

Soul and Pneuma in De Spiritu

Gregorić, Pavel

Source / Izvornik: **The Concept of Pneuma after Aristotle, 2020, 17 - 36**

Book chapter / Poglavlje u knjizi

Publication status / Verzija rada: **Published version / Objavljena verzija rada (izdavačev PDF)**

<https://doi.org/10.17171/3-61>

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:261:039886>

Rights / Prava: [In copyright](#) / [Zaštićeno autorskim pravom.](#)

Download date / Datum preuzimanja: **2025-02-22**



Repository / Repozitorij:

[Repository of the Institute of Philosophy](#)

Pavel Gregoric

Soul and Pneuma in *De spiritu*

Summary

This paper explores the conception of soul and its relation to pneuma in *De spiritu*, a short and relatively neglected treatise transmitted with the Aristotelian corpus. Following a review of all the relevant passages, it is concluded that the author was familiar with Aristotle's biological works and his conception of soul, but does not subscribe to it. It is shown that various other conceptions of soul make appearance in the treatise. It is proposed that the author aimed to make his physiological and anatomical theory – built on Aristotle's notion of pneuma – compatible with as many different conceptions of soul in circulation as possible, which he viewed as a competitive advantage of his theory.

Keywords: conception of soul; connate pneuma; mixture; artēria; physiology; anatomy; Pseudo-Aristotle

Dieser Beitrag erkundet die Konzeption der Seele und ihre Relation zu pneuma in *De spiritu*, einer kurzen und relativ vernachlässigten Abhandlung, die im aristotelischen Korpus überliefert ist. Nach Sichtung aller relevanten Passagen wird geschlossen, dass der Autor vertraut war mit Aristoteles' biologischen Werken und seiner Konzeption der Seele, ohne sich aber dessen Meinung anzuschließen. Auch wird gezeigt, dass verschiedene andere Konzeptionen der Seele in der Abhandlung vorkommen. Angenommen wird, dass der Autor beabsichtigte, seine physiologische und anatomische Theorie – aufbauend auf Aristoteles' Vorstellung des pneuma – mit möglichst vielen verschiedenen Konzeptionen kompatibel zu machen, was er als starken Vorteil seiner Theorie betrachtete.

Keywords: Seelenkonzeption; angeborenes Pneuma; Mischung; Arterie; Physiologie; Anatomie; Pseudo-Aristoteles

To the memory of two medical doctors –
 Dr. Nenad Juranić (1938–2016), the good doctor
 Dr. Slobodan Lang (1945–2016), the doctor of goodness

I

De spiritu is a curious and largely neglected short treatise transmitted with the Aristotelian corpus. It contains claims about soul and pneuma which have been cited in support of different views concerning the date and authorship of the treatise. For instance, Abraham Bos and Rein Ferwerda think that the treatise features the same conception of soul and its relation to pneuma that Aristotle championed, which supports Bos' view that the treatise was written by Aristotle himself.¹ Werner Jaeger, by contrast, thinks that *De spiritu* contains evidence of the Aristotelian as well as of a non-Aristotelian conception of soul developed under the influence of the Stoics and Erasistratus (fl. c. 260 BCE).² In this paper I would like to explore the conception of soul, its relation to pneuma, and the role soul plays (or fails to play) in this treatise. To do so, I will draw on the previous collaborative studies I have undertaken on *De spiritu*. For the benefit of the reader, I provide a list of assumptions with which I approach this task, asking the reader to consult the published studies for arguments and evidence in support of these assumptions.³

First of all, despite a diversity of topics discussed and the author's distressingly associative style, I assume that he operates with a unified picture of human physiology and anatomy. The picture rests on the idea of three distinct but partly overlapping and interacting systems in the body: the system of *artēriai*, by which external air is taken in, turned into pneuma and distributed to different parts of the body. The system of *phlebes*, by which ingested food is turned into blood and by which blood is distributed around the body. And, finally, there is the system of bones and *neura* which supports the body, protects vital organs, and enables locomotion.

Second, concerning pneuma in this treatise, I assume that it is the warm airy substance inside the organism. From the moment external air is inhaled and enters the windpipe – which is part of the system of *artēriai* devoted to the intake of air and distribution of pneuma – it undergoes qualitative changes: the inhaled portion of air is condensed, it receives moisture from the walls of the windpipe and bronchi (Ps.-Aristotle,

1 Bos and Ferwerda 2008, 2, 13, 22–25. The same views, indeed with the same formulations, are found also in Bos and Ferwerda 2007.

2 Jaeger 1913b, 55–74, esp. 68–73.

3 Gregoric, Lewis and Kuhar 2015; Lewis and Gregoric 2015; Gregoric and Lewis 2015.

De spiritu 483b6–10, 22–23), and it becomes warmer as well, since there is a lot of heat in the chest. These qualitative changes, achieved simply by means of passing through the *artēriai*, turn air into pneuma. Indeed, the author says that “the external air is mild, whereas once it is enclosed (inside the body) it becomes pneuma, as it gets condensed and distributed somehow” (ἔξω μὲν γὰρ πραΰς (sc. ὁ ἀήρ), ἐμπεριληφθεὶς δὲ πνεῦμα, καθάπερ πυκνωθεὶς καὶ διαδοθεὶς πῶς, *Spirit.* 483b6–8). It is important to observe that this process is supposed to be quick and simple: the inhaled portion of air acquires certain qualities simply by passing through the windpipe and other *artēriai*. This does not involve transformation of one substance into another, as maintained by some authors who are criticised in *De spiritu*. Nevertheless, because of the various and remarkable effects that it produces, the inhaled air very much deserves an appellation that marks it off from the ordinary atmospheric air, and that appellation is πνεῦμα.

Third, I assume that, in the author’s theory, a large portion of inhaled air goes through the windpipe into the lungs where it causes cooling. Another portion of inhaled air goes into the stomach through a “passage along the loin” (πόρος παρὰ τὴν ὀσφύν, *Spirit.* 483a20–21) where it helps digestion of food. From the large portion of pneuma that ends up in the lungs, most of it is evacuated through exhalation, but a smaller quantity gets distributed through the body for the purpose of nourishing the connate pneuma. Here I add, without further elaboration, that pulsation may be linked to the mechanism of distribution of pneuma from the lungs to the rest of the body. In any case, the pneuma which flows through the system of *artēriai* is engaged in three vital activities: respiration, digestion and pulsation (cf. *Spirit.* 482b14–17). It is important to note the threefold role of respiration: it is to draw in air for the purpose of cooling the chest, assisting digestion and supplying nourishment for the connate pneuma.

