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Aristotle on Mind and the Science of Nature

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On the basis of two premises to which he is committed, it would seem that Aristotle must be a "naturalist" about the investigation of the soul:

1. Natural things have both a material and a formal nature.
2. In the case of living things, their formal nature is their soul.

This paper deals with a complication in the above inference. In *De partibus animalium* I 1, Aristotle insists that the natural scientist should *not* speak of all soul, since not *all* of the soul is a nature, though one or more parts of it is (641b8–9). In this paper I argue that this claim is consistent with everything he says in the *De anima* about the investigation of reason, and is a consequence of his views about the methodological norms of natural science. Aristotle is a naturalist when it comes to those parts of the soul human beings share with other animals, but his views about the mind are much more complicated.

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1. Introduction

> Taking up a starting point of the inquiry, we say that what is ensouled is distinguished from what is without soul by being alive. But since being alive is spoken of in a variety of ways, we say something is alive if only one of the following is present—reason, perception, movement and rest in place, and again the movement involved in nutrition and decay and growth.
>
> (*De an*. II 2 413a20–25)

At the beginning of the *Meteorology*, Aristotle recites an appropriate course of study for an investigator of nature (338b20–339a10) in order to locate the investigation of meteorological phenomena. For my topic today two things are significant about this recitation: [i] the *De anima*, the investigation of the soul, is not mentioned, and [ii] the course of investigation of nature is said to culminate in a study of animals and plants. It is often assumed that the investigation of the soul reflected in the *De anima* is directly implied by the claim that the study of nature is completed when we have concluded our investigation of animals and plants. That is a rash assumption. The lack of mention of an investigation of soul in this recounting of the course of natural inquiry reflects a tension at the heart of Aristotle's philosophy of nature.

2. Souls and Natures

There seems to be an undeniable inference from premises Aristotle clearly and repeatedly endorses to the conclusion that an animal's soul constitutes a part, and the most important part, of its nature, in which case it is obvious that it is an object for the natural scientist to study. The premises are:

1. Natural things are natural in virtue of two natures, their form and their matter, and nature as form is more nature that nature as matter (*Ph*. II 1 193a28–30; II 2 194a12–13; II 8 199a30–32).

2. In the case of living things, their soul is their form (*De an*. II 1 412a19–20) From which it follows that:

3. The souls of living things are their natures in the sense of their forms. And as we shall see when we turn to *PA* I 1, Aristotle straightforwardly asserts this conclusion, so *we* needn't infer that he believes it.

Aristotle is thus, by his own account, a naturalist when it comes to the study of the soul; it is an object for the natural scientist to investigate. As Myles Burnyeat put it in a recent paper on *De anima* II 5: "His [Aristotle's] psychology is designed to be

the crowning achievement of his physics."[2] Ah, but with Aristotle, life is never simple. This paper deals with a complication in the above inference.

In *De anima* I 1 (403a27–8) Aristotle tells us that the study of the soul — *either of all of it or of the sort being considered* (he has been discussing emotions)[3] — is within the domain of the natural scientist. In *De partibus animalium* I 1 he begins with the same disjunctive uncertainty (641a17–18, a23), but concludes that the natural scientist should *not* speak of all soul, since not *all* of the soul is a nature, though one or more parts of it is (641 b8–9).

These passages raise important questions about the status of a theoretical investigation of the soul. Aristotle discusses only three types of theoretical science: the science of nature, mathematics, and first philosophy. If only *part* of the soul is to be investigated by the natural scientist, who is to investigate the remaining part or parts?[4] And if distinct parts are examined by different theoretical sciences, this appears to call into question the unity of the investigation of soul. Let's look at the two passages that create this tension.

3. *De anima* I 1

Famously, the *De anima* opens with praise for the inquiry into the soul (τῶν περὶ τῆς ψυχῆς ἱστοριῶν). Knowledge of beautiful and honorable things can be ranked normatively in terms of either their accuracy or the intrinsic value of their objects. On either count, Aristotle tells us, it is with good reason that the inquiry into the soul is placed in the first rank. He claims that such an inquiry contributes greatly to all truth,

[2] Burnyeat, 2003:36. Burnyeat cites the opening of *Meteorology* I 1 in defense of this claim, but, while the study of animals and plants is mentioned at least as the completion of the study of nature there outlined, a study of the soul is not mentioned. Compare: "Aristotle introduces *De Anima* by suggesting that the study of the soul or psychology is part of the study of nature in general. Indeed, one of the reasons for studying the soul is that it contributes greatly to our understanding of nature. The reason for this is that the soul is like a principle of animals." (Johansen, *Aristotle on the Sense-Organs*, Cambridge, 1997:7–8). But notice that saying that the study of soul contributes greatly to understanding nature does not imply that it is part of the study of nature. In fact since Aristotle could simply have said that, the fact that he didn't suggests that there is an interesting problem in seeing psychology as part of physics. The view finds its way into contemporary philosophy of mind: "In Aristotle's conception of human beings, rationality is integrally part of their animal nature ... What makes this possible is that Aristotle is innocent of the very idea that nature is the realm of law and therefore not the home of meaning" (John McDowell, *Mind and World*, 109).

[3] Aquinas (Pasnau, 1999:17) assumes Aristotle means "ones attached to a body"; but it seems almost trivial, given Aristotle's starting position, to say that those aspects of the soul attached to the body are in the domain of the natural scientist. By "of such a sort" I suppose he means the sort just discussed, any that are relevantly like the *pathê*, properly defined only by referring both to material changes undergone and a psychological state characterized teleologically — e.g. boiling of the blood due to a desire for revenge.

