CHAPTER 1

The unity, structure, and boundaries of Aristotle's science of nature

INTRODUCTION

> Asked to what end one should choose to live, Anaxagoras replied *"to study the heaven and the order of the whole cosmos"* (Aristotle, *EE* 1216 a 12–14 = *DK* 59 A 30).

Aristotle is not merely concerned with solving a list of problems or discussing a certain number of topics. He is engaged in an ambitious project of investigation. This project consists in an attempt to establish the right sort of connections – explanatory connections – between the things of the world. If this investigation is successful, it not only provides us with knowledge, but it gives us understanding of the world. The investigation of the natural world is no exception to this rule. Aristotle has left a certain number of *logoi*, each of which is a relatively independent and sufficiently self-contained argument devoted to a particular topic or problem.[1] But there is no doubt that these *logoi* are conceived as parts of a unitary project of investigation. There is also no doubt that Aristotle has a certain understanding of the relations between these parts. This understanding is strongly dependent upon a specific conception of the natural world and the substantial assumption that this particular department of reality is, at least to some extent, intelligible to us. More directly, Aristotle is persuaded that the natural condition for human beings is to know and understand the truth, and that we can know and understand a lot about the natural world if only our investigation is conducted in the appropriate way. But he is also aware that there are features of the natural world that we cannot adequately explain. I postpone discussion of this interesting tension.[2] For the time being, I would like to focus on the way Aristotle presents his inquiry into the natural world in the opening lines of the

1 For helpful comments on this point see Lang (1992: 2–13 and 1998: 3–33).
2 Chapter 4, "The limits of Aristotle's science of nature."

Meteorology. It is my intention to show that this presentation is not neutral with respect to a certain conception of the natural world. A better grasp of this conception will enable us to understand why Aristotle conceives of the study of the sublunary and the celestial world as forming a single science: the science of nature or natural science. A full appreciation of this conception will also help us to understand the precise sense in which Aristotle's science of nature is a distinctly organized investigation of the natural world. Aristotle does not think of the science of nature as a collection of loosely connected, if not disconnected, investigations. On the contrary, the investigations listed at the beginning of the *Meteorology* are distinct but related. Moreover, a close scrutiny of the opening lines of the *Meteorology* shows that these investigations are related in a certain way. I shall argue that the causal relation that holds together the different parts of the natural world provides us with the conceptual resources to understand the precise sense in which several distinct natural investigations are unified and integrated into a single science.

ARISTOTLE'S INVESTIGATION OF NATURE

What follows is a partial translation of the prologue to the *Meteorology*:[3]

(1) Earlier we discussed the first causes of nature, and natural change in general; (2) also the stars ordered according to their motion, (3) and the bodily elements, <establishing> their number, nature, and mutual transformation, (4) and generation and perishing in general. (5) There remains to be considered a part of this investigation which all predecessors have called meteorology (*meteōrologia*). <This part is concerned with> that which happens naturally, but with an order that is less perfect than that of the first element of bodies, and which takes place in the region nearest to the motion of the stars. Such are the Milky Way, the comets, and the movements of meteors. <It studies> also the affections we may call common to air and water, and the kinds and parts of earth and the affections of its parts. These throw light on the causes of winds and earthquakes and all the consequences the motions of these kinds and parts involve. Of these things some

3 This passage not only contains a recommendation regarding the order of investigation of the natural world but also establishes the relevant relationships among the different natural writings. I limit myself programmatically to discussing this passage as containing a recommendation regarding the order of investigation of the natural world. For a recent study of the opening lines of the *Meteorology* as evidence for the relationships that hold among the different natural writings, I refer the reader to Burnyeat (2004: 7–24). Lately Myles Burnyeat has been advocating the view that Aristotle is a systematic philosopher in the sense that he holds strong views about the appropriate order of learning and study. The reader who is interested in this topic should read Burnyeat (2001) and Burnyeat (2002: 28–90).

puzzle us while others admit of explanation in some degree. Further, <this inquiry is concerned with> the falling of thunderbolts, whirlwinds and fire-winds, and further, the recurrent affections produced in these same bodies by concretion. (6) Once we will have dealt with these things, we will consider whether we are somehow able to give, in accordance with the method indicated, an account of animals and plants, both in general and separately. (7) Once this is discussed, perhaps the whole of what we established at the outset will be complete (*Meteor.* 338 a 20 – 339 a 9).[4]

