The Doctrine of Winds in Blemmydes: On the Reception of Aristotelian Meteorology in the Palaeologan Age

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In a fundamental study in 1976, Wolfgang Lackner offered a concise but still standard panorama of the Byzantine philosophical studies on meteorology.[1] He demonstrated that, from the eleventh century on, the Aristotelian doctrine was used as a starting point in the scholarly framework, mostly via the intermediation of the Late Antique commentators: for instance, Michael Psellos and Symeon Seth gathered their knowledge on meteorology mainly from Olympiodorus' commentary on Aristotle's *Meteorologica.* Concerning the evolution of this philosophical branch in the Palaeologan age, Lackner observed (640):

> eine neue literarische Form, das philosophische Kompendium, begegnet in des Nikephoros Blemmydes zweiteiligem Lehrbuch, dessen erster Band der Logik, der zweite der Physik gilt. Die Meteorologie wird ganz in der traditionellen Reihenfolge in den Kapiteln 12–23 des zweiten Bandes nach den Φυσικαὶ ἀκροάσεις und Περὶ γενέσεως καὶ φθορᾶς besprochen. An Stelle von Olympiodors Kommentar benützte Blemmydes den gehaltreicheren des Alexander von Aphrodisias, daneben aber auch den Aristotelestext selbst und die pseudoaristotelische Schrift Περὶ κόσμου.

[1] W. Lackner, "Die aristotelische Meteorologie in Byzanz," in M. Berza and E. Stănescu (eds.), *Actes XIV Congr. Intern. Etudes Byzantines* III (Bucharest 1976) 639–643.

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Unfortunately, Lackner could not complete his monograph on the *Epitome physica*, where he planned to present a complete account of the manuscript tradition of this work and of its sources.[2] All he left on it are few but still pivotal studies.[3] This paper intends to pursue his preliminary studies on the *Epitome physica*, trying to sketch Blemmydes' reception, interpretation, and transmission of Aristotelian meteorology. In the present investigation, only a single, paradigmatic example from his coursebook will be studied: the doctrine of winds discussed in ch. 17.

First, a short introduction to the *Epitome* is in order.[4] It is the second book of Nikephoros Blemmydes' philosophical compendium (*Εἰσαγωγικὴ ἐπιτομή*, *Introductory compendium*), a coursebook written mainly as a teaching tool.[5] The *Epitome* contains a

[2] Lackner, in *Actes XIV* 640 n.10: "In einer demnächst abgeschlossenen Monographie des Verf. zu diesem Werk des Blemmydes werden die Detailergebnisse der Quellenanalyse vorgelegt."

[3] "Zum Lehrbuch der Physik des Nikephoros Blemmydes," *ByzF* 4 (1972) 157–169; *Actes XIV* 639–643; and "Die erste Auflage des Physiklehrbuches des Nikephoros Blemmydes," in F. Paschke (ed.), *Überlieferungsgeschichtliche Untersuchungen* (Berlin 1981) 351–364.

[4] The *editio princeps* was published by J. Wegelin, *Nicephori Blemmidae Epitome physica* (Augsburg 1605, Latin translation 1606, both reprinted in *PG* 142.1005–1320). The text was then edited together with some other works of Blemmydes in D. Voulismas, *Νικηφόρου μοναστοῦ καὶ πρεσβυτέρου τοῦ Βλεμμίδου Ἐπιτομὴ λογικῆς (…)* (Leipzig 1784). On both editions see A. Heisenberg, *Nicephori Blemmydae curriculum vitae et carmina* (Leipzig 1896) LI, LXXIV, LXXXII. On the *Epitome logica* see Heisenberg LXVIII–LXXVIII; K.-H. Uthemann, "Zur Sprachtheorie des Nikephoros Blemmydes. Bemerkungen zu einem byzantinischen Beitrag zur Geschichte der Logik," *JÖB* 34 (1984) 123–153, at 127–129; P. Carelos, "Ein 'integrierter' Fürstenspiegel im Prooimion der *Ἐπιτομὴ λογικῆς* des Nikephoros Blemmydes," *BZ* 98 (2005) 399–402, with further bibliography.

