

RESTORING THE ORDER OF ARISTOTLE'S *DE ANIMA*

The chapters of Aristotle's *De Anima* are not in their original sequence. The last two chapters, III 12–13 (434a22–435b25) have nothing to do with what immediately precedes; they have apparently dropped out of the text at some stage and been placed at the end, but internal evidence shows, I shall argue, that they originally belonged between II 4 and II 5 (between 416b31 and b32). The restored sequence brings into clearer focus many of Aristotle's most famous and controversial doctrines about perception.

I

The internal evidence is of three kinds. (a) Aristotle himself provides a plan for the treatment of topics in the rest of his work in II 3, and in their present position the topics of III 12–13 are an inexplicable deviation from the plan, whereas in the proposed position they follow the plan neatly. (b) The linking passages at present are difficult or impossible to understand, whereas in the correct order the linking passages are clear and straightforward. (c) In all the cases in II 5–III 11 where the same topic is referred to as discussed in III 12–13, it makes better sense to see them as references back to the passage in question than to see them as references forward.

(a) Order of discussion

After the historical discussions of Book I, Aristotle defines the soul in terms of life, and, more specifically, in terms of the various powers which living things possess. This is the import of II 2–3 (413a20–415a13) and also what Aristotle, in the *De Sensu* (436a1–2), says that he has said in the *De Anima*. These powers include nutrition, sensation (within which the contact senses are more universal than the distance senses), locomotion and thinking. The interesting thing about these various powers, according to Aristotle, is that they form a hierarchy, from the more universal to the less universal, according to which a creature which possesses a certain power also possesses all the other powers at least as universal as it.

The case of soul is equivalent to the case of figures; the first in the series, of both figures and living things, is always potentially present, e.g. the triangle is contained in the quadrilateral, and the nutritive power in the perceptive power... We must investigate why they are arranged in this series. For there is no perceptive power without the nutritive power, but in plants the nutritive power is separate from the perceptive power. Again, none of the other senses exists without the sense of touch, but touch does exist without the others, for many animals have neither sight nor hearing nor the sense of smell. And of perceiving creatures some have the power of movement, while others do not. Lastly, there are also a very few which have reasoning and thought, and those (among mortal creatures) which have reasoning have all the other powers, but not all which have the others have reasoning, and of these some do not even have imagination, while others live by imagination alone. (414b28–32 and b33–415a11)

This hierarchy informs the order in which Aristotle treats all the topics in the *De Anima*.

According to this scheme we might expect to see the following order of discussion: nutrition, sensation, locomotion, and then thinking. In fact, we see thinking discussed before locomotion, but this is easy to understand, because at the very point where Aristotle has finished discussing sensation and would be expected to discuss locomotion next, he makes a remark which explains why he is reversing the order.

Since there are two main differentiae by which the soul is characterized – local movement and thinking, understanding and perceiving, and thinking and understanding seem to be like a form of perceiving (for in both cases the soul discriminates and is cognizant of something which is) – indeed the ancients identify thinking and perceiving (e.g. Empedocles said ‘for ‘tis in respect of what is present that man’s wisdom grows’, and, elsewhere, ‘whence it happens that men always think different things’, and Homer’s ‘for such is man’s mind’ means the same); they all suppose that thinking is corporeal like perceiving, and that like is understood by, as well as perceived by, like, as explained also at the beginning of our discussion [sc. I 2]; yet they ought at the same time to have discussed error also, for it is more characteristic of animals than truth, and the soul continues longer in the state of error... (III 3, 427a17–b2)

The highest power, thinking, is like the third-highest power, perceiving, in that both are forms of cognition. This makes it convenient to treat thinking after perception and reserve locomotion for later. Furthermore, thinking is open to error in a way in which perception (at least of the special sensibles) is not, and this provides the occasion for Aristotle to criticize the notion that cognition is of like by like, as well as to account for the possibility of error. An incidental advantage of the reversal of the order of treatment is to allow Aristotle to deal with all the various modes of motivation and locomotion (including the rational modes), which would have been impossible without discussing reasoning first.

According to this revised scheme we should expect to see the following order of discussion: nutrition, sensation, thinking, and then locomotion. This is what we do see (except for III 12–13). Aristotle does discuss the senses after nutrition and before locomotion and thinking, surrounding his discussion of the individual senses with general remarks about their common features, at II 5–6 and II 12, and III 1–2. The former remarks are genuinely introductory, and the latter remarks discuss puzzles which have arisen from the intervening discussion and from the introductory remarks.