[4] Philoponus (see *CAG* 15 [*in De Anima*], 10, 10–27, 25, 9–17, 55, 8–14) wildly over-interprets the *PA* I 1 passage to be assigning the study of the intellect to first philosophy. Had it done so, my task here would be easier.

but especially truth related to nature. He justifies this last thought by saying that the soul is ... well, what precisely *does* he say that it is? The Greek is:

ἔστιν γὰρ οἷον ἀρχὴ τῶν ζῴων

Translators have struggled:

> Ross paraphrases: "since soul is the inner principle of animal life".
>
> Hamlyn takes οἷον a bit more seriously: "for the soul is *as it were* the first principle of animal life".
>
> Hicks translates: "the soul being *virtually* the principle of all animal life".
>
> Irwin and Fine take a minimalist approach: "*a sort* of principle of animals".
>
> Johansen does as well: "the soul is like a principle of animals".

Among these various renderings, Johansen and Irwin and Fine acknowledge the plural, τῶν ζῴων, and their deflationary translation of οἷον ἀρχὴ, "like a principle", "a sort of principle", is also a precise reflection of the Greek lacking in the other translators. Hicks supports his expansive translation by appealing to an passage in book II, when Aristotle argues that the soul is a principle and cause of the living body (415b8–416a18; Hicks 1907 176). But given the long and daunting list of open questions Aristotle is about to review in this opening chapter, it is implausible to think he is here stating a theorem to be proven later. Shortly I will suggest that his wording at this point is intended to leave options open that will eventually be under critical consideration.

The desire to leave options open may well extend to the term that all the above translators suppose refers to animals. In his recent book, Andrea Falcon notes (Falcon 2005 6 & n.11; and see Hicks 1907 184 402b4n.) that in the *Timaeus* Plato had already defended the use of the term τὸ ζῷον to refer to plants (77a5–6) as well as to beings superior to animals and humans, and earlier had used it to refer to the perceptible cosmos and the stars (38e7, 39e1–2). In reading the opening lines of *De anima* Falcon reminds us of this to support reading the term here with an "open" reference, not restricted to animals. In these opening remarks, all Aristotle is insisting on is that, whatever things turn out to be "ensouled" once the dust clears, soul will be rightly venerated as an object of investigation because it will be, *in some way or other*, a *principle* relative to those things. Thus the stress that all the above translations put on *animal* life may not be justified, even though Aristotle often uses this term to contrast animals with plants, and even sometimes (*GA* II 1 732a1–2) with humans. It is worth recalling that the *De caelo* insists a number of times that the heavenly spheres are ensouled (e.g. *Cael.* II 2 285a29–30; 292a20–22[5]), and of course Aristotle's unmoved mover is a necessarily active living thing, thought that has its own activity as its object.

[5] In fact the latter passage states that "it is necessary to suppose that they (the spheres of the stars and planets) participate in action and life".

My preference for the Irwin/Fine and Johansen translations of οἷον ἀρχὴ stems from the fact that I see this phrase as a way of *not* insisting that soul is *the* principle (let alone the *inner*, or *first*, principle) of living things. In fact the Greek phrase minimizes Aristotle's starting commitments in *two* ways: by leaving room for more than one principle and by leaving the sense in which it *is* a principle open.

A non-question-begging translation suitable to its place in this introductory passage, then, is "for the soul is a sort of principle of living things." Since this is the beginning of an inquiry about which there is general agreement on almost nothing, the exact extension of beings with soul should properly be left open, as should the questions of whether there is one or more than one principle of living things and what sort of principle or source a soul is.[6]

I believe Aristotle chose his words carefully here. For in the end, while Aristotle will insist that all soul is an ἀρχὴ of living things in some sense, he will deny that all soul is an inherent ἀρχὴ of change, i.e. a nature. He denies that *nous* is a source of the sorts of changes investigated by the natural scientist. This does not, however, imply that *nous* is not an ἀρχὴ in some other way.

Moreover, in so far as the life of the unmoved mover is to be identified with the activity of thought, it can be an ἀρχὴ of living things in a different, but equally legitimate, sense of the term, though not as their nature.

Aristotle goes on in *De an*. I 1 to specify what it is about the soul that needs to be investigated: its nature and substantial being, and then its attributes, some of which seem to be properties of the soul itself, others properties of living things that they possess on account of being ensouled (402a7–10). We will have cause to return shortly to these two distinctions, between essence and attribute, and between attributes of the soul and attributes that belong to living things on account of the soul. For it is the possibility of the soul having attributes not shared with the body that causes the tension upon which we are focused.

Before moving to that topic, however, there is a prior puzzle that needs to be resolved. Given that Aristotelian souls, at least in the case of animals and plants, are their formal natures, it is initially surprising to read that the investigation concerns the *nature* of soul — it seems a regress looms. Surely the soul is not the sort of thing that can have a nature, a source of change within itself; rather, it *is* such a source. That was our starting assumption.

I take the usage here to be the sort of usage Aristotle had in mind when he wrote, in his lexical entry on φύσις in *Metaphysics* Δ 4 that, on account of the fact that in one sense "nature" refers to a natural thing's being, (as in the quote from *PA* I 1, just above) the term has an extended use that refers to the being of anything.[7] Thus, if it is appropriate to say that one is investigating the οὐσία of soul, i.e. what it is essentially, then in this "extended" sense one can also say one is investigating its "nature".

[6] Recall, after all, that according to *Metaph*. Δ 1 there are perhaps six or seven distinct sorts of ἀρχὴ.

[7] *Metaph*. Δ 4 1015a12–13.

This reading fits well with the fact that when Aristotle begins to list the questions that must be answered in our investigation into soul, the first one is the question of the category to which soul should be assigned — that is, far from starting with the assumption that the soul is the nature as form of a composite substance, it has yet to be determined what category soul is in! At this point the "what is it?" inquiry is open to the consideration of answers such as, "Soul is a sort of bodily affection" or "Soul is a harmonic ratio", indeed the sorts of answers that are considered through the remainder of book I.