[5] On the life and works of Blemmydes see Heisenberg, *Nicephori Blemmydae* IX–CX; G. Mercati, "Blemmidea," *Bessarione* 31 (1915) 226–238 (= *Opere minori* III [Vatican City 1937] 428–440); Lackner (n.3 above); C. N. Constantinides, *Higher Education in Byzantium in the Thirteenth and Early Fourtheenth Centuries* (Nicosia 1982) 6 ff.; D. Stiernon, "Nicéphore Blemmydès," *Dictionnaire de spiritualité* 11 (1982) 187–198; J. A. Munitiz, *Nikephoros Blemmydes, A*

straightforward presentation on physics, meteorology, and astronomy: Aristotle and his commentators were the main sources for the chapters on physics (1–12) and meteorology (12–23), Cleomedes' *On Heaven* for the astronomical part (24–31). The first version of the text was composed ca. 1237–1239. A second revised and augmented version was created by the author in the last years of his life, i.e. in the 1260s, and was dedicated to the monks of his monastery in Emathia near Ephesus.[6]

The huge and enduring cultural impact of this coursebook can be measured by considering its manuscript tradition: more than one hundred manuscripts containing the whole text or excerpts from it are preserved, some of which can be dated to shortly after Blemmydes' death, the latest to the nineteenth century.[7] The rich manuscript tradition points to the wide dissemination of this text over the centuries and throughout the Byzantine Empire initially, then across Europe during the Renaissance and later across Greece and Eastern Europe. Furthermore, a single copy of the first version of the *Epitome physica* still survives in *Vat.gr.* 434 (end of the 13th cent.).[8] The text in this manuscript was thoroughly investigated by Wolfgang Lackner,[9] who demonstrated that it shows a closer adherence to the

Partial Account (Leuven 1988); E. Fryde, *The Early Palaeologan Renaissance (1261–c. 1360)* (Leiden 2000) 75–76; M. Stavrou, *Nicéphore Blemmydès. Œuvres théologiques* I (Paris 2007) 9–130.

[6] See Lackner, in *Actes XIV* 351–353.

[7] On the manuscripts and the typologies of the textual transmission of the *Epitome physica* see Heisenberg, *Nicephori Blemmydae* LXXVIII–LXXXII; Lackner, *ByzF* 4 (1972) 160; and S. Valente, "Zur Überlieferung der *Epitome physica* des Nikephoros Blemmydes: die ältesten Handschriften," in C. Brockmann et al. (eds.), *Griechisch-byzantinische Handschriftenforschung. Traditionen, Entwicklungen, neue Wege* (Berlin 2017 forthcoming).

[8] R. Devreesse, *Codices Vaticani Graeci* II (Rome 1937) 164; Lackner, in *Überlieferungsgeschichtliche Untersuchungen* 351–364; Valente, in *Griechisch-byzantinische Handschriftenforschung*.

[9] *Überlieferungsgeschichtliche Untersuchungen* 353–363.

wording of the sources, and is thus decisive for the *Quellenforschung*.[10] Considered more generally, this wide manuscript tradition offers clear evidence that readers and scholars over the centuries recognized the usefulness of the *Epitome physica* for studying physics, meteorology, and astronomy. This coursebook soon became one of the more widespread in the Aristotelian philosophical tradition.

As a part of Greek and Byzantine studies on meteorology, those on winds—i.e. regarding their origin and movements as well as their influence on the earth's climate—represent a well-defined field of investigation.[11] The first comprehensive systematization was accomplished by Aristotle in his *Meteorologica*:[12] his doctrine, based upon the theory of ἀναθυμίασις ("exhalation"),[13] was adopted by Blemmydes.

