, 232a9 and 6.10, 241a4) see Philoponus in *Cat.* 86,2-7.

363. See n. 359.

364. More precisely, it is the building of the foundation and walls that are the constituent processes of coming to be.

365. The lemma omits *en*, present in Ross’s text.

366. ‘In reality’ translates *epi tôn pragmatôn*; a more literal translation is ‘in the case of things’.

367. The Greek is *proêgountai hai geneseis tôn aitiôn tôn geneseôn tôn aitiatôn*, literally, the comings-to-be (or occurrences) of the causes precede the comings-to-be (or occurrences) of the effects.


369. The term I translate as ‘classify’ is *anagein*, literally ‘lead back’ or ‘reduce’. This usage (absent to Porphyry’s *Isagogê*) likely derives from Plotinus 6.1.9.3-32; 6.1.17.2; 6.3.1.17. See Ammonius in *Porph. Isag.* 63,2 and 71,24; Philoponus(?) in *An. Post.* 187,30; 239,10; 250,16; 265,18; also in *Cat.* 47,32.

370. These are not two separate conditions. Philoponus(?) has explained that no instances of coming to be are continuous.

371. As Philoponus(?) imagines this example, the (coming to be of) the wall immediately follows (that of) the foundation, and (the coming to be of) the house immediately follows (that of) the wall. This is why one can infer the coming to be of the wall and foundation, in turn, on the basis of the fact that there came to be the house. Since such linked processes of coming to be must at some level of analysis be consecutive (otherwise there would be infinite divisibility in the chain of efficient causation, and the chain would constitute a continuum), they are immediate, with no event forming a middle term between effect and cause. Philoponus(?)’ example, taken from 95b31-7, is simply for the sake of rendering
these relations more intuitive, but it does not seem to be a true example of such immediate relations. For example, the coming to be of the roof would be between that of the wall and the house, and there could well be an intermediate step (as the creation of bricks or cement) between the construction of the foundation and that of the wall. Philoponus(?) admits as much at 393,20-8.

372. See n. 343.
374. See n. 359.
375. The lemma ends the sentence with a period, while Ross closes the sentence with a question mark, yielding the translation: ‘Or will there always be something in between because of the infinitude?’
376. In all extant philosophical literature, this locution (anairein huponoian tina) is found only in the present text and in Philoponus’ commentary on An. Post. 1, another indication that the two texts have a common source.
377. I take this to be a restrictive clause, and hence omit the comma at 394,2.
378. The text is problematic. The reading I translate (apo tou mesou) is indicated by Philoponus(?)’ commentary. Ross reads ap’ amesou (from what is immediate). Pellegrin (2005), 413 n. 12 remarks that Philoponus(?) offers ‘a reasonable interpretation’, but it sits ill with 95b31: ‘But in these cases too an immediate principle must be assumed’. But there is no contradiction between this and the text as Philoponus(?) understands it. Philoponus(?) takes Aristotle not to be denying that the links between efficient cause and effect will be consecutive, and hence, in a sense, immediate. He is rather saying that when one is dealing with a sequence of such immediate links, one starts one’s inference back to the ultimate cause, not with the ultimate effect, but with a cause intermediate between the ultimate cause and the ultimate effect. That said, it is not clear why Aristotle would be denying that one can begin one’s inference back to the ultimate cause by starting with the ultimate effect.
379. to nun can be translated as ‘the instant’ as well as ‘now’. Accordingly, Aristotle’s text can also be translated as ‘one must begin from … the first instant’, that is to say, from the instant that is first in the order of temporal priority. Philoponus(?) is rejecting this interpretation.
380. This is another case in which Philoponus(?) presents an example that ill suits what it is meant to illustrate. For ‘a human being is an animal’ is indeed an immediate predication, as it is present in the definition of ‘human being’. But see n. 230.
381. On the distinction, see 383,2-7, and n. 321.
382. Aristotle An. Pr. 2.5.
383. This process is accounted for more fully in Aristotle Meteor. 1.9.
384. This interpretation of how the motion of the heavenly bodies is motivated by a desire for the divine intellect is put forward by Alexander of Aphrodisias Quaestiones 4.1-3, and was appropriated by Plotinus 2.2.1. On this see Merlan (1943).
385. On hair as resultant from moisture, see Aristotle GA 5.3, 782b12-18.
386. The reference is to An. Post. 1.4, 73b26-8, but is somewhat inexact.
387. An. Post. 2.11-12.
388. An. Post. 2.8, 93b16-18.
393. As Ross (1949), 634, points out, this is how Philoponus (?) addresses an apparent discrepancy in the classification of the kinds of definition given in An. Post. 2.10. Aristotle seems to list four types of definition (93b29-37; 93b38-94a7; 94a7-9; 94a9-10) yet at 94a11-14 as well as 75b31-3 he says that there are only three kinds of definition. Philoponus (?) solution is to say that Aristotle denies that a nominal definition is a definition, in the strict sense.

394. As Philoponus (?) is about to make clear, a prime number (in the sense employed in the present classification) is one that does not have another number as a factor. (See Euclid Elements Book 7, Def. 11: ‘a prime number is one measured by the monad alone’). A number that is not prime is secondary. On the distinction between prime and secondary numbers, see Nicomachus Intro. 1.11.1. (Nicomachus takes prime to be a species of odd number, but that is no doubt because of the Neoplatonic denial that the dyad is a number, on which see Roueché (2002), 120,2.)

395. In the present passage, a composite number is one that is the sum of two other numbers. An incomposite number is a number that is not composite. (This sense of ‘composite’ is different from that given in Euclid Elements Book 7, Def. 13, and followed by Nicomachus 1.11.2, who takes 11 to be prime and incomposite.) He is followed here by Philoponus in Nic. 96,6, which tells against Philoponus as author of the present commentary.

396. I have not been able to find an antecedent for this sense of ‘prime’.

397. Ancient arithmeticians were unanimous that one, or the monad, is not a number. This is because a number is a count, which the monad is the principle by which one counts (Aristotle Metaph. 1.1, 1052b18-22). See Euclid Elements Book 7, Def. 2; Klein (1968), 48-9; Roueché (2002).

398. See n. 412 on why the dyad is sometimes taken to not be a number.

399. Ross suggests katholou (‘are universal’) but Philoponus (?) must be reading anankaia. For as Philoponus (?) construes the argument, the universality of what is predicated in the what it is taken to be its premise, not its conclusion.

400. Philoponus (?) gives de (‘and’) the sense of gar (‘for’) because he understands Aristotle to have just proven that definitional predicates are necessary on the grounds that they are universal. See Ross’s discussion of the issues, 657.

401. While Barnes (1994), 64, following Ross’s punctuation, takes outó lambanetai as completing the relative clause, ‘in the case of anything else for which we take terms in this way’, and understands esti as the finite verb for the following clause, Philoponus (?) understands the comma after allou and takes outó lambanetai as the verbal phrase governing the next clause.

402. Things predicated in the what it is are either the definition itself or genera. (In this context a differentia must be taken to be a kind of genus; see n. 405 below.) If such a thing is not the definition, it must be the genus.

403. Philoponus (?) understands kata dunamin as synonymous with dunamei (‘potentially’).

404. These manuscripts read lephthentôn instead of deikhtentôn. According to Ross, Philoponus (?)’ commentary is the only source for this variant reading.

405. The problem is that differentiae are qualities, since they answer the question ‘what sort of thing is it?’ but not ‘what is it?’ If one asks it esti (‘what is it?’) of a particular human being, it would be improper to answer ‘rational’, but it would be fine to give this answer if one asked poion esti (‘what sort of thing is it?’) of that same human being. This is why a differentia is in the category of quality (poion); see Aristotle Metaph. 5.14, 1020a33-b1. Yet Aristotle and Philoponus (?) assert that the differentia is included in the ti esti.
When Aristotle first confronts the problem of where differentiae fit in his categorical scheme, he says that it is a special kind of quality, a quality in respect to substance (poian ... tina ousian, 3b21). But this is a puzzling and unenlightening remark, and Philoponus(?) does well not to explore it. Instead, Philoponus(?) asserts that when the differentia and genus are taken together (as is done when we call a human being a rational animal) the differentia is no longer a quality. Why not? Why would conjoining one predicate with another change the ontological character of the first predicate? Perhaps Philoponus(?) has in mind Aristotle Metaph. 7.12, 1036b27-1038a8 and 8.6, 1045a20-35, according to which the relation between genus and differentia is the relation of matter and form, which, together, constitute a unity. Accordingly, the genus and the differentia taken together are not something other than the genus, and will be of the same category as the genus. So if the genus answers the ‘what is it?’ question, so will the differentia, as long as that differentia is understood as forming a unity with the genus.

This is an alternative title for Porphyry’s Isagoge (See Barnes (2003), xii n. 14). Gudemann/Kroll (1916), 1777, who maintain that the current commentary is from the pen of Philoponus, deny that the reference is to Porphyry’s writings. In that case, they say, Porphyry’s name would have been explicitly cited. They suggest this is rather a reference to Philoponus’ explanations of the Isagoge. A problem is that in the beginning of in Cat., Philoponus (1,2) refers to his explanations as the Introductions (in the plural).

On the problems that this interpretation faces, see Goldin (2004), 711: ‘Could Aristotle be exhorting us to list and clarify individual numbers as the basic kinds of arithmetic? The list would go well beyond Aristotle’s example of two and three; there would need to be an infinite number of such numbers, all of which would need to be distinguished through the process of division, prior to the scientific clarification of the genus number’.

I read to tòi eidei.

Euclid Catoptrica Arg, 2; Proclus in Euclid 109,22.
11. cf. Euclid Elements Book 1, Def. 15.
12. Philoponus himself does not take the dyad to be a number: see Roueché (2002), 120. However, this need not be taken as strong evidence concerning the question of whether Philoponus is a direct or indirect author of the commentary. Aristotle does explicitly take the dyad to be a number, so perhaps, given the paraphrastic nature of this commentary, the author does not pause to register his disagreement.
13. cf. Euclid Elements Book 1, Def. 10.
14. cf. Euclid Elements Book 1, Def. 11.
15. cf. Euclid Elements Book 1, Def. 12.
16. cf. Euclid Elements Book 1, Def. 8.
17. The commentary shows that Philoponus(?) reads próton, not prótôn, as does Ross.
18. This would be a very unusual use of the term pathê (attributes), as is recognized by Ross (1949), 658. For discussion on this and Philoponus(?) interpretation of ‘the first common attributes’, see Goldin (2004), 713-18.
19. On this interpretation of the things that hold per se (kath’ hauta) here, and its relative merits in regard to the alternative understanding of them as demonstrated attributes, see Goldin (2004), 716-17.
20. The primary reference is to the extensive use of the method of division in Sophist and Statesman. We know that division was practised extensively in the
Academy from the fragment from Epicrates in Athenaeus 2.59d-f. Supported by 405,27 and other ancient evidence identifying Speusippus as Aristotle’s target at 2.13, 97a6-22, scholars have traditionally taken Speusippus to have advocated division as the means of arriving at a definition, but this has been called into question by Falcon (2000).

421. In what sense are the differentiae middle? Philoponus(?) is not here discussing demonstrations that employ these differentiae as middle terms. Perhaps they are middle insofar as they split the genus down the middle. Or perhaps mesôn needs to be excised from the text.

422. The lemma omits the g’ which need not be translated, but could be rendered as a weak ‘maybe’.

423. The commentary indicates that Philoponus(?) has all three terms (zóion hèmeron dipoun) in his text. Ross’s text prints only zóion hèmeron.

424. I am translating both ek tou hèttonos and pollloi mallon (at 404,3 below, and elsewhere) as ‘a fortiori’.

425. In this section I translate the same word, lambanein, as both ‘take’ and ‘assume’.

426. Philoponus(?) understands the first term as animal tame (taken together).

427. The lemma has hotidêpote for Ross’s ho ti dépote.

428. Philoponus(?) seems to read dialegomenon for dielomenon (‘the one who engages in division’) of Ross and the extant manuscripts.

429. As Ross (1949), 659 points out, the attribution of this objection to Speusippus is backed up by Themistius in An. Post. 58,4, Eustratius in An. Post. 202,17 and Anonymous in An. Post. 584,17, with Eudemus given as authority.