Aristotle is about to engage in a new study – meteorology, *meteōrologia* – and finds it important to begin by placing this study within his larger project of inquiry into nature. Why? The phrase *ta meteōra* was commonly used to refer to the totality of the phenomena which take place in the sky, including the celestial ones.[5] This explains why Aristotle cannot take it for granted that people understand what *he* means by *meteōrologia*, but rather has to establish the place that this study occupies in his larger project of investigation of nature. By so doing, however, he offers some information about the project in which he is engaged and the way he conceives of it.[6]

4 For a vindication of the authenticity of this prologue see Cappelle (1912: 514–35).

5 Anaxagoras was commonly regarded as the champion of this sort of study. In the *Phaedrus* we are told that Pericles learnt from him "high speculations about <what is high in> nature" – *meteōrologia physeōs peri* (269 C – 272 B). More explicitly, Pericles learnt from Anaxagoras speculations about what is high in nature; that is speculations about *ta meteōra*. But the speculations about *ta meteōra* are also high-flown speculations of little use in life. Concern about *ta meteōra* is a prominent feature in Aristophanes' portrait of Socrates in the *Clouds*. See *Clouds* 225–35. In saluting Socrates, the Clouds say that they would not listen to any other of the *meteōrosophistai* of the time except Prodicus. See *Clouds* 358–60. The *meteōrosophistai* are the teachers of what is high in nature but also of superfluous accomplishments (both *ta meteōra* and *sophistai* have a double meaning in this case). Such hostility to the study of *ta meteōra* was not uncommon in the fifth and fourth centuries BCE. This study was regarded as useless and obscure; the thought was that it did not deliver results because *ta meteōra* are beyond the grasp of human cognitive capacities. The Hippocratic author of *On Ancient Medicine*, for example, contrasts his expertise with "the study of the things in the sky and below earth" (*VT* I 3.7). In this study, it is not clear either to the speaker himself or to his audience whether what is said is true or not, since there is no criterion to which one should refer to obtain clear knowledge (*VT* I 3.8–10). For an exhaustive discussion of the usage of the phrase *ta meteōra* in the fifth and fourth centuries BCE, see Cappelle (1935: 315–58).

6 In clause (5) Aristotle provides the agenda of meteorology. This consists of a list of phenomena that meteorology is expected to discuss. This is clearly part of an attempt to revise the received conception of the discipline. At any rate, Aristotle was not completely successful in his attempt to revise the view that *ta meteōra* are the totality of the phenomena that take place in the sky. Both in the Hellenistic and in the post-Hellenistic tradition the phrase *ta meteōra* continued to be used for all the phenomena that take place in the sky, including the celestial ones. It is significant, I think, that Theophrastus felt the need to change the name of Aristotle's discipline from meteorology to metarsiology – from *ta metarsia* – precisely in order to avoid the ambiguous reference to *ta meteōra*. On this terminology and what it implies, see Cappelle (1913: 321–58).

There is no doubt that Aristotle's investigation is carefully structured: it begins with an examination of the first causes of nature and natural change in general, continues with a study of the celestial region, and ends with an investigation of the sublunary world, including a study of plants and animals. The examination of the first causes of nature and natural change in general – clause (1) – is a compressed but precise description of the content of the *Physics*.[7] By dealing with nature and change, the *Physics* provides a foundation for the entire investigation of the natural world.[8] The language is specifically designed to insist on the generality of the *Physics*. By saying that the *Physics* is concerned with the *first* causes of nature and change *in general*, Aristotle makes it clear that the *Physics* provides the explanatory resources and the principles for a sensible investigation of the natural world. But does the *Physics* provide *all* the explanatory resources and *all* the principles for *all* natural investigations? The answer is emphatically no. *PA* 1 is a relatively self-contained and independent *logos* devoted to developing principles that are specific to the study of animal nature. If the *Physics* provided all the explanatory resources and all the principles that are necessary for a sensible study of animal nature, there would be no need of a specific introduction to the study of animals.[9] It is significant, I think, that the opening lines of the *Meteorology* leave it open whether the study of animals and plants can be exhaustively conducted in accordance with the method indicated – clause (6).

