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published in
Mnemosyne: A Journal of Classical Studies
2007

DOI (link to publisher)
10.1163/156852507X169573

document version
Publisher's PDF, also known as Version of record

Link to publication in VU Research Portal

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Aristotle’s *De spiritu* as a Critique of the Doctrine of pneuma in Plato and His Predecessors

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Abstract

The treatise *De spiritu* of the Corpus Aristotelicum deserves better treatment than it has received since W. Jaeger in his 1913 article rejected its authenticity and dated it one hundred years after Aristotle. In this paper the authors argue that *De spiritu* defends purely Aristotelian viewpoints against persons like Plato and Empedocles, who held respiration to be the most important vital process. Most of the *De spiritu* is directed against the pneuma doctrine of Plato’s *Timaeus*. The ‘Aristogenes’ mentioned in *De spiritu* 2 is either Plato ‘the son of Ariston’ or a contemporary pupil of Plato and Aristotle.

Keywords

Aristotle, *De spiritu*, Plato, *Timaeus*, ancient psychology, pneumatology

1. Introduction

The Aristotelian Corpus includes a work entitled *Peri pneumatos*, usually cited by its Latin title *De spiritu*. References to this text are rare in the modern era. Aristotle’s authorship has been almost generally denied since the fifteenth century.\(^1\) The only exception to prove the rule was P. Gohlke.\(^2\)

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\(^1\) Cf. Tricot 1951, v and ix; Roselli 1992, 17.

\(^2\) Gohlke 1949, 88; 1953, 18 and 196. Gohlke is, however, prepared to see the work as...
The Greek text of the work, fourteen pages in all, leaves much to be desired. But the subject announced in the opening sentence may arouse the reader's curiosity. We read there: 'How is it that the innate *pneuma* maintains itself and grows?'

The 'innate pneumata' is a central subject in Aristotle's biological works. For living creatures this substance is often presented as being crucial to their quality of life, of perception, of mental activity, and of physiological vigour. According to a famous text in *De generatione animalium* 2.3, 736b30-737a1, *pneuma* is already present in semen and is an analogue of the astral element, which is responsible for the fertility and life-generating power of semen. It seems natural to assume that there is more *pneuma* in a fully grown living creature than in the semen from which the creature was formed (or in the menstrual fluid fertilized by it). The obvious question then is: what maintains *pneuma* and how does the volume of *pneuma* increase?

A generally acknowledged work by Aristotle also seems to have underlined the interest of this theme. *De motu animalium*, in a section which emphasizes the importance of *pneuma* in living creatures, contains the following remark: 'How this innate *pneuma* is maintained has been set out elsewhere.'

A uncompleted, a sketch, from Aristotle's final phase (21). Gohlke also demonstrated his independence in his defence of the authenticity of *De mundo*.

3) *Spir.* 1, 481a1: Τίς ἡ τὸ ἐμφύτου πνεύματος διαμορφή καὶ τίς ἡ αὔξησις; but see also *Iuv.* 6, 470a22 ff.; *Resp.* 5, 472b7. For *Spir.* see V.G. Jaeger 1913; Dobson 1914 1931; Hett 1936; Gohlke 1947 1953; 'Tricot 1951; Barnes 1984 (as regards *Spir.* this edition is almost identical to Dobson's 1914 edition); Roselli 1992, with a revised Greek text based on a collation of more manuscripts and with a critical apparatus, translation and commentary.

4) 'Innate' should not be mistaken to mean 'present from birth'. *Spir.* 5, 483a13 notes that though respiration starts at birth, nutrition and growth occur before birth, owing to *pneuma* or vital heat. *Pneuma* is best left untranslated. If we must choose an English equivalent, 'vital spirit' is better than 'vital breath', because the latter term suggests a connection with respiration.

5) *MA* 10, 703a10: τίς μὲν ὁν ἡ ὡσποδρομὸς τοῦ σωμάτου πνεύματος, εἴρηται ἐν ἄλλοις. Zeller (1921, II.2 96 n. and 937-8) had denied *De motu animalium* to Aristotle on account of this 'reference to *De spiritu*'. The passage is usually regarded as an aside and put between round brackets. In W. Jaeger’s view the reference forms an interruption and seems to duplicate 703a16: πότερον μὲν ὁν τοῦτον ἐστι τὸ πνεῦμα ἀεὶ ἢ γίνεται ἀεὶ ἔστερον,
Another intriguing feature of the *De spiritu* text is that it seems to say that *pneuma* 'forms a natural unity with the soul'. But the author also says that it 'is the vehicle of the soul in a primary sense'. These are remarkable statements which compel us to ask: how does the position of *De spiritu* relate to Aristotle's generally recognized doctrine of soul? In passing the author also suggests that the innate *pneuma* is 'the primary moving cause'.

His argument against the position that *pneuma* increases through the process of respiration is completely in line with Aristotle's method. He contends that there are also living creatures which do not breathe (but which do possess *pneuma*). Also, *Spir.* 5, 483b2 seems to refer to the *Anatomies*, a source which Aristotle often cites in his biological works. Such references are found only in Aristotle's work. But in *Spir.* 3, 482b8 the author also says: 'Therefore we must, as we said, look at respiration, the purpose for which (it takes place) and for which parts and how.' The words 'as we said' may well refer back to *De respiratione* 3, 471b26-9.