Among the meteorological sections of the *Epitome physica* (ch. 12–23),[14] chapter 17 is devoted to the winds: Περὶ ἀνέμων καὶ τῶν λοιπῶν πνευμάτων ("On winds and the other breaths"). In

[10] On Blemmydes' use of the sources see Lackner, *ByzF* 4 (1972) 164; P. Golitsis, "Nicéphore Blemmyde lecteur du commentaire de Simplicius à la *Physique* d'Aristote," in C. D'Ancona (ed.), *The Libraries of the Neoplatonists* (Leiden 2007) 243–256, and S. Valente, "Retrieving the Library of Nikephoros Blemmydes: An Investigation on the Sources of Chapter 31 (*On void*) of the *Epitome physica*," in A. Berger and C. Gastgeber (eds.), *The Scholar and his Library. Byzantium – 13th/14th c.* (Turnhout forthcoming), with further references.

[11] E.g. Hippoc. *Vict.* 2.38 (VI 532 L.), *Hebd.* 3 (7–8 R.); [Arist.] *Prob.* 26; Thphr. *Vent.*; Strab. 1.2.21; Sen. *QNat.* 5; Plin. *HN* 2.45–49. See V. Rose, *Anecdota Graeca et Graecolatina* I (Berlin 1864) 18–26; O. Gilbert, *Die meteorologischen Theorien des griechischen Altertums* (Leipzig 1907) 511–584; C. Ruhel, *De Graecis ventorum nominibus* (diss. Marburg 1909); R. Böker, "Winde," *RE* 8A (1958) 2211–2387.

[12] Especially in 2.4–6 (359b27–365a13).

[13] See, among many others, H. Strohm, *Untersuchungen zur Entwicklungsgeschichte der aristotelischen Meteorologie* (Leipzig 1935) 39–67; Lackner, in *Actes XIV* 639–643; M. Wilson, *Structure and Method in Aristotle's Meteorologica. A More Disorderly Nature* (Cambridge 2013) 51–72 and 196–216, with further bibliography.

[14] *PG* 142.1164A–1172B.

his survey,[15] Blemmydes deals first with the origin, causes, nature, and movements of the winds, concentrating on the theory of exhalation and its relation to rain. Then he lists the names of the twelve main winds with their qualities and the effects they produce on earth, as well as their positions. Finally, he concludes the exposition by discussing some minor and "etesian" (i.e. seasonal) winds.

In this chapter Blemmydes not only adheres to the structure of the Aristotelian treatise, but also picks word-for-word citations from it. However, he does not make any reference to the sources used, an omission customary in Byzantine scientific production. Additionally, in the major part of this chapter he tacitly quotes and rewords another source-text, the *Commentary on Aristotle's Meteorologica* of Alexander of Aphrodisias.[16] This choice is probably of some interest: this work was surely the most popular commentary on Aristotle's *Meteorologica* in Byzantium.[17] Yet, as Paul Moraux has clearly shown,[18] it differs from the other exegetical works of Alexander because he limited himself to rendering the Aristotelian text in a more readable and accessible way, together with some expansions, sometimes in the form of a paraphrase. This feature of the commentary may have been one of the reasons that induced Blemmydes to make extensive use of it for his textbook.

Blemmydes' approach can be examined by considering the beginning of chapter 17 (*PG* 142.1164a2–9). The two versions of the first lines are presented here in order to show how Blemmydes revised his original text.[19] Words or expressions changed in the final version are underlined:

[15] For a Latin resume of the chapter see Wegelin, *Nicephori Blemmidae Epitome physica* 188–190 (= *PG* 142.1163–1164).

[16] See Lackner, in *Überlieferungsgeschichtliche Untersuchungen* 356.

[17] See Lackner, in *Actes XIV* 640 with nn.11–12.

[18] P. Moraux, *Der Aristotelismus bei den Griechen von Andronikos bis Alexander von Aphrodisias* III *Alexander von Aphrodisias* (Berlin 2001) 264–314, esp. 269–272.