The introduction to the *De anima* continues, also famously, by warning the reader that the investigation upon which we are embarking is in every way and in all respects the most difficult about which to get hold of any secure belief (402a10–11). How one reads the rest of this chapter turns on how one interprets what Aristotle says about the character of this difficulty, so I want to spend some time on that.

The difficult nature of the task turns not so much on the fact that we are investigating the soul as on the fact that we are investigating its "substantial being and essence". The issue he spends some considerable time on at the very outset is whether, as with the method of demonstration for gaining knowledge of the attributes of things, there is a single, common method to be used when we are investigating essence. Even if there is, however, there are still many problems. He reminds us that while we might not, in that case, need to seek a new *method* of study for each new investigation, we will still need to seek for unique *starting points* : "For there are different starting points for different things, as in the case of numbers and of planes" (402a21–22).

All of this should remind us that we are in the philosophical milieu framed by the *Posterior Analytics*.[8] In any domain of knowledge, the necessary attributes of the objects in that domain are to be demonstrated from a set of starting points that are indemonstrable (*APo*. I 3 72b19–24; I 6 75a29–37; cp. *EN* VI 5 1139b29–32). Among these are principles that identify the being and essence of the primary objects in each domain (*APo*. II 10 94a10–12; II 13 96b7–14). But since these are not themselves demonstrated, the question arises, how one investigates and discovers these principles (*APo*. I 2 71b17–19; I 3 72b23–24; II 13 96a20–23). This is precisely the issue being identified as problematic here on the opening page of *De anima*; for however we understand it, Aristotle's base line assumption is that to investigate the soul is to investigate some sort (or sorts) of ἀρχή of living things.

The next stretch of text lists a number of questions that the person seeking knowledge of the soul must consider, all of which are systematically pursued and answered in books II and III. But I will move directly to the passage that follows this list of questions, in which Aristotle returns to the methodological question of how to inquire into the nature of the soul. For it is relevant to the *aporia* about whether the study of the soul is a subject for the natural scientist in a way that has, as far as I can tell, gone unnoticed.

[8] A point properly stressed in John Sisko's "On Separating the Intellect from the Body: Arisotle's *De Anima* III 4 429a10–b5", *Archiv fur Geschicte der Philosophie* 81 (1999), 249–267.

Not only, says Aristotle, is knowledge of the essence (τὸ τί ἐστι γνῶναι) useful in studying the causes of attributes belonging to substances; conversely, knowledge of the attributes contributes to knowing the essence (402b16–22). This passage begins, I want to suggest, to answer the question of whether there is a way of achieving knowledge of the essence as there is a way (demonstration) to achieve knowledge of attributes — the first matter of methodology raised at 402a15–20. The approach should be to first grasp, *via* what is available to perception, all or most of a thing's attributes, and this will allow us to speak best about the *ousia*, the source of demonstration (402b22–25).[9] He goes on to urge that there should be preliminary definitions that at best give us "acquaintance knowledge" of the attributes and at the least allow us to make probable inferences — definitions that don't provide at least this much are διαλεκτικῶς καὶ κενῶς. And the discussion of the *aporia* that follows immediately is, I suggest, an extended example of Aristotle doing just that — beginning with observations about various attributes (*pathê*) of the soul, from which he reaches some insight as to what the soul is.[10]

This *aporia*, which returns us once more to the treatise's opening prologue, concerns whether all the πάθη of the soul are shared by the soul and the ensouled thing, or whether any of them are properties of the soul by itself; and as virtually all commentators on this chapter note, the expression τὰ πάθη is employed in a tricky manner here. A case can be made that throughout the discussion the term refers to the attributes of soul generally, not simply to the emotions, notwithstanding that the examples of τὰ τῆς ψυχῆς πάθη at 403a16–18 are all emotions. If so, it refers to αἰσθάνεσθαι and νοεῖν a few lines earlier, at a7–8.[11] I'm not confident about this, but taking *pathê* to refer generally to the soul's affective attributes, or even more generally to all of its attributes, serves the point I want to make well. What I see Aristotle doing in this passage is starting with widely familiar cases of actions and passions that are psychophysical — are κοινά — and reasoning to a general conclusion about the nature of soul, and thus about the proper *way* to investigate it, and thus about the proper *science* to investigate it. And from the beginning the question of whether reason (νοῦς) is an ἴδιον, a distinctive property, of the soul or should be included among those attributes common to body and soul is central to the investigation.

Before proceeding a word or two about this contrast between ἴδιον and κοινόν is necessary. Aristotle refers to the objects under discussion as affections of the *soul*, and

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9 This recommendation has parallels in a number of other texts; for example, *HA* I 6 491a9–14: "After [we have grasped the differences and attributes of every animal] we must attempt to discover their causes. For to pursue the study in this way is natural, once there is a body of systematic information [ἱστορία] about each kind, since from these both the facts to be demonstrated and the principles from which demonstration ought to be performed become apparent". Here the focus is on finding causes after a study of differences and attributes has been carried out, but from the standpoint of *Posterior Analytics* II this is a matter of focus and emphasis, since scientific definitions identify causes. Compare *APr*. I 30 46a3–28.

10 Though I am not sure, it appears that Philoponus may have seen the connection that I am discussing; cf. *in De anima* 44, 22–26.

11 Ibid.: 198, 403a16n.

yet one of the ontological options under consideration throws that characterization into doubt. For if fear, say, is *shared in common* by soul and the ensouled body or subject, then it is no more nor less a πάθος of one than of the other. On the other hand, were fear a feature distinctive to the soul, the implication is that it will not be something "shared in common" with the body. And if any functions or affections of the soul (τὶ τῶν ἔργων ἢ παθημάτων, 403a1) are distinctive to it, Aristotle appears ready to draw the immediate conclusion that soul could be separated — and investigated separately.[12]

Note that the direction of inference, underscored by the illustration that follows, is *from* being something of the soul's own *to* the possibility of soul's separation. That is: if something is not a function or affection shared by soul and its possessor, then soul *may* be separated in some sense — there has as yet been no clarification of what kind of separability is under consideration. That we are considering the possibility of a function or affection not shared with a body is an assumption built in to the *protasis* — the kind of separability this entails, however, is left deliberately unexplored.