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6) *Spir.* 1, 481a15: καθαρώτερον γάρ ὃ τῇ ψυχῇ συμφυές. Cf. also 9, 485b13: διόπερ οὐ κακῶς εἰς τούτον, referring to the unity of the soul and *pneuma* as its instrument.
7) *Spir.* 5, 483b10: τὸ πρῶτον δεκτικὸν ψυχῆς. Cf. also 3, 482b23.
8) *Spir.* 2, 481b17: τὸ πρῶτον κινούν. Cf. 8, 485a7: τὸ πνεύμα τὸ κινητικόν.
9) *Spir.* 2, 482a8; 482a22.
10) Cf. Ross 1955, 264: "References in A. to ἀνατομία are frequent. Sometimes the reference is to actual dissections (*De Juv.* 474b9; 478a27; *De Part.* 677a9; *De Gen. An.* 746a22, 764a35, 771b32, 779a8); in other cases the reference is to the record of dissections in a work now lost (e.g. . . . *Hist. Anim.* 497a32; cf. ibid. 525a9, 566a15, *De Gen. An.* 746a15)." See also n. 11 below.
11) Curiously, this passage represents the position of others, so that it seems in *Spir.* that Aristotle's opponents are citing material from the *Anatomies*. For W. Jaeger ([1913] 1960, 62) it is unthinkable that a later pupil of Aristotle would refer to the *Metaphysics*, as in *MA* 1, 698a7, but he makes light of the idea that such a 'handbook' would have been cited by a later author. Cf. Nussbaum 1978, 10. Note, however, that 5, 483b22-23 says that the *artêria* contains moisture. This seems to imply that a corpse has been observed. If it is then said that 'ἐκ τῶν ἀνατομών is clear', we could specifically relate this to the dissection of corpses.
2. What Was Known about De spiritu in Antiquity?

The title of a work ‘On pneuma’ is absent in the Greek lists of Aristotle’s writings, but is mentioned in the Arabic one. Some modern authors believe that Galen and Pliny may have referred to De spiritu.

3. What Has Been Said about De spiritu in the Modern Era?

In his well-known 1913 article W. Jaeger also discusses De spiritu. But first he outlines Aristotle’s doctrine of pneuma, which he believes to be the earliest identifiable representative of the doctrine of an innate pneuma (p. 71): “Alle Lebewesen besitzen angeborenes Pneuma, in ihm wurzelt ihre Lebenskraft” (p. 74). This also applies to De motu animalium. Briefly summarizing the contents of De spiritu, he stresses how incoherent its composition is. The opening question of De spiritu—what is responsible for the continuity of the innate pneuma and for its increase?—is dealt with rather tentatively in the first two chapters (p. 86). The author then goes on to discuss various issues regarding respiration and the functions of blood. Everything Jaeger considers dissatisfactory here is seen to result from an abridgement of a more extensive discussion. This abridgement was carried out by a person with little talent and expertise (p. 89). Jaeger is nevertheless
prepared to assume some coherence for chapters 1 through 8. In his view, however, chapter 9 is a later addition by a Stoic with an interest in the Peripatetic theory of the innate pneuma.\textsuperscript{15)}

In arguing against the work’s authenticity, Jaeger follows V. Rose, whom he greatly admires.\textsuperscript{16)} In his accepted writings Aristotle shows knowledge of two kinds of blood, but only of one kind of blood vessel (\textit{phlebes}). And the Greek word \textit{artêria} means ‘windpipe’ in Aristotle. According to Jaeger, however, \textit{De spiritu} distinguishes ‘veins’ (\textit{phlebes}) and \textit{artêriae} to designate the system of veins and arteries.\textsuperscript{17)} Jaeger believes that it depends here on the anatomist Praxagoras of Cos, who developed this notion at the same time as Aristotle or slightly later (p. 89). But this dependence must have been mediated by Praxagoras’ pupil Erasistratus, who (in contrast to Praxagoras) was also a Peripatetic.\textsuperscript{18)}

\textit{J.F. Dobson (1914)}

\textit{The Works of Aristotle Translated into English}, vol. 3 (Oxford 1931) includes the translation of \textit{De spiritu} which J.F. Dobson published in 1914. In the Preface the author notes: “This treatise has been rejected as spurious by practically all editors, one of the chief reasons being the confusion of the senses assigned to \textit{artêria}. It is sometimes ascribed to Theophrastus. Its author had certainly studied the Aristotelian Corpus, and analogies may be traced to the \textit{de Respiratione} and some of the zoological treatises.”

The translation used W. Jaeger’s 1913 edition of the Greek text. Despite its countless defects, it was included without any changes in Barnes 1984.

\textsuperscript{15)} W. Jaeger [1913] 1960, 98-100. Jaeger’s chief objection to chapter 9 is that it assigns such an important role to fire. But the author of \textit{Spir. 9}, 485b9 says quite explicitly that the generation of living entities is not a matter of fire or pneuma (in itself), but of the soul which uses fire as its instrument. The theory of \textit{De anima} 2.4, 416a9-18 is not fundamentally different. The fact that the Stoa also talked about a \textit{τεχνικὸν πῦρ} is entirely irrelevant as an argument against the work’s authenticity.

\textsuperscript{16)} Rose 1854, 163 ff.

\textsuperscript{17)} W. Jaeger [1913] 1960, 89. Tricot (1951, v) regards this argument as unsound: “l’auteur, quel qu’il soit, entend par artères, non pas les vaisseaux sanguins, mais des ramifications respiratoires, ce qui enlève toute portée à cette prétendue distinction”. Cf. also 176 n. 4; 181 n. 2.

W.S. Hett (1936)

W.S. Hett (1936, 484-5) calls Spir. “obviously un-Aristotelian”. He observes “a general lack of coherence in the thought”. The work’s central notions, pneuma and artéria, are left clouded in obscurity.

Also, the Greek text (which Hett adds in his edition) is uncertain in many places, often making a satisfactory interpretation impossible.

P. Gohlke (1947)

P. Gohlke, always a stalwart defender of the texts attributed to Aristotle, must concede in the Introduction to his translation (1947, 18-21) “dass man wirklich an ihrer Echtheit zweifeln könnte” (18). The work is clearly incomplete and little more than a compendium of notes. Yet Gohlke maintains “dass Aristoteles selber die Schrift in ihrem jetzigen Zustande hinterlassen hat” (18). The work’s theme, the “Lebensluft”, disappears from view in the last section (19). But the theme does belong to the philosopher’s last phase (20). Gohlke sees the work’s statements on artéria i as a new insight into the difference between arteries and veins as we recognize it today (20).

The author proposes corrections to the Greek text in twelve places. His own translation of the Greek text calls for even more corrections.

