

The Place of Mankind in Aristotle's Zoology

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I. INTRODUCTION: THE PROPER STUDY OF MANKIND

Historians of psychology often treat Aristotle's *De Anima* as the first scientific treatment of their subject; and historians of biology do likewise with his zoological treatises. How are the investigations recorded in works such as the *Parts of Animals* and *History of Animals* connected to those in the *De Anima*? More specifically, given Aristotle's views about man's special and distinctive cognitive capacities, what does he think about man as an object of a distinctively *zoological* investigation? In the following pages, this more specific question will be explored, but with an eye to the way in which its answer may change the way we think about the broader question.

II. THE EXCLUSION OF REASON FROM ZOOLOGY

Aristotle stresses the centrality of reason in human life, whether that life be predominantly theoretical, practical, or productive. Yet a difficult and obscure passage in the first book of *De Partibus Animalium*—his zoological philosophy—argues *against* including reason among the objects of zoological investigation. These two conclusions might have led him to the philosophical

exclusion of man from the study of zoology. But in fact they did not. We will look first at his grounds for excluding reason from zoology, and then for the inclusion, indeed the centrality, of mankind.

In *De Partibus Animalium* I, Aristotle defends the view that zoologists should not simply study the material nature of animals but also, and even more, their *formal* nature (640b28–29). He then asserts the following complex conditional:

Suppose what one is thus speaking about is soul, or a part of soul, or is not without soul (at least when the soul has departed there is no longer an animal, nor do any of the parts remain the same, except in configuration, like the things in myths that are turned to stone)—if these things are so, then it will be up to the natural philosopher to speak and know about the soul; and if not all of it, about that very part in virtue of which the animal is such. (641a17–23)¹

There is much that is problematic about this passage. I want to focus on the puzzling disjunction “soul, or part of soul, or [what is] not without soul.” By the end of this sentence (actually the sentence goes on even further in the Greek text), he has already made more specific the idea of a part of the soul. It is the part of soul *in virtue of which an animal is an animal* that appears to be the “partial” option. And we quickly discover why. Aristotle is about to make the somewhat surprising claim that the naturalist must not study reason. And the argument justifying that claim is among the most puzzling in all of Aristotle’s zoological writings. It is worth quoting in full, since much of the discussion to follow will be an attempt to understand it, and to see its implications for Aristotle’s zoological philosophy.

In view of what was said just now, one might puzzle over whether it is up to natural science to speak about *all* soul, or some part, since if it speaks about all, no philosophy is left besides natural science. This is because reason is of the objects of reason, so that natural science would be knowledge about everything. For it is up to the same science to study reason and its objects, if they truly are correlative and the same study attends to all correlatives, as indeed is the case with perception and perceptible objects. (641a32–641b4)

The disjuncts of the previous discussion are now seen to reflect a particular concern about reason [*nous*] and its activity, thought [*diānoia*]. What are Aristotle’s grounds for excluding the study of reason from natural science? Elsewhere he occasionally suggests that reason or, at least its active part, has no particular organic basis (*An.* II.1 413a4–9, II.2 413b24–27, III.5 430a17–25), and that would certainly be grounds for exclusion; but that suggestion plays no role in the argument here. Rather, the argument presented here has the following structure:

- [i] Suppose: natural science studies soul in its entirety.
 - [ii] Soul includes reason
 - [iii] So natural science studies reason.
 - [iv] Reason is “of” its objects.
 - [v] Reason and its objects are thus correlative phenomena.
 - [vi] Correlatives are studied by the same science.
 - [vii] So natural science also studies the objects of reason.
 - <[viii] The objects of reason are the only objects of study besides natural objects.>
 - [ix] So natural science would study everything.
- Conclusion:* There would be no philosophy over and above natural science. (641a34–36).

Proposition viii is not in the text; it is added because it would seem to be the minimal addition necessary to give us the counterfactual result Aristotle in fact reaches. Perhaps the argument’s most problematic components are propositions iv, v, and vi, but there is no question that Aristotle endorses all three. *An.* III insists that actual knowledge is identical with its objects (430a2–5, 431a1–2), and the Platonic view that strict correlatives are studied by the same science is regularly endorsed (*Cat.* 7. 8a36–b15, *An.* II 4.415a14–22) and followed in practice, e.g., in such works as *On Perception and its Objects*, as he notes. Even if these two claims are accepted, however, they do not imply the conclusion that other theoretical disciplines will be *reduced* to the one that studies reason. If the correlatives are a form of cognition and its objects, the *study* of these correlatives—say the study of vision and the visible—need not bear the same relationship to the cognitive object and the cognitive activity as they bear to each other. For example, Aristotle’s philosophy of science is deeply informed by his study of mathematical reasoning and its objects. Yet, the philosophical study of mathematical reason and its objects is quite distinct from the mathematical study of those objects, and Aristotle seems clearly to presume that it is.