Fourth, the connate pneuma: I assume that it is the airy substance from which different tissues are composed. In Chapter 9 we learn that parts of the body – such as bones, flesh, air-ducts, blood-ducts and *neura* – are all made of simple bodies (τὰ ἀπλά, *Spirit.* 485b19, 22) mixed in different ratios. The difference in ratio accounts for the difference in qualities, shapes and dimensions of these structures. The only component of mixtures that the author singles out in addition to fire, is pneuma (*Spirit.* 485b10; cf. 484a3–6). I assume that pneuma and heat/fire are singled out because they are taken to be more important than the other simple bodies on account of their intimate connection with the soul (ἐν τούτοις γὰρ ὑπάρχει (sc. ἡ ψυχῇ), *Spirit.* 485b12). In any case, it is clear that all parts of the body contain heat and pneuma. It is my assumption that this pneuma at the level of composition is what the author refers to as the “connate

pneuma” (σύμφυτον πνεῦμα).⁴ More to the point, I assume that the connate pneuma in the constitution of *neura* is what the author calls πνεῦμα κινητικόν at 485a7, whereas the connate pneuma in the constitution of *artēriai* is responsible for their sensitivity.

When the author says that “the connate pneuma originates from the lungs and goes through the whole body” (τὸ δὲ σύμφυτον πνεῦμα δι’ ὅλου, καὶ ἀρχὴ ἀπὸ τοῦ πνεύμονος, *Spirit.* 482a33–34; cf. 481b19), I take him to mean that a portion of the inhaled air that enters the lungs – possibly a specially fine portion of air of the right temperature – gets distributed through the system of *artēriai* around the body for the purpose of replenishing the airy substance from which all parts of the body are composed in different ratios of mixture with other elements.⁵ The connate pneuma in the *artēriai* and *neura*, more than the other elements, seems to account for two ‘psychic’ activities, sensation and motion respectively. Unfortunately, the text tells us nothing about the way sensation and motion work, and hence it is exceedingly difficult to tell what is the precise role of the connate pneuma in these activities and how it effects this role.

Fifth, I take it that *De spiritu* was not written by Aristotle. Although the exact authorship and date of *De spiritibus* are likely to remain unknown, the fact that the author shows no awareness of the epochal discoveries of the Alexandrian doctors suggests that the text was written in the first half of the third century BCE, possibly in the decade between 270 and 260.⁶

So much about the assumptions, let us now turn to soul.

2

The word ψυχή and its cognates occur 15 times in the treatise which spans over five Bekker pages.⁷ Of the 12 occurrences of the word ψυχή directly relevant for our present task of determining the author’s conception of soul, 6 are found in the first part of Chapter 5, which happens to be one of the textually most problematic stretches of the treatise.⁸ Any interpretation of this stretch of the text, as well as of the other passages mentioning ψυχή, is bound to be controversial in points of detail, but I hope that my

4 The phrase ἔμφυτον πνεῦμα occurs once in the opening line, at *Spirit.* 481a1, and ὁ φυσικὸς ἀήρ also once, at *Spirit.* 482a6. There is no reason to think that these two phrases refer to anything other than what is elsewhere called σύμφυτον πνεῦμα. Roselli 1992, 69, says that the switch indicates lack of strict technical terminology.

5 I take it that the connate pneuma requires replenishment as the body naturally wears out. Also, suf-

ficient supplies of material for the connate pneuma is required for normal growth of the body; cf. *Spirit.* 481a1–2, 9–10, 14–15, 26–27; 482a22–27.

6 For more arguments in favour of this or even slightly earlier dating, see Lewis and Gregoric 2015.

7 ψυχή (11): 481a17, 18, 482b22, 23, 483a4, 26, 27, 30, 483b11 *bis*, 485b12. ἔμψυχος (3): 481a5, 483a31–32 (εὐψυχον codd.), 485a32. ἄψυχος (1): 485a30.

8 See the critical apparatus in Roselli 1992, 97–101.

discussions, on occasion supported by the outlined assumptions from my previous studies of *De spiritu*, will provide cumulative evidence for the conclusions I draw at the end.

Let us start with the occurrence in the least controversial passage. In Chapter 4, the author discusses three types of motions of pneuma in the body: respiration, pulsation and digestive motion. He establishes that pulsation is independent from respiration in the following way:

ΤΙ ἕάν τε γὰρ πυκνὸν ἕάν τε ὁμαλὸν ἕάν τε σφοδρὸν ἢ ἄραιον ἀναπνέη τις, ὃ γε σφυγμὸς ὁμοῖος καὶ ὁ αὐτός, ἀλλ' ἡ ἀνωμαλία γίνεται καὶ ἐπίτασις ἐν τε σωματικοῖς τισι πάθεσι καὶ ἐν τοῖς τῆς ψυχῆς φόβοις ἐλπίσιν ἀγωνίαις.

Whether one breathes rapidly or evenly, heavily or quietly, the pulse remains the same and unchanged, but irregularity and agitation (of the pulse occurs) in some bodily ailments and in fears, anticipations and conflicts of the soul.⁹

Ps.-Arist. *Spirit.* 4, 483a1–5

This passage tells us that soul is the subject of emotions such as fears, anticipations and inner conflicts. Many would find this statement uncontroversial, I suppose, but Aristotle warns us that, strictly speaking, this is not the correct way of speaking about soul: “... to say that it is the soul which is angry is as if we were to say that it is the soul that weaves or builds houses. It is doubtless better to avoid saying that the soul pities or learns or thinks, and rather to say that it is the man who does this with his soul.”¹⁰ This should not lead us to conclude hastily that the passage is un-Aristotelian, since Aristotle himself, despite his warning, occasionally uses precisely such locution.¹¹ However, there is another detail in the close context of this passage that is hard to explain if one assumes that *De spiritu* was written by Aristotle himself.

The passage tells us that pulsation is a type of motion of pneuma that reacts to certain pathological states of the body, but also to certain states of the soul. This seems to be a step towards the author’s conclusion that pulsation is prior to the other two types of motion of pneuma and “bears resemblance to some activity, not to the interception of pneuma – unless this contributes to the activity” (ἔοικεν ἐνεργείᾳ τινὶ καὶ οὐκ ἐναπολήψει πνεύματος, εἰ μὴ ἄρα τοῦτο πρὸς τὴν ἐνεργείαν, *Spirit.* 483a17–18). Earlier in Chapter 4, at 482b34–36, the author mentioned the Aristotelian view that pulsation is a mere side-effect of the release of the pneuma intercepted in the nutritive liquid

9 Throughout this paper I print Roselli’s text and indicate occasional divergences. Translations are all mine.

10 Arist. *De an.* 1.4, 408b11–15 (revised Oxford transla-

tion); see also 408b25–27.

11 E.g. Aristotle, *Physica* 4.11, 218b31; *De sensu* 7, 449a5–7; *De memoria* 1, 450b28.

processed by heat in the heart.¹² In the conclusion of Chapter 4, the author seems to distance himself from that view by saying that pulsation looks more like a purposeful process or activity (ἐνέργεια) – though he is unable to specify what the purpose is. This fact presents a difficulty for those who assume that *De spiritu* was written by Aristotle.¹³

Be that as it may, Chapter 4 seems to show that the author was familiar with Aristotle's theory of pulsation. Let us now look at two passages which bear witness to the author's familiarity with Aristotle's theory of soul. The first passage is brimming with textual problems and allows for different interpretations.