J. Tricot (1951)

This translation of the Parva naturalia and De spiritu was the first to publish De spiritu in French. Tricot assigns the work to the oeuvre of the physician Erasistratus of Ceos and dates it to c. 250 BCE (p. v). Importantly, Tricot notes that the use of the term artéria in the work does not indicate the author’s familiarity with the distinction between the venous and the arterial systems, as Jaeger and others had claimed. In De spiritu, says Tricot, artéria i are not blood vessels, but branches of the windpipe. De spiritu has no knowledge of the distinction between veins and arteries in the vascular system (pp. v; 176, n. 4).

Tricot did not use the translations by W.S. Hett (1936) and P. Gohlke (1947).
M.C. Nussbaum (1978)

In her valuable edition with commentary of *De motu animalium*19) M.C. Nussbaum also makes some remarks on *De spiritu*. She notes that “[V.] Rose denied that the *MA* could be connected with the obviously inferior *De Spiritu*...”. “And in general we have every reason to dissociate this careful and interesting treatise [MA] from the messy later work.” (p. 7) In her commentary on *MA* 10, 703a10-1 she notes: “The *De Spiritu* is a confused and inferior late work that does not even profess to be by Aristotle and acknowledges its late date by references to the theories of Aristogenes of Knidos, who wrote around the middle of the third century B.C.” (p. 375)

The Revised Oxford Translation (*Barnes 1984*)

This new edition of the *Complete Works of Aristotle* assigns two asterisks to *De spiritu*, explaining: “a pair of asterisks indicates that its spuriousness has never been seriously contested” (p. xiii). The translation by J.F. Dobson has been integrally adopted, including mistakes as in 2, 482a9, 482b6-7; 3, 482b6; 5, 483b31, 484a7 and the gross error in 8, 485a22. However, the footnotes omit some of Dobson’s comments.

A. Roselli (1992)

A. Roselli published a new edition of the Greek text with translation and commentary of *De spiritu* in 1992. She follows W. Jaeger in concluding that it is a rather early Peripatetic text, but believes that it uses insights developed by the well-known Hellenistic scholar Erasistratus, though his name is not mentioned.20) The physician ‘Aristogenes’, who is mentioned and discussed in *De spiritu*,21) is said to have been writing around the middle of the third century BCE.22)

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21) *Spir.* 2, 481a28 ff.
22) Cf. W. Jaeger [1913] 1960, 91 and 101; Roselli 1992, 76-8. A man by this name who came from Cnidos was supposedly a pupil of the physician Chrysippus, who was also Erasistratus’ teacher.
According to Roselli, *De spiritu* owes its name to the work's first two chapters. But the author fails to develop his own position in these. The next two chapters deal with subjects that do have a certain connection with the theme of *pneuma*. Chapters 5 and 6 are the least comprehensible. They reproduce abstracts of texts by others. They are followed by chapters about the bones of living creatures (chapter 7) and about locomotion (chapter 8). The final chapter talks about the role of vital heat in all that lives. According to Roselli, then, the entire work is fragmentary and fails to tell us anything about the author's own views (p. 5). For this reason she has given up on the idea of finding a coherent series of positions in the work (p. 6).

Roselli finds it more useful to compare the treatise with the medical text of the *Anonymus Londinensis* and with the Hippocratic Corpus and the work of later medical authors like Galen.

Roselli notes an ambivalent use of the term *artêria* in the work, sometimes linking up with the older anatomical tradition, sometimes following the newer (p. 10). Likewise the term *neuron* sometimes occurs in the early sense of ‘sinew’ and sometimes in the newer, Alexandrian sense of ‘nerve’ (p. 11).

Remarkably, Roselli rejects the view of E. Neustadt and W. Jaeger (1913) that the final chapter is much later than the rest and moves outside the Peripatetic tradition (p. 12). According to Roselli, the work is important because it allows us to reconstruct some of the discussions following from the anatomical discoveries by Alexandrian physicians (p. 12).

Roselli did not use P. Gohlke’s German translation (1947).

4. Critical Evaluation of the Modern Debate

It is astonishing how confidently W. Jaeger spoke in his 1913 article and how since then every student of *De spiritu* has followed in his footsteps, while on the other hand many other scholars have neglected the work, because they accept Jaeger’s authority without question. Jaeger is convinced that Aristotle is not the author of *De spiritu*. Virtually the only arguments he adduces are those which support this position. But we should look at the other side of the picture as well: if the work is later than Aristotle’s time, which facets of the work can be seen to sit uncomfortably with this date?
Thus the work mentions an ‘Aristogenes’ who defended a theory of *pneuma* that is rejected by the author of *De spiritu*. ‘Aristogenes’ position seems to have been that respiration increases the volume of the innate *pneuma* during the growth of an individual. Each of the arguments marshalled against this view in *De spiritu* can be found in Aristotle’s recognized work. Another view attributed to the opponents is that fish have a respiratory system. As in Aristotle’s generally recognized works, the author of *De spiritu* argues that water does not contain air.

The question urges itself: isn’t the theory attributed to ‘Aristogenes’ rather naïve and simplistic and could it have been defended a hundred years after Aristotle’s death? First of all we need to examine whether the theory which Aristotle disputes in *De respiratione* is the same as that of ‘Aristogenes’ in *De spiritu*. *De respiratione* dismisses a theory which holds that respiration serves to ‘feed’ the ‘internal fire’ of a living creature, in the sense that the inhaled air provides fuel for the vital heat. Jaeger was convinced that the ‘Aristogenes’ of *De spiritu* came from Cnidos and lived in the time of Erasistratus and King Antigonus Gonatas, whose physician he was. But there is no indication of this in the work itself. There was probably more than one Aristogenes. And it is doubtful whether an Aristogenes who lived a hundred years after Aristotle could have awarded the special kind of mediatory role to *pneuma* as ‘Seelenorgan’ which *pneuma* possesses in *De spiritu*.

Modern authors who date *De spiritu* after Aristotle’s death should also explain why this text, like the *Parva naturalia*, mainly conducts a debate on theories like those of Empedocles (who is mentioned three times) and

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23) *Spir.* 5, 483b34. It would be interesting to point out examples of such a position from the time around 250 BCE.


25) Wellmann (1895) mentions four more people with the same name. And, of course, the claim that the work cannot be Aristotelian because the name of Aristogenes occurs in it is just as strong as the claim that the Aristogenes in question must have lived before 322 because he is mentioned in a work by Aristotle.