[19] On the typology of changes introduced by Blemmydes see Lackner, in

Epitome physica: first version[20]	*Epitome physica*: final version
<δ>ιττῆς οὔσης τῆς ἀναθυμιάσεως, τῆς μὲν ἀτμιδώδους τε καὶ ὑγρᾶς, τῆς δὲ ξηρᾶς καὶ καπνώδους, οὐδετέρα τούτων χωρὶς τῆς ἑτέρας ἐστίν, ἀλλ' ἅμα μὲν εἰσίν, ἀπὸ δὲ τοῦ πλεονάζοντος ἐν τῷ συναμφοτέρῳ καλεῖται τὸ ὅλον. ἡ μὲν οὖν ὑγροῦ πλέον ἔχουσα ἀναθυμίασις ἀρχὴ τοῦ ὑομένου καθέστηκεν ὕδατος, ἡ δὲ τὸ ξηρὸν ἔχουσα πλέον ἀρχὴ καὶ αἰτία καὶ ὕλη τῶν ἀνέμων καὶ τῶν λοιπῶν πνευμάτων ἐστίν.	διττῆς οὔσης τῆς ἀναθυμιάσεως, τῆς μὲν ἀτμιδώδους καὶ ὑγρᾶς, τῆς δὲ καπνώδους καὶ ξηρᾶς, οὐδετέρα τούτων χωρὶς τῆς ἑτέρας εὑρίσκεται, ἀλλ' ὁμοῦ μὲν καὶ ἅμφω, ἐκ δὲ τοῦ πλεονάζοντος καλεῖται τὸ ὅλον. ἡ μὲν οὖν ὑγροῦ πλέον μετέχουσα ἀναθυμίασις ἀρχὴ τοῦ ὑομένου ὕδατός ἐστιν· ἡ δὲ τὸ ξηρὸν ἔχουσα πλέον ἀρχὴ καὶ αἰτία καὶ ὕλη τῶν ἀνέμων καὶ τῶν λοιπῶν πνευμάτων γινώσκεται.

(final version) There are two kinds of exhalations, the one being vaporous and wet, the other smoky and dry. Neither one of them can be found without the other, but only both together at once, and the whole is named according to the predominant part. The exhalation that has more moisture is the origin of rainwater, the one that has more dryness is acknowledged as the origin, cause, and matter of the winds and other breaths.

When we turn to how Aristotle introduces the section on winds in the *Meteorologica*, we see that Blemmydes clearly had this text in mind (359b27–34 and 360a8–13):

> περὶ δὲ πνευμάτων λέγωμεν, λαβόντες ἀρχὴν τὴν εἰρημένην ἡμῖν ἤδη πρότερον. ἔστι γὰρ δύ' εἴδη τῆς ἀναθυμιάσεως, ὡς φαμεν, ἡ μὲν ὑγρὰ ἡ δὲ ξηρά· καλεῖται δ' ἡ μὲν ἀτμίς, ἡ δὲ τὸ μὲν ὅλον ἀνώνυμος, τῷ δ' ἐπὶ μέρους ἀνάγκη χρωμένους καθόλου προσαγορεύειν αὐτὴν οἷον καπνόν· ἔστι δ' οὔτε τὸ ὑγρὸν ἄνευ τοῦ ξηροῦ οὔτε τὸ ξηρὸν ἄνευ τοῦ ὑγροῦ, ἀλλὰ πάντα ταῦτα λέγεται κατὰ τὴν ὑπεροχήν (…)· τῆς δ' ἀναθυμιάσεως, ὥσπερ εἴρηται, διπλῆς οὔσης, τῆς μὲν ἀτμιδώδους τῆς δὲ

Überlieferungsgeschichtliche Untersuchungen 354–363, and Valente, in *The Scholar and his Library*.

[20] Ch. 17 is at *Vat.gr.* 434 foll. 196v–198r. Here and below, the transcription is my own.