We should now expect the following order of discussion: nutrition, the senses (introductory), the individual senses, the senses (puzzles concerning them), thinking, and then locomotion. There is no reason in this scheme of things (or in any modification of it) for the topics of III 12–13 to be discussed *after* locomotion. They consist of the following: nutrition is universal, but sensation is not; the point of having sensation; contact senses and distance senses; how media can transmit information to distance senses; why the bodies of perceiving animals must consist of at least two of the four elements; ways and consequences of destruction of the sense organs; the differences between necessary senses and beneficial senses. Clearly these topics are introductory topics concerning sensation, the differences between plants and animals, and the differences between contact senses (which are universal in animals) and distance senses (which are not). Clearly, they effect the transition from a discussion of nutrition (in which plants and animals share) to a discussion of sensation. They have a natural role to play in the discussion when placed between II 4, the discussion of nutrition, and II 5, part of the introductory discussion of sensation. This would have been obvious if we had found the chapters either in their original place or labelled as having been displaced.

(b) The linking passages

The linking passages between the various chapters also show the original location of the disputed chapters. The beginning of III 12 is far better as a continuation from II 4 than from III 11. At III 11, Aristotle has been discussing whether it is the particular or the universal opinion which can more properly be said to motivate a person; perhaps it is both, and the universal opinion motivates ‘while it is quite stationary,

whereas the particular opinion is not' (434a20–1). There is an impossible non-sequitur between this and the following:

The nutritive soul, then, must be possessed by everything which is alive and has a soul, from its birth to its death. For what has been born must grow, reach maturity, and decay – which are impossible without nutrition. Therefore the nutritive faculty must be found in everything which grows and decays. But sensation need not be found in all things that live. (434a22–7)

This latter passage is a very appropriate link between the discussion of nutrition (which Aristotle has just said he has finished, for the present, at 416b30–1) and the discussion of sensation, especially in view of the hierarchy of powers and the order which that hierarchy imposes on his discussion.

Likewise, it is clear that II 5 is better as a continuation of III 13 than of II 4. II 5 begins, 'having made these distinctions let us speak of perception in general' (416b32–3). This is not impossible as a continuation of II 4, for Aristotle has indeed there been making distinctions, notably between two senses of 'what nourishes' (416b25–7). But it is particularly appropriate as a continuation of III 13, for that chapter has been distinguishing between the contact senses and the distance senses in at least two respects, that (i) the former cannot, and the latter can, be supported by organs constituted of a single element, and (ii) the former are necessary for life, whereas the latter are useful for well-being. Put after III 13, the first sentence of II 5 would now be saying, 'So much for the ways in which senses differ from each other; let us now discuss the common features of sensation.' This is exactly what happens in II 5–6, which are the remainder of the general introduction to the treatment of the senses.

(c) Direction of internal references

The third kind of internal evidence concerns the direction of internal references. These references are all implicit; there are no explicit references in III 12–13 to passages outside these chapters, nor are there any explicit references elsewhere in the *De Anima* to III 12–13. But there are many implicit references, in which a topic is taken up after having been discussed before. Some of these concern doctrines about whose interpretation scholars disagree, but of those five references which are not controversial, all indicate that III 12–13 belongs before II 5ff. (The same is true, I think, of the controversial references, but I do not use them as evidence.)

(1) In II 7 (419a11–21) Aristotle explains (against Democritus) why it is that colour must be seen through a medium which is actually transparent; the colour will not be seen when placed directly on the eye, which is evidence that the power which colour possesses to effect qualitative change is only the power to effect qualitative change in a medium, which in turn has the power to effect qualitative change in an organ. At a25–30 the same account is said to hold of sound and smell. The argument here is that it is *necessary*, if we are to see, hear or smell, that there be a medium. In III 12, there is a related passage which explains how it is *possible* to perceive through a medium: at 434b27–435a10 Aristotle explains how qualitative change can be affected across a medium by using the analogy of the transmission of local movement across a medium. The argument (in III 12) for the possibility of perception across a medium ought to come before the argument (in II 7) for the necessity of a medium, because the alternative account, which Aristotle relies on when refuting Democritus, is the account already given at III 12. 'Colour changes what is transparent, e.g. the air, and that, extending continuously (*συνεχούς*) from the object to the organ, changes the latter' (419a13–15, which reads like a summary of 434b27–435a2). Putting the two