7 In late antiquity it was generally agreed that Aristotle's *Physics* consisted of two parts. According to Philoponus and Simplicius, Aristotle and his pupils referred to the first four *logoi* of the *Physics* as *ta peri archōn*, and to the last three *logoi* as *ta peri kinēseōs*. Simplicius informs us of the existence of another division: the first five *logoi* were thought to form *ta peri archōn*, and the last three *ta peri kinēseōs*. The prologue to the *Meteorology*, and in particular the description of its contents as an examination of (i) the first causes of nature, and (ii) natural change in general, may have encouraged the division of the *Physics* into two parts. But there is no reason to think that this division goes back to Aristotle. On this point see Brunschwig (1991: 11–39) and Barnes (1997: 1–69). See also Pellegrin (2003: 265–71).

8 Myles Burnyeat would say that the *Physics* provides a "conceptual foundation" for the study of nature. See Burnyeat (2004: 19–20).

9 On *PA* 1 as a *logos* devoted to establishing methodological standards for the study of animal nature, see Lennox (2001a: 133–43). A discussion of the way in which *PA* 1 does not only specify but also builds on the general account of nature offered in the *Physics* goes beyond the scope of the present study. I refer the reader to Code (1997: 127–43). This article contains a discussion of the way in which *PA* 1 completes the general account of causality offered in the *Physics*. In *Phys.* 2 Aristotle is not content to present his general account of causation and discuss how luck and chance fit it. The final section of *Phys.* 2 is devoted to explaining why nature (together with thought) is a final cause, and what place necessity has in the study of nature. However, the discussion offered in *Phys.* 2 is only partial, and Aristotle returns to this topic in *PA* 1. It is only in *PA* 1 that Aristotle argues for the methodological priority of the final over the moving cause.

The study of animals and plants comes at the end of the program of investigation. Once an account of animals and plants is offered, perhaps the investigation of nature will be complete – clause (7). At least two things are to be noted here. First of all, we only have a study of animals, and perhaps Aristotle has left only a study of animals. His references to works on plants are always impersonal and could be referring to the work of a Peripatetic colleague such as Theophrastus.[10] Secondly, and more importantly, Aristotle presents the study of animals as a part of the science of nature. This is confirmed by what Aristotle says in *PA* 1, the official introduction to the study of animals. There Aristotle presents the study of animals as "an inquiry into nature" (639 a 12). He describes this study as "a theoretical <science> concerned with nature" (640 a 2, 641 b 11), and as "an investigation of nature" (644 b 16). He says that "the inquirer into nature" is concerned with both the soul and the matter, but more with the soul (641 a 29–30). Finally, he wonders whether the whole soul, or only a part of it, is the province of "the <science> of nature" (641 a 33–4). This language is mildly surprising, especially if one considers that in *PA* 1 Aristotle concerns himself, by his own admission, solely with animal nature (645 a 5–6). Why does Aristotle insist on nature if his focus is animal nature? Aristotle conceives of the study of animals as a specific investigation. For him, the relevant explanatory principles are to be biologically specific in order to provide an adequate explanation of animal life. In the end, the investigation of animal nature requires a reference to a soul of a specific type as form, and to a living body of a specific type as matter. At the same time, Aristotle wants to disabuse us of the view that the study of animal nature is an independent investigation. In other words, the specificity of the study of animal nature does not involve a denial of the explanatory unity of the science of nature.

Since Aristotle speaks of animals and plants, he obviously regards the study of animals as a discrete investigation. He is persuaded that we are able, at least in principle, to draw a line between animals and plants: animals have a share in cognition; plants do not. Here is how Aristotle makes this point in *GA*:

> The function of an animal is not only to generate, which is in fact common to all living beings; in addition, all animals partake in a form of cognition [*gnōsis*], some more, some less, some very little indeed. For they have perception [*aisthēsis*], which is a form of cognition . . . it is by perception that animals [*zōia*] differ from merely living beings [*zōntōn monon*] (*GA* 731 a 30–5 and 731 b 4–5).