As problematic as this argument is, it clearly is intended to reach a counterfactual conclusion. Aristotle has a more interesting, and positive, argument for excluding the study of reason from zoology, and that argument follows immediately after this counterfactual result of assuming that the naturalist studies reason.²

However, it is not the case that *all* soul is a source of change, nor all its parts; rather, of growth it is the part which is present even in plants, of alteration the perceptive part, and of locomotion some other part, and *not* the rational; for locomotion is present in other animals too, but reasoning in none. So it is clear that one should not speak of all soul; for not all the soul is a nature, but some part of it, one part or even more. (641b4–10)

A number of commentators treat this as a separate argument, but it makes more sense as Aristotle’s first challenge to the presupposition that

zoology should study all of soul. In outline, the challenge seems to be the following:

- [i] Natures are sources of change.
- [ii] The natural scientist studies natures.
- [iii] Therefore only those aspects of soul which are sources of change (nutritive, generative, perceptive, and locomotive change) are proper objects of natural science.
- [iv] Not every part of soul is a source of change—in particular, reason is not.

Conclusion: Natural science does not study all soul—in particular, it does not study reason.

The strength of this argument depends on the plausibility of two claims not seriously defended here. The first is that natural science is restricted to the study of change and its causes. This is argued for in *Phys.* I.1–2. The second, discussed at length in *An.* III.9–10, is that reason is not a source of movement.

Commentators have had worries about this latter claim, and with good reason.³ Human beings are agents, and our most characteristic actions are grounded in rational deliberation. Aristotle believes this, and he argues eloquently for it in his ethical and psychological writings. So why should he not view reason—*nous*—as a source of change, a nature, as much as any other part?

One might attempt to dodge the issue by invoking Aristotle's distinction between reason and practical intelligence [*phronesis*]. Aristotle will, it is true, on occasion use "reason" in a restricted sense to refer to that capacity we have to comprehend indemonstrable first principles of demonstration (e.g., *An. Post.* II.19 100b17–22). But he also uses it in a much less restrictive manner, and it is clear from the discussion in *De Anima* III.9–10 we will look at shortly, that it is this less restrictive use that is relevant here. For in that discussion, Aristotle seems to have grounds for denying that reason as such—even practical reason—is an object of study for natural science. Properly speaking it is not a source of locomotion, even for humans. The only evidence given in the argument in *De Partibus* for that claim is that, since locomotion exists in many non-human animals, and these animals do not possess reason, locomotion is not due to reason. But this argument shows only that reason is not a *necessary* condition for locomotion generally. It does *not* show that it is not *sufficient* in animals which have reason, nor does it show that it is not *necessary* for *human* locomotion.

An. III.9–10, however, does provide an argument against these options. Chapter 9 begins by distinguishing between two capacities of animal souls, the discriminative and locomotive. Reasoning and perception are among the discriminative. Various options are considered and rejected for the locomotive capacity, until only desire (or appetite, *orexis*) and practical reason

remain to be discussed in chapter 10. “It would appear reasonable that these two are movers, namely desire and practical reason” (433a17–18). But appearances can be deceiving. Aristotle goes on to insist that, while practical reason can play an important role in ethical behavior, it is neither necessary nor sufficient for animal locomotion. First of all, humans can act irrationally, showing that reason is not *necessary* for human action; and its involvement in human action is restricted to being a valuable aid to desire, showing that even in the human case it is not sufficient. Even in humans it is desire and its object that are the true movers (433a18–31).⁴ The *De Anima*, then, provides support for what is otherwise a rather weak argument.

David Balme has noted that the correlative nature of reason and its objects, which supports the conclusion that there would be no philosophy other than natural philosophy, provides the basis for another exclusionary argument. For the objects of *theoretical* reason are abstractions. Such objects, being immaterial, do not change and, unlike the objects of practical reason, play no essential role in goal-directed processes. They are therefore not natural objects. If to study reason is to study its objects, and these objects are abstractions, the study of theoretical reason would be excluded on this ground. But though this argument, or something like it, is hinted at immediately following the argument we have been dissecting, it goes undeveloped.