passages together, the overall pattern of argument is this: we see that some animals see, hear and smell through a medium at a distance; but perception is alteration by the object (as is said at *Physics* VII 2, 244b10–245a2, to which 416b33–5 refers); alteration takes place only when there is contact between what alters and what is altered (*Physics* VII 2, 244b2–5 and 245a2–11); perception at a distance through a medium will therefore be possible only if there is a continuous (*συνεχής*) series of alterations from object to organ (*Physics* VII 2, 245a5–8 and *De Anima* III 12, 434b27–9); when we try to see, smell or hear without a medium (i.e. by immediate contact) we fail (*De Anima* II 7); therefore all seeing, hearing and smelling at a distance is necessarily via a continuous series of alterations in a medium. At II 7, Aristotle can be confident that his experiment of placing the object in contact with the organ succeeds in proving that a medium is necessary and there is no need to suppose direct alteration of the organ by the object, only because he already (at III 12) has shown how the organ can be indirectly altered by the object.

(2) Similarly, Aristotle's remark, in II 7, that touch and taste also operate through media, again needs to be taken against the background of III 12–13. There, Aristotle says that touch and taste perceive by immediate contact (434b14–18 and 435a17–19) which distinguishes them from sight, smell and hearing. But at II 7, he says that media are necessary for sight, smell and hearing, and that 'the same is true of touch and taste, despite appearances; why this is so will be clear later' (419a30–1). The forward reference is to II 11, where he will explain that there are indeed media between the organs of touch and taste and their objects, but that those media (flesh for touch and the tongue for taste) are not external to the body (423b1–26). In II 11, Aristotle corrects the idea that taste and touch perceive by contact (*τῷ ἄπτεσθαι*) while sight, smell and hearing take place at a distance (*ἄποθεν*) (423b1–4). This idea was stated in III 12–13; touch takes place by contact (*τῷ ἄπτεσθαι*, 435a17, and *ἄπτόμενον*, 434b27) whereas the three distance senses involve perception at a distance (*ἄποθεν*, 434b27). The simpler, more commonsense theory in III 12–13 is corrected by a more subtle theory in II 11, and Aristotle cannot have baldly stated the refuted theory in a context which came *after* its refutation.

(3) Again, at the beginning of II 10, Aristotle states that 'what is tasteable is something tangible' (422a8) and proceeds from this to argue about what kind of sense taste must be. This might conceivably be an allusion to II 9 (421a18–19), where it is said that 'taste is a kind of touch', but this is a parenthetical remark, and it is more likely that both remarks allude to III 12, where Aristotle explains, in some detail, why taste is a kind of touch. Taste is directed at food, which is a tangible body, and none of the distance senses is directed at anything nutritious. Both taste and touch are necessary for an animal to survive (434b18–24). Again, the first time that Aristotle associates taste with touch in particular (II 3, 414b6–14) he refers forward to a later discussion, which must be III 12, where it is said plainly that taste is a kind of touch, and why. Aristotle cannot very well have given the reasons, why the first premise in his discussion of taste in II 10 holds, in some later context.

(4) In II 8, Aristotle is discussing sound, and, as a special case, vocal sound. Since the common feature of sounds is that they are made 'by the impact of something against something else, in air' (420b14–15), voice, too, will need air for its production. But nature uses air for two purposes, to keep the body cool, and also to help make vocal sounds, just as nature uses the tongue for two purposes, to taste food, and also to help make articulate vocal sounds. In the former cases (refrigeration and tasting) the function is necessary for the animal's existence, whereas in the latter cases (making articulate vocal sounds) the function serves the animal's well-being (b16–22). This

discussion is related to III 12–13 in two respects; generally, there is a discussion of the teleology of the senses in III 12–13, with a similar invocation of 'nature' (434a31) and the same distinction between the necessary and what serves well-being (434b22–6); specifically, it is said that the tongue is used for the sake of its possessor's well-being to make significant sounds to others (435b24–5).¹ In this latter context we are told that the distance senses all serve their possessor's well-being, rather than being necessary, for vision is good for seeing, and hearing is good for communication, but neither is strictly necessary for the animal's existence.² It is rather easier to see this passage in II 8 as coming after III 12–13 than vice versa, although either order is feasible. The III 12–13 passage is a general discussion of the teleology of the senses which presents arguments for four ideas which the passage in II 8 uses: (i) nature makes the senses for certain ends (434a31f.), (ii) there is a difference between ends, in that some are necessary for life, whereas others are useful for well-being (434b22–4), (iii) the senses which serve well-being are less widely distributed than those which are necessary (434b24–6; cf. 420b19), and (iv) taste is a necessary sense (434b18–24).