10 I owe this point to Jim Lennox.

For Aristotle, plants are merely living beings, *zōnta*; but they are not *zōia*, because they have no share in perception, which is a form of cognition. Aristotle is clearly reacting to a certain tendency to connect the name *zōion* with the verb for living and being alive, *zēn*. From Plato's *Timaeus*, for example, we learn that everything that partakes of life, whatever it might be, can be rightly named *zōion*, "living being" (*Tim.* 77 B 1–2). The connection between the name *zōion* and the verb *zēn* explains why in the *Timaeus* plants are introduced as a second class of *zōia* alongside men (*Tim.* 77 A). Plants are recognized as *zōia* because they are living beings (*Tim.* 77 A). I shall return to the ambiguity of the name *zōia* in due course. For the time being, suffice it to say that the term *zōia* can be used to refer to all the living beings that there might be, including plants.[11] The fact that Aristotle normally uses the term *zōia* to refer to animals, to the exclusion of plants, is ultimately due to his conviction that animals are a distinct class of living beings, and animal life is a form of life different from plant life. Later on I shall argue that the *DA* provides the explanatory resources and the conceptual framework for an optimal study of animal life. For the time being, I am content to say that the first yet crucial step for an optimal study of animal life is an argument for the view that animals are a distinct class of living beings. It is precisely by relying on the results achieved in the *DA* that Aristotle can restrict himself to a study of animals and set aside a study of plants.[12]

But how does Aristotle conceive of the study of animals? Jim Lennox has recently drawn attention to the cross-references within *HA*, *PA*, *GA*, and *IA*. He has shown, to my mind successfully, that these works are all parts of a single, unified investigation. He has also shown that this single, unified investigation displays a definite structure of a certain type. Put differently, Aristotle credits the study of animals with unity, structure, specificity, and discreteness, but he does not recognize this study as an independent investigation.[13]

11 But it would be a mistake to think that the term *zōia* is ambiguous only between (1) *all living beings*, including *plants*, and (2) *animals*, to the exclusion of *plants*. In the *Timaeus* the name *zōion* is attributed to any living being that there might be, including any living being superior to man that there might be. Stars are recognized as *zōia*, on the crucial assumption that they are alive (*Tim.* 39 A; 39 E); moreover, the sensible world as a whole is a *zōion* (*Tim.* 30 B). I owe this clarification to Michael Frede.

12 Cf., for example, *PN* 467 b 4, 468 a 31, 442 b 25, and *GA* 716 a 1, 783 b 20.

13 J. G. Lennox, "The Place of Zoology in Aristotle's Natural Philosophy," presented at the Classical Philosophy Colloquium, Princeton, December 1–2, 2001. A revised version of this paper was given as the Keeling Lecture in the fall of 2003 and is now published in Lennox (2005: 55–71). Lennox rightly says that "this structure has nothing to do with the order in which the actual investigations were done nor with the order in which works were written" (57). The reader is expected to go

PA 1 confirms the idiosyncratic way in which Aristotle conceives of the study of animal nature. In this *logos* Aristotle insists not only on the unity of the science of nature but also on its structure, placing the study of animal nature *after* the study of the celestial substances:

> since we have already dealt with those substances [= the celestial substances], saying what appears to be the case to us, it remains to speak of animal nature, trying to omit as far as possible nothing, however noble or ignoble it may be (*PA* 645 a 4–7).

We may or may not believe that this passage is reminiscent of the beginning of the *Meteorology* (this is, in fact, open to debate), but there is no doubt, I think, that the study of animal nature is regarded as part of a larger inquiry, itself structured in a specific way.

THE PLACE OF THE STUDY OF THE CELESTIAL WORLD IN ARISTOTLE'S INVESTIGATION OF NATURE

From the opening lines of the *Meteorology* we learn that the study of animals and plants comes at the end of a large and ambitious program of investigation. But why does it come *at the end* of this program? There is no doubt that certain conceptual resources are presupposed in the study of animals. For example, since animals and plants are perishable beings, we have to be clear about the nature of perishing. We have to know, in particular, that perishing is a case of going out of existence rather than a case of becoming something else. This helps us to understand why an investigation of generation and perishing is mentioned at the beginning of the *Meteorology* – clause (4) – and why this investigation comes before the study of animals and plants – clause (6). This investigation is conducted