430. Falcon (2000), 403-6 argues that Philoponus(?) misunderstands the point of Speusippus’ objection. On the basis of the evidence of Eudemus’ commentary, preserved by the anonymous commentator, he argues that Speusippus is not offering what he takes to be a conclusive argument against the possibility of definitional knowledge; he is rather raising a difficulty concerning its possibility.

431. This is apparently a gloss on ta atoma toi eidei ta prôta at 96b16.

432. The term diaphora can be translated here as either ‘differentia’ or ‘difference’. Philoponus(?) here tells us that Aristotle is saying that not all features by which things can be distinguished (differences) will distinguish species, but only those that enter in the definition of a thing, what is usually in English called a ‘differentia’.

433. Philoponus(?) has ta antikeimen, while Ross’s text offers the contraction tantikeimen. There is no difference in translation.

434. I read tôi for to.

435. Philoponus(?) thinks that it is significant that, in the sort of division that is under discussion, the divider both assumes that the kind in question is in one or another of the differentiae that divide the genus, and knows this, precisely. The term for ‘know’ (ginôskein) is a general, nontechnical term, for both Aristotle and Philoponus(?), and can refer to epistemic states that fall short of meeting the demands of scientific understanding (epistasthai) or intellection (noein). Yet there is some justification behind this state; otherwise one’s knowledge that the species falls under a certain differentia would be the same thing as an assumption that it does so. Accordingly, Philoponus(?) presents as an example of the such ‘precise’ knowledge that which arises as a result of a deduction on the basis of derivative, nondefinitional attributes, what Philoponus(?) has earlier called a sign-syllogism (386,30-387,2). But whether the species is classified under a differentia by assumption or by virtue of such knowledge is immaterial to the issue that Aristotle is
making, as Philoponus(?) recognizes at 407,20-1, where he restricts himself to considering the case in which the classification is by assumption.

436. The lemma gives ean; Ross’s text an. There is no difference in translation.

437. ousia here might also have the sense of ‘essence’.

438. I read hexis δ’ at 407,27.

439. Aristotle An. Post. 2.5.


442. On this term see Whittaker (1990), 89 n. 83.

443. Ross reads dia τόν διαίρεσθαι (‘through the divisions’). Philoponus(?) is aware of the textual variation; see 408,29-30 below.

444. The Greek is tithetai, closely related to thesis.

445. Aristotle nowhere says this. On this sense of ‘analysis’ see 335,6-26.

446. Philoponus(?) has said this only once before in the current work: 400,25-9.

447. cf. Aristotle Top. 1.4, 101b16-25, where all dialectical problems are said to concern either genus, property, or accident, which is why dialectic must study property, definition, genus, and accident.

448. On this sense of aphormê, see van Ophuijsen (2001), 186 n. 1024.

449. That is, it is the one that is logically entailed by the others.

450. Philoponus(?) is clarifying the (relatively rare) sense of ekhesthai at 97a33.

451. Ross prints d’ hapanta (‘all of these’) while the lemma gives de panta.

452. The usual understanding of huparkhei de tode is ‘this belongs [to it]’; see Barnes (1994), 66.

453. 405,11-12.

454. This could be a reference to Chiron’s knowledge of medicine; see Homer II. 4.219; 11.831.

455. See the Oxford Classical Dictionary (3rd edn), ‘satyr’: ‘In satyric drama they are the first to sample the creation of culture out of nature in the invention of wine, of the lyre, of the pipe, and so on’.

456. Pan was considered a natural musician, shepherd, and hunter.

457. I have found no other reference to this interesting anecdote, apart from that cited by Eustratius in An. Post. 206,32, which is surely derivative on the present commentary.

458. At 97a39, Philoponus(?) seems to be reading en toi eidei where Ross has simply toi eidei. Both texts are to be translated in the same way, but that of Philoponus(?) makes the sense of the dative more explicit.

459. These are the more specific differentiae, which come later in the definition, as Aristotle formulates it.

460. Aristotle never talks of analysis in this connection; see n. 445.

461. Aristotle does not explicitly here mention homônuma (equivocity) as the problem to be prevented here. Rather, he says that the text he presents will determine whether that whose definition is sought is one or more things. But equivocal things are those which, while more than one in kind, are referred to with the same term; see Cat. 1, 1a1-6. So Philoponus(?) is right that Aristotle is here concerned with the prevention of equivocity; this is confirmed by the mention of equivocity at 97b30-7.

462. The first extant text that we have in which ‘neighing animal’ is presented as a (mock) definition of horse is Galen De methodo medendi libri xiv; among the commentators on Aristotle it is found in Asclepius in Metaph. 414,33. For this and the definition of an ox as zôion muêtikon, see Sextus Empiricus Adv. Math. 11.38, 3-7.

464. The phrase harmonzein ta merika tois katholou is found only in Philoponus in An. Post. 17,6-7.

465. I delete to zôion in 414,16.

466. I read aphorizei for aphorisas of the MS.

467. The phrase harmozein ta merika tois katholou is found only in Philoponus in An. Post. 17,6-7.

468. I delete to zôion in 414,16.

469. I read aphorizei for aphorisas of the MS.

470. I translate barus as 'flat'. In its nontechnical sense, the term means 'heavy'; a musical note that is barus is low in pitch (but is not necessarily a note that is low relative to some norm, as is what in English we would call a 'flat note').

471. A sound that is 'sharp' (oxus) is, as in English, one of a high pitch. (However, in Greek, the term is not used to determine pitch relative to some norm, as in English). A flavour that is 'sharp' is one that is spicy or pungent.

472. This is not Aristotle's account of spicy taste; see Sens. 4, but it is found in Oribasius Collections Mediae 2.69, 10-11.

473. This is the Greek name of Menander, the Greek comic poet.

474. This is the same example of what is said by analogy is found in Porphyry in Cat. 67,18-26; Philoponus in Cat. 21,14-22,14; 42,3-6; 66,29-67,26. On these examples, and the Neoplatonic tendency to run together metaphor and analogy, see Hadot (1990), 137; Sorabji (2005) vol. 3, 235-7.

475. The term, skeparnon, also means 'bandage', see LSJ, s.v.

476. The lemma has legein for Ross's eklegein.

477. The same example of what is said by analogy is found in Porphyry in Cat. 67,18-26; Philoponus in Cat. 21,14-22,14; 42,3-6; 66,29-67,26. On these examples, and the Neoplatonic tendency to run together metaphor and analogy, see Hadot (1990), 137; Sorabji (2005) vol. 3, 235-7.

478. Perhaps here sunagein has the sense of 'assemble'.

479. The term for 'dissections' is anatomai, which can also have the sense of 'divisions'. As Ross (1949), 663-4 points out, Themistius and Eustratius also understand Aristotle as referring to dissections, although Aristotle's term for 'dissect' is anatemnein.

480. Philoponus(?) term for 'rumen' is stomakhos, which, for human beings, refers either to the stomach or its opening.

481. Philoponus(?) term for 'rumen' is stomakhos, which, for human beings, refers either to the stomach or its opening.

482. This is because a problem, understood as the subject matter for deductions (Aristotle Top. 1.4, 101b16), is a proposition differently arranged (101b34-6) and a proposition is determined by its subject and predicate (An. Pr. 1.1, 24a16-17).

483. The reference can either be to snoring or deep breathing, in general.

484. This is apparently not true; see S. Inoue, ‘Water Supply in Japan’, Transactions of the International Engineering Congress (1915), 246: ‘The temperature of well water being nearly uniform throughout the year, it naturally feels warm in winter and cold in summer’.

485. Mutual displacement, called periôsis at Plato Tim. 79A-80C and antiperistasis in a number of Aristotelian and post-Aristotelian texts (most importantly Phys. 8.10, 267a18-19) is a matter of a series entities simultaneously moving and being moved. On this notion, and its appearance in later Greek philosophy to explain a number of phenomena, see Opsomer (1999), 417-29, to which I am
indebted for the references. He points to Plutarch, 7th Platonic Question, as an especially rich text in seeing how mutual displacement was appealed to in order to explain a number of different phenomena. At ps-Aristotle Probl. 24.8, 936b19-23, antiperistasis is appealed to (without being named as such) as the reason why baths are warmer in the winter.

486. On how the digestive track is warmer in the winter, see Hippocrates Aphorisms 1.15. On the cold as closing the pores, see Galen De tremor 600,4-15; 602,10-12; Soranus Gyn. 4.5.2,3-4; Alexander Quaestiones 1.6, 2-3. On how the mutual displacement of hot and cold result in bodies being warmer in the winter, see ps-Aristotle Problems 35.4, 964b38-965a7. I have not been able to locate an antecedent to bringing all these elements together in explaining why people digest more easily in winter.

487. This explanation is given at Meteor. 1.12, 348b2-5.


490. Aristotle understands the echo as resultant from a mass of air bouncing like a ball (DA 2.8, 419b25-31, but Alexander of Aphrodisias (in DA 48,7-21) and the author of the Problems 11.6, 899a32-b17 present an account of wave motion much like that of the present text. For translations and commentary, see Sorabji (2005) vol. 1, 51-2.

491. Plato held that visual rays go out from the eyes (Tim. 45B2-C2). Philoponus rejects this assumption (in DA 324,25-326,37) and follows Aristotle’s view as it is found in DA 3.12, 435a10; Sens. 2, 438a25-7; and Mem. 2, 452b10-11. Here, however, Philoponus (?) bases his account of reflection on Meteor. 2.9, 370a17; 3.2, 372a29; 3.3, 372b15ff., where Aristotle adopts the hypothesis that visual rays emit from the eyes to the object. For Philoponus’ theory of vision and light, see Sambursky (1958); de Groot (1983); Sorabji (1987); de Groot (1991).

492. Plato Tim. 46A-C. On Aristotle’s more mature account, it is light, not the rays of sight, that bounces off the mirror, but see Coel. 2.8, 290a and Meteor. 2.9, 370a17; 13; 3.2 372a29; 3, 372b16 where Aristotle talks of the eyes emitting visual rays to the object. It is the latter account that forms the basis for Philoponus(?)’ discussion of the example here. On the ambiguity of the Aristotelian texts on this point, see Boyer (1983), 92-5.

493. Aristotle, Meteor. 3.4.

494. I keep the MS reading and do not delete eph’ hón as does Wallies; I insert a comma after anapheretai.

495. Philoponus (?) is puzzled concerning why Aristotle calls problems for which the middle term of the one is classified under the middle term of the other ‘different’ problems. However, Aristotle might simply be saying that such problems, which can indeed be considered the same, are different only in a certain respect.

496. Could Philoponus (?) believe that he needs to offer this explanation because his contemporaries used a solar calendar?

497. The term here is ekleiipsis, but it is clear that Philoponus (?) is referring to the moon’s waning and not to its suffering an eclipse.


499. Philoponus (?) takes An. Post. 2.16 to make implicit reference to, and to continue, the investigations of 2.11-12.

500. An. Post. 1.3, 72b25-33. As Philoponus (?) understands Aristotle’s argument here, this is the first horn of a dilemma. If causes and effects are simultaneous, either could be deduced through the other, so, if there is no circular demonstration, neither deduction will be a demonstration.
The major and middle terms of a demonstration need not convert when the middle term expresses an efficient cause. For the efficient cause can be temporally prior to its effect, so that by the time the effect occurs, the efficient cause has passed. Given the effect, the cause must have been, but need not be.

This is the second horn of the dilemma that Philoponus (?) takes Aristotle to be presenting. If the cause is not simultaneous with the effect, that effect will have arisen from more than one cause, since smoke comes about as a result of a whole sequence of efficient causes. Because demonstration is thought to reveal a single cause, the possibility of a demonstration of the effect is again called in question.

An. Post. 2.2, 90a1; 15-23 and the commentary at 370,31-371,1; 371,26-7.

This is the second horn of the dilemma that Philoponus (?) takes Aristotle to be presenting. If the cause is not simultaneous with the effect, that effect will have arisen from more than one cause, since smoke comes about as a result of a whole sequence of efficient causes. Because demonstration is thought to reveal a single cause, the possibility of a demonstration of the effect is again called in question.