Τ2 ἔχει δ' ἀπορίαν καὶ τὰ περὶ τὴν αἴσθησιν. εἰ γὰρ ἡ ἀρτηρία μόνον αἰσθάνεται, πότερα τῷ πνεύματι τῷ δι' αὐτῆς, ἢ τῷ ὄγκῳ [ἢ τῷ σώματι]; ἢ εἶπερ ὁ ἀήρ πρῶτον ὑπὸ τὴν ψυχὴν, τῷ κυριωτέρῳ τε καὶ προτέρῳ; τί οὖν ἡ ψυχὴ; δύνάμιν φασι τὴν αἰτίαν τῆς κινήσεως τῆς τοιαύτης. ἢ δῆλον ὡς οὐκ ὀρθῶς ἐπιτιμήσεις τοῖς τὸ λογιστικὸν καὶ θυμικόν· καὶ γὰρ οὗτοι ὡς δυνάμεις λέγουσιν. ἀλλ' εἰ δὲ ἡ ψυχὴ ἐν τῷ ἀέρι τούτῳ, οὗτός γε κοινός. ἢ πάσχω γέ τι καὶ ἀλλοιούμενος εὐλόγως, ἂν ἔμψυχον ἢ ψυχὴ,¹⁴ πρὸς τὸ συγγενὲς φέρεται καὶ τῷ ὁμοίῳ τὸ ὅμοιον ἀῖξεται. ἢ οὐ; τὸ γὰρ ὅλον οὐκ ἀήρ, ἀλλὰ συμβαλλόμενον τι πρὸς ταύτην τὴν δυνάμιν ὁ ἀήρ. ἢ οὐ; <...> τὸ ταύτην ποιοῦν καὶ τὸ ποιῆσαν τοῦτ' ἀρχὴ καὶ ὑπόθεσις.

Things related to sensation also pose a difficulty. If only *artēria* is sensitive, is this due to the pneuma that passes through it or to its bulk [or to its body]? Or, if air is the first under soul, is it due to that which is superior and prior (*sc.* soul)? What, then, is soul? They claim that a capacity is the cause of such motion (that contributes to sensation). Or it is clear that you will incorrectly criticise those who posit the calculative and spirited (parts of soul), for they also speak of capacities. But if soul is present in this air, surely this air is common. Or (shall we say that), being affected or altered by something, if (we have something) ensouled or soul, it moves towards what is akin to it, and like is increased by like? Or not? For the whole is not air, but air is something that contributes to that capacity (*sc.* sensitivity). Or not? <...> that which brings about this (sensitivity?), or once it has brought it about, that is the principle and basis.

Ps.-Arist. *Spirit.* 5, 483a23–35

12 See Aristotle, *De respiratione* 20, 479b26–480a15.

13 Bos and Ferwerda 2008, 112, play down the discrepancy between Aristotle's view of pulsation and the one in the conclusion of Chapter 4 of *De spiritu*.

14 From οὗτός to ἡ ψυχὴ I follow Jaeger's text and punctuation. Roselli prints οὗτός γε κοινός, ἢ πάσχω γέ τι καὶ ἀλλοιούμενος; εὐλόγως ἂν ἔμψυχον ἢ ψυχὴ†.

The author's reasoning at the beginning of the passage seems to be as follows. Assuming that only *artēria* is sensitive, the question is whether this is due to the passage of air, to the constitution of *artēria*, or to something "superior and prior" to both, which in all likelihood refers to soul. This prompts the question what soul is, or perhaps what role it plays in rendering the body sensitive (τί οὖν ἡ ψυχὴ, *Spirit.* 483a27). In response to this question, the author refers to some people who claim that the cause of sensation – or rather the cause of the sort of motion that brings about sensation – is a *dynamis*. This is most probably a reference to Aristotle's view that soul is a set of capacities. Indeed, in Aristotle's theory, the perceptual capacity (ἡ αἰσθητικὴ δύναμις) is one of the three fundamental capacities of the soul, and he dedicates more space to it in *De anima* than to all the other capacities taken together. However, the claim that a capacity is the cause of sensory motion is here attributed to some unnamed people, with the verb in the third person plural (φασί), which suggests that the author does not associate himself with that view.

The following sentence, now with the verb in the second person singular, is no less surprising: "[I]t is clear that you will incorrectly criticise (οὐκ ὀρθῶς ἐπιτιμήσεις) those who posit the calculative and spirited (parts of the soul), for they also speak of capacities." This is clearly a (truncated) reference to the Platonic division of the soul into three parts – the calculative, the spirited and the appetitive. Now the author *objects* to a criticism of this division of the soul, but it is not at all clear what motivates him to raise this objection.¹⁵

If the words "you will be wrong to criticise those who posit etc." do not address anyone in particular, but aim to make a general point, the author's idea seems to be the following: should one take Aristotle's lead and maintain that a capacity of the soul is responsible for sensory motion, one might be tempted to follow Aristotle also in rejecting the Platonic division of the soul, knowing that Aristotle criticised it extensively in *De anima*; however, the Platonic division of the soul need not be seen as a competing account, because the *logistikōn* and the *thymikōn* (and the omitted *epithymētikon*) are capacities of the soul also in Plato's theory.¹⁶

15 Bos and Ferwerda 2008, 20, think that "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". I agree that this is a problem which Aristotle raises to Plato at several places, but I confess that I cannot see anything in T2 pointing to the question of the unity of the soul. Towards the end of my paper, I offer an explanation of the author's motivation for raising this objection. Very briefly, he wants to make his physiological and anatomical theory of pneuma compatible with as many different conceptions of soul in circulation as possible.

16 This is roughly how Roselli 1992, 100, understands the author's train of thought. Needless to say, Aristotle did consider Plato's account of the soul as competing and indeed irreconcilable with his own: Plato took the soul, or at any rate its calculative part, to be an extended entity which moves the body by itself being in motion, which Aristotle discusses critically in *De an.* 1.3–4. Moreover, Plato divided the soul spatially, assigning each part of the soul to a different part of the body, leaving the soul's unity unexplained (Arist. *De an.* 1.5, 411b5–10).

On the other hand, if the words “you will be wrong to criticise those who posit etc.” address a particular person, the most probable target is Aristotle and his criticism of the Platonic division of the soul in *De an.* 3.9–10.¹⁷ In that case, however, it seems that the author misunderstood the point of Aristotle’s criticism. The point of his criticism is not that the Platonic parts of the soul are not *dynameis*, but rather that they are wrong *dynameis* into which the soul should be divided for the purpose of a systematic account.

Whatever one makes of the author’s objection to the criticism of the Platonic division of the soul, the first half of T2 (lines 23–30) seems to count as evidence against the Aristotelian authorship of *De spiritu*: Aristotle would hardly attribute to other people (φασί) the claim that a capacity of the soul is responsible for sensory motion, or be quick to point out that Plato’s division of the soul is compatible with that claim and with the underlying account of the soul as a set of capacities. Nevertheless, the first half of T2 counts as a solid piece of evidence that the author was familiar with Aristotle’s theory of the soul.