through these writings in a certain order. A discussion of this order is not immediately relevant to the present discussion. I am content to claim that the reasons for this order are to be found in *PA* 1, both in the distinction Aristotle here makes between gathering the data and providing causal explanations (639 b 8–10), and in his defense of the primacy of the final (formal) principle over the moving principle (639 b 15 – 640 b 5) and the material principle (640 b 5 – 641 a 17). For example, the study of the moving principle and the parts that are functional to reproduction (*GA*) comes *after* the study of the other bodily parts (*PA*). Aristotle provides a reason for this order at the very beginning of *GA*: the final (formal) principle comes *first*, and the material and the moving principle occupy *second* and *third* place respectively (715 a 4–6). There is no doubt that the reader of *GA* is expected to be already familiar with *PA* 1 and with the arguments that Aristotle offers there for the primacy of the final (formal) principle over the moving principle. On the relationship between the *PA* and the *GA*, see also Code (1997): "we need to know in a detailed way how and why the *ousia* is the way it is before we can account for the way in which the efficient cause operates. Knowledge of the efficient causes by means of which animals are generated is posterior to knowledge of their final causes" (143).

in the *GC*.[14] It is significant, I think, that some familiarity with this treatise seems to be presupposed on the part of the reader of the *DA* and the biological treatises.[15] This does not explain, however, why the study of the celestial region comes before the study of animals and plants. The *Meteorology* is nevertheless crystal clear on this point: the study of the stars ordered according to their motion occupies second place in the inquiry into nature and comes before the study of any aspect of the sublunary world – clause (2).[16] At first sight, this is a little surprising. There are two, if not three, good reasons to expect the study of the sublunary world to precede, rather than to follow, the study of the celestial world. To begin with, Aristotle admits that the study of the celestial world is more difficult, and that our grasp of the celestial bodies is slight, especially if confronted with what we can know about <plants and> animals (644 b 32 – 645 a 7). In addition, Aristotle insists on the existence of similarities between the celestial and the sublunary world, and claims that these similarities play a significant role in the study of the celestial world. Finally, at one point he even says that the study of <plants and> animals offers in exchange a certain grasp of the celestial bodies (645 a 3–4).[17] Why, then, should this study come after, rather than before, the study of the celestial world?

It is not difficult to find a first, tentative answer to this question. Aristotle is not the first thinker to engage in an investigation of the natural world in its entirety. At the time there was an already established tradition of inquiry into nature, which is registered and transmitted by Plato in the *Timaeus*. According to this tradition, the student of nature was expected to put all natural explanations into the context of an overall narration whose order of topics is *first* the heavens, *then* the elements, and *finally* the living beings.[18] There is no doubt that this is exactly the order

14 On the *GC* as a study of generation and perishing in general and its foundational character for the sublunary science of nature, see Burnyeat (2004: 7–24).

15 Aristotle seems to refer to the *GC* at *DA* 417 a 1–2, 423 b 29; *PA* 640 a 9–10, 646 a 15, 645 b 9–11.

16 *PA* 1 confirms that the study of animal nature comes after the study of the celestial bodies (645 a 4–5).

17 Here I follow Düring and his interpretation of the difficult *antikatalattetai* in 645 a 3. Cf. Düring (1943: 120).

18 Strictly speaking, the *Timaeus* does not provide an investigation of the natural world in all its aspects. Plato is remarkably shy about animals and plants. However, this is to be understood in the light of the fact that the *Timaeus* is programmatically an account of "the all" down to the generation of "man" (see, for instance, 90 E 1–3). Once an investigation of the human body (pathology and anatomy included) is offered, the program is completed. In spite of this programmatic restriction, there is no doubt that the *Timaeus* consists of a general, unified account of the natural (better: sensible) world in terms of which all the natural phenomena can be, at least in principle, explained.

that Aristotle follows in the opening lines of the *Meteorology*. However, if we want to understand why Aristotle insists on speaking of inquiry into nature, and indeed places the study of animals after the study of the celestial world, we cannot be content with a generic appeal to the pre-Platonic tradition of inquiry into nature. Aristotle routinely presents himself as continuing the tradition of the *physiologoi*. At the beginning of the *Physics*, for example, Aristotle puts himself in direct continuity with this tradition, and makes his own position grow out of the opinions and results achieved by his predecessors. But his position is not merely the culmination or perfection of this venerable tradition. It is a dramatically new position.