On nature as producing its effects through contemplation, see Plotinus Enneads 3.8.3-4. According to a TLG search the phrase ἡ φύσις πρῶτον γινώσκει to aiton is echoed only by Philoponus In Phys. 18.23 (hekastē phusis touto ginoskei prōton houper kai estin aitia) which C. Osborne (2006), 39 renders as ‘each nature knows first of all that thing of which she is the cause’.

On a sign-deduction, see 386,30-387,2, and note 340.

Philoponus (?) reads τού ταὐτού, while Ross’s text has ἡνος (which would yield the translation ‘is it possible for there to be more [than one] cause of a single thing’?).

I read τῶν ζῴων at 425,1.

Philoponus (?) takes Aristotle to be offering two solutions to the difficulty that he has presented. The first is that, when we are dealing with causes that are simultaneous with their effects, there is no danger of reciprocal demonstration, since the deduction that concludes a cause from an effect is not, properly speaking, a demonstration. The second solution, which would apply in cases in which the cause and effect are not simultaneous, as well as cases in which they are, is to grant the possibility of more than one cause featuring as middle terms in a demonstrative chain. The second solution is inferior, because, when there is a series of middle terms, they are not all of equal extension, and hence the demonstrative chain falls short of the demand that the middle term of demonstration reveal the per se cause. (See An. Post. 1.15.)

autou refers back to ἥλω τινι (‘some whole’).

Another possible translation is ‘is observed to universally belong to’.

Philoponus (?) takes Aristotle’s position to be that the middle term of a demonstration does indeed convert with the major term; hence the cause converts with the effect. Accordingly, he can be understood as in the tradition of those who see Aristotle here as asserting that the middle term of demonstration must be a ‘commensurate universal’. In order to deal with possible counterexamples, Philoponus (?) tells us that for the cause to convert with the effect, it must be referred to with sufficient specificity. At least in the example at hand, this requires specifying the subject in which the cause is found.

I translate in accordance with Philoponus (?)’ understanding of the text.

As Detel (1993) vol. 2, 812, points out, Philoponus (?) does not discuss the difficult issue of the relations between chapters 16 and 17.

This is in fact the same topic already considered at 2.16, 98b25-38.

cf. 370,31-371,1; 371,26-7; 423,20.

This is an odd interpretation of Aristotle, since the sign or accident is not a cause (except insofar as the major premise, which employs the sign or accident as a middle term, is a logical cause of the conclusion, or a cause of one’s knowledge of the conclusion).
517. Ross (1949), 668 punctuates differently, putting the comma after houtōs instead of mê, and accordingly interprets ‘if the proof is not like this, there can be more than one cause’.

518. As Ross (1949), 669 points out, there are difficulties with Philoponus(?)’ interpretation according to which the examples Aristotle is about to consider are examples of problems that concern accidental propositions. Aristotle in fact gives examples of what are in fact clusters of problems, but appear to be instances of the same problem because they employ terms that are the same generically or analogously or merely by virtue of an equivocity.

519. In his critical apparatus, Ross (1949) points out that the commentary supports the alternative reading grammai instead of his grammê.

520. An. Post. 1.5, 74a17-25 shows that Aristotle was acquainted with the notion of a general theory of proportion, like that developed by Euclid in Book 5 of the Elements, even though he insists that demonstrations be restricted to single genus, and holds that numbers are a genus of quantity different from magnitude.

521. As Philoponus(?) is about to make clear ‘equal-times-equal’ is another term for what we would call ‘proportional’. Plato uses the term at Theaetetus 174E6 and Aristotle at Metaph. 14.6, 1093b13, but in the sense of ‘square’. (Philoponus(?) recognizes this as another sense of the phrase at 427,27-30.) It is not clear why or on what grounds Philoponus(?) can here ascribe to the phrase the sense he does. 427,30-1 suggests that Philoponus(?) finds in his text a reference to pairs that stand in the same ratio as ‘equal-times-equals’.

522. At Cat. 1, 1a1-6, Aristotle defines equivocal as things for which the name is the same but the definition (logos) is different.

523. Philoponus(?)’ account of the middle term is rather puzzling. He has just said that lines and numbers (and other species) are different genera; accordingly, unless proportionality is equivocal, it would apply to a higher genus that encompasses lines, numbers, etc. But here Philoponus(?) tells us that it applies to the genus of having equal-times-equal numbers. Perhaps einai tous arithmous or tous arithmous should be excised from the text.

524. Euclid Elements Book 6, Def. 1.

525. ‘Proportional’ here translates analogon, which is compounded of ana and logos, with the root sense of ‘along the lines of the ratio’.

526. I read dusin for tetrasin at 429,23.

527. I translate in accordance with Philoponus(?)’ understanding, as reflected in the commentary. Cf. Barnes (1994), 71: ‘there will first be a middle term in the one direction’.

528. Aristotle’s reference to ‘the first middle in the other direction’ is unclear; Philoponus(?)’ suggestion that it refers to the middle term alluded to at 98b5-16 (flat-leaved), which is over all of the various sorts of plants that shed leaves, is endorsed by Lennox (1987), 96.

529. Wallies mistakenly has 99a28 as the line number.

530. Ross (1949), 672 thinks that okhanos here means the same as okhetos: channel (cf. Theophrastus HP 1.7.1.12). But here Philoponus(?) seems to be using the term to refer to the part of the plant that attaches the leaf to the stem. Cf. Herodotus, 1.171,15-16, where the term refers to the handle attached to a shield.

531. Ross’s text does not have estin, and so would be translated ‘But I would call a primary universal that ...’.

532. Ross emends by omitting ‘to A’, which yields the translation ‘For why will there not be some cause such as to belong to all of the D?’

533. I read hôi, for Wallies’s ōi (which must be a typo).
Philoponus(?), takes the ‘indivisibles’ to continue to be the most specific species. So on his account, Aristotle is continuing to consider the case in which the middle term of the demonstration extends more widely than the minor term, and reiterates that in such a case, the middle term in reality denotes a multiplicity of causes. Ross (1949), 673 and Barnes (1994), 257, in contrast, understands ta atoma here to refer to immediate predications that will serve as links in a demonstrative chain. But while Barnes suggests that on Philoponus(?)’ reading, the sentence is a ‘prolix’ addition to 2.17 (and Ross loc. cit. does indeed include it in this paragraph), Philoponus(?) does take the sentence to introduce what follows. As he sees it, if a demonstration employs a middle term that does not convert with the minor term, then there must be a new middle term which, between the two aforementioned terms, would convert with the minor term, and, on Philoponus(?)’ account, it is this that generates the demonstrative chain (with multiple middle terms) about which Aristotle proceeds to ask ‘which is the true cause?’

The commentary shows that Philoponus(?) like some of the MSS (but not Ross) reads the plural ta engutata.

Within the An. Post. Aristotle has not yet called scientific understanding a disposition (hexis) but see EN 1139b31-2; also perhaps the reference is back to Philoponus in An. Post. 23.23-4.

Ross deletes ‘or not’ and suspects that Philoponus(?) does not have it in his text, since it is not indicated in his paraphrase.

The commentary shows that, like Irwin and Fine (1995), 67, Philoponus(?) does not understand enesti as potential as does Barnes (1994), 73, Pellegrin (2005), 337, and Detel (1993) vol. 1, 83. For the einai and ekhein at 435,3-4 must be syntactically parallel, and there is no way that the einai at 435,3 can be taken as a complement for a potential esti at 435,2. Rather, both infinitives are substances that are complements of an existential einai.

The term antilambanein, or, more commonly, the middle antilambanethai, indicates a mental grasp, or which one is conscious. Neither Plato nor Aristotle use the term in a technical sense. Its first use as philosophical coinage is found in Plotinus’ account of perception, which the current passage no doubt echoes. According to Plotinus, perception involves three stages. First, there is an affection (pathos) in the sense organ. Next, by virtue of antilêpsis, there is the production of an impression (tupos) of what is sensed (the aisthêma) in the imagination (phantasia), and it is by virtue of this that there is consciousness of what is sensed. It is on this basis that what is sensed can be the object of discursive reasoning (dianoia). (See 4.3.29.24-5; 4.4.19; 4.8.8.16-23.) On this see Warren (1964), 83-9.

Plato (Theaetetus 192A4; 194B5) in passing uses the term tupos to refer to the impressions made by perception, but his preferred term for this is ekmageion. In Mem. 1, 450a30-b5 Aristotle considers the formation of memory as like the production of a tupos, but he does not ever use this term in a technical sense when
discussing the workings of sense, imagination, and memory. The technical sense seems to derive from Plotinus, on which, see the previous note. On the Neoplatonic understanding of the imagination as that in which percepts are imprinted, so that a kind of mental image in the imagination results, see Sheppard (1991). There she points out that while Simplicius definitely understands the phantasia to be the repository of mental images, the author of the commentary on DA 3, ascribed to Philoponus (which she identifies as Stephanus, leaving open the possibility of a close relation to the thought of Philoponus) sometimes (although not always) understands phantasia as a way of interpreting data of perception without the intermediacy of mental images. In the present passage the tupoi are sensible, not mental entities.

548. Aristotle denies imagination to maggots, as well as bees (or flies) and ants at DA 3.3, 428a10-11. Sheppard (1991) discusses the Neoplatonic controversy over whether such creatures have phantasia. The consensus was that if they have it (and Stephanus is more inclined to grant it to bees and ants than to maggots) it is a certain, more limited form of imagination, associated with memory (called anamnèstikê phantaska, not didaktê phantasia, which is associated with primitive forms of learning). Philoponus(?) follows Aristotle in denying that maggots have imagination, but holds that bees do have phantasia (434,23) and accordingly changes Aristotle’s examples of ants and bees to the less controversial examples of worms and flies.

549. A number of Neoplatonic authors, Proclus, Ammonius, Philoponus, and Asclepius among them, identified phanstasia with the passive intellect (see Sorabji (2005) vol. 1, 121-3), but this does not speak against the view that the present commentary derives ultimately from Ammonius for the passive intellect is not here mentioned at all.

550. The verb ‘to speak’ here is legein, with close and transparent etymological connections to logos.

551. This could also be translated ‘similarities of the precepts’.

552. On the Neoplatonic account that universals are ‘assembled’ (or ‘conglomerated’) from particulars, see Sorabji (2005) vol. 1, 174. Philoponus in Phys. 12,22-8 tells us that it is reason (logos) that so brings together (sullegein) the particular percepts known through perception in order to form the universal.

553. The term is sunêxen, which before this, in this commentary, always means ‘inferred’, and could perhaps have that sense here, but cf. 438,22, where that sense is not possible. Tuominen (2007), 211 gives it the passive sense, translating ‘the universal has come together’ but that active verb cannot have that sense.

554. This could also be translated ‘a universal from experience is fixed and stabilized in the soul’.

555. The lemma reads de tês for Ross’s d’; the definite article in Philoponus(?)’ text is corroborated by 436,2.

556. In his rejection of an understanding of ê (or’) as indicating a disjunction
between ways of describing things (so that ‘the whole universal that comes to a stand in the soul’ is an alternative description of the accumulated perception called ‘experience’), Philoponus(?) here asserts that the universal is a mental content of a different order from experience. See Sorabji (2004), vol. 3, 173-4; (2006), 115, 124 n. 22; (forthcoming).

560. Perhaps Philoponus(?) has a different text, and reads aisthēmatos instead of katholou at 100a6. Sorabji (forthcoming) thinks that the substitution is a conscious move on the part of Philoponus(?), as he wants to deny that Aristotle holds that memories as such give rise to a universal (as opposed to a mere image). In this paper, Sorabji surveys a number of interpretative moves found among the commentators, as they try to come to grips with how repeated perception of particulars can give rise to universal concepts. Two of the main strategies found among the commentators are absent from the present commentary. First, there is no account of the projection of forms from intellect. (On this see Sorabji (2006), 120 and (forthcoming); it is found in Philoponus, in DA 5.3-4.) Second, unlike what is found in the writings of Porphyry, Themistius, and Eustratius, we do not see the teaching that initial concept conveyed by the percept needs to be turned into a universal in order for a form to be present in intellect immaterially. Rather, as Sorabji (forthcoming) points out, 437,15-438,2 indicates that he takes the perception to already be of the universal, and the universal, as such (not muddled up with particular characteristics) is directly sent to the imagination. Both of these considerations provide indirect evidence that this commentary ultimately derives from Ammonius via Philoponus or Asclepius.