καπνώδους, ἀμφοτέρας ἀναγκαῖον γίγνεσθαι. τούτων δ' ἡ μὲν ὑγροῦ πλέον ἔχουσα πλῆθος ἀναθυμίασις ἀρχὴ τοῦ ὑομένου ὕδατός ἐστιν, ὥσπερ εἴρηται πρότερον, ἡ δὲ ξηρὰ τῶν πνευμάτων ἀρχὴ καὶ φύσις πάντων.

Let us proceed to the theory of winds. Its basis is a distinction we have already made. We recognize two kinds of evaporation, one moist, the other dry. The former is called vapour: for the other there is no general name but we must call it a sort of smoke, applying to the whole of it a word that is proper to one of its forms. The moist cannot exist without the dry nor the dry without the moist: whenever we speak of either we mean that it predominates. (…) Consequently, since there are two kinds of evaporation, as we said, one like vapour, the other like smoke, both of them are necessarily generated. That in which moisture predominates is the source of rain, as we explained before, while the dry evaporation is the source and substance of all winds (transl. Webster).

Although the doctrine is the same, the wording of the *Epitome physica* does not match the Aristotelian text. In fact, the direct source can be identified as the commentary on the passage by Alexander of Aphrodisias. Blemmydes combines two similar passages taken from the commentary, as is shown by a comparison of the first version of the *Epitome physica* and Alexander (copied passages underlined):

Epitome physica: first version	Alex. Aphr. *In Mete.* pp.89.24–31 and 90.12–17 Hayduck
<δ>ιττῆς οὔσης τῆς ἀναθυμιάσεως, τῆς μὲν ἀτμιδώδους τε καὶ ὑγρᾶς, τῆς δὲ ξηρᾶς καὶ καπνώ-	ἀρχὴν δὴ καὶ τοῦ περὶ τούτων λόγου τὴν αὐτήν φησιν εἶναι· τὴν γὰρ ἀναθυμίασιν. διττῆς γὰρ οὔσης, ὡς κατ' ἀρχὰς εἴρηται, τῆς ἀναθυμιάσεως, τῆς μὲν ξηρᾶς τῆς δὲ ὑγρᾶς, ἡ μὲν ὑγρὰ ἀτμὶς καλεῖται, ἡ δὲ ξηρὰ τὸ μὲν κοινὸν καθόλου ἀνώνυμος, ἀπὸ δέ τινος τῶν ὑπ' αὐτὴν ξηρῶν ἀναθυμιάσεων, ἥτις ἐστὶ καπνός, ἀνάγκη καὶ τὴν ὅλην ὀνομάζειν καπνώδη.

δους, οὐδετέρα τούτων χωρὶς τῆς ἑτέρας ἐστίν, ἀλλ' ἅμα μὲν εἰσίν, ἀπὸ δὲ τοῦ πλεονάζοντος ἐν τῷ συναμφοτέρῳ καλεῖται τὸ ὅλον.	ἔστι δὲ οὐδετέρα τούτων χωρὶς τῆς ἑτέρας, ἀλλ' ἅμα μέν εἰσιν, ἀπὸ δὲ τοῦ πλεονάζοντος ἐν τῷ συναμφοτέρῳ τὸ ὅλον καλεῖται.
	(…)
	διττῆς δὲ τῆς ἀναθυμιάσεως οὔσης, τῆς μὲν ἀτμιδώδους τε καὶ ὑγρᾶς, τῆς δὲ ξηρᾶς τε καὶ καπνώδους, διὰ τὰ εἰρημένα ἀμφοτέρας ἀναγκαῖον ἅμα γίνεσθαι·
ἡ μὲν οὖν ὑγροῦ πλέον ἔχουσα ἀναθυμίασις ἀρχὴ τοῦ ὑομένου καθέστηκεν ὕδατος, ἡ δὲ τὸ ξηρὸν ἔχουσα πλέον ἀρχὴ καὶ αἰτία καὶ ὕλη τῶν ἀνέμων καὶ τῶν λοιπῶν πνευμάτων ἐστίν:	ὧν ἡ μὲν ὑγροῦ πλέον ἔχουσα ἀναθυμίασις ἀρχὴ τοῦ ὑομένου ὕδατός ἐστιν, ὡς εἴρηται, ἡ δὲ τὸ ξηρὸν ἔχουσα πλέον ἀρχὴ καὶ αἰτία καὶ ὕλη ἐστὶ πάντων τῶν πνευμάτων· φύσιν γὰρ τὴν ὕλην εἶπε νῦν.