We are now ready to tackle the question of what this text has to say about the nature of the investigation, and investigator, of the soul. Aristotle thinks that consideration of all the πάθη of the soul gives a presumption in favour of the view that they are μετὰ σώματος (403a16–17). There is a subtle priority here. These affections are *of* the soul but "participate in" or "are together with" the body.[13] They are λόγοι ἔνυλοι, a phrase I will return to momentarily. But for now I want to focus on a different aspect of this argument, the way in which it moves from consideration of something that seems to be the case with all the soul's πάθη to the general character of an inquiry into the soul itself — that is, this is an instance of reasoning from a consideration of the *attributes* of the soul to a conclusion about its *nature*, what it is. Beginning with the above characterization of these πάθη, he draws a conclusion about their definitions: these definitions will have to include a reference to a certain change of a kind of body (or anyway a part or capacity of a body), *as well as to the efficient and final causes of that change*. And from that description of their definitions, he concludes:

> And on account of these considerations the study of the soul — *either of all soul or of the sort we are discussing* — is at once [a study] of the natural scientist (403a27–28).

[12] Both Hicks and Hamlyn translate χωρίζεσθαι at 403a11 as "... separated from the body". For reasons given in the text above, I don't think this is correct even as interpretation, and there is nothing in the Greek corresponding to "from the body". It is true, however that the feminine pronouns and adjectives here (αὐτὴν ... αὐτῆς ... χωριστή) make it clear that the implication he is at this point drawing is that if any functions or affections are not shared with the body, the *soul* could be separate. Later in the chapter it is the separability of the functions/affections themselves that is at stake (403b10–19). I'm not sure why he appears to draw a conclusion about soul's separability from the possibility of the separability of one function or affection, but one possibility is this: even after Aristotle's own account of the soul is in place, he is willing to talk about the various faculties of soul as kinds of soul (cf. II 2 413b25–28).

At this point Aristotle may be leaving open the possibility that "a soul" is separate if, for example, intellect is.

[13] Hicks: "conjoined with"; Hamlyn, Smith: "involve"; Irwin and Fine: "require".

Thus from a consideration of the content of the definitions of the *pathê* of soul a conclusion is reached about which of the theoretical sciences is to study soul itself — either all soul or a certain sort of soul.

However, Aristotle remains uncommitted regarding extending this conclusion, reached by focusing on the πάθη under discussion, to "all soul". And of course he *remains* uncommitted well after he has given his own positive general account of the soul as substance *qua* form and first actuality of a natural body with organs.[14]

We are now ready to look at the concluding section of *De an*. I 1, which I consider to be its unifying goal. It aims to specify conditions that need to be met in order for the soul to be an appropriate subject for investigation by natural science. But that task cannot be accomplished without reorienting his audience about what it means to study something as a φυσικός; and that reorientation in turn requires a discussion of how the investigations of a φυσικός, and his objects, are to be distinguished from other related investigations (and *their* objects) with which it may be confused.

Aristotle sets up a dichotomy, one he then moves quickly to erase, between a supposed account of anger to be given by the φυσικός and another to be given by the διαλεκτικός.[15] The first would give a statement about the matter, the second would give "the form and the account". At this point he briefly notes that this *logos* must be in a certain sort of matter if it is to exist. Using a house as his example, he now characterizes three *distinct* accounts, one that talks about a house by reference to its sheltering function, a second that catalogues the materials from which it is built, and a third that talks about the form in these materials for the sake of certain functions (403b3–7).

In the end, the account appropriate for natural science is the account that is "from both", i.e. an account that draws on knowledge of the form present in the matter for the sake of an end.[16]

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[14] For example, in *De an*. II 2 he reiterates: "Concerning the intellect and the capacity for theoretical study nothing is yet clear, but it seems to be a *different kind of soul*, and this alone can be separated, just as the eternal from the perishable" (413b24–7).

[15] Initially it is surprising that, immediately after he has given a model definition of an embodied *pathos* in which it would seem matter and form are both mentioned, he sets up this dichotomy. But in fact that is to imagine things being said that have not; and indeed the unusual phrase λόγοι ἐνύλοι may well be yet another instance of Aristotle bringing his audience and readers along one careful step at a time. What he has told us is that *movement*, a *source* of movement, and a *goal* of movement will be mentioned in these accounts. That is sufficient for him to claim that this will be something for the natural scientist to study, but a couple of more steps are needed before he can conclude that the natural scientist's definition must involve essential reference to both form and matter. There is an interesting parallel here with the structure of the *Physics*. The form of the definition given at 403a25–27 is what one might expect based on the discussion of *Physics* I. But *Physics* II imposes on the prior discussion of the "principles of change" the idea of things with natures, one of which corresponds to the form and another to the matter. And it is only when *that* step is taken that Aristotle is forced to consider the question of whether there can be a single science of nature. More on this in section II.