Democritus, whereas (apart from the name ‘Aristogenes’) it fails to mention (contemporaries of) Praxagoras or Erasistratus.\footnote{Roselli (1992, 76) notes: “la menzione di Aristogene fornisce l’unico elemento esplicito per la datazione di Spir.”}

No doubt Rose and Jaeger are right when they point to a difference in terminology between most of Aristotle’s biological works and \textit{De spiritu}, particularly in regard to the term \textit{artêria}. In the work this term sometimes seems to denote an air passage and sometimes a blood vessel. But it is unclear what consequences should be attached to this. We know that the distinction between two parts of the vascular system was familiar to Aristotle in \textit{De generatione animalium}.\footnote{\textit{GA} 2.4, 738a11: \textit{σχιζ}ο\textit{μένων ἄνωθεν τῶν δύο φλεβῶν, τῆς μεγάλης καὶ τῆς ἀρτῆς, πολλαὶ καὶ λεπτὲς φλέβες τελευτῶσιν εἰς τὰς ὑστέρας.} Peck (1942, 180 n. a) comments here: "the \textit{vena cava} and the whole venous system, and the aorta and the whole arterial system”. See also 740a28.} But there is no indication that he connected this with a distinction between oxygen-rich and oxygen-poor blood.

Jaeger also regards Erasistratus as the source of \textit{De spiritu}, because he believes that the soul no longer plays a role in it: nature has taken its place and a blind mechanism of \textit{pneuma}-matter seems to be posited.\footnote{W. Jaeger [1913] 1960, 96.} We should note, though, that the author of this work, though focusing on \textit{pneuma}, most certainly knows that \textit{pneuma} is only so important because it is the primary vehicle and instrument of the soul.\footnote{\textit{Spir.} 1, 481a17 and all of chapter 9.}

5. Vital Heat as the Multifunctional Instrument of the Soul in Chapter 9

In view of the foregoing, it may be useful to look in somewhat more detail at chapter 9, which concludes \textit{De spiritu}. The author enters into a debate there with those who refuse to attribute any productive activity to \textit{fire}, but are willing only to award it one power: the power to cut.\footnote{\textit{Spir.} 9, 485a28: Οἱ ἀναιρούντες ός οὐ τῷ θερμῷ τὸ ἐργαζόμενον ἐν τοῖς σώμασιν, ἢ ὢτι μία τις φορὰ καὶ δύναμις ἡ τητική τοῦ πυρός, οὔ καλῶς λέγωσιν. Roselli (1992, 123) notes that Arist. \textit{Cael.} 3.5, 304a12 and 8, 307a26 urges this criticism against Plato’s \textit{Ti}. 56a.} A striking
point here is that the author uses the term ‘to bring about’, ‘to produce’. This term also featured in Aristotle’s criticism of Plato’s theory of Ideas in *Metaphysics* A 9, where Aristotle blamed Plato for distinguishing only between the Ideas and that which received the Ideas. According to Aristotle, a ‘productive factor’ was lacking in Plato’s system. The term had also featured in *De anima* 2.4, where Aristotle states that fire by itself cannot be the ‘productive principle’, but ‘fire-under-the-soul’s-direction’ can.

The author of *De spiritu* disputes the views he rejects by pointing out that heat has very different effects on different substances: it can condense and rarefy, dissolve and harden substances. Aristotle had mentioned the same variation in effects of pneuma in *De motu animalium* 8. In *De generatione animalium* 2.1 he had also presented these qualities as being caused by vital heat and its decrease. But he was quick to add that the ‘exact proportion’, the logos, of these qualities was not a result of heat but of the governing principle!

As regards production in living creatures, we should assume the same state of affairs, and try as it were to discern the ‘fire of nature’, like the fire of craft (in the cases mentioned earlier). Looking at the various crafts, we can observe the different effects of fire, which melts gold and casts bronze and dries brick and prepares food. Or, rather perhaps, the crafts have these different effects. But they have these effects while using fire for

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52) *Metaph.* A 9, 991a22: τί γὰρ ἐστι τὸ ἐργαζόμενον πρὸς τὰς ἰδέας ἀπόβλεπον; Aristotle repeatedly criticizes his teacher for the lack of a ‘third principle’; cf. *Metaph.* A 9, 991b3-5; *GC* 2.9, 335a30, 335b8. Ambrose, *Hexaëmeron* 1.1, 1 had therefore attributed to Aristotle not only the principles of *species* and *materia*, but also a third principle, which he called *operatorium*.


54) *Spir.* 9, 485a32: τὰ μὲν πυκνῶτα, τὰ δὲ μαλακά, καὶ τίκει, τὰ δὲ πήγνυσιν.

55) *MA* 8, 702a9-10: μεταβάλλοντα ἐκ πεπηγότων υγρὰ καὶ εἰς υγρῶν πεπήγοτα καὶ μαλακά καὶ σκληρά εἰς ἄλλα ἄλλα.

56) *GA* 2.1, 734b31: σκληρὰ μὲν σοὶ καὶ μαλακά καὶ γλίσχρα καὶ κραυγὰ καὶ ὁσα ἄλλα τοιάτα καθ’ ὑπάρχει τοῖς ἐμψύχοις μορίοις, θερμότης καὶ ψυχρότης χοίρεσιν ἄν. For this work, see also Ferwerda 2005. See also *MA* 2.2, 648a20-649b8.

57) *GA* 2.1, 734b33-735a4.