From this comparison it is evident how Blemmydes used his source: he selected some sentences from it and combined them into a new text, but always keeping in mind the original Aristotelian wording. It is another interesting case of "Aristoteles aus dritter Hand," i.e. "third-hand Aristotle," to use the terminology coined by Dieter Harlfinger.[21]

In the rest of the chapter—as well as in the whole *Epitome physica*—the compositional method of Blemmydes remains the same, a synthetic combination of Aristotle's and Alexander's texts. As Lackner pointed out, only in the last three sections does Blemmydes depend on the pseudo-Aristotelian treatise *De mundo*.[22] For the sake of completeness, I list the sources employed by Blemmydes for compiling chapter 17:[23]

[21] D. Harlfinger, "Aristoteles aus dritter Hand. Die Parekbolai aus der *Philosophia* des Georgios Pachymeres," *Parekbolai* 1 (2011) 171–186 (https://ejournals.lib.auth.gr/parekbolai/article/view/309/283, last seen 22 Aug. 2016).

[22] Lackner, in *Überlieferungsgeschichtliche Untersuchungen* 356.

[23] This is based on the final version of the treatise. Passages that are not

Section 1: Alex. Aphr. *In Mete.* p.90.12–17 (cf. p.89.24–30) + p.89.30–31
2: Alex. Aphr. p.91.2–6 + p.53.20–22
3–6: Alex. Aphr. p.91.15–19 + Arist. *Mete.* 360b7–8 + p.91.19–21 + (Arist. 360b12–13) + Alex. Aphr. p.91.21–31 + p.119.32–36 + Arist. 367a31–367b4 + Alex. Aphr. p.116.14–15? (cf. Arist. 358a16–26) + Arist. 359b28–360a33
7: (?) + Alex. Aphr. p.16.8–13 + p.16.6–7
8: Alex. Aphr. p.56.2–8 + p.95.3 + p.95.6–12 + (Arist. 361b1–5, Alex. Aphr. p.54.16–18)
9: Alex. Aphr. pp.93.35–94.2 + (p.93.27)
10: (Arist. 363a34–364a4, Alex. Aphr. pp.108.19–110.8, cf. [Arist.] *Mund.* 394b19–35, Olymp. *In Mete.* pp.185.12–187.1, Psell. *De omn.doctr.* 146 [p.76.35–48] Westerink)
11–12: Arist. 364b29–30 + (364b3–12) + Alex. Aphr. p.112.16–18 + Arist. 364b12–13 + Alex. Aphr. p.112.20–26 + Arist. 364b17–22 + 364b23–25 + 364b30–31 + Alex. Aphr. p.113.8–23
13: Alex. Aphr. pp.107.27–108.12 + (Blemm. *Ep.phys.* 17.10) + (Alex. Aphr. p.108.12–13)
14 + 15: Blemmydes' addition for the revised version (see below)
16: [Arist.] *Mund.* 394b13–19
17–18: [Arist.] *Mund.* 394b35–395a10

It is obvious that Blemmydes is not a mere compiler, but also locates texts fitting his argument within other parts of his sources. This is the case, for instance, in section 5 concerning the question whether the winds are warm or cold. Aristotle dealt with this problem in *Meteorologica* 2.8 concerning earthquakes (367a31–367b4):