561. In Sorabji (2005) vol. 1, 176, McKirahan offers another possible translation: ‘one and the same thing becomes manifest in all those particulars’.

562. Aristotle can be understood to say that a principle of art is derived from experiences concerning how things come to be, while a principle of science is derived from experiences concerning the essential features of these same things. Philoponus(?) on the other hand, interprets Aristotle as appealing to a two-world metaphysics, in the Neoplatonic style. A principle of art is derived from experiences of bodily particulars, while a principle of science is derived from experiences of eternal Forms. But how would such principles be ultimately derived from the perceptions of bodily particulars, as Aristotle in the present text is insisting is the case? Tricot (1979), 244 n. 4 who follows Philoponus(?) cites EN 6.4, 1140a10.

563. This is a fairly common Platonic locution, see, for example, Phaedo 78C-D (cf. Aristotle Metaph. 6.2, 1026b27). However, he never uses the exact formulaic wording aei kai ōsautōs ekhein. A TLG search shows 59 instances of this. One is the present passage. Four are from Olympiodorus’ Commentary on the Gorgias, two are from Proclus, 9 are from Philoponus, and 11 are from Asclepius.

564. See n. 574.

565. Many of the ancient commentators on Aristotle explicitly deny that Aristotle is right in saying that we gain concepts from what we perceive. See Sorabji (forthcoming): ‘Objections to Aristotle are repeated by all but Ammonius, who has left no writing on the subject, in a chain of teachers and pupils stretching from Syrianus, through his student Proclus, to his pupil Ammonius and his two pupils Simplicius and Olympiodorus, and the present objection recurs in Proclus and Olympiodorus’. It is notable that no such objection is put forward in the present commentary, and that Philoponus is absent from Sorabji’s list.

566. The verb here translated as ‘wage’, sunkrotein, has the connotation of ‘organize’.

567. The word translated as ‘strength’ is alkên. This provides some support for
the conjecture of Barnes (1994), 265 of ἀλθὲν at 100a13. See Pellegrin (2005), 420 n. 8.

568. On this interpretation see Ross (1949), 677.

569. The reference is of course to the tripartite account of the soul in Plato Republic 4.

570. Because Philoponus(?) talks of the loss of knowledge within the soul before explaining how the soul gains knowledge from repeated perceptions, I take this to be an allusion to Platonic recollection. (In personal communication Anne Hewitt has shared her doubts that recollection need be understood as part of the picture here.) Even if we grant that Philoponus(?) does attribute to the soul innate knowledge, he admittedly does not appeal to the summoning up or recollection of such knowledge to account for the acquisition of the first principles. (An example of the sort of appeal to recollected knowledge that is missing can be found in Porphyry, Commentary on Ptolemy’s Harmonics, 15,1-5 (on which see Sorabji forthcoming), according to which the already possessed conception ‘supplements and corrects’ the received form in the imagination.) Rather, he says that such innate knowledge is destroyed by the passions that result from association with the body. We can interpret him either as saying that the innate knowledge of Forms is not utterly destroyed, but is rendered inaccessible by the passions (in which case we wonder why we do not hear about them again) or we can interpret him as saying that they are indeed so destroyed (which gives them no explanatory value in the first place). For a Neoplatonic account along the first lines, see Philoponus, in de Intellectu 36-40, translated in Sorabji (2005) vol. 1, 179-80 and Charlton (1991), 56-9. There Philoponus argues that in calling the soul all things in potentiality, he does not mean that the intellect is totally devoid of knowledge, but that it is like one with knowledge at the level of first actuality, prior to bringing that knowledge up to the level of second actuality. Compared to the waking geometer, ‘the geometer who is asleep or drunk because he is held down by sleep or intoxication resembles the man who does not have the disposition at all. So in the same way even if he says the soul resembles an uninscribed thing you write on, he calls it this because of the holding down of cognition by the passions which make it seem as if it did not have forms at all’. This is because at birth we fell into a ‘state of swoon’ and as a result forms are nonevident and hidden. This potentiality for knowledge, which requires only the removal of an impediment for its actualization, is intermediate between the Aristotelian notions of first potentiality and first actuality. On this see de Haas (2000). While Philoponus might be willing to say that innate knowledge is destroyed insofar as there are impediments to its actualization, Iamblichus ap. ‘Philoponum’ in DA 3,533, 25-35, translated in Sorabji (forthcoming), understands the knowledge as present, but marred: ‘So if he likens it [potential intellect] to a writing tablet, clearly it has accounts of things, just as the writing tablet has written letters. If he calls it “on which nothing is written”, it stands for “ill-written” because it has faint, non-evident written letters, as also we say of a tragic actor with a bad voice “He has no voice”’. Hence Iamblichus might be willing to consider innate knowledge ‘destroyed’ in the second sense.

571. As Sorabji (forthcoming) points out, Philoponus(?), ‘like the other ancient commentators, do[es] not in fact take the following to be a new account of how sense perception contributes to concept formation; rather he takes this account to begin here’.

572. An alternative translation is ‘all at once it made the percept stand and imprinted it in the imagination’; cf. Sorabji (2005) vol. 1, 176.
The term translated as ‘stamp is’ *apomorxis*. The operative metaphor behind the term is not that of a stamp but that of a rubbing (of a bas relief etc.).

On the Neoplatonic understanding of particulars as bundles of properties, see Lloyd (1990), 46 n. 7 and Sorabji (2005) vol. 1, 17; vol. 3, 165-8. Sorabji identifies as sources Plato *Theaetetus* 209C and Alcinous *Didask.* 4,7 and, crucially, Porphyry *Isag.* 7,16-8,3. Sorabji suggests that because Porphyry is writing an introduction to the *Categories*, which does not mention matter, he is knowingly simplifying Aristotle’s metaphysics, but later Neoplatonists did not realize this, and, like Philoponus(?) here, imported this Platonic account of individuals into their accounts of Aristotelian metaphysics.

Sorabji (2005) vol. 1, 174, explains the teaching here as follows: ‘When we perceive an individual it is not only these characteristics of the individual that leave a mark in our sense image, but also such characteristics as being a human and being rational, moral, animal’.

Note that there is no reference here to the higher, transcendental imagination, which Plotinus takes to be the faculty by which we are conscious of intelligible. See Sorabji (2005) vol. 1, 63-5.

Throughout this passage, Philoponus(?) takes the imprints to be the active agents that instil the knowledge of the universal. This is in contrast with ps-Philoponus in *DA* 538,4-10, who, concerned with identifying the nature of the activity by which this transition to intellectual grasp of first principle or *noêsis* occurs, cites Plato *Philebus* 39B in identifying the Active Intellect as the painter who actively inscribes the imprints in the potential intellect.

Philoponus(?) is not afraid to endorse Aristotle’s very expansive notion of perception, here, according to which perceptible features include certain universals that are over and above the proper and common sensibles. This is in contrast to Plato who in the *Theaetetus* (185D-E) argues that even such universals as the similar can only be recognized through the exercise of reason.

Unlike Themistius in *An. Post.* 63,15, Philoponus(?) does not take Aristotle to be talking about all scientific generalizations here, but only those that are first principles. On this see Sorabji (forthcoming).

At *EN* 1.13, 1102a26-1103a5 Aristotle divides the soul into aspects that are rational (having *logos*) and those that are not. Desires are there said to be rational, insofar as they are such as can listen to and obey reason. Insofar as the ethical virtues concern such aspects of the soul, and being measured in regard to anger is an ethical virtue, what Plato calls *thumos*, responsible for anger and pride, would likewise be a rational aspect of the soul, in this sense. However in *Republic* 4, Plato sharply distinguishes desire and *thumos* from reason, and Philoponus(?) here quietly follows Plato in opposition to Aristotle when he says that *thumos* and desire are obedient to reason, but are not themselves rational (*logikos*).

I add *arkhê* at 440,2, not *allê arkhê* as does Wallies.

At 440,7 I read *hên* for *has*, and follow CEF in adding *heteron* after *alêthesteron*. 
This page intentionally left blank
Bibliography


Bibliography


Bibliography


Moraux, P. (1979), Le commentaire d’Alexandre d’Aphrodise aux Seconds analytiques d’Aristote, Berlin: de Gruyter.


Bibliography
English-Greek Glossary

able to apprehend: antilêptikos
able to perceive: aisthêtikos
accident, accidentally: kata sumbebêkos
account: logos
addition: prosthesis
adjacent: ephexês
affirmative: katêgorikos
air: aêr
akin: homogonos
analogous: analogos, kat’ analogian
analogy: analogia
analysis: analusis
analytic: analutikos
analyze: analuein
anger: thumos
angle: gônia
be angry: thumousthai
apprehend, be apprehended: antilambanesthai
argument: logos, epikheirêma
arrangement: thesis
art: tekhnê
ass: onos
assemble: episunagein, sunagein
assume: lambanein
at the same time: hama
attribute: pathos
beginning: arkhê
belief: doxa
belong: huparkhein
better known by nature: gnôrimôteros phusei
better known to us: gnôrimôteros hêmin
block: antiphrattein
blocking: antiphraxis
boundary: horos

capability of laughter: gelastikos
cause: aitios, aitia
centaur: kentauros
chance: automatos
circle: kuklos

classify: anagein
be coextensive: exisazein, parekteinein
come to know: gnôrizein
come to know: common: koinos
common nature: koinotês
complete in all parts: holoklêrios
compose: suntithenai
composite: sunthetos
composition: sunthesis
concept: logos
conceptualization: epinoia
consider: theorein
constitute: sunistanai
constitutive: sustatikos
content: hupokeimenon
content: agôn
continuous: sunekhês
contradiction: antiphasis
convention: thesis
convert: antistrephein
deduction: sullogismos
defect: ekleipsis
definable: horistos
define: horizein
defined, that which is defined: horiston
definition: horos, horismos
demonstrable: apodeiktos
demonstrate: apodeikhunai
demonstration: apodeixis
demonstrative: apodeiktikos
dialectical: logikos, dialektikos
diameter: diametros
difference: diaphora
differentia: diaphora
difficulty: aporia
disappearance: ekleipsis
discover: heuriskein
discussion: logos
divide: diairein
division: diairesis
doctrine: logos

discussion: logos

earth: gê
echo: ékhô

eclipse: ekleipsis

be eclipsed: ekleipein

effect: aitiaton

efficient: poïetikos

eliminate: anairein

employ as being the same: tautizein

end: telos

entailment: akolouthêsis

equivocal: homônumos

essence: ou sia, to ti ên einai

essential: ouisiôdês

essentially: ouisiôdôs

establish: paristanai, kataskeuazein

existence: huparxis, hupostasis

expression: logos, phônê, sêmainomenon

extreme: akron

fact: pragma, hoti

faculty: dunamis

fault: kakia

figure: skhêma

final: telikos

find: heuriskein

first: prôtos

fish: ikhthus

fit: epharmozein

follow: akolouthein, hepe sthai

form (n.): eidos

form (v.): sunistanaï
generic: genikos

genus: genos

get rid of: anairein

go beyond: huperbainein

god: theos

good: agathos

have scientific understanding:

epistasthai

healthy: hugieinos

hear: akouein

hippos: hippoc

house: oikia

human being: anthrôpos

hypothesis: hupóthesis

hypothesize: hupotithenai

hypothetical: hupothetikos

if it is: ei esti

imagination: phantasia

immediate: amesos

immortal: athanasos

important: timios

impression: tups

imprint (n.): ek tulopós

imprint (n.): ek tulopoun

imprint in: entupoun

inanimate: apsukhos

incidentally: kata sumbebêkos

indemonstrable: anapodeiktos

indicate: déloun

indicative: délôtikos

individual: kath’ hekaston

indivisible: atomos, adiairetos

induction: epagôgê

infer: episunamein; sunagein

initiate: kinein

inquiry: skepsis

intellect: nous

intelligible: noêtos

invention: epinoia

investigate: zêtein

investigation: zêtês is

involving art: tekhnêtos

isosceles: isoskeles

learn: manthanein, akouein

learning: mathêsis

leave out: paraleipein

light: phôs

limit: peras

line: grammê

list: sustoikhia

luck: tukhê

lucky: tukhêros

major: meizon

manner: tropos

material: hulikos

matter: hulê

mean: sêmaininein

meaning: sêmainomenon

mediated: emmesos

memory: mnêmê

metaphor: metaphora

method: methodos
middle term: mesos, mesos horos
minor: elattôn
mode: tropos
monad: monas
moon: selênê
motion: kinesis
move: kinein
mutual displacement: antiperistasis
natural: phusikos
nature: phusis
necessary: anankaios
nominal: onomatôdês
number: arithmos