58) *Spir.* 9, 485a33: ἐν δὲ δὴ τοῖς ἐμψύχοις σῶτος ὑποληπτέον, ἄσπερ φόσεως πῦρ ζητοῦντα, καθόπερ τέχνης.
their various purposes. For they use fire as an instrument for melting, for casting, and for drying, but in some cases for purposes of design.\textsuperscript{39}

Just as we can say of these craftsmen that, besides their specific tools, they use fire as sôma organikon, so Aristotle argued in De anima 1.3 that the soul uses its sôma as an instrument.\textsuperscript{40} De spiritu makes it perfectly clear that the soul’s ‘instrumental body’ is not the visible body, but pneuma (or its analogue). ‘The natural vital principles (of living creatures) do the same. Hence there are all kinds of differences between them,’ says the author of De spiritu.\textsuperscript{41} These vital principles play the same role in nature as the crafts in human production. That is to say, they provide the logos for the effect of fire.\textsuperscript{42}

‘It may be difficult for the inquirer to see that nature itself is the user of this fire, and that nature by means of the visible qualities also brings about the form. For that is not a matter of fire or pneuma.’\textsuperscript{43} This observation, too, is entirely Aristotelian, as we can particularly infer from the passage in De generatione animalium 2.1 cited above.\textsuperscript{44} The author then continues: ‘It is remarkable that these matters [i.e. ‘fire’ and pneuma] have such a faculty. And the case is just as remarkable with the soul. For it is present in them.’\textsuperscript{45} In any case the author of De spiritu is saying in plain words here that the soul is present in ‘fire’ and in pneuma. In Spir. 5, 483b11 he had also said

\textsuperscript{39} Spir. 9, 485b1: χρώνει γὰρ ὀσπερ ὄργανον μαλακτοῦσα καὶ τήκουσα καὶ ξηραίνουσα, ένια δὲ καὶ ὑβριζουσα. It is interesting to compare the argument of Arist. Pol. 1.2, 1252b1-3, where Aristotle reasons that nature does not try to produce a kind of Swiss army-knife with dozens of functions: οὐδὲ γὰρ ὁ φύσις ποιεῖ τοιοῦτον οἷον οἱ χαλκοτούσι τὴν ἁλειφηνή μάσχεραν πενυχρᾶς, ἀλλ᾽ ἐν πρός ἔν.

\textsuperscript{40} de An. 1.3, 407b25: δεῖ γὰρ τὴν μὲν τέχνην χρήσθαι τοῖς ὀργάνοις, τὴν δὲ ψυχὴν τῷ σώματι.

\textsuperscript{41} Spir. 9, 485b3: Τὸ αὐτὸ δὴ τοῦτο καὶ αἱ φύσεις· ὅθεν δὴ καὶ πρός ἀλλήλα διάφορα. (The Greek manuscripts read διαφοραί and διαφοράν.)

\textsuperscript{42} Cf. GA 2.1, 734b37-735a4: σκληρῶν μὲν γὰρ καὶ μαλακῶν τὸν σίδηρον ποιεῖ τὸ θερμον καὶ τὸ ψυχρόν, ἀλλὰ ξίφος ἢ κίνησις ἢ τῶν ὄργανων ἔχουσα λόγον [tón] τῆς τέχνης· ἡ γὰρ τέχνη ἀρχή καὶ εἴδος τοῦ γνωμονόμου, ἀλλ᾽ ἐν ετέρῳ· ἡ δὲ τῆς φύσεως κίνησις ἐν αὐτῷ ἀφ᾽ ετέρας ὡσαν φύσεις τῆς ἔχουσι τὸ εἴδος ἐνεργεια. (Cf. De An. 1.3, 734b36. Cf. GA 2.1, 734b36. Cf. de An. 2.4, 416a13-8.)

\textsuperscript{43} Spir. 9, 485b8: Οὐ δὲ τοῦτο χαλεπόν, ἀλλὰ μάλλον τὸ τὴν ψυχὴν αὐτῆν νοσήσει τὴν χρωμένην, ἢ τῆς ἀμα τοῖς αἰσθητοῖς πάθει καὶ τὸν ῥυθμὸν ἀποδώσει. τοῦτο γὰρ οὐκέτι πυρὸς οὐδὲ πνεύματος.

\textsuperscript{44} GA 2.1, 734b36. Cf. de An. 2.4, 416a13-8.

\textsuperscript{45} Spir. 9, 485b11: τούτοις δὲ καταμεμίχθησιν τοιοῦτον δύοναμιν θεωματών. ἐτὶ δὲ τοῦτο θεωμάτων καὶ περὶ ψυχῆς· ἐν τούτοις γὰρ ισχυρέως.
that pneuma is the primary vehicle of the soul. Thus De spiritu uses the same authentically Aristotelian system as De motu animalium 10: pneuma is the vehicle of the soul, the visible body is animated by the presence of pneuma. This is followed by a few lines of which it is very difficult to determine what the author exactly means.\(^{46}\)

The final problem tackled by the author is the question of the differences in (vital) heat in various species. Differences in fire are differences of more and less. These in turn are related to the degree in which fire is mixed with something else. The purer fire is, the more fire it is.\(^{47}\)

Again he locks horns with Empedocles, who assumed the same mixture of flesh for all species of creatures. The author of De spiritu, like Aristotle elsewhere in the Corpus, considers this too rough and ready. In his view, the specific logos of horse-flesh and of ox-flesh is determined by vital heat led by the natural principle of a horse and an ox respectively. The effect of vital heat\(^ {48}\) results in different end products owing to the natural principle.

6. Brief Outline of the Contents of De spiritu

Chapter 1

The work starts by clearly indicating its subject: how is it that the innate pneuma maintains itself and grows? Two theories are mentioned in 1, 481a6-7 and then critically analyzed in chapters 1 and 2.

\(^ {46}\) Spir. 9, 485b13: διόπερ οὐ κακῶς εἰς τούτον, ἢ ὀπλὸς ἢ μορίον τι τὸ δημιουργοῦν, καὶ τὸ τὴν κίνησιν ἀληθὴν ὑπάρχειν ἐνέργειαν· καὶ γὰρ ἢ φύσις, ἢς καὶ ἢ γένεσις. Hett (1936, 515) translates here: ‘Therefore the fact that its motion always exerts a similar activity may reasonably be referred to the same agent, either absolutely or to some definite effective part: for nature, from which they are generated, remains the same.’ Perhaps this should be read as: ‘Therefore it is not incorrect to assume a unity [of fire/pneuma and the soul] absolutely or the part [of the soul] that produces and that always brings about motion: for also the natural principle of life, to which generation is due, [is always present].’ Furlanus and W. Jaeger suggest a correction here: ἐνεργοῦν. Perhaps ἐνέργεια (Roselli) should be preferred.