[16] Translating is tricky. I take the ὁ δὲ at 403b5 to answer to the ὁ μὲν at b4. Thus, when A. asks, at 403b7 τίς οὖν ὁ φυσικὸς τούτων; the most natural way to take it is "Which of these, then, is the natural <logos>

These accounts, those appropriate to natural science, refer to functions and attributes of natural bodies and natural matter, and in the next section of the paper I will argue that this is to be read in light of the general program for the unity of natural science in *Physics* II 2 *De an*. I 1 ends by considering one implication of this idea that, given that the attributes of the soul are all or mostly with a natural body, the soul is to be investigated by the natural scientist. Throughout the discussion the possibility of attributes that are proper to the soul and *not* shared with a body has been highlighted. If, and apparently only if, there are such attributes could they be separated (403a10–12). But what exactly is meant by "separation" and "being separable" has been left unexplored. In this discussion of the nature of the definitions provided by the natural scientist, however, a contrast has emerged between accounts that state only the "formal" properties of an object, even when those properties are the properties of a material object. A properly "natural" account of such a thing must, in some way, be based on both an account of the matter and an account of the form. Such accounts need to be contrasted in two directions: with accounts in the crafts, which, while they too refer to functions and affections of bodies (cf. *PA* I 1 639b14–21) do not refer to attributes of *natural* body; and with accounts which involve separability from body and matter, but in two very different senses. The unstated implication is most interesting: *neither member of the original contrast — the natural scientist focused purely on matter vs. the dialectician — is anywhere to be found*. Matter that is not the matter of something more interesting is not mentioned as an object of study. A study of enmattered attributes that studies them as if they were not attributes of natural bodies, i.e. which treats them in abstraction, will fall to the mathematician; while one that studies attributes "in so far as they have been separated" is the task of the "first philosopher" (403b9–16). If these are our options, and the intellect turns out to be a property of the soul not involved with matter, it would seem to be something for the first philosopher to investigate.

Though often treated as a preliminary chapter that lays out problems that shape (and are shaped by) the nature of the answers in book II, this opening section of

(i.e. the *logos* of the natural investigator?)". Following through on that suggestion, however, leads one to see why the majority of translators rather assume that ὁ φυσικός is being used in the same way as it was at 403a29, to refer to the natural investigator. For on the alternative assumption, a natural way to continue translating is: "Is it the < *logos*> about the matter, ignoring the *logos*, or the <*logos*> about the *logos* alone? Or is it rather the <*logos*> derived from both? And which of these is <the logos> of each of the other two?". There are problems in either case. In favor of reading "logos" all the way through is that it is suggested by the opposition with which the passage begins, and makes best sense of ὁ ἐξ ἀμφοῖν (b8-9). (To see the hoops one must jump through otherwise: the normally lean and textually precise Irwin and Fine translation translates that phrase, "Or is the <real> student of nature more properly the one who mentions both form and matter?". They are aware of the problem with their choice; when they translate ὁ δὲ at 403b6 as "someone else", a footnote reads: "Or perhaps 'another account'" (Irwin and Fine 1995, 172n.15). I lean toward supposing the definite articles pick up on *logos* throughout. I can even imagine Aristotle smiling at the fact that there will be *logoi* that ignore the *logos*, *logoi* that are of the *logos* alone, and *logoi* that derive from each of these other *logoi*. But I am one of those who thinks Aristotle has a wicked sense of humor.

book I is focused on a single goal, and by 403b17–19, Aristotle is able to state, without any hesitation or doubt, a revolutionary conclusion about the study of the soul:

> We said that the affections of the soul are inseparable from the natural matter of living things, in so far as they are present in the way that anger and fear are, rather than as line and plane are (403b17–19).[17]

Read in the light of his general program for the study of nature, Aristotle has already concluded that, with the possible exception of reason, the soul is to be studied in a way contemplated neither by Plato and his followers nor by traditional natural philosophy. It is to be studied according to the program of *Physics* II 2.

4. The Unity of Natural Science

Elsewhere[18] I have argued that in order to see the unity of the argument in *Physics* II 2 one needs to imagine an audience that will have drawn certain implications from the views articulated in the opening chapter of *Physics* II, and in particular from the idea that nature is spoken of in two distinct ways, as matter and as form, shape or configuration. In the aftermath of Plato and Pythagoras, to hear that distinction is to hear a recommendation that the study of nature will be parceled out to two realms of science, the sciences of nature and of mathematics. This accounts for the otherwise puzzling claim at the beginning of *Physics* II 2 that, since nature is spoken of both as matter and as form, we next need to discuss how the *physikos* and *mathematikos* differ from one another (193b22–23). It also accounts for why that discussion leads directly into the question of how it is possible for there to be one, rather than two sciences devoted to understanding the natures of things. That worry is stated as an *aporia after* Aristotle has recommended that nature should be studied "as if we were investigating, about snubness, what it is?". As he says in stating the *aporia*, the fact that we are investigating things, the names for which and the definitions of which refer to matter and form, does not answer the question of whether it is possible to study such things in a unified way — that all depends on how one understands the relationship between matter and form. Aristotle in the remainder of the chapter begins to sketch a radically new way of thinking about the unity of matter and form, such that such unities *must* be the object of a single, unitary, natural science. I say "begins to sketch", because nowhere in chapter 2 is the view stated with anything like the beautiful succinctness of these lines in chapter 8:

> And since the nature [of a thing] is twofold, on the one hand as matter and on the other as form, and the nature as form is an end, while the others are for the sake of the end,

[17] The text is corrupt on various counts; I'm following the text printed by Hicks rather than by Ross, but not with any strong conviction.

[18] "'As if we were investigating snubness': Aristotle on the prospects for a single science of nature". (*Oxford Studies in Ancient Philosophy* XXXV [2008] 149–186).

> this [nature as form] would be the cause for-the-sake-of-which (199a30–32; cf. 200a7–15, a32–b8).[19]

Relying heavily on a discussion of the way in which knowledge of the materials to be used for some end and knowledge of that end are intimately related in craftsmanship, Aristotle returns to answer a question he has left open earlier:

> Up to what point, then, should the student of nature know the form and the what-it-is? Perhaps just as a doctor knows sinew and a sculptor bronze, up to the point of knowing what each is for, and about that which is separable in form but in matter (194b10–13).