Whatever the strength of these arguments, they have far-reaching implications for Aristotle’s zoological project. They in no way exclude human beings from being proper objects of zoology. But they do mean that the most characteristic feature of human beings is to be excluded. Does Aristotle in fact follow his own advice? There are two classes of texts that might suggest he does not. First of all, there are a number of passages in which the human ability to reason appears to be a crucial premise in explanations of various other characteristics that humans possess. Second, there are the many passages, which I have explored in depth elsewhere,⁵ in which Aristotle discusses the intelligence displayed by other animals as part of a zoological investigation of their differentiating characteristics. In order to understand the import of this passage for the place of mankind in Aristotle’s zoology, we need to look carefully at these problematic texts.

III. MANKIND AS THE STARTING POINT OF ZOOLOGY

There is no question that Aristotle takes the view that human nature is to be investigated as a part of general zoology. Humans are animals of a distinctive kind. Our central concern in this discussion is whether Aristotle follows his injunction to exclude from the zoological investigation of humans their rational faculty. But a brief review of some of our other zoological peculiarities

will set the context for the investigation of that issue.

First of all, it is noteworthy that humans are among the animals that are excluded from Aristotle's division of blooded animals (a category that corresponds closely to our vertebrates) into five "great kinds," namely, fish, birds, live-bearing quadrupeds, egg-laying quadrupeds, and cetaceans. Since the theoretical basis of these groupings appears to be the intersection of modes of locomotion and of procreation, and since we are the only live-bearing bipeds, we find no home within these groups. He defends the exclusion in *P. A. I.4*.

Perhaps, then, the right course is this. In some cases—whenever the kinds are spoken of by people in a clearly defined manner and have both a single common nature and forms in them not too distant—we should speak in common according to kinds, like bird and fish and any other there may be that, though it is unnamed, embraces, like a kind, the forms within it. But whenever they are *not* such as this, we should speak one by one, *e.g., about mankind and any other of this sort.* (644b1–6)

Furthermore, even when we consider that we share bipedalism with birds, theirs is, as he puts it in *P. A. I.2*, a bipedalism that is "other and different."⁶ Among animals with hair we have the greatest amount on our heads and the least amount elsewhere. We also have the largest brain, but not for reasons having anything directly to do with cognition, since he argues that the brain has no direct role in cognition (which he localizes in the heart). These are among the more important of a long list of characteristics that Aristotle argues distinguish us from all other animals.⁷

Even though we do not belong to any of Aristotle's large kinds of blooded animals, the investigation of humans has an extremely important heuristic role in Aristotle's biology. In the *De Partibus*, the point is made as Aristotle begins his discussion of the non-uniform parts (organs, as we would say) in book II, chapter 10. He has indicated the relatively small number of such parts in plants, and the greater complexity found in animals.

And there is still greater variety among those whose nature partakes not only of living but, in addition, of living well. Such is mankind; for of the animals known to us either mankind alone, or mankind most of all, partakes of the divine. So both because of this and because the shape of the external parts of mankind is most familiar, one ought to speak about this first. For straightway the natural parts are disposed according to nature in this kind alone, that is, what is above for a human being accords with the above of the whole cosmos; for man alone among the animals is upright. (656a3–13)

This passage provides three distinct, though related, reasons for beginning the investigation of organs with mankind. First, given our capacity for

living well, it is claimed we have a great variety of organs. This passage is often overinterpreted, so it is worth noting that it is not claimed that mankind is the only kind of animal capable of living well (we are argued to be *one* species that can);⁸ nor is it claimed that we are the only animal that has a divine nature, though that option is left open. Finally, it should be noted that the passage does not cite our partaking of the divine as the reason why we should be investigated first. It is the greater organic complexity we exhibit that is the reason for our methodological primacy—our “partaking of the divine” is cited as justification for the claim that we not only live but live well, which in turn underlies the organic complexity that justifies our having zoological primacy.

Nor does a reference to partaking of the divine have to be a veiled reference to our reason. The same claim is made for all plants and animals, insofar as they reproduce their formal natures (*An.* II.4 415a25–b7, *G. A.* II.1 731b24–31). However, in the context of justifying a claim about living well, this passage likely is a covert reference to reason.⁹ The covert nature of the reference is, perhaps, telling. But, more importantly, even if reason were mentioned explicitly, it would not be the object of investigation in this text. Aristotle is providing a justification (or a set of justifications) for treating the arrangement of parts in humans as a standard for the investigation to follow. This first justification seems to be that those animals capable of “living well” will be the most “complex” in their organic parts. It is that fact that justifies taking mankind as a starting point.