object of investigation: zêtêma
object of scientific understanding: epistêtos
observe: theôrein
odd: perittos
of the same time: homokhronos
opposed, opposite: antikeimenos
ox: bous

part: meros, morion
particular: merikos
particularize: merikeuein
per se: kath’ hauto
perceive: aisthanesthai
perceptible: aisthêtos
perception: aisthêsis
phrase: logos
place: topos
pleasure: hêdonê
point: stigmê
point of departure: aphormê
posterior: husteros
postulate: aitéma
power: dunamis
predicate (n.): katégoroumenon
predicate (v.): katégoroímen
premise: protasis
prepare: katakeuazêin
present: paristanai
pride: megalopsukhia
primary: prôtos
principle: arkhê
prior to us: proteros hêmin
problem: problêma
proper: idios
property: idion
to be proportional: ekhein analogon
proud: megalopsukhos
prove: deiknunai

quake: seiesthai
qualification: prosdiorismos
random: matên
ratio: logos
rational: logikos
ray: aktis
reason: logos
reason why: dioti
reduce: anagein
refer: déloun
referring: délôtikos
relation, relationship: logos
render continuous: sunekhein, sunekhizein
reputable: endoxos
right: orthos
role: logos
rule: topos

science of demonstration: apodeiktikê
scientific understanding: epistêmê
see: horan, theôrein
sentence: logos
set: kataskeuazêin
show: deiknunai
side: pleura
sight: horasis, opsis
sign: tekmeriódês
signify: sêmainein
similar: homoios
simple: haplous
simultaneous: hama
skip: huperbainein
skipping: huperbasis
soul: psukhê
sound: phônê
species: eidos
specific: eidikos
stamp: apomorxîs
study: theôrein
subject: hupokeimenon
subsist: huphistanai
substance: ousia
subtraction: aphairesis
supplemental condition: prosthêkê
syllogism, syllogistic deduction: sullogismos
syllogistically deduce: sullogizesthai
take: lambanein
take a walk: peripatein
teach: didaskein
<table>
<thead>
<tr>
<th>English</th>
<th>Greek</th>
</tr>
</thead>
<tbody>
<tr>
<td>teaching:</td>
<td>didaskalia</td>
</tr>
<tr>
<td>term:</td>
<td>horos, lexis, phônê</td>
</tr>
<tr>
<td>that which is</td>
<td>to mé on</td>
</tr>
<tr>
<td>thesis:</td>
<td>thesis</td>
</tr>
<tr>
<td>thing:</td>
<td>pragma</td>
</tr>
<tr>
<td>thought:</td>
<td>dianoia</td>
</tr>
<tr>
<td>thunder:</td>
<td>brontê</td>
</tr>
<tr>
<td>time:</td>
<td>khronos</td>
</tr>
<tr>
<td>transmit:</td>
<td>parapempein</td>
</tr>
<tr>
<td>triad:</td>
<td>trias</td>
</tr>
<tr>
<td>triangle:</td>
<td>trigônon</td>
</tr>
<tr>
<td>unclear:</td>
<td>adêlos</td>
</tr>
<tr>
<td>undifferentiated:</td>
<td>adiaphoros</td>
</tr>
<tr>
<td>universal:</td>
<td>katholou</td>
</tr>
<tr>
<td>unknown:</td>
<td>agnóstos</td>
</tr>
<tr>
<td>vague:</td>
<td>amudros</td>
</tr>
<tr>
<td>wane:</td>
<td>ekleipein</td>
</tr>
<tr>
<td>waning:</td>
<td>ekleipsis</td>
</tr>
<tr>
<td>way:</td>
<td>tropos</td>
</tr>
<tr>
<td>what it is:</td>
<td>ti esti</td>
</tr>
<tr>
<td>whether it is:</td>
<td>ei esti</td>
</tr>
<tr>
<td>without a name:</td>
<td>anónumos</td>
</tr>
<tr>
<td>word:</td>
<td>onoma</td>
</tr>
</tbody>
</table>
### Greek-English Index

A few key terms are employed quite often within Aristotle’s *Analytics*. This is also true for the commentaries on the *Analytics*, including the present work. For such frequently occurring technical terms, I list only the first occurrence, followed by ‘etc.’. In some cases, the Index of Subjects provides an account of the key passages which employ the term. There is a separate Index of Names.

<table>
<thead>
<tr>
<th>Term</th>
<th>Greek</th>
<th>English</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>adêlos</td>
<td>unclear</td>
<td>356,28.29; 366,17</td>
<td></td>
</tr>
<tr>
<td>adiarentos</td>
<td>indivisible</td>
<td>356,14-358,8; 390,21-391,14</td>
<td></td>
</tr>
<tr>
<td>adiaphoros</td>
<td>not being at variance, 357,29.32; 358,7; undifferentiated, 413,17.19; 414,33; 437,10-16; [what] makes no difference, 369,7; 378,31; indifferent, 413,8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aér</td>
<td>air</td>
<td>392,11-12; 420,2-421,8; 422,21</td>
<td></td>
</tr>
<tr>
<td>agathos</td>
<td>good</td>
<td>345,30-2; 350,32; 356,32-358,7; 385,29.31</td>
<td></td>
</tr>
<tr>
<td>agôn</td>
<td>contest</td>
<td>383,7.10</td>
<td></td>
</tr>
<tr>
<td>aisthanesthai</td>
<td>perceive</td>
<td>340,13.19; 417,19.27; 434,7-435,3</td>
<td></td>
</tr>
<tr>
<td>aisthésis</td>
<td>perception</td>
<td>335,11; 340,2-20; 359,9.10.14; 414,31; 428,14.23; 435,1.5.18; 436,19.23.34; 437,15.21.31; 438,11; 439,3; sense, 414,27</td>
<td></td>
</tr>
<tr>
<td>aisthétikos</td>
<td>able to perceive</td>
<td>346,19; 348,25; 370,22; 411,18-413,31; 417,24.25; faculty of perception, 434,3.5.</td>
<td></td>
</tr>
<tr>
<td>aisthêsos</td>
<td>perceptible, 338,6-32; 340,4-35; 414,26; 434,6-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aitéma</td>
<td>postulate</td>
<td>408,11</td>
<td></td>
</tr>
<tr>
<td>aitia, aitos</td>
<td>cause</td>
<td>334,5 etc.</td>
<td></td>
</tr>
<tr>
<td>aitiaton</td>
<td>effect</td>
<td>335,10 etc.</td>
<td></td>
</tr>
<tr>
<td>akolouthein</td>
<td>follow, 387,15; 389,23; 394,14; 410,14; 429,6.28.29; 430,14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>akolouthésis</td>
<td>entailment</td>
<td>381,25; 386,22.27; 387,14; 388,11; 390,5; 397,14; 422,32</td>
<td></td>
</tr>
<tr>
<td>akouein</td>
<td>hear</td>
<td>376,22; 417,15; 434,10; 455,2; learn, 408,12</td>
<td></td>
</tr>
<tr>
<td>akron</td>
<td>extreme</td>
<td>339,3; 370,15; 374,24; 395,11; 401,10; 426,27-431,24</td>
<td></td>
</tr>
<tr>
<td>aktis</td>
<td>ray</td>
<td>340,8.12; 370,8; 421,1-18</td>
<td></td>
</tr>
<tr>
<td>amesos</td>
<td>immediate</td>
<td>350,15 etc.</td>
<td></td>
</tr>
<tr>
<td>amudros</td>
<td>vague, 367,7-368,19; murky, 434,17-27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anagein</td>
<td>classify, 392,13; 398,20; 401,31; 404,21; 405,17; 407,5.8; 408,4.31; 413,21; 415,20.27; 418,10; 419,3; 429,10; 433,9; reduce, 336,18; 341,11; 346,1; 416,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anairein</td>
<td>do away with</td>
<td>405,27.28; eliminate, 344,11, 393,32; 394,4; 414,12</td>
<td></td>
</tr>
<tr>
<td>analogia</td>
<td>analogy</td>
<td>391,8; 416,16.20; 419,18; 428,24; <em>kat’ analogian</em>, analogous, 428,31; <em>ekhein analogian</em>, to be analogous, 357,8-14; 416,16</td>
<td></td>
</tr>
<tr>
<td>analogos</td>
<td>analogy, 348,34; 419,11; analogous, 419,4-20; <em>ekhein analogon</em>, to be proportional, 427,11-17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>analuein</td>
<td>analyze, 335,1.7; 336,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>analusis</td>
<td>analysis</td>
<td>334,20-336,1; 336,1; 355,8; 406,13; 409,5.7; 412,12</td>
<td></td>
</tr>
<tr>
<td>analukos</td>
<td>analytic</td>
<td>334,22-4; 335,9.21; 402,21</td>
<td></td>
</tr>
<tr>
<td>anankaios</td>
<td>necessary</td>
<td>334,14 etc.</td>
<td></td>
</tr>
<tr>
<td>anapodeiktos</td>
<td>indemonstrable</td>
<td>344,7.13; 365,25; 371,22.24; 374,33; 375,3; 397,26; 432,22</td>
<td></td>
</tr>
<tr>
<td>anônumos</td>
<td>without a name, 399,30-400,29; 404,7; 409,16.23; 418,22.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anthrôpos</td>
<td>human being</td>
<td>335,24 etc.</td>
<td></td>
</tr>
<tr>
<td>antikeimenos</td>
<td>antipodal</td>
<td>396,10.12;</td>
<td></td>
</tr>
</tbody>
</table>
opposite, 406,30-408,20; opposed, 407,2-410,29

antilambanesthai, to apprehend, 437,31; 438,4; to be apprehended, 428,14

antilēptikos, able to apprehend, 339,10; 434,6; apprehensive, 428,23

antiperistasis, mutual displacement, 419,35; 420,22

antiphasis, contradiction, 369,13-15; 407,7

antiphrattein, block, 335,13-16; 340,7-21; 346,13-348,31; 357,14.15; 364,18-365,4; 373,30; 386,23; 395,13-20; 399,7; 425,31; 426,22; 429,9; 430,20-431,26

apodeiknunai, demonstrate, 336,9 etc.; apodeiktikos, demonstrative, 334,4.6; 359,13; 363,25; 366,19; 397,18; 427,3; 429,5.27; 432,25; apodeiktike, science of demonstration 334,2.23; 335,4.30

apodeiktikôs, demonstratively, 343,13; 404,4; 425,15

apodeiktos, demonstrable, 341,14-345,24; 365,24; 374,31; 375,8.11; 439,21

apodeixis, demonstration, 334,2 etc.; exposition, 424,16,20

apomorxasthai, to be stamped, 437,22

apomorxis, stamp, 437,17; 438,9

aporein, present a difficulty, 339,1 etc.
aporia, difficulty, 343,2.4; 390,16; 422,32; 423,22.34

apsukhos, inanimate, 338,8; 349,10; 392,13; 405,16; 411,19.20; 417,24

aritmos, number, 336,3.30; 339,31.32; 344,24; 348,3-32; 371,28; 397,30-1; 398,8-401,18; 427,13-428,7

arkhê, beginning, 334,9; 335,4; 342,1.3.6; 344,12; 354,26; 366.26; 392,28.30; 393,16.17; 433,26, principle, 335,7 etc.

athanatos, immortal, 353,25-7; 407,24; 410,27,28

atomos, indivisible, 352,4.30; 400,11-402,7; 431,21-31

automatos, chance, 380,5-381,16; 384,33; 385,12

bous, ox, 400,9; 406,9; 412,29; 413,28; 417,11-418,33

brontê, thunder, 353,16-19; 368,2-9; 369,31-371,21; 374,14-29; 383,14-19

deiknunai, prove, 340,31 etc.; show, 341,9 etc.

dêlôtikos, indicative, 358,13; 362,23.24; 372,12; 374,32; 375,3; referring, 419,4.20

dêloun, indicate, 341,18 etc.; refer, 338,2 etc.