As to the second half of T2 (lines 30–35), they might be interpreted, with some effort, as containing another piece of evidence that the author was familiar with Aristotle’s theory of the soul. Here is a tentative reconstruction of the author’s reasoning, ignoring some details and textual difficulties. In response to the question what makes *artēria* sensitive, one might argue that this is due to the passage of air or because “soul is in air” (ἡ ψυχὴ ἐν τῷ ἀέρι τοῦτω, *Spirit.* 483a30).¹⁸ Now, is soul in all air, including the external atmospheric (κοινός) air – our author seems to be reasoning – or only in the air which has undergone certain qualitative changes in a living being? It is more reasonable to think that soul is only in the air which has undergone the requisite changes and which contributes to rendering the living being sensitive.¹⁹ Or perhaps it is best to suppose that soul is not even in that air, but is rather the principle and basis (ἀρχὴ καὶ ὑπόθεσις, *Spirit.* 483a35–36) which makes it possible for the inhaled air to undergo the requisite changes as it passes through the system of *artēriai* and thus to render the body sensitive. This would be the author’s answer to the initial question whether *artēria* owes its sensitivity to the passage of air, to the constitution of *artēria*, or to soul.

If this charitable reconstruction of the author’s train of thought is correct, soul seems to be taken here as the formal cause which explains the structure of the body such that the relevant physiological processes and psychological states can take place. In other words, it is because of soul that *artēria* is constituted in the particular way and that air is able to pass through it having acquired all the right qualities; so it is soul that

17 Apparently, that is what Bos and Ferwerda 2008, 120, also think in their comment on this sentence.

18 I presume this would be a position close to that of Diogenes of Apollonia, who identified soul with air;

cf. Arist. *De an.* 1.2, 405a21–25 (= fr. 64A20 DK) and Simplicius, *In Aristotelis Physicorum libros commentarius*, Diels p. 151,28 14 (= frs. 64B3–5 DK).

19 Of course, this air is *pneuma*.

explains, first and foremost, why *artēria* is sensitive. With this reconstruction, then, the second half of T2 contains an additional piece of evidence that the author was familiar with Aristotle's theory of soul. I admit, however, that the evidence is tenuous, not only because my reconstruction is tentative, but also because in Chapter 9, as I will argue later, the author shows no awareness of the concept of formal causation.

Here is another passage which mentions both soul and capacity of the soul.

T3 ἡ μὲν οὖν ἀναπνοὴ δῆλον ὡς ἀπὸ τοῦ ἐντὸς ἔχει τὴν ἀρχήν, εἴτε ψυχῆς δύναμιν εἴτε ψυχὴν δεῖ λέγειν ταύτην, εἴτε καὶ ἄλλην τινὰ σωμαίων μίξιν, ἢ δι' αὐτῶν ποιεῖ τὴν τοιαύτην ὀλκὴν.

It is clear that respiration has its origin from the inside – whether one should define it as a capacity of the soul, soul, or some other mixture of bodies – which, by means of these, produces such intake (*sc.* of external air).

Ps.-Arist. *Spirit.* 4, 482b21–25

The principle of respiration is said to be inside the body, and the first two candidates for this principle are “capacity of the soul” and “soul” (εἴτε ψυχῆς δύναμις εἴτε ψυχὴ). Aristotle would be the most obvious philosopher who would think that soul, or, more precisely, the nutritive capacity of the soul, is the principle of respiration, contrary to some Hellenistic philosophers and physicians who think that vital activities such as respiration are due to nature (φύσις), not to soul. I take it that the third alternative, “some other mixture of bodies” (ἄλλη τις σωμαίων μίξις), is mentioned precisely to leave room for that possibility, for I am inclined to believe that the author accepts the distinction between nature and soul, such that nature explains vital processes like respiration, pulsation, digestion and reproduction, whereas soul explains processes like sensation and locomotion. I will return to this topic later.

I take T2 and T3 to constitute direct evidence of the author's familiarity with Aristotle's theory of soul. The close affinity of soul with pneuma, affirmed at several places (see T5 and T6 below), can also be regarded as direct evidence to that effect. There is also abundant indirect evidence for the author's familiarity with Aristotle's theory of soul. For instance, *De spiritu* opens with the questions how the connate pneuma is maintained and how it grows.²⁰ These questions merit attention, we learn, “for we see that it becomes larger and stronger with with change of both age and condition of the body” (*Spirit.* 481a2–3). Of course, we can ‘see’ this only if we take it for granted that there is such a thing as the connate pneuma, and that it is the source of strength

20 In the opening line, at *Spirit.* 481a1, and only there, the author uses the phrase ἔμφυτον πνεῦμα, which

seems to be synonymous with σύμφυτον πνεῦμα; cf. n. 4 above.

in animal bodies.²¹ Both of these ideas are found in Aristotle and probably originate with him. Indeed, the very question in the opening sentence of *De spiritu* seems to go back to a parenthetical remark in Aristotle's *De motu animalium* 10: "How the connate pneuma is preserved is stated elsewhere" (703a10–11).²² The fact that the author knew Aristotle's biological works such as *De motu animalium* and *De respiratione* can be taken as indirect evidence of his familiarity with Aristotle's theory of the soul, since it is unlikely that one could have knowledge of the former without at least some familiarity with the latter. Moreover, the author's use of the term *energeia* with reference to purposeful or vital activity (e.g. *Spirit.* 483a17, 18 and coupled with *dynamis* at 482b6–7), his insistence on teleological explanations (e.g. throughout Chapter 3), his practice of testing the adequacy of an account by appealing to other animals (e.g. in Chapters 2 and 8), the analogy of nature and art (in Chapter 9), and many physiological details borrowed from Aristotle – it is hard to imagine that one could pick all that up without gaining some knowledge of Aristotle's theory of soul.

Given the author's familiarity with Aristotle's theory of soul, however, some passages in *De spiritu* are puzzling. Consider the following passage:

T4 ἀλλ' αἱ μὲν τέχναι ὡς ὄργανω χρῶνται (*sc.* τῷ πυρί), ἡ δὲ φύσις ἅμα καὶ ὡς ὕλη. οὐ δὴ τοῦτο χαλεπὸν, ἀλλὰ μᾶλλον τὸ τὴν φύσιν αὐτὴν νοῆσαι τὴν χρωμένην, ἥτις ἅμα τοῖς αἰσθητοῖς πάθεσι καὶ τὸν ῥυθμὸν ἀποδώσει· τοῦτο γὰρ οὐκέτι πυρὸς οὐδὲ πνεύματος, τούτοις δὴ καταμειχθαι τοιαύτην δύναμιν θαυμαστόν. ἔτι δὲ τοῦτο θαυμαστόν [ταυτόν] καὶ περὶ ψυχῆς· ἐν τούτοις γὰρ ὑπάρχει. διόπερ οὐ κακῶς²³ εἰς ταυτόν, ἢ ἀπλῶς ἢ μόριόν τι τὸ δημιουργοῦν, καὶ τὸ τὴν κίνησιν αἰεὶ τὴν ὁμοίαν ὑπάρχειν ἐνεργεία. καὶ γὰρ ἡ φύσις, ἀφ' ἧς καὶ ἡ γένεσις.