I would like to make a fresh start from a well-known Aristotelian "slogan": "it takes a man to generate a man."[19] Among other things, this slogan is designed to point to the fundamental fact that the generation of a man can be understood only in the light of the nature of the man. However, a slightly revised version of this slogan can be read in the *Physics*: "it takes a man *and the sun* to generate a man" (194 b 13). Interestingly enough, the revised slogan occurs also in *Lambda*. From *Lambda* we learn that the explanatory factors involved in the generation of a man are earth, water, air, and fire, a particular form of organization as the goal of the generation, the father, and finally the motion of the sun around the ecliptic (1071 a 11–17). In this compressed text, Aristotle is doing several things at once.[20] Among other things, he is trying to establish the explanatory role that both the father and the sun have in the generation of a man. Notoriously, Aristotle admits a plurality of explanatory principles: material, formal, final, and moving principles. According to him, both the father and the sun are moving principles, but they are related to the man in different ways. Father and son are the same in form; more precisely, the father is in actuality what the earth, water, air, and fire that will become the man are potentially.[21] The sun, unlike the father, is a moving principle of the man without being the same in form. It is a moving principle – or better, a remote moving principle – through its characteristic motion around the ecliptic; by so moving it indirectly secures the continuous generation of man from man, and hence the eternal permanence of the species.

19 From Bonitz (1870) we learn that this slogan occurs at *Phys.* 193 b 8, 198 a 26, 202 a 11; *GC* 333 b 7; *PA* 640 a 25, 646 a 33; *GA* 735 a 21; *Metaph.* 1032 a 25, 1033 b 32, 1049 b 25, 1070 a 8, b 34, 1092 a 16.

20 For a close discussion of this text in its context see Code (2000: 161–79).

21 A complication: from *Theta* 7 we are told that earth, water, air, and fire are not potentially the man (1048 b 37 – 1049 a 1).

I have insisted on the slogan that it takes a man and the sun to generate a man because I am convinced that this slogan sheds some light upon a substantial assumption that Aristotle makes about the character of the natural world. First of all, Aristotle is persuaded that the natural world is an arrangement or organization of a certain kind; that is, a certain kind of *cosmos*. Secondly, and more importantly, Aristotle thinks of this *cosmos* as a unified whole – in Greek *holon*. The parts of this unified whole are causally related to one another in a certain way. The celestial and the sublunary world are related to one another in such a way that the celestial world acts on the sublunary world. More specifically, the outer part of the sublunary world is immediately in contact with the lower part of the celestial world.[22] On Aristotle's account, what acts on something is normally affected by it. But this particular case represents an exception to the rule. The celestial world acts on the sublunary world but it is not affected by it. Why? For Aristotle, reciprocal action takes place only when the matter is the same (324 a 34–5).[23] The celestial and the sublunary world are not the same in matter. I postpone discussion of this crucial aspect of the theory to the following chapters. For the time being, I am content to say that Aristotle is famously committed to the view that the celestial world is made of a body which has the capacity to perform circular motion but does not have the capacity to be affected by anything: the so-called fifth body or fifth element.[24] By simply performing its characteristic circular motion, this particular body has an influence on the living and non-living beings populating the sublunary region.

22 Remember that Aristotle does not believe in action at a distance; under the appropriate circumstances A acts on B if, and only if, A is immediately in contact with B, or A is in contact with some suitable medium C which, in turn, is in contact with B.

23 Aristotle's notion of matter cannot be reduced to the notion of material out of which something is made. From *Zeta* we learn that matter is that which is capable of being and not being (1032 a 20–1). From *Lambda* we learn that matter is that which has the capacity for both <contraries> (1069 b 14–15). Finally, from the *GC* we learn that matter, *qua* matter, is capable of being acted upon (324 b 19). It is by resting on the last passage that Aristotle can claim that:

1. Of the things that can act on something else, those of which the form is not in matter cannot be acted upon (324 b 5–6).
2. Of the things that can act on something else, those of which the form is in matter can be acted upon <provided that the matter is the same> (324 b 6).

24 But Aristotle never makes use of the expressions "fifth element" or "fifth body." He also refrains from using the name *aithēr* to refer to the simple celestial body. In the *DC*, Aristotle is content to register that *aithēr* is the traditional name for the upper part of the world (270 b 20–1). It is unfortunate that Aristotle's reticence in using *aithēr* is not appreciated enough. The fact that Aristotle avoids this word is often overlooked, if not obscured and denied, by routinely referring to Aristotle's celestial simple body as *aithēr*. I shall return to Aristotle's language in the Epilogue.