(5) Two complex arguments in Book III make connections between the organs of the various senses and the four elements. At III 1, 424b22–425a13, Aristotle argues that there cannot be a sense in addition to the conventional five. In outline, his argument is dilemmatic; at 424b24–9 he argues that there is no further sense which we might have by contact, because we can perceive all possible tangible qualities, and at 424b29–425a13 he argues that, in respect of the distance senses, by which we perceive through media, there is no further sense which we might have, because we possess all the senses which apprehend through all the possible pure media. At III 13, 435a11–b3, Aristotle sets out to show that animals cannot have elementally simple bodies, for the organ of touch (which all animals possess) cannot be elementally simple (although the organs of the distance senses can consist simply of air, water or fire). The organ of touch cannot be comprised simply of earth, according to 435a20–b1, because it can perceive all possible tangible qualities. It makes better sense to see the

¹ Torstrik and Ross, in their editions (Torstrik, *Aristotelis De Anima*, Berlin, 1862; Ross, *Aristotle, De Anima*, Oxford, 1961), excise 435b24–5 γλωτταν δὲ ὅπως σημαίνει τι ἑτέρω, possibly correctly, for it is not relevant to the immediate context and could easily have been added by an editor who had read 416b16–22. There would have been reason for an editor to add something at this point if the papyrus MS he was working from was damaged (see n. 2, and below, pp. 379–81).

² There is a complication at this point (435b22–4) in that Aristotle says that taste, too, is for the sake of well-being. But it is not a distance sense, and at 434b22–6 (which is referred to at 435b20) Aristotle has said that 'these senses [*sc.* touch and taste] are necessary for animals and it is clear that no animal can live without touching [at b21 taste is said to be a kind of touch]; but the other senses are for the sake of well-being and need to belong not to just any kind of animal, but only to some, e.g. to those which can move.' Again, the 'other senses', which at 435b19–21 are said to be for the sake of well-being, are marked off in the preceding discussion in distinction to touch because they do not by themselves involve contact with the object (435b7–13). So in III 12–13, taste is said to be necessary for an animal, and *not* one of the senses which are for the sake of well-being. Again, in *De Sensu* 436b14–21, taste is said to be necessary for animals and is distinguished from smelling, hearing and seeing in that the latter belong only to animals which can move. Only at III 13 (435b22–4) is it said, against the view clearly expressed in four other places, that taste is a sense which exists for well-being. It is also strange that smell is not mentioned at 435b22, for smell is earlier said to be a distance sense which exists for the sake of well-being. I suggest that we should read *δοσφρησιν* for *γεῦσιν* at 435b22; then both problems disappear. (According to the account which I give below, these lines were arguably at the very outside of a roll which was damaged by moisture and moths, and in which Apellicon is said to have 'filled in the gaps incorrectly', Strabo, *Geography* 609. See below, pp. 379–81.) But this crude solution to the issue does not affect the larger issue of whether III 12–13 is the background for II 8.

argument in III 1 as presupposing the argument in III 13 than vice versa, for the reasons which follow.

The first premise in the argument at III 1 is that 'we do, in fact, have perception of everything perceptible by touch' (424b24–5). This is advanced as a familiar fact, and the only place where it can have been discussed previously is at III 13, 435a21–b1, where it is connected with the proof that the organ of touch cannot consist solely of earth because it is receptive of all tangible qualities (*sc.* and not just those of earth). Something like a complete list of tangible qualities is offered at *De Generatione et Corruptione* II 2: 'hot, cold, dry, moist, heavy, light, hard, soft, viscous, brittle, rough, smooth, coarse, fine' (329b18–20). The remark in III 1 cannot rely on II 11 where Aristotle says that 'what can be touched are the differing qualities of body *qua* body; by such differences I mean those which characterize the elements, viz. hot, cold, dry, moist, of which I spoke previously in my treatise on the elements [*sc. De Gen. et Corr.* II 2–3]' (423b27–9). It cannot rely on this remark, for what is required in the argument at III 1 is that we perceive *all* possible tangible qualities, which is what the remark at III 13 says, and not what the remark at II 11 says, for at II 11 Aristotle speaks of the four primitive qualities.