The question that is posed here concerns the extent of the natural scientist's knowledge of *form*, but initially it looks as if the answer concerns the extent to which the natural scientist should seek knowledge analogous to a craftsman's knowledge of his *matter*. But notice Aristotle's full answer: the craftsman and the natural scientist needs to know what the relevant matter is *for*. And what is the matter for? It is for its goal, τὸ οὗ ἕνεκα. That, however, *is* a certain sort of knowledge of the *formal* nature. It is, indeed, "knowledge of the form, up to a point"; but also of the matter, as present and organized for the sake of that formal goal.

His answer, then, takes us directly back to his initial, conditional, statement of the teleological model of unity — "it is for the same science to know that for the sake of which and the end as well as what is for the sake of these" (194a27–29). It is up to the natural scientist to investigate form in so far as form is identified with *the goal of certain materials* (and again we are told to look to crafts such as medicine or carpentry for a model of how this works). By framing the answer in the way that he does, Aristotle underscores the way in which the teleological unity of matter and form leads to an *epistemological* unity — one can inquire into natural form only by asking, about things like flesh and bone, "what are they for?".

That may or may not be all there is to say about form, however. In the last lines of this sketch of how a science of two natures is to be unified, Aristotle returns to the question of separability. After saying that the *physikos* should study form just as a doctor studies the form of sinews by asking what sinews are for, he adds: "... and about things which are separable in form, yet are in matter" (194b12–13). This expression is *prima facie* odd. For the things he appears to be discussing are natural forms, and it is odd to say that forms are separable in form. But the point Aristotle wants to drive home is that the natural scientist is to know what natural things are in the way that the doctor is to know that for the sake of which a bodily part is as it is. The thought, then, is that one can think of the biological function formally, but it is always the function of some material body. The thought goes back to the idea that the Aristotelian conception of natural science is that it studies things that are "not without matter, but not in accordance with matter" (194a14–15). "Separable in form but in matter"

[19] The compression of Aristotle's Greek is impossible to capture in English: καὶ ἐπεὶ ἡ φύσις διττή, ἡ μὲν ὡς ὕλη ἡ δ' ὡς μορφή, τέλος αὕτη, τοῦ τέλους δὲ ἕνεκα τἄλλα, αὕτη ἂν εἴη ἡ αἰτία, ἡ οὗ ἕνεκα.

is the positive way of stating the point. The nature of this "separability in form" or "in account", however, and how it differs from the "separability in thought from change" that Aristotle earlier in the chapter grants to mathematical attributes, is not explored. Moreover, there is also the question of whether there are things that are separable in other ways — such as attributes of the soul that are the property of the soul alone, and not shared with body.[20] There is much more to be said about this issue, and much more that *is* said in *Metaphysics Z-H*, *Λ*, *M*, and *N*. That, I take it, is why this is knowledge of form (and matter) only up to a point, and why, however one reads them, the last lines of *Ph*. II 2 point to issues concerning separability that are to be taken up by first philosophy.

The program for a single, unified science of nature that is sketched in *Ph*. II 2 and developed in the remainder of that book turns fundamentally on a new understanding of "natural universals". The universals that are to be central to natural science are to refer, at whatever level of generality, to *teleologically unified composites*. Thus neither the "separation in thought from change" that characterizes the mathematical sciences, nor the separability from body that *may* characterize abstract thought[21] is to be countenanced in the science of nature.

The parallels between the closing sections of *Physics* II 2 and the *De anima* I 1 are, then, extensive. Both take seriously the question of whether the formal and material components of a composite are sufficiently unified to be studied by a single science or not; and both discussions revolve around questions about the different types of separability characteristic of the objects to be investigated by the natural scientist, the mathematician, and the first philosopher (cf. 403b9–19). *Ph*. II 2 aims to insure a place for a distinctive, and unified, theoretical science of nature, reducible neither into mathematics nor into first philosophy (let alone into an investigation of matter by itself); and *De anima* I 1 aims to specify what needs to be true about "parts" or "attributes" of soul for them to be a subject of such a science.

This, then, is the background to the passage in *PA* I 1 with which we began.

5. "Not all soul is a nature…"

Much ink has been spilled in recent years[22] over the so-called "correlatives argument" in *PA* I 1, a conditional argument that concludes that if reason were to be studied

[20] Moreover, it is instructive to consider the differences between the discussion of living functions in the *De anima* in comparison to works such as *De partibus animalium, De incessu animalium or On respiration*. There are ways of discussing living form that, while acknowledging its material basis, abstract significantly from it.

[21] Recall again: "Concerning the intellect and the capacity for theoretical study nothing is yet clear, but it seems to be a different kind of soul, and this alone can be separated, just as the eternal from the perishable" (413b24–7).

[22] And of course not only in recent years. I've already had reason to note Philoponus' (mis)use of the "correlatives" argument, and this passage was of central concern to the Renaissance Italian commentators on *PA* I since both Averroists and their critics saw its relevance to their debate over the unity and

by the natural philosopher, there would be no other philosophy — it would have all theoretical objects as its domain. This is not a conclusion Aristotle accepts, and it is clear from the passage that follows that he rejects it by denying the antecedent. What makes this passage so important, as the Renaissance commentators realized, is that it states a position on the question about whether reason is to be studied by the science of nature without any of the hesitation and qualification that one finds elsewhere:

> However, it is not the case that all soul is an origin of change, nor all its parts; rather, of growth the origin is the part which is present even in plants, of alteration the perceptive part, and of locomotion some other part, and not the rational (τὸ νοητικόν); for locomotion is present in other animals too, but thought (διάνοια) in none. So it is clear that natural science should not speak of all soul; for not all of the soul is a nature, but some part of it, one part or even more. Further, none of the abstract objects (τῶν ἐξ ἀφαιρέσεως) can be objects of natural study, since nature does everything for the sake of something (641b5–11).