The second justification for beginning with mankind is our relative familiarity. This is the *only* justification provided in the *Historia Animalium*. At the close of that monumental work’s methodological introduction, Aristotle recommends that “the parts of human beings should be taken up first; for just as every community reckons its currency in relation to that most familiar to itself, so should it be in other situations—and mankind is of necessity the most familiar of animals to us” (*H. A.* I.6 491a20–23). Yet, when he turns from the *external* to the *internal* organs of the blooded animals, near the end of book I, he recommends that we reverse the order of investigation.

The parts which are apparent externally are ordered in this manner, and as was stated, most are named and are known because of familiarity. In the case of the internal parts, it is just the opposite. For the internal parts of mankind are mostly unknown, so that we need to investigate by referring to the parts of other animals which have a similar nature. (494b19–24)

Interestingly, no such point is made explicitly in *De Partibus*. And in fact, when Aristotle moves to the internal organs, he continues to take the setup in humans as paradigmatic.¹⁰

The third justification for beginning the investigation of the organic parts with their arrangement in mankind is that mankind's parts are disposed in accordance with the natural order of things—in humans, functional “up” is objectively “up”; functional “down” is objectively “down.” Thus to follow the order of investigation suggested by beginning with human beings is to follow the “natural” order of investigation.

This is perhaps the strangest of these arguments for us. Aristotle has a biological set of criteria for determining “up,” “down,” “left,” “right,” “front,” “back.” The *De Incessus Animalium* (*I. A.*) in fact provides “functional” accounts of these “dimensions” (2. 705a28–31), which are posited as basic starting points of zoological investigation (*I. A.* 2. 704b17–22). Organic upward is toward the point of nutritive ingestion; organic downward is toward the point of excretion of waste. Since in other quadrupeds these are roughly at the same height above the earth, *functional* up does not coincide with up in the cosmological sense, i.e., toward the heaven. In humans there is such a coincidence.¹⁰

So far, then, the justification for beginning the investigation of animal organs with those in mankind in no way violates the principle that reason will be excluded from zoological enquiry.

In fact, an unsuspecting reader might be very surprised, given this methodological prescription to follow the order dictated by mankind's anatomy, with the discussions that follow. For while there is no question that the anatomy of mankind is regularly discussed, it is equally true that mankind is not at center stage. The above introduction to the discussion of the animal organs ends at 656a13. As we would expect, the order in which the external parts are discussed is: head generally (656a13–26), senses generally (656a27–657a10), ears (657a11–25), eye coverings (657a25–658a10), eyelashes (658a11–658b9), eyebrows (658b14–26), nostrils (658b27–659b20), lips (659b20–660a13), tongue (660a14–661a30), and (at the beginning of book III) teeth and mouth. After finishing the discussion of the head with a review of various sorts of defensive or aggressive appendages to the heads of certain animals, he moves on to the neck in *P. A.* III.3. Mankind is not mentioned until 657b1, where it is indicated that we blink more often than other animals with two eyelids. During the discussion of eyelashes (658a14–23), it is noted that we are the only animal with them on both eyelids, and this is explained by reference to our uprightness. Because the same sort of cause accounts for the fact that we have such hairy heads, Aristotle also explains this, by reference to our skull sutures and moist brains surrounded by warm blood vessels, all of which promotes the growth of hair. Though the discussion of eyebrows suggests by its wording that its claims are restricted to humans, we are in fact never mentioned. In fact, humans are not mentioned again until the discussion of lips and tongue. The soft, fleshy

character of our lips is accounted for by noting that they are not only used to protect teeth, as in other vivipara, but also “for the good,” that is for *logos*. Likewise, our tongues are the softest and most detached because we are the most perceptive taster among the animals and because this is the best arrangement for speech—and he cites as evidence for this the fact that the more vocally adept the bird, the more “detached” is its tongue (660a25–30).

In sum: the order in which the parts are taken is, as we should have expected, the order in which they are found in humans, if we begin from the “natural” top and proceed downward. But the order also is determined by another of Aristotle’s basic methodological principles, one I have been at great pains to stress in my work on Aristotle’s philosophy of biology—parts should be predicated of the widest kind that possesses them, and explained at the same level; and, the corollary of this principle, features should be explained at a narrower level of extension only when they are distinctive of kinds of narrower extension. Thus, humans are mentioned specifically only when they have a feature which distinguishes them from the various other kinds that Aristotle is discussing. Thus in every case where humans are mentioned specifically, it is because they have a feature which distinguishes them from one or more of the kinds being discussed; and that feature is then explained in virtue of something else distinctive of humans.