diairein, divide, 337,18 etc.

diairesis, division, 349,3 etc.

dialektikos, dialectical, 345,28.29; 409,21

diametros, diameter, 377,5

dianoia, thought, 335,12; 360,9; 384,32; 385,13; 438,24; 439,14; kata dianoian, mentally, 364,33; by virtue of thought, 380,23; 414,31

diaphora, difference, 341,20; 421,30; differentia, 349,6 etc.
didaskalia, teaching, 334,8; 432,31; 433,26

didaskein, teach, 334,8 etc.
dioti, reason why, 336,20 etc.
doxa, belief, 414,31; 439,1-29

dunamis, faculty, 339,9; 433,32-435,13; 438,25-440,6; power, 380,12; 400,7; 420,17; 421,13; 430,11; 435,21.24; 436,32; potentiality, 384,29; 385,6
ei esti, if it is, 336,20 etc.; whether it is 366,31; 367,3-368,27 etc.

eidênaí, know\(^a\), 341,25; 343,27-31; 344,15; 359,30; 360,8; 364,4.10; 365,14.15; 366,31; 406,4; 407,1
eidikos, formal, 352,17; 353,32; 364,17-376,32; 379,1; 386,21-387,4; 432,22; specific, 400,32-402,28; 406,11-409,23; 411,14-414,20; 417,32; 431,27.28; 437,14

eidos, form, 339,8 etc.; species, 342,21
Greek-English Index

etc.; kind, 335,7.8; 341,24; 372,9.11; 386,5; 391,22; 416,4
ekhô, echo, 420,29-421,2
ekleipein, be eclipsed, 335,12-16; 336,24-33; 337,10.28; 338,11; 340,3-34; 343,22; 353,16.20; 366,27-30; 368,28; 370,11; 371,9; 424,5-25; wane, 422,7-15
ekleipsis, defect, 356,17; disappearance, 386,13-26; eclipse, 337,24-341,4; 343,6.9; 353,18; 366,3-372,6; 375,17.26.29; 379,29; 424,27.29; 426,13; waning, 422,6
ektupôsis, imprint, 434,9.13
ektupoun, imprint, 434,8
elattôn, less 341,6 etc.; minor, 347,18 etc.
emmesos, mediated, 370,21; 371,32; 372,3; 391,30; 394,23; 408,16
endoxos, reputable, 366,20.22
entupoun, imprint in, 434,18; 435,7.22; 436,34; 437,17.26.29; 438,8
epagôgê, induction, 343,19; 349,25; 353,8; 358,22-359,14; 371,26
epharmozein, fit, 352,6; 409,19; 410,20; 414,12
ephexês, adjacent, 342,16; 369,19; 421,3-8; 429,21
epikheirêma, argument, 344,26; 345,29.31; 350,22; 352,10; 355,3; 390,26; 403,31; 406,18.31; 407,31; 409,26-410,1
epinoia, conceptualization, 343,8; 372,32; 375,22; 380,24; 424,5; invention, 382,18
epistasthai, have scientific understanding, 336,4 etc.
epistêmed, science, 343,33; 361,10.11; 407,15; 411,5; 429,24-6; 433,2.10; scientific understanding, 336,4 etc.
epistétos, object of scientific understanding, 340,2-35; 440,11.12
episunagein, assemble, 340,20; 414,32; 415,10; 435,13.16.18; 436,22; 437,6.8.14; 438,11.17.21.23; infer, 353,12; 407,28.33
episunathroizein, gather together, 435,16.23
exisaζen, be coextensive, 395,15-19; 399,7; 429,8-431,24
gê, earth, 335,17-20; 338,17-340,9; 343,9; 366,30; 370,8-372,5; 384,15; 388,2; 395,21-34; 420,8; 423,1-424,29; 426,14
gelastikos, capable of laughter, 346,17; 347,28; 351,9; 354,16; 364,21; 366,4; 367,15; 378,30; 426,20
genikos, generic, 335,27; 338,5; 361,7; 409,21
genos, genus, 335,27 etc.
gignôskein, know, 335,7 etc.
gnôrimos, known, 416,29; 433,1; 439,21
gnôrimûteros hêmin, better known to us, 336,28; 367,2
gnôrimûteros phusei, better known by nature, 336,28
gnôrizein, come to know, 335,11.29; 340,4.12; 353,1.2.4; 361,9; 367,12.20.25; 368,7.12; 433,2; 437,18; 438,20; 439,31
gnôsis, kind of knowledge, 343,34; 345,7.12; 436,16; knowledge, 343,5 etc.
gnôstos, known, 335,7.28; 344,16
gônia, angle, 338,28 etc.
grammé, line, 342,18 etc.

hama, at the same time, 337,28; 340,10; 341,26; 343,1.5; 366,28; 369,1.20.21.32; 383,3.8; 386,21; 387,6.7.13.18.21; 391,26; 392,20; 395,6; 422,31.33; 423,5.8.28; 424,3.32; together, 373,29; 390,20.22
haplous, simple, 336,36; 336,21-339,21; 375,17; 402,11-17
hédonê, pleasure, 345,30; 348,10.11
hepesthai, deal with, 346,7.9; follow, 348,19; 392,2.17; 395,7; 410,13; 415,6; 417,23; 418,29; 423,14; 424,35; 425,1
heuriskein, discover, 336,3 etc.; find, 362,7; 380,7.22.33; 397,10; 400,20; 412,30; 415,27; 416,4; 417,9; 419,14.16; 433,24
hippos, horse, 349,26; 363,16; 392,10; 404,32; 406,25; 417,20; 418,15; 425,17.19; 437,13
holoklêrios, complete in all parts, 383,3-13
homogonos, akin, 389,25.26; 390,36,37
homoios, similar, 412,10; 413,17.19; 415,15-28; 428,1-22; 435,5; 437,11.12.28
homokhronos, of the same time, 389,26; 390,36; 424,2
homônumia, equivocity, 414,28.32
homônunumós, equivocally, 361,7; 426,32
horasis, sight, 340,21
horismos, definition, 334,16 etc.
horistos, defined, that which is defined, 339,9; 351,4-31; 352,6; 353,3-354,16; 357,27; 359,4; 364,19-365,30; 371,20,31; 373,30; 374,32; 377,18; 382,18.21; 385,26-407,18; 409,11-412,8; 416,29; 426,32; 428,2-19; 429,17-20; 432,18; 437,21; 438,18; 439,22.24
idion, property, 345,29; 346,10-347,28; 349,17; 354,15; 365,3; 366,4-5; 370,24; 395,16
idios, proper 402,2-10
ihthhus, fish, 419,9-28; 428,26-9,1
isosceles, isosceles, 345,12-18
kakia, fault, 351,18.21; 352,8; 356,24
kataskeuazein, establish, 390,18; 391,7; 408,28-409,35; 411,14-17; 422,16.17.27; prepare, 382,18.21
kataskeuē, condition, 421,9; [what] prepares, 334,11; support, 348,22
kata sumbebêkos, accidental, accidentally, 338,19-28; 343,21.22; 352,18; 367,3; 372,28-373,27; 389,3; 409,24; 426,17-427,4; incidentally, 334,16
katégorein, predicate, 338,26 etc.
katégoria, predicate, 400,13
katégorikos, affirmative, 341,28-33; 365,33
katégoroumenon, predicate, 337,3.16; 338,4; 373,19.22; 378,31
kath’ hausto, per se, 338,18-28; 341,3; 343,3.20.21; 345,17; 373,18.19; 376,3; 389,3.10; 426,8-22; 452,30; 433,1; by itself 339,25; 340,30; in its own right, 432,27
kath’ hekaston, individual, 335,27; 358,26; 359,3; 395,18; 406,12; 409,8; 414,8-416,8; 429,12; 432,2-9; 437,31
katholou, universal, 335,27 etc.
kentauros, centaur, 336,12-337,7; 360,2
khronos, time, 386,4-390,6; 392,31-394,26; 424,2; 434,27; 438,32; 439,26; 442,19,20; 423,4
kinein, initiate, 422,32; move, 349,26 etc.
kinesis, motion, 380,15; 381,19; 384,9-18; 387,27-32; 390,2; 391,1-22; 393,3; 396,15; 421,20; movement, 385,17
koinos, common, 401,17-402,5; 412,15-413,35; 415,21-419,19; 437,21; 438,18
koinotês, common nature, 412,12-414,9; 437,19
kuklos, circle, 336,12-337,7; 360,2
"Greek-English Index"
lambanein, assume, 344,8 etc.; take, 335,2 etc.

lexis, term, 335,32; 361,6; 414,24,29; 416,13-30

logikos, general, 395,14; rational, 335,25 etc.; dialectical, 366,19

logos, account, 334,10 etc.; argument, 343,30; concept, 435,34; definition, 424,5; discussion, 348,23; doctrine, 352,11; expression 336,7,11; 340,28,3; 357,8; meaning, 435,32; phrase, 418,21; ratio, 339,31-4; 427,24-32; 428,21; reason, 343,6,30; relation, relationship, 340,24; 419,7,10; role, 338,25; 376,29.31; sentence, 363,10; text, 342,5

manthanein, learn, 336,13.16; 347,8; 354,8; 361,6; 366,26; 372,21.23; 409,22; 423,20; 433,31

mathêsis, learning, 433,13-30

mé on, that which is not, what is not, etc., 359,20-362,33; 369,18

megalopsukhia, pride, 412,36-414,5

megalopsukhos, proud, 413,3-7

meizon, greater 338,29 etc.; major, 347,27 etc.

merikeuein, particularize, 338,6-9; 403,27,28

merikos, particular, 335,26; 340,22; 341,31; 349,25; 353,9; 358,23; 359,1.10; 400,11-401,2; 403,22; 409,17; 410,7,8; 412,12-415,13; 435,34-438,22

meros, part, 334,20 etc.

mesos, middle term, 334,5 etc.

metaphora, metaphor, 416,12-25

methodos, method 334,25; 349,4,20; 350,13; 355,7.9.10.11; 401,2.4; 410,10; 412,18; 413,1; 418,19

mnêmê, memory, 435,19-437,5

monas, monad, 336,31.32; 344,24; 371,29.30; 398,12.13; 401,15-17

morion, part, 353,3; 383,3.7; 393,13; 397,33.34; 398,4-9

noëtos, intelligible, 338,6-339,10

nous, intellect, 335,25; 337,22; 338,31; 339,8.10.17; 341,3; 351,7.13; 352,30; 367,24; 369,3; 375,17; 396,7; 398,23; 407,24-7; 410,11-412,32; 438,22-440,11; mind, 368,9

oikia, house, 376,5-22; 378,6.21; 380,24; 382,7-17; 385,2-11; 387,9-388,7; 391,3-394,19

onom, title, 363,6.7; word, 359,30-363,16; 372,14-32; 373,16; 377,19; 397,25; 400,1.2; 412,34; 418,16-419,15; name, 407,6.8; term 410,29

onomatôdês, nominal, 360,4; 361,14; 362,26.28; 372,10-26; 397,25,29

onos, ass, 434,6; 435,17

opsis, sight, 342,20.21; 356,13; 421,2.12

orthos, right, 338,28; 341,5.6; 342,15; 345,3.14; 351,8; 353,32.33; 354,2.3.15; 358,12; 360,4.29; 361,2; 362,22; 371,32; 374,33; 375,31; 399,6.26; 400,13; 415,7.8; 426,30; substance, 338,6.7.30.31; 339,7,17; 343,24.25; 346,19; 348,21-4; 355,12.13; 358,13; 362,29.31; 367,22; 369,2.7; 370,19-24; 392,13; 407,28; 411,18-413,30; 417,23

ousiôdês, essential, 351,24; 352,17; 353,33; 358,6; 364,29; 367,14; 368,21-369,32; 375,30; 406,25-9; 409,19

ousiôdôs, essentially, 348,26.27;
351,8-30; 354,14; 356,3; 364,18; 367,11-368,1; 372,30; 399,24; 409,12; 411,36

panselênos, full moon, 368,10; 422,19

paraleipein, leave out, 351,28-352,22; 384,13; 404,14.15; 405,23.25

parapempein, transmit, 437,25

parekteinein, be coextensive, 430,29; reach, 431,2

paristanai, establish, 342,27 etc.;

pathos, attribute, 338,22; 339,19-30; 342,14.17; 343,25; 345,3.17; 357,11; 369,3.6; 375,16; 402,1-17; 418,28

peras, limit, 390,18-391,14

peripatein, walk, take a walk, 373,7; 378,4-379,27; 381,34; walk, 434,26.29

perittos, odd, 398,24-399,31; superfluous, 347,16; 411,34
**sustatikos**, constitutive, 349,6; 361,5; 400,22; 412,15