Commentators have tried to limit the scope of this claim in various ways. In "On Aristotle's Conception of the Soul", Michael Frede, though without actually citing this passage, surely has it in mind when he says:

> I think it is with reference to this kind of intellect [active intellect which is immaterial and not dependent on the body in any way] that Aristotle sometime says that not every kind of soul falls within the province of the study of the natural scientist (Nussbaum and Rorty, 1992:105).

Sarah Broadie, however, and I think correctly, notes that when one reads through this passage and its context, it is hard to imagine that Aristotle has in mind "an active intellect [that] is not a human intellect, that is not an integral part of the human soul", as Frede suggests. Frede goes on, however, to face the fact that even when considering the human intellect Aristotle seems to be wavering on the issue of whether there are attributes of the soul that are peculiar to it. The view he attributes to Aristotle in *De anima* III 4–5 is that "the exercise of the intellect ... unlike the exercise of the other so-called mental faculties, does not involve the use of a bodily organ" (105). Thinking of this sort may be a second order processing of the results of perception

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separability of the intellect, on which see S. Perfetti, "Three Different Ways of Interpreting Aristotle's De Partibus Animalium: Pietro Pomponazzi, Niccolo Leonico Tomeo and Agostino Nifo" in Carlos Steele, Guy Guildentops and Pieter Beullens, eds, *Aristotle in the Middle Ages and Renaissance*, (Leuven, 1999) 297–316; and E. Mahoney, "Neoplatonism, the Greek Commentators, and Renaissance Aristotelianism", in D. J. O'Meara ed., *Neoplatonism and Christian Thought* (Albany, 1982) 264–282. Recently, the passage has been discussed by Sarah Broadie "Nous and Nature in *De Anima* III" *Proceedings of The Boston Area Colloquium in Ancient Philosophy, Vol. XII* (1996) (Lanham, 1998), 163–176; and by her commentator Victor Caston ("Aristotle on the Relation of the Intellect to the Body: Commentary on Broadie") in the same volume 177–192; cf. William Charlton, "Aristotle on the Place of Mind in Nature", in A. Gotthelf and J. G. Lennox eds, *Philosophical Issues in Aristotle's Biology* (Cambridge, 1987), 408–423; and J. G. Lennox, "The Place of Mankind in Aristotle's Zoology", *Philosophical Topics*, Vol. 27, n. 1 (1999) 1–16, and J. G. Lennox, *Aristotle: On the Parts of Animals* (Oxford, 2001), 139–145.

and imagination, directly dependent on those results, and thus (and in this his view is akin to Broadie's) only indirectly dependent on their bodily organs (Frede 106, Broadie 163–66).[23]

I want to focus on the obvious — Aristotle's emphasis here, consistent with every passage in which he discusses what distinguishes the science of nature from other theoretical sciences, is on nature as a source (or principle) of change. His restriction here on which parts of soul can be investigated by the science of nature is based primarily on an answer to the question, "Are all of the soul's capacities sources or principles of change?". In this passage he specifically denies that the rational capacity is a source of locomotion. The grounds of this denial initially seem weak, namely that many locomotive animals lack the capacity to think. But Aristotle may well want to restrict the natural investigation of animal locomotion to locomotion, and its causes, that are common to all locomotive animals.[24]

Charlton cites *De an*. III 10 433a9ff. against Aristotle's conclusion in *PA* I 1, but that passage restricts its claim that thought may be a source of locomotion to *practical* thought, and explicitly denies that theoretical thought is — and even the restricted claim about practical thought is in the end called into question.[25] Here is the passage, with some important context:

> At least it appears that the moving source is one of these two things, desire (ὄρεξις) or reason (νοῦς), *if one were to take imagination to be a sort of reasoning* (νόησίν τινα); for many people follow imagined things contrary to knowledge, and in other animals there is neither reason nor calculation (λογισμὸς), but there is imagination. Therefore both of these things are capable of moving things, that is both reason and desire, *but by reason here I mean the one calculating for the sake of something, i.e. practical reason* (ὁ πρακτικός); and it differs from theoretical reason in virtue of its end. And desire is always for the sake of something; for the object of desire (οὗ ἡ ὄρεξις) is *the starting point of practical reason* (*De anima* III 10 433a9–16).

In the previous chapter he had stated the idea more baldly: "... neither is the mover the faculty of calculation (τὸ λογιστικόν) nor what is called reason; for the theoretical faculty thinks nothing practical nor speaks about what is to be pursued and avoided,

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[23] There is, further, the passage in *GA* II 3 (736b–30) that concludes: "It remains then that the intellect alone enters additionally from outside and alone is divine; for bodily activity is in no way associated with its activity". Burnyeat asserts that this may "perfectly well refer ... to a second potential νοῦς acquired through the agency of a teacher (2003, 70n. 111)", a suggestion already hinted at in Charlton 1987 411–12.

[24] On which, see the opening lines of *De motu animalium*, 698a1–7.

[25] See Charlton, 1987:411; Lennox, 1999:4–5. Mary Louise Gill in her comment on an earlier version of this paper challenged me to look at this material, for which I thank her. She also felt there was conflict, and offered a most ingenious reading of the *PA* I 1 passage on the hypothesis that it was an aporetic consideration of a view Aristotle in the end rejects. Part of her argument rested on Aristotle's remarks about order being more apparent in the cosmos than in animals, but the sentiment in that passage is exactly mirrored at *De caelo* II 8 290a29–35. In the end, since I don't see the incompatibility between the *PA* I 1 text and the *De anima*, I don't feel the need to press a different interpretation.

while [animate] motion is always in pursuit or avoidance of something" (432b26–29); while later in chapter 10 he reiterates that "it is always the object of desire that causes motion" and thus "it is this sort of capacity, that which is called desire, that moves" (433a29–30). And when he finally summarizes these two chapters on the faculties of soul involved in locomotion, the summary leaves out mention of reason altogether:

> Since [animate] locomotion involves three things, first the mover, second that by which it moves, and third that which moves, while the mover is twofold one of which is unmoved while the other is both a mover and is moved — *the unmoved mover is the practical good, that which is moving and moved is the faculty of desire, and that which is moved is the animal* (433b13–16).[26]

Aristotle's position, then, is tolerably clear. The mandate of the natural scientist is to explain change by searching for its sources and causes. In a highly qualified way that may involve consideration of *practical* reasoning, but even in that case the search for the sources and causes of locomotion will point the natural scientist toward a study of the objects of desire and imagination and away from a study of reason.