\(^ {47}\) Spir. 9, 485b17: πυρὸς γὰρ διαφοραὶ κατὰ τὸ μᾶλλον καὶ ἢττον. τοῦτο δὲ σχεδὸν ὡσπερ ἐν μίξει καὶ ἀμιξίᾳ· τὸ γὰρ καθαρότερον μᾶλλον.

\(^ {48}\) Cf. Spir. 9, 485b22: τῇ κράσει διαφέρειν (with Furlanus) and 485b23: τοῖς λόγοις ὅν διαφέροι.
Theory B, which is best viewed as depending on Empedocles’ theory, argues that the innate pneuma results from the addition of food and the concoction of this food thanks to the process of respiration. Theory A sees the innate pneuma as being boosted by the inhaled air and concocted by the motion of the lungs. The result of this treatment of the inhaled air is to increase the innate pneuma. This theory is best understood as reproducing the passage in Plato’s Timaeus on respiration and the nutrition of living creatures (see section 10 below). Both theories are based on the principle that respiration is the central phenomenon in all life processes.

Chapter 1 lodges three objections to theory B, all of which can be understood against the background of well-known Aristotelian positions.

Chapter 2

Theory A, attributed to ‘Aristogenes’, runs up against at least eight objections applying to living creatures with respiration. The author also considers the problems of theories A and B for insects (which do not possess a respiratory system) and for fish (in water, where respiration is impossible).

The clear structure and tight approach of chapters 1 and 2 are emphasized by a constant repetition of the problem that forms the work’s starting-point. The key words ‘maintenance’ (or ‘nutrition’) and ‘growth’ in the opening sentence 1, 481a1 recur throughout. 1, 481a27 concludes the discussion of theory B in this way. 2, 481a28 indicates clearly that theory A will now be dealt with. 482a8 repeats the question for breathless creatures and 482a21 for aquatic animals. 482a27 clearly marks the end of chapters 1 and 2 as a whole. 2, 481b29 refers to the objections already given in 1, 481a22-7 (2, 481b1 mentions that theory A has more objections than theory B). The order of discussion of (a) animals with respiration, (b) insects, and (c) fish also plays a role in 5, 483b1 and in chapter 8 (and is also familiar from the Parva naturalia).

Chapter 3

Because the disputed theories see respiration as the central phenomenon in all vital processes, the author continues with this subject. His opponents hold that all parts of a creature’s body benefit from respiration for their nutrition and refrigeration. The author adduces objections to both facets of the theory on the basis of positions familiar from parts of the Parva
naturalia. But in passing he also raises the point that for instance the bones of a living creature depend for their nutrition and for supply of the innate 
pneuma on the processes which are initiated by respiration (482b7). The author wants to contest this and so is forced in chapters 6-8 to deal with the topic of bone and its functions and, in turn, with sinew, and with the question what the real principle of motion of a living creature is. This will also clarify what purposes respiration serves and what parts of the body it benefits. He also casually mentions that plants possess life and are nourished. Evidently they need no system of respiration for this.

Chapter 4

In chapter 4 he discusses how (a) respiration is related to (b) the pulsatory motion and (c) the introduction of nutriment. According to the disputed theory, all three are connected with the breath in the artêria. He demonstrates that respiration cannot be primary, but, in the development of an individual creature, begins only after the pulsatory motion and the introduction of food. He also proves that the pulsatory motion is due to the blood in the heart, and therefore cannot be located in the artêria. This chapter, too, helps to provide a clearer picture of respiration than in his opponents, and to indicate that there are vital processes which are independent of respiration.

Chapter 5

The following chapter deals with the distribution of food to all parts of the body as a result of respiration. The artêria is given priority here. It alone contains breath/pneuma. The artêria system is a dense network that distributes the innate pneuma, as bearer of vital heat and the perceptive faculty, throughout the body of the living creature. The opponents hold that this dense network runs parallel to the system of blood vessels. The author makes much of their view that the bones, but not the sinews, are directly connected with the artêriai. This raises the question whether pneuma acts directly on the bones to set them in motion. This, too, is a matter in which he wants to underline his very different position (as he does in chapters 7 and 8).

Again in this chapter (as in 4, 482b22-5) it seems as if Aristotle’s opponents have been unable to explain their view of the soul and its part in the process of respiration (5, 483b24-8). In 5, 483a28-9 he seems to suggest
that his opponents, like Plato, have failed to integrate the various ‘parts’ (functions) of the soul.

A recognizable link with chapter 4 can be noted in 5, 483a23. The author says here that the exhalation of breath can be empirically established. In 4, 482b19 he had said that this system of respiration is ‘evident to a certain extent’. In chapter 5 the author observes once again that, according to his opponents, fish must also possess respiration to live. He rejects this utterly. The key word in the opening sentence of chapter 1, ‘maintenance’, is once again a striking feature here in 484a8.

Chapter 6

In the sixth chapter the author asks whether seed passes through the artêriai and he looks in detail at the relation between sinews and bones, and how they receive nutriment. Because his opponents posit a close link between the system of the artêriai with pneuma and the vascular system with blood, he points to the fact that birds, snakes, and fish have no blood at all.

Chapter 7

The author goes on to enumerate various functions of bones and then illustrates them systematically. They do form parts of members that can move, but motion is not the primary function of bones. For there are members which do move, but do not contain bones (the heart, the abdomen, and the intestines in it). He also formulates the thesis that all motion needs an unmoved starting-point.

Chapter 8

Keenly analyzing the final cause of things, the author concludes that the sinews bring about the motion of a living creature’s members. So they must primarily contain the cause of motion, pneuma. The author illustrates this by speaking about the motion of bipeds, quadrupeds, birds, bats, and shellfish and crustaceans, from a fund of knowledge that immediately brings to mind De incessu animalium.

Chapter 9

In the final chapter the author administers the coup de grâce to his opponents. Since chapter 1 the subject has been the ‘innate pneuma’. But his
opponents took this in the sense of the ‘vital breath’ of (higher) living creatures, and they added fish. The author has developed an entirely different interpretation. For him it is the ‘innate vital heat’, which is active not only in seed and in plants, but in all species of animals, from their very first beginning, under the direction of their form of life or soul. The opening sentence of chapter 9 characterizes the opponents as ‘those who hold that it is not vital heat that is the efficient principle in bodies’, and so characterizes the supporters of theories A and B from chapter 1 as those who assume a different ‘efficient principle’. Though these opponents talk about a life-bearing pneuma, they see respiration as a more original and efficient principle.