Two of these features are accounted for by reference to our possession of articulate speech. Such accounts, presumably, bring Aristotle perilously close to violating his proscription against explanatory appeals to reason in natural science. These passages are thus strong evidence that he took that proscription very seriously. For in fact reason is never mentioned. Here are the two passages.

For just as nature made the human tongue unlike the tongues of other animals, using it for two activities, as we say it does in many cases, so it does with the lips—it makes use of the tongue for the sake of both flavors and speech, while it makes use of the lips for the sake of both speech and the protection of teeth. For vocal speech is composed out of units of sound; and if the tongue were not such as it is nor the lips moist, most of those units of sound could not be spoken, since some result from pressings of the tongue, others from pursings of the lips. (659b34–660a8)

Mankind has the most detached, softest and broadest tongue, so that it may be useful for both its activities—the soft and broad tongue being useful both for the perception of flavors (for man is the most keenly perceptive of animals, and his tongue is soft, for it is most tactile, and taste is a sort of touch); and for the articulation of words and language. For being such, and detached, it would be most able to pull in and push out in every way. This is clear in those for whom the tongue is not fully

detached; for they speak inarticulately and defectively, and this is a deficiency of language. In what is wide the narrow is also present; for the small is present in the great, but not the great in the small. And that is why among the birds those most able to pronounce units of speech have broader tongues than the others. (660a17–27)

Aristotle rigorously restricts both discussions to the peculiar nature of human *vocalization*, never mentioning that our articulate sounds are able to serve the purposes of practical and theoretical reason. This is perhaps most clearly revealed in his closing remark about which birds are most able to pronounce units of speech [*gramatta*]. As far as this discussion goes, one could easily conclude Aristotle was a strict behaviorist when it comes to language.

IV. MATTERS OF THE HEART

Since cognition is a cardio-vascular function in Aristotelian biology, the next place in *De Partibus* where we are able to test Aristotle's resolve with respect to the proscription on the discussion of reason is chapter 6 of book III. Earlier, in *P. A.* II.2 (648a2–14), there was a brief discussion of the effects of certain differences in blood and its analogue in bloodless animals—differences along the continua thick/thin, hot/cold, pure/turbid—and their correlation with certain cognitive differences. In that discussion thinner, cooler and purer blood are associated with being “more perceptive and intelligent” [*aesthētikōteron kai noerōteron/phronimōteron*]. In that discussion the only kind of animal that is mentioned is the bee, which is cited as an example of a bloodless creature which is more intelligent than many blooded ones.

In the discussion of the heart there is a parallel claim of a correlation between the relative size and hardness of the heart and how “perceptive” an animal is (667a11–21). But, as with the earlier discussion, this is a discussion of the anatomical correlates of differences in character, and neither reason, nor human cognition, is mentioned. Thus the use of this cognitive language must be understood within the context of Aristotle's views about cognition—below the level of human ability to grasp universals and reason theoretically—as differing only by the more and less from one species to the next.¹²

That reason is systematically excluded is even clearer from the overall structure of the argument. It begins with a demonstration that blood, being liquid, requires vessels, and that these require a source, followed by evidence that the heart is that source. The human heart is singled out for special mention only once, when it is noted that while all hearts tend to be

centrally located, this is most obvious in the human case (665b18–22). It is argued that “all perception evidently originates from and proceeds to the heart” (666a11–12), and it is stated as an unargued principle that “animal is defined by perception, and the primary perceiver is the primary blooded part, and such is the heart” (666a34–b1). The discussion concludes with the claim that what the heart is and what it is for has been stated. Clearly, its cognitive function has been identified, but only at the level of perception.

V. THE CHALLENGE OF THE HUMAN HAND

Perhaps the greatest challenge to the claim that Aristotle rigorously sticks to his principle of the exclusion of reason from zoology is to be found near the end of book IV, in chapter 10. Aristotle’s ultimate explananda in this chapter are the differences in limb number and structure in the viviparous animals, as the summary at 687a2–5 makes clear. In his discussion of humans, Aristotle first begins by explaining upright posture, which can then be used to further explain the possession of hands, a discussion of which follows (687a5–23). Clearly, this is just what we would expect, since these are two anatomical traits that distinguish humans from other blooded vivipara, and thus require special explanation. However, what is not to be expected is an apparent appeal to human reason in the explanation provided.