But whereas crafts use it (*sc.* fire) as an instrument, nature uses it at the same time also as matter. What is difficult, surely, is not that, but rather that nature herself uses it and assigns not only sensible properties to (bodily parts) but also their proper structure. For this is no longer the scope of fire or pneuma. So, it is remarkable that such a capacity should be combined with these (two bodies,

21 See Arist. *De motu an.* 10, 703a8–10; *De somno et vigilia* 2, 456a15–17; *De generatione animalium* 2.4, 737b32–738a1; 5.7, 787b10–788a16. One might object that ἰσχυρότερον at *Spirit.* 481a2 does not really say that the *body* grows stronger by means of the connate pneuma, but rather it is the connate pneuma that grows stronger (ἰσχυρότερον). This is a different way of expressing the same idea, I take it, and it will be borne out by the role of the connate pneuma in the movement of the limbs.

22 If this remark is a reference to *De spiritu*, I suppose it is a later interpolation by an editor or scribe who knew of the existence of *De spiritu*. Certainly this, and a similar parenthetical promissory remark few lines down, at *De motu an.* 10, 703a16–18, ostensibly interrupt the train of Aristotle's thought in *De motu an.* 10.

23 I follow the manuscript reading κακῶς, preferred by all the editors save Roselli, who reads καλῶς.

namely fire and pneuma). Moreover, this is remarkable also with regard to soul, for it is found in these (two bodies). For this very reason it is not bad (that they are associated) with the same thing, either unqualifiedly or some particular productive part of it, and that its uniform motion is always present in actuality. For this applies also to the nature from which generation, too, comes about.

Ps.-Arist. *Spirit.* 9, 485b6–15

In this passage the author describes fire both as an instrument and as matter, and he finds nothing particularly problematic with such a description. What he finds problematic, rather, is that nature herself uses fire in such a way as to adorn the bodily parts with just the right qualities, shapes and dimensions.²⁴ The same problem is then extended to soul (ἔτι δὲ τοῦτο θαυμαστόν ... καὶ περὶ ψυχῆς, *Spirit.* 485b11–12). Now, this indicates two things. First, the author does not seem to follow Aristotle in identifying the nature of a living being with its soul. As is well known, Aristotle defines nature as the internal principle of motion and rest, and in the case of living beings this is their soul. The author of *De spiritu*, by contrast, appears to distinguish a living being's soul from its nature. Nature seems to come first and at a lower level of organic complexity which is common to all living beings, whereas soul comes second and at a higher level of organic complexity manifest in living beings with sensation and locomotion. Whether this was written under the influence of the Stoic *physis-psyche* distinction, as Jaeger and Roselli argue,²⁵ or perhaps as a forerunner of that theory, one has to admit that this detail does not look very Aristotelian.

Second, the author's wonder at the works of nature and its demiurgic agency in Chapter 9 indicates that he does not subscribe to Aristotle's conception of soul as formal cause. As every Aristotelian knows, soul is what explains the shape and organization of the living body. That is to say, the simple bodies are mixed in the right way and bodily parts adorned with just the right qualities, shapes and dimensions *because* they constitute the appropriate matter for the form they were meant to realize – and the form in question is the soul. Only a person who does not accept formal causation sees a difficulty with nature achieving the right ratios of mixture at all the right places.

It is reasonable to ask why the author does not accept Aristotle's conception of soul as formal cause. If the author is someone with solid knowledge of Aristotle's biological

24 Dobson, Hett, Gohlke, Tricot and Roselli take φύσιν to be the subject of νοῆσαι, whereas Bos and Ferwerda 2008, 45, take φύσιν to be the object of νοῆσαι. They opt for this reading in order to avoid saddling the author of *De spiritu* with the distinctly un-Aristotelian claim that nature thinks. The other ar-

gument they give in favour of their reading is more convincing: the alternative would grammatically require νοεῖν instead of νοῆσαι. I accept Bos and Ferwerda's reading, though nothing in my argument depends on it.

25 Jaeger 1913b, 70–73; Roselli 1992, 126.

works, surely he must be familiar with formal causation and hypothetical necessity. Indeed, we have seen that T2 may contain evidence of the author's understanding of soul precisely in the role of the formal cause. So why does he not make use of it in Chapter 9?²⁶ One possible explanation is that he operates with a different conception of soul. But which conception is that?

The talk of mixture of the simple bodies in different ratios to achieve tissues of different qualities, shapes and dimensions, with the result that there is an ensouled being, may suggest that the author endorses a version of the "Pythagorean" *harmonia*-conception of soul familiar from Plato's *Phaedo* and later championed by the early Peripatetic philosophers Aristoxenus of Tarentum and Dicaearchus of Messene.²⁷ According to this theory, soul is an epiphenomenon of the right balance of elements in the body, much like the attunement of the lyre is an epiphenomenon of the right tension of the strings.

I do not think that the author of *De spiritu* subscribes to this conception of soul, either. True, he does think that the simple bodies must be mixed in the right ratios at all the right places, and he marvels at nature for achieving that, but for him this does not seem to be a sufficient condition for the presence of soul. What is crucially required – in addition to the right mixtures in all the right places that constitute an organism with different tissues and systems – is *pneuma* with its various motions and mixtures described in this treatise. For our author, *pneuma* (and fire) stand in a more intimate relation to soul than the other simple bodies or mixtures of simple bodies – as visible from T4 where soul was said to be "present in *pneuma* and fire" (ἐν τοῦτοις γὰρ ὑπάρχει (sc. ἡ ψυχῆ), at *Spirit.* 485b12, referring back to πυρὸς καὶ πνεύματος in line 10).

There are two further passages suggesting that the author took soul to be intimately connected with *pneuma*.

T5 καθαρώτερον γὰρ ὁ τῆ ψυχῆ συμφυῆς (sc. τὸ σύμφυτον πνεῦμα), εἰ μὴ καὶ τὴν ψυχὴν ὕστερον λέγοι γίνεσθαι, διακρινομένων τῶν σπερμάτων καὶ εἰς φύσιν ἰόντων.

For that which is connate to the soul (sc. the connate *pneuma*) is purer – unless one were to say that soul too is generated later, following the separation of seeds and their advancement to their respective nature.

Ps.-Arist. *Spirit.* 1, 481a17–19

26 This problem can be explained away by adopting the thesis of Neustadt 1909 and Jaeger 1913b, 73; Jaeger 1913a, xix, that Chapter 9 does not belong with the rest of the treatise. Against that thesis, see Lewis 2020.

27 See Aristoxenus frs. 120a–d Wehrli (= Cicero, *Tusculanae disputationes* 1.10.19; 1.18.4; Lactantius, *De opificio dei* 16) and Dicaearchus fr. 11 Wehrli (= Nemesius, *De natura hominis* 2); cf. Caston 1997.

T6 οὐκ ἄρα λεπτότατος (*sc.* ὁ ἐμπεριληφθεὶς ἀήρ), εἴπερ μέμικται. καὶ μὴν εὐλογόν γε τὸ πρῶτον δεκτικὸν ψυχῆς, εἰ μὴ ἄρα καὶ ἡ ψυχὴ τοιοῦτον, καὶ οὐ καθαρὸν τι καὶ ἀμιγές.

So, if (the enclosed air) is mixed, it is not supremely fine. Yet it is very reasonable that the primary receptacle of the soul is such – unless the soul too is of this character (*sc.* mixed), i.e. not something pure and unmixed.