Chapter 9 is an ode to the varied activity of this life-bearing and life-producing fire or vital heat. In this chapter the author underlines the close bond between the soul and its instrumental vital heat. And entirely in line with De generatione animalium and the (rest of the) Parva naturalia he describes how this one instrument of the soul brings forth a great variety of results in the whole of natural reality.

If De spiritu had received more attention and therefore been better understood, the fatal misinterpretation of Aristotle’s psychology by Alexander of Aphrodisias, in which Aristotle regarded the soul as the entelechy of the visible body, could never have taken root.49

7. What Positions Are Held by the Author of De spiritu Himself?

In the course of his critical inquiry into the two theories which he rejects, we do find several positions which the author of De spiritu himself holds.50

– He is convinced that the concoction of food received by a living creature not only produces building materials for the parts of the visible body, but always residues (perittômata) as well—1, 481a19-20, b27-8.
– The respiration of living creatures is not characteristic of all living entities and not even of all animals, and therefore is not the central and most fundamental vital process, but serves to cool living creatures with high vital heat—2, 482a16; 3, 482a31, b1; 5, 483b6, 484a9-10.

50 It would be useful to compare these with the description of “die pneumatische Theorie des Aristoteles” which W. Jaeger ([1913] 1960) gives on pp. 70-8. But that would take up too much room here.
A related position is that insects (which have no respiration) do have a cooling system, but one which works via their diaphragm—2, 482a17.

Water does not contain air (and so fish cannot possibly have a respiratory system)—2, 482a23.

The pulsatory motion noticeable in many living creatures is not a phenomenon connected with respiration and the inhaled *pneuma*, but of the blood in the heart region—4, 482b36.

All living creatures, including those which possess no respiratory system, have a principle of vital heat. That is why they need an opposite principle that provides the right balance in temperature—5, 484a7.

Everything that is moved starts from a state of rest—7, 484b19. Tricot (1951, 189 n. 3) calls this a “principe fondamental de la Physique et même de la Métaphysique aristotéliciennes”.

Bones have a glutinous fluid surrounding them which can be regarded as blood that has not been fully concocted. They do not receive their nutriment via respiration or the *artēriai*—6, 484a32.

In natural inquiry it is most useful to determine accurately what a thing’s final cause is—8, 485a4-6.

An interesting detail is that the author of *De spiritu* states in 8, 485a21 that shellfish do have feet, but not for the purpose of movement, but to support their weight, as *De incessu animalium* 19, 714a14 also argues.

A fundamental starting-point in natural inquiry is: comparable effects have the same causes in the same way—2, 482a10-1, 24-5; 6, 484b7-8; 8, 485a11-2.

All these are positions that Aristotle developed and/or defended, like the very important position on ‘the soul’ held in *De spiritu*.

### 8. The Position of the Author of *De spiritu* on the Soul

While discussing the two theories which he reports in chapter 1, the author of *De spiritu* makes various remarks which build up an increasingly clear picture of his position on the soul.

In 1, 481a16 he asks: can *pneuma* arise from nutriment if it is itself primary (*prōton*)? Because that which is connected with the soul is ‘purer’ (481a17), one would not expect it to arise from something like nutriment. This already sheds light on the view underlying the entire work.
that pneuma is a sôma which is connected with the soul in a very special way and is the instrument of this soul. (For ‘purër’, cf. also 481a24.)

– In 2, 481b15-7 he opposes ‘Aristogenes’ when the latter states that breath derives its heat from the motion of the lungs. The author objects that in that case the vital breath is not ‘the primary moving cause’. Clearly for the author pneuma does constitute ‘the primary moving cause’ (directed by the soul-principle).

– In 4, 483a3 the author distinguishes somatic disorders from fears, hopes, and tensions of the soul, which affect the frequency of the pulsatory motion of the blood in the heart. To anyone familiar with Aristotle’s biological works, this passage makes it clear that in De spiritu, too, he posits a close relation between the soul and a sôma, which is, however, not the visible, coarse-material body, but the fine-material soul-sôma or pneuma, which forms an indissoluble unity with the soul. This soul-sôma is also the ‘prime mover’ of all vital activity, including the pulsatory motion.

– In 5, 483a23-7 the soul comes up in a discussion on perception. The author states that, according to his opponents, only the artêria possesses perception. He asks whether this is due to the inhaled air which flows through the artêria, or whether his opponents see the inhaled air as subordinate and serviceable to the soul, and so really regard the soul as the subject of perception. The starting-point of this question seems to be Aristotle’s own theory of perception as a matter of the soul assisted by its instrumental pneuma.

– In 483a27-30 he raises the issue that, besides the nutritive activity of the soul, there is also the rational and the conative activity. The underlying question here seems to be: what guarantees the unity of the soul? This is a question which Aristotle often poses as a challenge to Plato.

– In 483b10 he talks about inhaled air in the view of his opponents as ‘that which is the primary vehicle of the soul’. Again he uses his own terminology here and concludes that such a substance would have to be of the finest quality.

– In chapter 9 the author finishes off the opponents whose theory he contests throughout De spiritu. He states there that nature uses vital heat to produce living creatures (485b6-9). The soul is active in vital heat or pneuma. And it can be viewed as forming a unity with pneuma (485b13-5). It is the theory of the soul and its instrumental body which Aristotle
uses extensively in *De generatione animalium* 2.1, as in all his biological writings.51)

9. What Is the Position of ‘Aristogenes’ That the Author of *De spiritu* Contests?

If the author of *De spiritu* thinks and writes from the scientific perspective of Aristotle and nobody else, we must accurately determine which position he criticizes so persistently.