As stated, the argument has a number of lacunae; the following provides a minimal expansion (additions in angled brackets) which gives Aristotle his desired conclusion:

1. Humans are divine in nature.
2. A function of what is most divine is reason.
- <3. Therefore a function of humans is reason.>
4. Reason is hampered by having much which is bodily pressing down [on its organ].
- <5. Therefore humans do not have much which is bodily pressing down.>
- <6. Things which do not have much which is bodily pressing down are upright.>
7. Therefore humans are upright.

Thus uprightness in humans is, in essence, a consequence of their being properly constructed for reasoning.

This argument needs to be integrated with an earlier one, at 653a28–32. There Aristotle claims that mankind’s upright nature is due to the great heat around the human heart, which causes growth in the upward direction. This argument is alluded to later in our passage, at 686b27–31. Thus normal, adult humans are upright because of the heat around the heart (the seat of

intelligence and the common sense) sending elevating heat upward. But having this “elevating heat” above, moderated by the brain, is fitting for a rational being, since the region around the heart is then not pressed down upon from above.

A number of the premises in this argument stand unsupported. Why are humans thought to have a less heavy upper region than quadrupeds? How precisely are soul functions hampered by having bodily material above? What does it mean to *locate* soul functions such as reason? These last two questions raise broader issues of how Aristotle conceives of the material basis of reason and common sense in this discussion.

Some useful detail is provided by *De Somno* 3, since Aristotle sees sleep as a temporary dulling of cognitive functions due to just those causes that are a quadruped’s natural condition. Briefly: excessive nutrient, in the form of ill-concocted blood, rises due to the heat of the heart, but then presses down as it is cooled by the brain (456b18–29). We “nod off” because of this heavy nutrient in our heads, and children sleep a great deal because their growth, which is in the upward direction, carries much nutrient upward, which leads to the recurrence of the above dormative process (456b32–457a6). This constant excess of nutrient above also accounts for the “dwarfish” nature of children (457a6–7), which in our *P. A. IV* passage is also connected to their relative lack of reason. This discussion is thus consistent with the *P. A. IV* account, and provides some grounds for the premises in this argument.

One can read this passage, then, as a teleological explanation for those physiological processes which have our upright posture as a consequence. And as the goal is the primary cause in such an explanation, it is the proper functioning of reason that seems to be the primary cause.

This result is reinforced by the last discussion to be examined, in which Aristotle responds to Anaxagoras’ argument (as he presents it) that human beings have reason because they have hands. Not surprisingly, Aristotle thinks this is precisely the opposite of the truth.

Anaxagoras said it was because it has hands that mankind is the most intelligent of animals; it is reasonable, however, that it is because mankind is most intelligent that it is given hands. For the hands are an instrument, and nature always apportions, like an intelligent human being, each instrument to the one able to use it. Surely it is more fitting to give flutes to the flautist than to provide the ability to play flutes to one who has them; for nature has provided the lesser to the greater and superior, not the more honorable and greater to the lesser.¹³ So if it is better thus, and nature does, among the possibilities, what is best, it is not because they have hands that mankind is most intelligent, but because mankind is the most intelligent of animals that it has hands. For the most intelligent animal would use the greatest number of instruments well, and the hand would seem to be not

one instrument, but many; for it is, as it were, an instrument for instruments. Accordingly, to the one able to acquire the most arts nature has provided the most useful of instruments, the hand. (687a8–23)

There are a number of features of this argument that make it less problematic than the previous one for the question of whether reason is properly precluded from Aristotle's zoological studies. First, here it is the fact that mankind is the most practically intelligent [*phronimōtaton*] of animals that is at issue, and throughout *P. A.* degree of practical intelligence is discussed as an issue of "character," and is cashed out behaviorally. It is clear from the constant use of the comparative and superlative in these discussions that Aristotle is not predicating of humans something nonexistent in other species—rather, it is something that we have to a greater extent. Thus we can use the hand, that instrument of instruments, while animals of lesser intelligence could not. And since nature produces the best possible arrangement, we have hands.

VI. CONCLUSION: PRESUPPOSING REASON AND STUDYING REASON

The question that has concerned us is the place of mankind in Aristotle's zoological philosophy. It is an interesting question precisely because Aristotle holds the following three beliefs.

1. Mankind, in virtue of its ability to employ theoretical reason, is a participant in the divine. This is in fact the feature that most clearly differentiates mankind from the other animals.
2. Mankind is a proper, indeed a prime, object of zoological investigation.
3. Reason is *not* a proper object of zoological investigation.