These are surely the thoughts in the background of our passage in *PA* I 1. Natures are sources of change (κίνησις). Properly speaking, apart from substantial generation, there are only three categories of natural change, growth (quantitative change), alteration (qualitative change) and locomotion (change in place). He mentions all three here, pointing out that that part of soul that is a source of growth is shared even by plants, while the perceptive part, associated with alteration, and "some other part" (τὸ ὀρεκτικόν?), associated with locomotion, are shared by all animals.[27] He denies, however, that the part of the soul associated with locomotion is the rational part, and the passages from the later chapters of *De anima* argue for this very conclusion.

As a look at the opening chapters of the *Nicomachean Ethics* make clear, Aristotle sees goal directed activity as a central aspect of human life, and he is equally clear that such a life is one lived in accordance with reason. But unless those activities are properly conceived of as changes in one of these three categories, they are going to be the subject of another science, not the science of nature.[28] In those passages in which he taxonomizes knowledge, the study of human action is characterized as a

[26] Compare *De motu* 6 701a4–6: "For the animal moves and progresses by desire or choice, when some alteration has taken place in accordance with perception or imagination".

[27] The passage thus generally comports with the opening of *De an*. II 3, that lists θρεπτικόν, αἰσθητικόν, ὀρεκτικόν, κινητικὸν κατὰ τόπον, and διανοητικόν as the capacities of soul to be discussed (414a31–32). However the capacity for movement in place is treated as related to, but distinct from, those of desire and perception.

[28] This is, of course, a central theme of Burnyeat 2003. He argues that in the end the precise wording of the qualification about perception — regarding whether it is an alteration or not — is driven by Aristotle's background thesis that the study of the soul is the province of the natural scientist. My concern is that Aristotle seems not to be driven to extend this thesis beyond perception.

practical science, not, as natural science is, a theoretical science. Investigating theoretical reason, however, seems to be the task neither of practical science or natural science — where does its investigation belong?

Which brings us to the last sentence I quoted from *PA* I 1. Whatever else theoretical reason does, it certainly studies things viewed in separation from change — whether in the realm of mathematics or first philosophy. But, while the natural scientist in his inquiries about nature will think abstractly, what he will be thinking *about* will be particular, changing things and the sources and causes of those changes — these are the objects of his investigations. As Aristotle says a few lines later, we say that one thing is for the sake of another whenever there is apparent a goal toward which a change proceeds when nothing prevents it (641 b24–6). Reasoning in mathematics and first philosophy begins only when the kinds of change investigated by natural science are put aside. An inquiry into the essence of abstract thought, such as the investigation reported in *De anima* III 3–7, is more akin to these two theoretical sciences. At any rate, it is not studying nature as Aristotle understands it.

De partibus animalium I 1, then, does clearly deny that thought and its objects are suitable subject matter for natural science, and at least in part on grounds of the "separability" of thought and its objects. But the crucial separability in both cases is separability from natural change. Theoretical reason and its objects are not proper objects for natural science, since they are neither engaged in, nor the sources of, the sorts of change that are the proper subjects of the natural scientist. Whether the intellect is separate from the body in any more robust sense is not, as far as I can tell, a question that even arises in the context of *PA* I 1.

6. Conclusion

De an. I 1 in the end is uncommitted about whether natural science studies all soul or not, and is quite clear that if there is a capacity of the soul that is not to be studied by natural science, it is reason. That question, like many others raised in this preliminary, problem-setting chapter, is not there answered. But some advances are made. First, we learn something about the nature of soul from a study of its *pathê*, namely that most, if not all, of its attributes are associated with the body and are not attributes peculiar to the soul, meaning that neither the approach of the traditional dialectician nor that of the traditional natural scientist alone can study the soul if that is its nature. There needs to be a way of studying the soul modeled on the definitions found in an Aristotelian natural science, one that studies teleologically unified composites of body and soul. Whether reason can be studied in this way remains, however, an open question in book II, well after Aristotle has presented his own theoretical account of the soul as the first realization of a natural, instrumental body.

PA I 1, on the other hand, is straightforward on the issue. Of the various sorts of change that are the proper subject of natural science, the capacity for thought is not

a proper source or principle for any of them. Neither it nor the activities to which it gives rise are a proper subject of natural investigation. It is not a nature, i.e., not a source or principle of natural changes. As far as one can tell from that passage, however, its activities could well be dependent, in various ways, on other activities carried out by bodily structures.

The backdrop, the context that explains what is going on in both of these passages, I have argued, is *Physics* II 2. It lays down the conditions for an entity to be investigated by a unified science of nature, and only certain parts of the soul, according to *PA* I 1, meet those conditions. In the end, while Aristotle need not be a "spiritualist" with respect to human reason, he is not a naturalist either. The seeds for an autonomous study of reason and its object are sown in these texts. Unless Aristotle is prepared to add to his list of theoretical sciences, it seems the investigation of the soul is to be shared by the natural scientist, the moral philosopher and the metaphysician. And this serves to remind us that in the end it looks as if the message of *Metaphysics* Λ is that there is only one entity that is eternal and always active, and it is an activity of self-reflective reason.