Again, we can see a development from an outline view at III 13 to a more precise view in III 1. At III 13 it is supposed that 'the elements other than earth can constitute sense organs' (435a15). But at III 1 this claim is refined; air and water can and do constitute sense organs, but fire cannot, for it is either in no sense organ or in all (425a5–6). Similarly, it is a suppressed premise in the argument at 435a15–20 that touch, being a contact sense, must have an organ which contains earth. But by the time the question is addressed at III 1, Aristotle has a more guarded view, that 'earth is found in no sense organ, or else is especially associated with the organ of touch' (425a6–7). This more guarded view is connected with the development in II of his theory of touch; since touch, too, despite appearances and what was originally said in III 12–13, turns out to be a distance sense of sorts, flesh turns out to be the medium of touch rather than its organ, and we must search for the organ within (423b22–3). In these three cases, it can hardly be that Aristotle propounds the less subtle, and superseded, view in a passage which comes after its correction. This completes the argument for the view that the chapters of the *De Anima* have been dislocated.³

II

The restored order sheds light on some of Aristotle's most famous and controversial views on perception. For example, the demonstrandum of the argument at III 13 is that no animal can have a body which is elementally simple. This argument is begun at 434a27–30 and resumed at 434b9–11; it concerns nothing less than establishing the main differences between plants and animals, which is exactly the topic which belongs between the discussion of nutrition (II 4) and the discussion of general traits of perception (II 5). Plants have simple earthen bodies (435b1), which is why they cannot perceive. Another mark which distinguishes plants from animals, at III 12, is that plants cannot 'receive the form without the matter' (434a29–30). This has, of course, always been taken to be a reference back to II 12 (424a32–b3). The reason in II 12 has to do with their having no mean between perceptible qualities, and this is also said at III 13 (435a21–3) where it is connected with the flexible receptivity of the organ

³ I do not mean to suggest that there were chapters already marked out in Aristotle's text which then got shuffled; the practice of dividing the *De Anima* into the present chapters goes back no further than the third edition of Erasmus' complete Aristotle (Basle, 1550).

of touch. But now we should see these remarks in II 12 as pointing backward to III 12–13. What was established there is that there is a difference between plants and animals in that animals must be of an elementally complex nature; not until II 12 is the other conclusion clearly drawn, that there is a difference between plants and animals in that plants cannot receive forms without matter. (What plants can do, short of perceiving, is to be warmed and cooled, 424a34–bl; this pair of effects is what was given in III 13, 435a23, as an example of the flexible receptivity of the organ of touch.)

The same applies to another famous doctrine, that excesses in sensible qualities destroy the organ's power to perceive. This fact has been mentioned at II 10 (422a20–33) and II 11 (424a10–15) and is explained at II 12 (424a26–32) before being repeated at III 2 (426a26–b7) and III 4 (429a31ff.). But now we should see that its introduction is at III 13 (435b7–19). In this passage Aristotle makes the point that excesses of tangible qualities will cause the animal to die (although excesses of other qualities will not) and sees this as explained by his view that touch is the only necessary sense.

Finally, the restored order will affect our understanding of the famous analogy between the senses and wax (II 12). Wax first appears at III 12 (435a2–5), as an example of something fluid which can be affected (unlike stone) yet which does not pass on the changes made in it (unlike air or water). It is therefore an example of something receptive but unsuited to being a medium, and so suited to being the last term in the continuous physical sequence of alterations involved in perception. So when Aristotle says at II 12 that all senses are like a piece of wax which can take on the form without the matter, the emphasis on *all* senses reflects the fact that Aristotle's new view, developed in II 7–11, is that all senses involve media, even the 'contact' senses; all senses without exception are like wax in that they are the end of a continuous sequence of alterations which pass through media.