An obvious way of insuring the consistency of these three propositions is to exclude this one feature of human nature, reason, from zoological enquiry. This appears to be the way defended in *De Partibus Animalium I*. But there is a serious roadblock to the successful deployment of this strategy. Aristotle takes human anatomy and physiology as the paradigm for organizing the investigation of the nonuniform parts (organs) of blooded animals. In particular, he takes the upright posture of mankind as his starting point in determining the order in which the parts are to be investigated. Our upright posture, however, appears to be a result of our being properly organized for the deployment of reason. Not only does this appear to be the ultimate explanation for the physiological account of the development of that posture; it also seems to be the explanation of why, given that posture,

we are given that instrument of instruments, the human hand.¹⁴

It is at this point that one can pursue two different interpretive strategies. It is clear that Aristotle thinks that the character trait he refers to as “practical intelligence” is one that ranges along a continuum within the animal kingdom, and is closely associated with the temperature, density, and “purity” of an animal’s blood. We are the most practically intelligent of all the animals, but there are plenty of creatures, including insects, that Aristotle feels no discomfort in describing as practically intelligent. The *P. A. I.1* prescription on the study of reason by natural science does not mention practical intelligence, and that is the only kind of intelligence mentioned in the explanation for our possession of hands. One can push hard on this line of interpretation, and be reasonably successful.

However, there are unmistakable references in *P. A. II.10* and *IV.10* to Aristotle’s characteristic association of our rationality with divinity. This is plausibly taken to be a reference to what Aristotle believes utterly differentiates us from the other animals, namely, reason. Here he has in mind that faculty that allows us to ascend through levels of abstraction to the realms of mathematics and first philosophy; a faculty which he has trouble associating with any particular bodily organ.

The reference to theoretical reason in these arguments should not be ignored. An interpretive strategy which allows us to take these passages seriously is readily available. Now that we have examined those passages in which Aristotle alludes to human rationality, we should briefly return to the passage with which we began to reconsider precisely what it means to declare a subject off limits to natural science.

What is declared off limits is a theoretical investigation [*theoria*] of reason. Two arguments are provided for this declaration. One is that, assuming that such an investigation would study both reason and its objects, natural science would swallow up mathematics and first philosophy. I suggested earlier that this seems a dubious claim, even given Aristotle’s assumption that the same investigation studies correlatives. The other seems to be that natural science should concern itself with soul just insofar as soul is a source of biological change or movement—with the soul of animal, *qua* animal. Here, relying on the resources of *De Anima* III, Aristotle seems to have an argument. Reason, insofar as it is viewed independently of desire and locomotion, is not a source of change or motion.

If natural science is to study mankind *qua* animal, however, it must account for his differentiae, those features, should he have any, which distinguish him from all other animals. Aristotle’s philosophy of science dictates that such features must be accounted for by reference to other features equally distinctive of mankind. Such differentiae include human uprightness, human hands, our lack of tail and our fleshy buttocks, to mention a

few. Either directly or indirectly, reference to our peculiar form of intellect seems to be required to explain these features.

What seems completely clear, however, is that *De Partibus Animalium* does not theoretically investigate human reason. In fact, even what is said about the souls of animals generally seems to presuppose, and regularly refer readers to, such an investigation—specifically that found in the *De Anima* and *Parva Naturalia*.

The investigation of Aristotle's proscription on the zoological investigation of reason may thus help us to understand why Aristotle distinguishes inquiries as he does. By having an essentially functional enquiry into the nature of soul which is distinct from his zoology, Aristotle can assume, as starting points and premises of zoological arguments, what those arguments cannot themselves establish. This should lead us to reconsider the import of the first chapter of the *De Anima*. For that chapter is an aporetic enquiry into what sort of study the study of soul is—an enquiry driven by distinctions between natural enquiry, dialectical enquiry, mathematical enquiry, and the enquiries of the first philosopher.

Among the puzzles there raised is a by now familiar one.

In most cases none of the affections of soul (e.g., anger, courage, desire, and sensation generally) appears to be acted upon or to act without body. Reasoning [*to noein*], however, seems most of all to be distinctive; but if this too is a sort of imagination [*phantasia*], or does not exist without imagination, even this would not be possible without body. (403a6–10)

The enquiry we know as the *De Anima* may well be driven by Aristotle's concerns about the limits of the zoological investigation of mankind.