– This position awards a dominant place to respiration (and pays no or insufficient attention to life forms which do not have respiration).
– This view assigns a special place to inhaled air as the vehicle of all vital processes.
– The inhaled air also possesses vital heat as a result of the movement of this air in the lungs—2, 481b12-5.
– As a result of the respiratory process, blood is distributed via the veins and breath via the *artēriai* throughout the visible body of a living creature—5, 483a18-22, b25.
– Veins and *artēriai* are always situated side by side—5, 483b30-1. They are not two parts of one system, in the sense of blood vessels with oxygen-rich blood and blood vessels with oxygen-poor blood, but separate systems which need each other.
– The heat of the *pneuma* in the *artēriai* is responsible for the heat and the liquidity of the blood in the veins—5, 483b19-22.
– A living creature has perception because it possesses the vital *pneuma*, which is found in the *artēriai* throughout the visible body—5, 483a24-7.
– The alternating motion of respiration ensures that the vital *pneuma* is distributed through the *artēriai* and blood through the veins to the other parts of the visible body, for instance to the bones.
– Bones are set in motion through the effect of the vital *pneuma*.
– The process of respiration is a process that also brings about refrigeration of certain parts of the living creature—3, 482a31.

51) Claghorn 1954 contains an entire chapter (chapter 7) on ‘Aristotle’s Criticism of Soul’, but not a single word about *De spiritu* and about what could be regarded as the most extensive criticism of Plato’s *Timaeus*. 
The relation of vital breath to the soul remains remarkably unclear in the discussion of the theory ascribed to ‘Aristogenes’. In one place we are given the impression that he distinguishes three ‘parts’ of the soul, but does not indicate how their unity is to be seen (5, 483a28-30).

10. Who Are the Opponents in De spiritu and Who Is ‘Aristogenes’?

The author of De spiritu thinks entirely in line with Aristotle’s biological writings and his De anima. There is no position occupied by the author of De spiritu that cannot be explained with reference to parts of Aristotle’s surviving and generally recognized work. The debate in De spiritu is also conducted with Empedocles and Democritus from the time before Aristotle, as in the Parva naturalia.

The author speaks here with the self-confidence of a teacher before an audience that recognizes him as such—2, 482a33; 6, 484a32. He also has the similar tendency to deal with subjects as a related whole, and therefore holds over a detailed discussion of the distribution of food to the parts of the body—3, 482b12-3—, just as Aristotle often does in his generally recognized writings. His criticism is mainly directed at the ‘Aristogenes’ mentioned in chapter 2, but also at supporters of ‘Aristogenes’, who seem to form a clearly identifiable group—2, 481b14, 18; 5, 483a27. Nothing in their views decisively indicates a late date. On the other hand, all the themes of De spiritu figure prominently in Plato’s Timaeus.

– Plato describes the body of a living creature as being provided throughout with ducts by which food is conveyed (Ti. 77c7).
– This food, after being processed and dissected by the internal fire (78e6 τὸ πῦρ ἐντός), is transferred from the abdomen to the veins thanks to the process of respiration (78e5), and distributed through these veins (cf. 70d2; 80d).
– The respiratory system not only serves the purpose of nutrition, but also cools the heart (70c5).
– De spiritu 5, 483b34 attributes to ‘Aristogenes’ the view that fish breathe. This is also the position of Plato, Timaeus 92a7-b6.
– What Plato says in Timaeus 77d3 and 73b2, but particularly in 91a4, about the central importance of the marrow is a plausible explanation for the question in De spiritu 6, 484a14 whether semen is pressed
through the artêria, a question which at first sight seems to come out of the blue.

– In the Timaeus Plato also holds the view that the natural effect of fire is separation and cutting (cf. Spir. 9, 485a29).

– In the Timaeus Plato also awards sinews the function of holding bones together (75d4).

The writer seems to identify ‘Aristogenes’ with Plato. He may have permitted himself a literary joke here, with ‘Aristogenes’ as a sly allusion to Plato, whose father was in fact called Ariston.52)

11. Conclusions

Certainly De spiritu has places where the Greek text is corrupt.53) But these do not prevent us from following a large part of the author’s argument and establishing that he is attacking two theories with which his own position is fundamentally at odds. These two theories place respiration at the heart of all vital processes. For Aristotle, respiration is not a primary process, not even for living creatures which possess such a system. Aristotle knows that all kinds of vegetative processes start in the seeds of a plant and the eggs of fishes and birds and the semen of blooded animals long before there can be any question of animal processes like respiration. Aristotle took pride in explaining the possibility and purposiveness of these processes by means of his theory of the soul as (first) endothele in an indissoluble unity with its instrumental body, pneuma or vital heat.

Crucial to an understanding of the argument of De spiritu is the insight that this work talks about artêriai as ‘vessels’ which contain pneuma, but which also extend throughout the body and ensure concoction and distribution of the food. This was also essential to the theories of Empedocles

52) Cf. the way Heracles is referred to as ‘Kadmogenes’ in Sophocles, Trachiniae 118 and Xerxes as ‘Dareioegenes’ in Aeschylus, Persians 6 and 146. It might be objected that ‘Aristogenes’ would have been expected. However, we do know quite a few people called ‘Apollodorus’, ‘Apollophanes’, ‘Apollothemis’, ‘Artemidorus’, and ‘Isidorus’, but not many called ‘Apollonophanes’, ‘Apollonodorus’, etc. Cf. Bechtel 1917.

53) We got invaluable support from Dr. D. Holwerda of the University of Groningen for the restoration of the text in several places.
and Plato disputed by Aristotle, as we can establish from Aristotle’s own statements about these predecessors elsewhere in the Corpus.\(^{54}\) If we read *De spiritu* as a preliminary ‘shorthand’ study by Aristotle, in the style of the *Problemata*, but also of many parts of the *Parva naturalia*, we find no compelling reason in the discussion to regard any part of it as post-Aristotelian. The author defends Aristotle’s positions against Aristotle’s opponents. It therefore seems justified to substitute ‘Aristotle’ for the designation ‘Anonymus’ in Jaeger’s text edition.

Aristotle did not need to set out in detail the alternative doctrine of an innate *pneuma* (which is not identical with the inhaled air), given that this theory was familiar enough from his *Parva naturalia* and other biological works (and from the *Eudemus* and *De philosophia*, we might add). It is striking, though, that he does not give a detailed answer to the question with which the treatise opens: ‘How is it that the innate *pneuma* maintains itself and grows?’

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