Ps.-Arist. *Spirit.* 5, 483b9–12

In T5, the connate pneuma is said to be something connate to the soul, i.e. something with which the soul is naturally bound together. I take it that much the same idea is expressed in T6 with the idea that pneuma is “the primary receptacle of soul” (τὸ πρῶτον δεκτικὸν ψυχῆς, *Spirit.* 483b10–11). This privileged position of pneuma in relation to soul, I think, rules out the possibility that the author endorses any sort of *harmonia*-conception of soul.

On the other hand, he does not identify soul with air or pneuma, as some Presocratics and the Stoics did.²⁸ For our author, soul seems to be a *dynamis* (or perhaps a set of *dynameis*) which a living being has owing to pneuma and its various motions and roles in the body. Pneuma is connate (συμφυές) to the soul, it is the primary vehicle of the soul, but it is not the soul itself. As we have seen, the author rejects the view that soul is reducible to air – whether to all air indiscriminately, or even to the inhaled air that has undergone suitable alterations by passing through the body (i.e. pneuma). Our author seems to think that there must be a certain “principle and basis” (ἀρχὴ καὶ ὑπόθεσις, *Spirit.* 483a35–36) which makes it possible for air to undergo these alterations and to produce its various effects in the body. Although he does not explicitly equate this principle with soul in T2, I have suggested that this is what he had in mind.

So, which conception of soul does the author endorse? Could it be Aristotle’s non-reductivist conception of soul, after all? Bos is convinced that this is exactly what we find in *De spiritu*. He believes that the intimate connection between soul and pneuma found in this treatise is asserted also by Aristotle in *De anima*.²⁹ Namely, Bos takes Aristotle’s canonical definition of soul as the form of the natural organic body (σώματος φυσικοῦ ὀργανικοῦ, Arist. *De an.* 2.1, 412b5–6) to establish a direct hylomorphic relationship between soul and pneuma: soul is not the form of the whole body made of tissues

28 E.g. Anaximenes (Aëtius 1.3.4 = fr. 13B2 DK), Xenophanes (Diog. Laërt. 9.19 = fr. 21A1 DK), Diogenes of Apollonia (Theophr. *Sens.* 39–45; Aristotle, *De anima* 1.2, 405a21–25; Simplicius, *In Arist. Phys.* Diels 151,28 = frs. 64A19, 64A20, 64B4, 64B5 DK). For the Stoic view, see Diog. Laërt. 7.1; Ps.-Galen,

De historia philosopha 24, Diels 613; Tertullian, *De anima* 5; Iamblichus, *De anima* apud Stobaeum, *Eclogae* 1.49.33 (Wachsmuth 367,17); Aëtius 4.21; Calc. *In Tim.* 220 (= SVF 1.135, 136, 137; 2.826, 836, 879); cf. Long 1982; Annas 1992, 37–70.

29 Bos 2003; Bos and Ferwerda 2008.

and organs, but only of pneuma in the body. It is true that Aristotle establishes a tight connection between the connate pneuma and soul at several places (e.g. Arist. *De motu an.* 10: *De an.* 3.10; *Gen. an.* 2.3), but this connection should not be understood in terms of the direct hylomorphic relationship. Very briefly, pneuma is not an ancient counterpart to the Cartesian pineal gland that physically reacts to mental states in some mysterious way; rather, it is a material thing which reacts physically to subtle thermic alterations in the heart that accompany perceptions of pleasant and unpleasant things. When heated or chilled, pneuma in the heart expands and contracts, thereby acting mechanically on the tiny *neura* in the heart and this leads to the motion of the limbs.³⁰ And if the connection between the connate pneuma and soul is not understood in terms of the direct hylomorphic relationship, there is no reason whatsoever to understand Aristotle's notion of the natural organic body in his canonical definition of soul in *De anima* with reference to pneuma only, as Bos insists.³¹

Earlier in this paper I listed some reasons to think that the author of *De spiritu* does not subscribe to Aristotle's non-reductivist conception of soul as the form of the living body; notably, T4 could not have been written by someone who accepts Aristotle's view. What speaks even more decisively against the view that the author of *De spiritu* subscribes to Aristotle's conception of soul are passages in which the author intimates that soul might be something "mixed" with the simple bodies from which living beings are composed. In T3 the author of *De spiritu* speaks of a "capacity of the soul, soul or some other mixture of bodies" (εἴτε ψυχῆς δύναμιν εἴτε ψυχὴν δεῖ λέγειν ταύτην, εἴτε καὶ ἄλλην τινὰ σωματίων μίξιν, *Spirit.* 482b22–24) as being responsible for respiration, which may imply that soul is also a mixture of bodies. In T4, nature or soul is explicitly said to be something "mixed" with pneuma and fire (καταμειχθαι, *Spirit.* 485b10). In T6 he entertains the idea that soul is "not something pure and unmixed" (οὐ καθαρὸν τι καὶ ἀμιγές, *Spirit.* 483b12). I suspect Aristotle would never venture such claims, since they imply corporeality of the soul.³²

We have made a full circle trying to determine which conception of soul the author endorses, without a positive result.³³ The conclusion we ought to draw at this stage, I

30 For more details, see Corcilius and Gregoric 2013; Gregoric and Kuhar 2014; Gregoric 2020, 427–438.

31 Further difficulties for Bos' position are specific claims about pneuma in *De spiritu* which contradict Aristotle. For example, the source of pneuma for Aristotle is the heart, whereas in *De spiritu* it is the lungs (482a33–34); there is nothing in Aristotle to suggest that pneuma flows only through *artēria* (*Spirit.* 483b12–13, 18–19), or that only *artēria* is sensitive. For other difficulties, see Gregoric and Lewis 2015.

32 According to Aristotle, only entities of the same type can mix; cf. Arist. *Gen. Corr.* 1.10 and *Sens.* 7, 447a30–b3.

33 Jaeger 1913b, 73, writes: "In the other account, fire-pneuma is the organ of the soul, the πρῶτον ὑπὸ τὴν ψυχὴν, which is entirely Peripatetic (483a26). There the soul is ἀμιγής (sc. 'unmixed') and καθαρὰ (sc. 'pure') (483b12), here (viz. in Chapter 9) it is corporeally mixed with fire-pneuma, which marks the whole distance between Anaxagoras and Zeno of Citium!"

propose, is that the author is not committed to any particular conception of soul. If we look carefully at T₃, T₅ and T₆, we can see that he consistently hedges his statements about soul, as if trying to leave room for different conceptions of it.

In T₃ the author observes that the principle of respiration must be inside the body, but he leaves it open whether it is a capacity of the soul, soul itself or “some other mixture of bodies” (ἄλλη τις σωμαίων μίξις, *Spirit.* 482b23–24). As I have suggested, the expression “some other mixture of bodies” may indicate that the principle of respiration is neither soul, nor any particular capacity of the soul, but nature. If that is correct, this again looks like a concession to the conception of soul favoured by the Alexandrian doctors and the Stoics, but also a possibility compatible with the *harmonia*-conception.