NOTES

1. All translations of Aristotle's texts are my own.
2. William Charlton (in "Aristotle on the Place of Mind in Nature," in *Philosophical Issues in Aristotle's Biology*, ed. Allan Gotthelf and James G. Lennox [Cambridge: Cambridge University Press, 1987], 410–11) presents this argument as a *reductio ad absurdum*. But this cannot be correct. It does not conclude by simply asserting the contradictory of the initial supposition. Nor is the conclusion presented as an obvious absurdity. Aristotle thinks it is false, but not obviously so; and he thinks the principal error in the argument lies in its initial supposition.
3. See David M. Balme, *Aristotle: De Partibus Animalium I and De Generatione Animalium I* (Oxford: Clarendon Press, 1972; reprint, 1992), 89, 92; Charlton, "Aristotle on the Place of Mind in Nature," 411.
4. There are valuable discussions of this argument in Cynthia Freeland, "Aristotle on Perception, Appetition and Self-Motion," and Susan Sauvé Meyer, "Self-motion and External Causation," both in *Self-motion from Aristotle to Newton*, ed. Mary Louise Gill

- and James G. Lennox (Princeton: Princeton University Press, 1995), 33–63 and 65–80, respectively.
5. “Aristotle on the Biological Roots of Virtue: The Natural History of Natural Virtue,” in *Biology and the Foundations of Ethics*, ed. Michael Ruse and Jane Maienschein (Cambridge: Cambridge University Press, 1999), 10–31.
 6. *P. A.* I.2 643a3–5. For a fuller discussion of the difference, cf. *P. A.* IV.12 693b2–5; *I. A.* 11. 710b5–711a2.
 7. A useful collection of the remainder can be found in G. E. R. Lloyd, *Science, Folklore and Ideology* (Cambridge: Cambridge University Press, 1983), 30. For a critical review of Lloyd’s views on “Man as a model” in Aristotle’s zoology, see James G. Lennox, “Demarcating Ancient Science: A Discussion of G. E. R. Lloyd, *Science, Folklore and Ideology*,” *Oxford Studies in Ancient Philosophy* 3 (1985): 307–24.
 8. Nor is it surprising that he does not limit this attribute to humans. In *H. A.* VIII (IX) Aristotle regularly uses this term to refer to the lives of certain birds. Cf. 609b19 (and Balme’s note), 615a16, 18, 28, 32; 616b10, 13, 23, 30; 619b23; 620a21.
 9. Cf. *Nicomachean Ethics* X.8 1178b7–32.
 10. Though I will not have time to pursue it here, the systematic differences in the order of investigation between the *Historia Animalium* and *De Partibus Animalium* should at least be noted. In *P. A.*, the order, very roughly, is [i] uniform parts (tissues and fluids) of blooded and bloodless animals; [ii] upper external non-uniform parts (organs) of blooded animals; [iii] internal organs of blooded animals; [iv] internal and external organs of bloodless animals; and [v] lower external parts of blooded animals. In *H. A.*, on the contrary, all the organs, both external and internal, of the blooded animals are studied *before* the uniform parts. The bloodless animals are then studied, followed by books devoted to reproduction and generation, behavior, and habits. It should also be noted that the organs and fluids associated with reproduction are explicitly excluded from *P. A.* altogether, since they are to be investigated in *De Generatione Animalium* I; and in *H. A.* are treated as part of the discussion of reproduction and generation, not of external or internal organs.
 11. He is likely attempting to be humorous when he occasionally remarks that by these criteria, in plants the up is down and the down is up.
 12. Cf. James G. Lennox, “Aristotle on the Biological Roots of Virtue,” in *Biology and the Foundations of Ethics*, ed. Ruse and Maienschein; J. L. Labarrière, “La *phronesis* animale,” in *Biologie, Logique et Métaphysique chez Aristote*, ed. Daniel Devereux and Pierre Pellegrin (Paris: CNRS, 1990), 405–38; Andrew Coles, “Animal and Childhood Cognition in Aristotle’s Biology and the Scala Naturae,” in *Aristotelische Biologie: Intentionen, Methoden, Ergebnisse*, ed. W. Kullmann and S. Föllinger (Stuttgart: Franz Steiner, 1997), 287–324.
 13. Cf. DK 59A102. We have no independent confirmation that this is Anaxagoras’ view, but it is broadly consistent with an evolutionary perspective expressed at DK 59A1 (Hippolytus *Ref.* 1,8,12), that animals first arose from the moist, and then began to reproduce. So here Anaxagoras may be claiming that (as the Epicureans later insisted) first the organ arises, then the ability to use it. Aristotle, of course, wants to give causal priority to functional ability.
 14. Nor do the explanatory results flowing from our rationality end there. From 689b2–690a1, Aristotle explains two other features which differentiate us from the other vivipara by reference to our upright posture: our lack of tail and our fleshy buttocks.