**sustoikhia**, list, 412,21-414,2

**tautizein**, to employ as being the same, 337,20,25; 348,6; 378,29,30; 379,26

**tekhnê**, art, 380,23-382,16; 385,15-32; 407,14,15; 411,5,11; 414,14; 436,8,10

**tekhnêtos**, by art, involving art, 380,23-381,8; 382,30; 383,22; 384,32-385,26

**tekmêriôdês**, sign-, 386,31; 424,13,23,34

**telikos**, final, 375,26; 376,10,12; 378,3-379,15; 381,19-385,34; 397,12

**telos**, end, 380,16-385,31; 392,30-393,17; 422,1; goal, 380,16

**theos**, god, 336,12,15; 337,15

**theôrein**, consider, 369,2; observe 337,23 etc.; see, 356,17; study 340,29-34; 343,9,25; 364,14; 369,11; 381,22

**theôrêma**, topic, 382,3; 386,3; 415,2; 417,2; 422,30; 426,5; 429,5


**thumos**, anger, 364,22-366,17; 371,14,22; 373,14-374,15; thumos, 436,32; 438,26

**thumousthai**, be angry, 364,26-365,27; 374,12

**ti esti**, what it is, 336,20 etc.

**timios**, important, 334,24,25; 335,6

**to ti ên einai**, essence, 347,13,16; 349,2; 354,12; 355,22; 356,26-357,2; 375,29,30; 377,16,20; what it was to be, 366,9

**topos**, nest, 434,14; place, 338,27; 368,13; 380,14,15,17; 387,32; 406,12; 417,26; 425,18,19

**trias**, triad, 336,31; 398,20-6; 399,22-401,15

**trigônon**, triangle, 338,27-32; 341,5,7; 342,16,18; 343,11-16; 344,31-345,18; 361,13-25; 369,16,22; 372,18-29; 415,26,27; 428,10-21; 429,15-17

**tropos**, manner, 341,11; 353,1,4; 413,6; mode, 360,13,14; 361,26; way, 336,5,6; 337,5; 339,22; 340,28; 351,5,21; 355,2,6; 356,29; 365,34; 366,12; 371,26; 373,5,8; 374,18,20; 374,20-3; 416,13,21; 418,34; 419,11; 420,28; 428,29

**tukhê**, luck, 380,5-381,16; 385,14-33; fortune, 413,9

**tukhêros**, lucky, 380,31-381,16

**tupos**, impression, 434,8

**zêtein**, investigate, 334,11 etc.; seek, 354,26; 396,6; 401,20; 412,28

**zêtêma**, object of investigation, 334,10,14; 336,12,16; 337,18,28; 338,33; 339,1,5; 341,9,15; 386,4,6,9; 390,2; 432,7,16

**zêtêsis**, investigation, 334,13 etc.

**zôion**, animal, 339,13 etc.
This page intentionally left blank
Index of Passages Cited
References in this index are to the Notes sections of the book.

ARISTOTLE
Nat. An. 11,37,21-2: n.216

ALCINOUS
Didask. 4,7: n.574; 5: n.18; 5,5: n.12

ALEXANDER OF APHRODISIAS
in An. Pr. 7,23-8,2: n.15;
43,28-44,2: n.109
in DA 48,7-21: n.490
in Top. 330,21-2: n.463
Quaestiones 1.6,2-3: n.486; 2.16, 61: n.328; 2.18: n.384

AMMONIUS
in An. Pr. 6,2-9: n.15; 28,28-29,2: n.109
in Cat. 5,4-10: n.17
in Int. 38,13-14: n.204;
142,31-143,1: n.313
in Isag. 1.6-7: n.149
in Porph. Isag. 63,2; 71,24: n.369

ANONYMOUS
in An. Post. 584,17: n.429

APULEIUS
Int. 185,15-20: n.109

ARISTOTLE
An. Post. 1: n.10; 1.2-4; 6: n.4; 1.7:
n.4, n.188; 1.10: n.4; 1.13: n.6,
n.340; 1.32: n.188; 2: n.10; 2.3-7:
n.128; 2.4: n.226; 2.5: n.439; 2.7:
n.210; 2.8-10: n.129; 2.10: n.211,
n.393; 2.11-12: Introduction n.22,
n.387; 2.12: n.220, n.499; 2.13:
n.128; 2.16: n.499, n.513; 2.17:
n.513, n.534; 2.23: n.109;
71a1-11: n.543; 71a11-17: n.184,
v.193, n.266; 71b9-19: n.2;
71b17-19, 24: n.3; 71b33-72a5:
n.33; 72a15-16: n.141; 72a18-24:
v.10; 72a19-24: n.168; 72a19-20:
n.348; 72b25-33: n.500; 73a34-7:
n.53, 276; 73b2-5: n.54;
73b26-8: n.386; 73b30-2: n.56;
74a17-25: n.520; 74a25-30: n.56;
74b21-4: n.234; 75b31-3: n.393;
76a31-6: n.190; 76a40-b16: n.10;
76b23-34: n.441; 76b27-30: n.141; 78a22-b13: n.7; 78a30,
78a37: n.308; 85b23-5: n.3;
89a16: n.7; 89b15: n.7; 89b29-31:
n.19; 89b39: n.45; 90a1: n.502;
90a5-6: nn.9, 59; 90a6-7: n.7;
90a6-9: n.236; 90a14-15: n.10;
90a15-23: n.502; 90a24-30:
n.237; 90a36-7: n.83; 90a38-b17:
n.84; 90b1-4: n.209; 90b7-8: n.56;
90b18-91a11: n.85; 90b29: n.68;
91a35-6: n.208; 91a35: n.209;
91a36-8: n.105; 91b7-11: n.104;
91b31: n.125; 91b34-5; 92a4-5:
n.134; 92a33: n.8; 92b17: n.189;
93a3: n.212; n.224, 93a6: n.224;
93a15: n.279; 93a16-35: n.260;
93a17-19: n.237; 93a18-19:
n.238; 93a19-20: n.238; 93a22:
n.242; 93a29: n.240; 93b29:
n.268; 93b29-37: n.393;
93b29-32: n.389; 93b30: n.269;
95b31-7: n.371; 93b33: n.270;
93b38-94a7: n.393; 94a1-3:
n.392; 94a7-9: n.391, n.393;
94a9-12: n.390; 94a9-10: n.393;
94a11-14: n.393; 94a12-13:
n.392; 94a13-14: n.391; 94a21-2:
n.318; 94a22: n.298; 94a33-4:
n.294; 94a33: n.293, n.294;
94a34: n.294; 94a36: n.297;
94b18-20: n.306; 95a27-b1:
n.220; 95a34: n.351; 96b16;
n.431; 97a6-22: n.420; 97a33;
n.450; 97a39: n.458; 97b30,37:
n.461; 98b5-16: n.528; 98b25-38:
n.514; 98a35-b16: n.318; 99a28:
n.529; 99b9: n.536; 100a6: n.560;
100a13: n.567
An. Pr. 2.5: n.382; 24a10-11: n.16;
24a16-17: n.481; 24b18-20:
n.146, n.148; 25b26-31: n.16;
25b32-7: n.86; 50a39-b4: n.139;
70a6-b6: n.340
Index of Passages Cited

<table>
<thead>
<tr>
<th>Reference</th>
<th>Page Range</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cael.</em> 290a17-24</td>
<td>n.492; 299b6-7</td>
<td>n.358</td>
</tr>
<tr>
<td><em>Cat.</em> 1a1-6</td>
<td>n.461; n.522; 3b21</td>
<td>n.406</td>
</tr>
<tr>
<td>DA 403a1-b3</td>
<td>n.217; 403a3-b19</td>
<td>n.129; 403a29; 404b27-30; 408b32; n.99; 419b25-31; n.490; 428a10-11; n.548; 435a5-10</td>
</tr>
<tr>
<td><em>EN</em> 2.6-9</td>
<td>n.153; 1102a26-1103a5</td>
<td>n.580; 1139b31-2; n.539; 1140a10; n.562</td>
</tr>
<tr>
<td><em>GA</em> 1.23</td>
<td>n.129; 4.1-2</td>
<td>n.129; 741a88-b3; n.131; 767a1-8</td>
</tr>
<tr>
<td><em>HA</em> 492b23-6</td>
<td>n.109; 517a33-b2</td>
<td>n.130; 538a13-13</td>
</tr>
<tr>
<td><em>Int.</em> 16a19</td>
<td>n.272; 19b19-20</td>
<td>n.38; 20b35-7</td>
</tr>
<tr>
<td><em>Long.</em> 478a26-b3</td>
<td>n.488</td>
<td></td>
</tr>
<tr>
<td><em>Mem.</em> 450a30-b5</td>
<td>n.547; 452b10-11</td>
<td>n.491</td>
</tr>
<tr>
<td><em>Metaph.</em> 7, 8</td>
<td>n.62; 7.5</td>
<td>n.198; 7.11</td>
</tr>
<tr>
<td><em>Meteor.</em> 1.9</td>
<td>n.383; 3.4</td>
<td>n.493; 348b2-5</td>
</tr>
<tr>
<td><em>PA</em> 661b6-12</td>
<td>n.320; 687a5-23</td>
<td>n.114; 691b5-16</td>
</tr>
<tr>
<td><em>Phys.</em> 2.3</td>
<td>n.283; 2.9</td>
<td>n.285; 192b35-6</td>
</tr>
<tr>
<td><em>Poet.</em> 1457b16-9</td>
<td>n.156</td>
<td></td>
</tr>
<tr>
<td><em>Rhet.</em> 1357b3-5; 1402b12-20</td>
<td>n.340</td>
<td></td>
</tr>
<tr>
<td><em>SE</em> 177b13-15</td>
<td>n.118</td>
<td></td>
</tr>
<tr>
<td><em>Sens.</em> 4</td>
<td>n.473; 438a25-7</td>
<td>n.491</td>
</tr>
<tr>
<td><em>Somn.</em> 456a30-b9</td>
<td>n.489</td>
<td></td>
</tr>
<tr>
<td><em>Top.</em> 100a25-7</td>
<td>n.146; 148; 101b16-25</td>
<td>n.447; 101b16</td>
</tr>
<tr>
<td><em>PS-ARISTOTLE</em></td>
<td>Problems 899a32-b17</td>
<td>n.490; 936b19-23</td>
</tr>
<tr>
<td><em>ARISTOXENUS</em></td>
<td>Fragment 23,7</td>
<td>n.81</td>
</tr>
<tr>
<td><em>ASCLEPIUS</em></td>
<td>in <em>Metaph.</em> 372.8-10; 398.1-5</td>
<td>n.313; 414.33</td>
</tr>
<tr>
<td><em>DAMASCUS</em></td>
<td><em>Vita Isidori</em> fr. 111: Introduction</td>
<td>n.13</td>
</tr>
<tr>
<td><em>PS-DAVID</em></td>
<td><em>Proleg.</em> 19,26-20,22</td>
<td>n.217</td>
</tr>
<tr>
<td><em>EPICRATES</em></td>
<td><em>In Athenaeus</em> 2.59d-f</td>
<td>n.420</td>
</tr>
<tr>
<td><em>EUCLID</em></td>
<td><em>Catoptrica</em> Arg. 2</td>
<td>n.410</td>
</tr>
<tr>
<td><em>Cato</em></td>
<td><em>Elements</em> 1, <em>Def.</em> 1</td>
<td>n.79; n.357; 1, <em>Def.</em> 2</td>
</tr>
<tr>
<td><em>EUSTRATIUS</em></td>
<td>in <em>An. Post.</em> 155.35-156.3</td>
<td>n.313; 202,17</td>
</tr>
<tr>
<td><em>GALEN</em></td>
<td><em>De tremor</em> 600.4-15; 602,10-12</td>
<td>n.486</td>
</tr>
<tr>
<td><em>Hippocrates liberum iii</em> epidemicarium commentarii iii</td>
<td>506.7-9</td>
<td>n.305</td>
</tr>
<tr>
<td><em>PS-GALEN</em></td>
<td><em>Def. Med.</em> 19.349.6-7</td>
<td>n.149</td>
</tr>
</tbody>
</table>
Index of Passages Cited