III

Only occasionally have older editors and scholars been troubled by these chapters; Trendelenburg admits that they might seem out of place and that Aristotle's treatment seems 'quasi desultoria', but thinks that they are in place after all (*Aristotelis De Anima Libri Tres*², Berlin, 1877, p. 458 = p. 547 of the first edition, Jena, 1833). Wallace paraphrases Trendelenburg in his *Aristotle's Psychology in Greek and English* (Cambridge, 1882), 289. D. W. Hamlyn, however, in his *De Anima, Books II and III* (Oxford, 1968), 156 sees that the chapters do not follow from what precedes while not being at variance with the doctrine of the rest of the work. He supposes that they might have been added by Aristotle to the rest of the *De Anima* at a later stage. If they were added to an earlier version of the *De Anima*, it must indeed have been Aristotle who added them, not a later editor, for Aristotle refers to them as part of his *De Anima*. 'We have already, in our treatise *De Anima*, explained the nature of sense and sensation, and the reason why it belongs to animals' (*De Sensu* 436b9–12); the reason why it belongs to animals is given in III 12–13. But if it was Aristotle who added them to an earlier version of the *De Anima*, it is hard to see why he added them in such an awkward way; better to see them as having been displaced from their original order.

IV

When and how did this dislocation take place? It must have been before the time of Alexander of Aphrodisias, our earliest direct witness to the text (fl. early 3rd century

A.D.). In his book ἀπορίαι καὶ λύσεις he comments on 416b32–3, the first sentence of our II 5, and says that Aristotle has just finished discussing the nutritive power of the soul, which is the topic of our II 4 (Alexander, op. cit. III 3 = 82.24–6 Bruns). So Alexander read the *De Anima* in the conventional order. It is extremely unlikely that a writer on pagan texts in Alexander's time was working from codices rather than papyrus rolls,⁴ from which it follows that the dislocation occurred at an early stage in the process of transcribing the *De Anima* from one set of papyrus rolls to another. Beyond this one cannot be confident.

This sort of accident in the transmission of a text can be explained by accidental damage to the rolls on which the text was written, and in fact we know that some of Aristotle's works were damaged while being stored. The famous story told by Strabo (*Geography* XIII, 608–9) has it that the heirs of Neleus (who was bequeathed Aristotle's library by Theophrastus) stored the books underground where they were damaged by moths and moisture, before selling them, after a gap of some two hundred years, to Apellicon, who published them in Athens, 'full of errors'. Apellicon's library was seized by Sulla, according to Plutarch (*Life of Sulla*, 26) and taken to Rome where Tyrannio the grammarian arranged them and gave copies to Andronicus of Rhodes. Andronicus published them in Rome and made the list of Aristotle's writings which was still current in Plutarch's time. As it happens, the book lists derived from Andronicus (§§ 148–58 of the *Vita Menagiana* and §§ 29–56 of the list derived from Ptolemy Chennos, see, e.g. I. Düring, *Aristotle in the Ancient Biographical Tradition* [Göteborg, 1957], 80–92, 221–31 and 241–6) are the first to mention the *De Anima*. The earlier book lists, derived from Hermippus of Alexandria, or Ariston of Ceos (both late third century B.C.), do not mention it,⁵ and Andronicus is the first person whom we know of after the death of Theophrastus to have read the *De Anima*.⁶ So the *De Anima* seems to have suffered the fate described by Strabo, and the dislocation of the text may well be due to this period of its history.

One can only guess at how exactly this happened, but the following suggestion shows that it is easy to imagine at least one of the possibilities. The *De Anima* is approximately 96,000 characters in length. If we suppose that it was at one stage on two papyrus rolls, which is the number of standard rolls required for it when written in an ordinary hand, with ordinary margins,⁷ then the division would have been made

⁴ J. G. Kenyon, *Books and Readers in Ancient Greece and Rome*² (Oxford, 1951), 111–12.

⁵ § 13 of the catalogue in Diogenes Laertius (5.22) and § 13 of the catalogue in the *Vita Menagiana* refer to Περὶ ψυχῆς α' which cannot refer to our *De Anima*; it is part of a series of published works, not one of his scientific works, and what Plutarch refers to as 'Eudemus, or *De Anima*' (*Consolatio ad Apolloniam*, 115B), which is a dialogue. Again, § 73 of the catalogue in Diogenes Laertius (5.24) refers to Θέσεις περὶ ψυχῆς α', which is also unlikely to be our *De Anima*, for that work does not consist of θέσεις, unless possibly it is a separate edition of Book I of our *De Anima*, which does consist of doxographical reports and criticisms.

⁶ Andronicus knew the *De Anima*, for he rejected the *De Interpretatione* as spurious, on the grounds that it did not square with his reading of the *De Anima*; see Ammonius, *In De Int.* 5.27–6.4 Busse. The report is repeated by Philoponus, *In De An.* 27.21–7 Hayduck, and Alexander had earlier said that Andronicus rejected the *De Interpretatione* (*In Anal. Prior.* 160.31–161.1 Wallies). For the view that nobody between Theophrastus and Andronicus knew the *De Anima* we have only the argument from silence.