In T₅ he leaves room for the possibility that soul appears at some later stage of development of an individual, notably once it has started to take part in the process of digestion of food (the working premise here is that the connate pneuma is nourished from the process of digestion of food). Perhaps this is not in line with Aristotle who thinks that soul in its nutritive capacity appears with the formation of the heart, but it is compatible with the *harmonia*-conception and even evocative of the Stoic theory and the theory of Alexandrian physicians, where the development of the embryo is governed by nature, whereas soul appears at birth.

T₆ considers the possibility that the air enclosed in the system of *artēria* becomes pneuma by actually mixing with moisture and coarse bits in there. In that case, the author concludes, pneuma would not be the finest substance (λεπτότατος, *Spirit.* 483b10). However, it is reasonable to suppose that the first receptacle of soul is the finest substance, adding a caveat: “unless soul itself is also like that, i.e. not something pure and unmixed”. This may very well be intended as a concession to a reductive materialist conception of soul, notably the Stoic one.³⁴

It is reasonable to ask why the author of *De spiritu* is not committed to any particular conception of soul. It might be because he was agnostic, but it might also be something programmatic. What I want to suggest is that he regarded it as a recommendation of his physiological and anatomical theory of pneuma that it is compatible with a variety of different conceptions of soul, or at any rate not decisively bound to any one of them. I have argued that the conceptions of soul in play, in addition to Aristotle’s non-reductive one, are the epiphenomenalist *harmonia*-conception which enjoyed some popularity among the early Peripatetics, and the reductive materialist conception championed by the Stoics. Another conception of soul that the author wanted to keep on the table was the Platonic one. That is why in T₂ the author raised the objection to anyone who might think that subscribing to the Aristotelian view that a capacity of the soul is responsible for

34 So Jaeger 1913b, 71–73, and Roselli 1992, 74: “ψυχή too is a body ..., which brings us close to the Stoic definitions of the soul”

sensory motion automatically rules out Plato's division of the soul into the calculative, the spirited and the appetitive part. Our author urges that these three parts can also be understood as capacities, so that even adherents of the Platonic conception of soul can be sympathetic to our author's theory.

If the author aimed to develop a physiological and anatomical theory around the Aristotelian notion of *pneuma* and to demonstrate its superiority over the rival physiological and anatomical theories, reminding the reader every now and then of his theory's compatibility with different conceptions of soul looks like a reasonable strategy, especially if the competing physiological and anatomical theories typically came in conjunction with certain conceptions of soul. Of course, one who chooses this strategy cannot attach great explanatory value to soul, but perhaps one does not need to – if one aims to present a physiological and anatomical theory of a limited scope, as seems to be the case with the author of *De spiritu*.

3

Even though soul does not loom large in *De spiritu*, there are certain things that we can say with a modicum of certainty about soul and *pneuma* in *De spiritu*. First of all, our author thinks that soul, however one conceives of it, stands in a privileged relationship with one type of stuff, and that is *pneuma*. This is in line with Aristotle's theory but also with the theories of the Stoics and the Alexandrian doctors.

Second, the privileged relationship between soul and *pneuma* is based on *pneuma*'s purity and fineness. This is in line with the ancient tradition, noted by Aristotle, to identify or associate soul with supremely fine and the least corporeal stuff.³⁵ This tradition persists in Hellenistic times and was advocated also by Galen.³⁶

Third, *pneuma*'s purity and fineness has something to do with the fact that *pneuma* originates from external air which is considered by many philosophers and physicians, at least from Diogenes of Apollonia onwards, to be the finest type of stuff.

Fourth, soul is relegated to a supporting role in this treatise. Typically, *De spiritu* introduces soul in support of the claim about *pneuma*'s purity and fineness, as in T5 and T6, or with reference to the principle of an activity under discussion, such as respiration in passage T3 or sensitivity in passage T2.

Fifth, the author seems to separate soul from nature in T3 and T4, and he does so in a way which is reminiscent of the *physis-psyche* distinction advocated by the Stoics. Nature

35 Arist. *De an.* 1.2, 405a4–7, 21–25; 1.5, 409b19–21.

36 See, e.g., Ep. *Hdt.* 63; Asclepiades (in Calc. *In Tim.* 215 = Waszink ed. alt. 1975, 229, 18–230,7); Galen,

Ut. Resp. 5.5 (Furley/Wilkie 128 = K. 4.507); Galen, *PHP* 7.3, 23–29 (De Lacy 444, 12–446, 10 = K. 5.606–609). See also the chapter by Leith in this volume.

accounts for the vital activities of respiration, digestion and pulsation, whereas soul goes with the characteristically animal activities of sensation and locomotion. I have argued elsewhere that the crucial role in both sets of activities is played by pneuma, though not in the same way. It is pneuma flowing through the system of *artēriai* that plays the role in vital activities, and pneuma mixed in the right ratios with other simple bodies in the constitution of *artēriai* and *neura* that plays the role in the “psychic” activities of sensation and locomotion, respectively. Pneuma in the latter role, I have argued, is what the author calls “connate pneuma”.

Sixth, if one goes along with my assumption that the author makes the distinction between the pneuma flowing through the system of *artēriai* and the connate pneuma as a building block of different tissues, *De spiritu* comes close to the Hellenistic *physis-psychē* distinction in yet another way. Namely, if my assumption is correct, *De spiritu* foreshadows the differentiation of pneuma into two different types, one in charge of vital activities (respiration, digestion, pulsation) and the other in charge of “psychic” activities (sensation, locomotion). This would constitute a clear anticipation of the historically momentous distinction between vital and psychic pneuma, introduced by the Alexandrian doctors and later worked out by Galen.

Finally, I think that the cumulative evidence I have provided in this paper speaks quite strongly against Aristotle’s authorship of *De spiritu*. The author’s knowledge of Aristotle’s biological works and his familiarity with the Aristotelian theory of soul indicate that he affiliated himself with the Peripatetic school. However, his commitment to Aristotle’s conception of soul was so weak that he did not see a problem in allowing non-Aristotelian conceptions of soul to appear on equal footing across the treatise. I have suggested that this is the result of the fact that the author had no particular need for a robust concept of soul in developing his physiological and anatomical theory of pneuma and questioning rival ones, but also because he wanted to make his theory acceptable to doctors and philosophers who may have held different views concerning soul.

Bibliography

Ancient Authors

Aëtius

Aëtius. *De placitis reliquiae*. In *Doxographi Graeci*. Ed. by H. Diels. Berlin: Reimer, 1879.

Anaximenes

Anaximenes. *Fragmenta*. In *Die Fragmente der Vorsokratiker*. Ed. by H. Diels and W. Kranz. Sixth Edition. Berlin: Weidmann, 1951–1952.

Arist. *De an.*

Aristotle. *De anima*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1961.

Arist. *De motu an.*

Aristotle. *De motu animalium*. Ed. by M. Nussbaum. Princeton, NJ: Princeton University Press, 1978.

Arist. *Gen. an.*

Aristotle. *Aristotelis De generatione animalium*. Ed. by H. J. Drossaert Lulofs. Oxford Classical Texts. Oxford: Oxford University Press, 1965.

Arist. *Gen. Corr.*

Aristotle. *De generatione et corruptione*. Ed. by C. Mugler. Collection des Universités de France. Paris: Les Belles Lettres, 1966.