Rep. Bk. 4: n.569, n.580; 340E:
   n.327; 511C-D: n.58
Tht. 174E6: n.521; 185D-E: n.578;
   192A4; 194B5: n.547; 209C: n.574
Tim. 45B2-C2: n.491; 46A-C: n.492;
   60A6: n.71; 67D: n.151; 79A-80C:
      n.485; 90A2-B1: n.114;
      91E2-92A4: n.114

Plotinus
   Enneads 2.2.1: n.384; 3.8.3-4:
      n.504; 4.3.29.24-5; 4.4.19;
      4.8.8.16-23: n.546; 6.1.9.30-2;
      6.1.17.2; 6.3.1.17: n.369

Plutarch
   Mor. 1012D: n.105
Porphyry
   Commentary on Ptolemy’s
      Harmonics 15.1-5: n.570
   in Cat. 67,18-26: n.476; 73,22-7:
      n.129
   Isag. 6,6-11: n.21; 7,16-8,3: n.574;

Proclus
   in Euclid 109,22: n.410
Sextus Empiricus
   Adv. Math. 8.354,5: n.177;
      11.38,3-7: n.462
Simplicius
   in Phys. 261,15-17, 347,16-17: n.313
Soranus
   Gyn. 4.5.2,3-4: n.486
Themistius
   in An. Post. 50,19-28: n.215; 58,4:
      n.429; 63,15: n.579
Theophrastus
   HP 1.7.1.12: n.530
Wisdom of Solomon
   16:14: n.23
Xenocrates
   frs 60 (Heinz); 165-87 (Isnardi
      Parente): n.99
# Index of Names

References in this index are to the page and line numbers of the CAG text which appear in the margin of the translation.

<table>
<thead>
<tr>
<th>Name</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achilles</td>
<td>413,2</td>
</tr>
<tr>
<td>Ajax</td>
<td>413.3,7</td>
</tr>
<tr>
<td>Alcibiades</td>
<td>412,21; 413,3; 437,22</td>
</tr>
<tr>
<td>Aristotle</td>
<td>334,1; 349,16; 369,5; 373,7; 378,18; 382,3; 391,25; 396,14; 400,21; 422,11</td>
</tr>
<tr>
<td>Callias</td>
<td>438,12</td>
</tr>
<tr>
<td>Euclid</td>
<td>377,1</td>
</tr>
<tr>
<td>Helen (of Troy)</td>
<td>387,11; 389,24; 390,10</td>
</tr>
<tr>
<td>Hesiod</td>
<td>362,8</td>
</tr>
<tr>
<td>Homer</td>
<td>363,6; 373,9</td>
</tr>
<tr>
<td>Odysseus</td>
<td>363,7</td>
</tr>
<tr>
<td>Plato</td>
<td>338,32; 349,4; 373,7; 392,9; 402,23; 403,3,9; 411,7; 412,21; 435,7,29; 437,12</td>
</tr>
<tr>
<td>Socrates</td>
<td>338,32; 358,4.5; 373,7,20,24; 378,4.22,23; 381,34; 387,10-393,7; 400,35; 412,21; 435,6; 437,12,22</td>
</tr>
<tr>
<td>Sophroniscus</td>
<td>387,10-393,6</td>
</tr>
<tr>
<td>Speusippus</td>
<td>405,27; 406,16,31; 407,31</td>
</tr>
<tr>
<td>Xenocrates</td>
<td>348,2</td>
</tr>
<tr>
<td>Zeus</td>
<td>363,8; 383,19</td>
</tr>
</tbody>
</table>
This page intentionally left blank
Subject Index

References in this index are to the page and line numbers of the CAG text which appear in the margin of the translation.

account: a requirement for scientific understanding and demonstration, 439,23-4
includes but is not restricted to definition, 350,25-8
is correlated with a title, 363,5-10
unity of, 373,5-25
addition, 351,2-352,26
analogy, 418,35-419,21; 428,25-429,2
analysis, senses of, 335,6-336,2
anger, definitions of, 364,21-365,36; 373,13-374,17
animals: have faculty of perception, 434,3-6
art, 436,6-12
stochastic, 385,15-25
attributes, proper to genus, 402,2-19
begging the question, 347,25-348,30; 355,2-3; 356,8-357,9; 358,17-19; 366,13-15; 403,11-15; 404,12-13; 407,31-408,5
cause, all scientific questions investigate, 337,18-32
efficient, 375,26; 377,24-31; 381,18-36; 387,7-19; 397,12
final, 375,26; 376,10-12; 378,2-379,31; 381,18-385,36; 397,12
formal, 375,26; 386,20-387,5; 397,12
material, 375,26-377,1; 382,9-35; 387,7-19; 397,12
per se, 426,9-10
sometimes different, sometimes not different from effect, 371,4-17
whether there is one for a single effect, 426,5-428,23
cause and effect: consecutive coming to be of, 391,25-392,18
differently tensed entailment between, 388,4-389,35
entailment between, in cases of coming to be, 392,29-395,34
reciprocity of, 422,30-426,3; 429,4-432,22
temporal discontinuity of, 387,21-396,26
temporal order of, 381,18-36
variation in time of, 386,2-387,7
chance, 380,5-381,17; 384,32-5,13
clarity in definition, 415,2-416,11
coming to be for the most part: in such cases the middle term is for the most part, 396,19-397,8
coming to be, necessary and eternal: demonstrated by necessary, eternal middle term, 396,2-19
complete in all parts, 383,2-4
conversion: of definition and defined, 346,11-14
of accounts, 347,33-349,2
of terms, 346,32-347,3; 348,4-30
deduction (syllogism): not the same as demonstration, 341,9-34
definition: composite, 374,14-375,19
definition of, 372,8-9; 373,26-374,2; 375,2-8; 397,23-30
different from title, 363,4-14
discovery of, 370,17-24; 371,17-19
discovery of (for genera), 401,2-402,18
discovery of (for most specific species), 398,19-401,2
does not exist for what is not, 362,26-363,2
does not show it is the definition of the defined, 363,16-19
formal, 353,32-354,1; 364,16-366,18; 373,13-18; 374,3-6; 375,2-4
how to prove it is not open to criticism, 408,32-409,19
immediate, 397,25-6
indemonstrable principle, 371,22; 376,2-4
indicates cause, 368,30-2; 373,27-374,6
indicates substance, 358,12-13
is an explicit word, 377,19
made up of properties, 354,13-16
making sure its parts are in good order, 410,3-15
material, 364,16-375,8
nominal, 360,3-9; 362,20-8; 372,9-10; 397,24-5
of a method of investigation not employed in that method, 355,8-10
of simples, not composites, 375,17
of substances, 348,22-30
of syllogism not employed in syllogism, 355,8-10
of universals (not particulars), 414,8-17
principle of demonstration, 344,6-24
showing that all its parts fit the defined, 410,19-412,9
whether the same as demonstration, 341,12-34
demonstration: based on necessary and true premises, 366,21-2
continuous, 374,17-21
dialectical argument, relation to difficulties (aporiai), 345,26-32
dialectical problems, classification of, 409,21-9
dialectical syllogism, 366,13-20
differentia, first, 405,10-11
differentiae: predicated in what sort of thing the definiendum is, 400,21-9
use of division in leaving none out, 404,15-405,25
dissections, useful in determining causes, 417,6-17
division: does not beg the question when identifying parts of definition, 407,31-408,27
method of, 349,4-353,30
useful in determining causes, 418,8-11
usefulness in discovery of definition, 402,21-403,29
eclipse, solar, 337,24
lunar, 335,13-4; 336,24-6; 337,9-341,15; 343,9-22; 353,15-16;
equivalent, 411,4-141,6; 415,31-416,4; 426,31-428,24
experience, 436,2-5
fact, 336,4-338,10
a composite, 367,1-2
indicated by demonstration, 345,2; 360,27-8
fact and reason why: whether known at the same time, 369,20-4
faculties of soul: rational divided from irrational, 438,25-7
form, 365,15-16
generation, cyclical, 395,6-34
genus: distinguishing from equivocal term, 412,11-414,6
nameless, 399,32; 400,25-6; 404,7; 409,12-25; 418,17-25
proving the first term to be, 409,24-410,8
hypothesis, 354,7-13
hypothetical syllogism, definition not proved by means of, 356,8-358,20
if it is, 336,4-338,13
established by demonstration, 360,15-6
known together with what it is, 368,21-369,11
Iliad, 373,7-11
imagination, 435,7
impression, 434,6-21
imprint, 437,15-19
individuals: as basis for investigating definition, 414,18-34
indivisible in species: distinguished from indivisible in number, 400,32-5
induction, 438,20-4
cannot be used to prove definition, 358,22-359,8
proof by, 349,25-8
intellect: knows principles, 439,26-9
potential, 439,3
practical, 439,3-7
knowing all things: not necessary for the divider, 405,27-407,29
knowledge, from accidents, 372,24-5
of a thing from essential attributes, 367.27-368.15
of reason why (determined by knowledge of if it is), 368.17-27
of what it is (at same time as knowledge of if it is), 368.21-2
of whether it is (from accident), 368.6-15
partial, 338.2-13
vague, 367.7-8; 368.17-24
luck, 380.5-381.17; 385.13-31
metaphor: to be avoided in definitions, 416.13-31
middle term: and the cause, 337.29; 338.13-19; 369.22
employed in syllogism, 346.7-9
first, 429.33-430.7
investigation concerns, 340.1-12
motion: circular, 387.29-30
rectilinear, 387.30-388.2
necessary, senses of, 384.21-31
objects of investigation, 336.4-338.13
composite or simple, 339.1-2
percept, 437.15-20
perception: apprehends universal as well as particular, 437.27-31
doesn’t prove a definition, 359.8-11
found in all animals, 434.3-4
postulate, 408.11-14
premise, immediate, 392.20-1; 393.30-1
principles: cannot be possessed while unaware of them, 433.15-21
more known than conclusions, 439.18-21
not innate, 433.27-33
problems: composite, 338.2-13
distinguished from conclusions, 336.4-11
kinds of, 336.4-32
sameness of, 419.24-422.27
proof, circular, 395.11-13; 423.4-5
property: expressed by definition, 346.9-11
reason why, 336.4-339.35
as composite, 367.1-2
rout, metaphor of, 436.22-437.2
sign-deduction, 424.20-4
sign-demonstration, 386.30-1
simple term, 337.5-7; 338.15-20
simples, as most specific species, 402.12-19
‘if it is’ investigated for them, 336.20-337.7
skipping, 351.2-352.27
species, most specific, 400.32-403.1; 406.11; 409.7-9; 411.14-414.17;
417.31-418.1; 431.26-7; 437.11-15
substance: dianoetic, 338.32-3
indicated by definition, 343.24
intelligible and perceptible, 338.31-2
subtraction, 351.2-352.27
that it is: established by demonstration, 360.15-361.25
thunder, 353.16-7; 368.7-9; 369.30-1; 370.10; 371.10; 374.14-24;
383.14-20
title of the book, 334.20-336.2
undifferentiated in species, 437.11-15
universal: as common nature, 437.19-20
assembled, in the case of some animals, 435.12-35
comes from perceptions’ making a stand, 438.8-14
converting, distinguished from nonconverting, 430.20-3
destruction of knowledge of, 436.31-4
knowledge of, 340.14-24
primary, 430.25-431.20
what is not: has no definition, 359.16-360.9; 362.29
what it is: as object of investigation, 336.4-339.35
cannot be known without knowing whether it is, 366.25-367.2
established by definition, 360.15-16
indicated by definition, 345.1-2
investigated in the case of simples, 369.11-12
known with if it is, 368.21-2; 369.1-3
same as reason why, 339.19-341.7
whether it is, accidental grasp of, 367.4-29
word: by convention, 372.29-373.3
is an implicit definition, 377.19