⁷ Since the *De Anima* was not prepared for publication by the earlier Peripatetics, it would not have been assembled into a single-roll edition, and it would have remained on the separate stationer's rolls on which it was written. These were never more than twenty sheets glued together, according to Pliny, *HN* 13.23 (confirmed by N. Lewis, *Papyrus in Classical Antiquity* [Oxford, 1954], 54–5). At a maximum width of 7½ inches per sheet, a roll would amount to 12½ feet, and it is impossible to fit the 96,000 characters of the *De Anima* onto a roll of 12½ feet, even assuming (unrealistically) the largest number of characters per line (25), the largest number of lines

after III 13 and before II 5, because the first half (roll A) contains roughly 47,000 characters, and the second half (roll B) contains roughly 49,000 characters, and there is also a natural break at the beginning of II 5 ('Having made these distinctions, let us speak of perception in general', 416b32–3). Since 'when a roll had been read it was left with its end outside',⁸ damage to the outside of a roll could detach a small piece from the end. If roll A were damaged and a small piece or two detached (III 12–13 would cover two papyrus sheets, or *κολλήματα*, in about 5 or 6 columns),⁹ what could be more understandable than placing the detached piece(s) at the end of the work rather than at the end of roll A? This kind of dislocation is among the easiest to explain for transmission of texts on papyrus rolls. So it is not unlikely that the dislocation was due to Apellicon when he found the rolls in a damaged state, and published them, perhaps in the three-roll form which has become canonical; or else it was due to Tyrannio or Andronicus. But this is only a suggestion, and there are many other ways in which chance or an editor could have done the deed.

All the evidence in favour of my thesis that III 12–13 has been displaced is internal, for there is no external evidence, nor will there ever be, except in the unlikely event that a very early papyrus turns up with text that straddles both sides of one of the gaps (II 4–III 12, or III 13–II 5). But if the *De Anima* is indeed one of those books which suffered the fate described by Strabo, then it is likely that all our manuscripts derive from an edition of the copy preserved underground, and it would be fetishism to value the manuscript evidence over the evidence internal to our understanding of the course of the argument.

University of Toronto

D. S. HUTCHINSON

per column (45), and the largest number of columns per foot (6). On the other hand, if it were written on two rolls, it would have been written at an ordinary density (all figures taken from Kenyon, *op. cit.* (n. 4), 51–60). The reason for the *De Anima* now being in three books is presumably that when it was published it was given large writing and large margins for a scholarly market.

⁸ Kenyon, *op. cit.* (n. 4), 61. Although this is not always true (I understand that it was not the case with the Herculaneum papyri), there is evidence contemporary with Aristotle in a marble statue of Sophocles. This marble is evidently a copy of the bronze which Lycurgus arranged to have set up in the theatre at Athens c. 336–324 B.C. (Ps.-Plutarch, *Lives of the Ten Orators*, 841F) and which was still standing in Pausanias' day (*Description of Greece* 1.21.1). At his right foot there is a *capsa*, or scroll-bucket, containing eight papyrus rolls, of which one is stored half-way open, one is stored with the beginning on the outside (or is upside-down), and six are stored with the end on the outside. The copy is now in the Vatican (Museo Gregoriano Profano, § 9973 = § 237 of the former Museo Profano Lateranense).

⁹ Here is the calculation (all figures taken from Kenyon, *op. cit.* (n. 4), 51–60): roll A has approximately 46,465 characters; it, being most of a stationer's roll, was between 10 and 12½ feet in length; so it was written on at a density of 300–60 characters per inch of roll. III 12–13 has approximately 4190 characters, which therefore occupied 10–14 inches of roll, and since there were 2–3 inches per column, 4–7 columns. But since *κολλήματα* of modest quality would be from 5 to 7½ inches, the text might have covered two *κολλήματα* which became detached because their glue perished in the moisture to which Strabo refers. So we can picture the detached scrap(s) as being, very roughly, five or six columns on two *κολλήματα*. (These figures are confirmed by working from the other direction; there were approximately 18–25 characters per line, so III 12–13 would have occupied 167–233 lines, and 25–45 lines per column, i.e. somewhere between 4 and 9 columns and between 8 and 27 inches.)