Arist. *Mem.*

Aristotle. *De memoria*. In *Aristotle. Parva naturalia*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1955.

Arist. *Pb.*

Aristotle. *Physica*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1950.

Arist. *Resp.*

Aristotle. *De respiratione*. In *Aristotle. Parva naturalia*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1955.

Arist. *Sens.*

Aristotle. *De sensu*. In *Aristotle. Parva naturalia*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1955.

Arist. *Somm.*

Aristotle. *De somno et vigilia*. In *Aristotle. Parva naturalia*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1955.

Aristoxenus

Aristoxenus. *Fragmenta*. In *Die Schule des Aristoteles. Texte und Kommentar*. Ed. by F. Wehrli. Second Edition. 2 vols. Basel: Schwabe, 1967.

Calc. *In Tim.*

Calcidius. *Timaeus a Calcidio translatus commentari-oque instructus*. Ed. by J. H. Waszink. Plato Latinus 4. London: The Warburg Institute, 1962.

Dicaearchus

Dicaearchus. *Fragmenta*. In *Die Schule des Aristoteles. Texte und Kommentar*. Ed. by F. Wehrli. Second Edition. 2 vols. Basel: Schwabe, 1967.

Diogenes of Apollonia

Diogenes of Apollonia. *Fragmenta*. In *Die Fragmente der Vorsokratiker*. Ed. by H. Diels and W. Kranz. Sixth Edition. Berlin: Weidmann, 1951–1952.

Epicurus *Ep. Hdt.*

Epicurus. *Ad Herodotum*. In *Epicuro. Opere*. Ed. by G. Arrighetti. Second Edition. Turin: Einaudi, 1973.

Gal. *PHP*

Galen. *Galenus De placitis Hippocratis et Platonis*. Ed. by P. De Lacy. Corpus Medicorum Graecorum V 4,1,2. Berlin: Akademie Verlag, 2005.

Gal. *Ut. Resp.*

Galen. *De utilitate respirationis*. In *On Respiration and the Arteries. An Edition with English Translation and Commentary of De usu respirationis, An in arteriis natura sanguis contineatur, De usu pulsuum, and De causis respirationis*. Ed. by D. J. Furley and J. S. Wilkie. Princeton, New Jersey: Princeton University Press, 1984, 80–132.

Ps.-Arist. *Spirit.*

Ps.-Aristotle. *De spiritu*. Ed. by A. Roselli. Pisa: ETS Editrice, 1992.

SVF

H. von Arnim, ed. *Stoicorum Veterum Fragmenta*. 4 vols. Leipzig: Teubner, 1903–1924.

Xenophanes

Xenophanes. *Fragmenta*. In *Die Fragmente der Vorsokratiker*. Ed. by H. Diels and W. Kranz. Sixth Edition. Berlin: Weidmann, 1951–1952.

Secondary Literature

Annas 1992

Julia Annas. *Hellenistic Philosophy of Mind*. Berkeley and Los Angeles: University of California Press, 1992.

Bos 2003

Abraham P. Bos. *The Soul and its Instrumental Body. A Reinterpretation of Aristotle's Philosophy of Living Nature*. Leiden and Boston: Brill, 2003.

Bos and Ferwerda 2007

Abraham P. Bos and Rein Ferwerda. "Aristotle's *De Spiritu* as a Critique of the Doctrine of pneuma in Plato and His Predecessors." *Mnemosyne* 60.4 (2007), 565–588.

Bos and Ferwerda 2008

Abraham P. Bos and Rein Ferwerda. *Aristotle on the Life-Bearing Spirit (De Spiritu). A Discussion with Plato and His Predecessors on Pneuma as the Instrumental Body of the Soul*. Leiden and Boston: Brill, 2008.

Caston 1997

Victor Caston. "Epiphenomenalisms, Ancient and Modern." *The Philosophical Review* 106.3 (1997), 309–363.

Corcilius and Gregoric 2013

Klaus Corcilius and Pavel Gregoric. "Aristotle's Model of Animal Motion." *Phronesis* 58.1 (2013), 52–97.

Gregoric 2020

Pavel Gregoric. "The Origin and the Instrument of Animal Motion – *De Motu Animalium* Chapters 9 and 10." In *Aristotle: De Motu Animalium. Proceedings of the XIXth Symposium Aristotelicum*. Ed. by O. Primavesi and C. Rapp. Oxford: Oxford University Press, 2020, 416–444.

Gregoric and Kuhar 2014

Pavel Gregoric and Martin Kuhar. "Aristotle's Physiology of Animal Motion. On Neura and Muscles." *Apeiron* 47.1 (2014), 94–115.

Gregoric and Lewis 2015

Pavel Gregoric and Orly Lewis. "Pseudo-Aristotelian *De Spiritu*: A New Case Against Authenticity." *Classical Philology* 110.2 (2015), 159–167.

Gregoric, Lewis and Kuhar 2015

Pavel Gregoric, Orly Lewis and Martin Kuhar. "The Substance of *De Spiritu*." *Early Science and Medicine* 20 (2015), 101–124.

Jaeger 1913a

Werner Jaeger. *Aristotelis De animalium motione et De animalium incessu, Ps-Aristotelis De spiritu libellus*. Leipzig: Teubner, 1913.

Jaeger 1913b

Werner Jaeger. "Das Pneuma im Lykeion." *Hermes* 48.1 (1913), 29–74.

Lewis 2020

Orly Lewis. "De Spiritu on Heat and Its Roles in the Formation, Composition, and Activities of Animals." In *Heat, Pneuma, and Soul in Ancient Philosophy and Science*. Ed. by H. Bartoš and C. G. King. Cambridge: Cambridge University Press, 2020, 140–156.

Lewis and Gregoric 2015

Orly Lewis and Pavel Gregoric. "The Context of *De Spiritu*." *Early Science and Medicine* 20 (2015), 125–149.

Long 1982

Anthony Arthur Long. "Soul and Body in Stoicism." *Phronesis* 27.1 (1982), 34–57.

Neustadt 1909

Ernst Neustadt. "Ps.-Aristoteles, Peri pneumatosis c. IX und Athenaios von Attalia." *Hermes* 44.3 (1909), 60–69.

Roselli 1992

Amneris Roselli. [*Aristotele*]. *De spiritu*. Pisa: ETS Editrice, 1992.

PAVEL GREGORIC

Pavel Gregoric, BPhil, DPhil (*Oxon.*), taught Philosophy at the University of Zagreb from 2000 to 2017, now holds the position of a Senior Research Fellow at the Institute of Philosophy in Zagreb. He has held visiting positions at Central European University in Budapest, Humboldt-Universität in Berlin, UC Berkeley and University of Gothenburg. He is the author of the monograph *Aristotle on the Common Sense* (OUP, 2007) and the co-editor of *Pseudo-Aristotle: De mundo. A Commentary* (CUP, 2020) and *Encounters with Aristotelian Philosophy of Mind* (Routledge, 2021).

Dr. Pavel Gregoric
Institute of Philosophy
Ulica grada Vukovara 54/IV
HR-10000 Zagreb
Croatia
E-Mail: gregoric@ifzg.hr