> τὸ δὲ ψῦχος συμβαίνει διὰ τὸ τὴν ἀναθυμίασιν εἴσω τρέπεσθαι, φύσει θερμὴν οὖσαν καθ' αὑτήν. οὐ δοκοῦσι δ' οἱ ἄνεμοι εἶναι θερμοὶ διὰ τὸ κινεῖν τὸν ἀέρα πλήρη πολλῆς ὄντα καὶ ψυχρᾶς ἀτμίδος, ὥσπερ τὸ πνεῦμα <τὸ> διὰ τοῦ στόματος φυσώμενον· καὶ γὰρ τοῦτο ἐγγύθεν μέν ἐστι θερμόν, ὥσπερ καὶ ὅταν ἀάζωμεν, ἀλλὰ δι' ὀλιγότητα οὐχ ὁμοίως ἐπίδηλον, πόρρωθεν δὲ ψυχρὸν διὰ τὴν αὐτὴν αἰτίαν τοῖς ἀνέμοις.

closely matched are in parentheses.

> Wind is not recognized to be hot, because it sets the air in motion, and that is full of a quantity of cold vapour. It is the same with the breath we blow from our mouth: close by it is warm, as it is when we breathe out through the mouth, but there is so little of it that it is scarcely noticed, whereas at a distance it is cold for the same reason as wind.

This very text and the relevant passage from the commentary by Alexander[24] are incorporated by Blemmydes into his own text (section 5):

> *Vat.gr.* 434: τὴν μὲν οὖν τῶν ἀνέμων ὕλην θερμὴν καὶ ξηρὰν ἀναθυμίασιν εἶναι φασί, μὴ δοκεῖν δὲ τοὺς ἀνέμους θερμούς, διὰ τὸ κινεῖν τὸν ἀέρα· πολλῆς ἀτμίδος πλήρη τυγχάνοντα καὶ ψυχρᾶς· οὕτω γὰρ καὶ τὸ διὰ τοῦ στόματος φυσώμενον πνεῦμα, θερμὸν μὲν ἐγγύθεν εἶναι τοῦ στόματος, πόρρωθεν δὲ ψυχρὸν διὰ τὴν αὐτὴν αἰτίαν.[25]
>
> They say that the substance of the winds is the hot and dry evaporation, but it does not seem that the winds are hot because they set the air in motion, which happens to be full of a quantity of cold vapour. In fact, it is like the breath we blow from our mouth: close by it is warm, whereas at a distance it is cold for the same reason.

The presentation of the twelve winds and the related iconographic apparatus constitute an interesting structural aspect of ch. 17. In the *Meteorologica*, Aristotle introduced the description of the position of the winds with the help of a diagram (ὑπογραφή),[26] explicitly assigning a hermeneutic value to it in his

[24] Alex. Aphr. *In Mete.* p.119.31–36.

[25] The final version (*PG* 142.1165B) reads: τὴν μὲν οὖν τῶν ἀνέμων ὕλην, θερμὴν καὶ ξηρὰν ἀναθυμίασιν εἶναι φασί, μὴ δοκεῖν δε τοὺς ἀνέμους θερμούς, διὰ τὸ κινεῖν τὸν ἀέρα, πολλῆς ἀτμίδος πλήρη τυγχάνοντα καὶ ψυχρᾶς. οὕτω γὰρ καὶ τὸ διὰ τοῦ στόματος φυσώμενον πνεῦμα, θερμὸν μὲν ἐγγύθεν εἶναι τοῦ στόματος, πόρρω δὲ ψυχρὸν διὰ τὴν αὐτὴν αἰτίαν.

[26] *Mete.* 363a25–29: δεῖ δὲ περὶ τῆς θέσεως ἅμα τοὺς λόγους ἐκ τῆς ὑπογραφῆς θεωρεῖν. γέγραπται μὲν οὖν, τοῦ μᾶλλον εὐσήμως ἔχειν, ὁ τοῦ ὁρίζοντος κύκλος· διὸ καὶ στρογγύλος· δεῖ δὲ νοεῖν αὐτὸν τὸ ἕτερον ἔκτμημα τὸ ὑφ' ἡμῶν οἰκούμενον, "What we say about their positions [of the

description. After describing how to draw the wind-rose and setting the cardinal points, he assigned to each of them the relevant winds.[27] A wind-rose is also transmitted, e.g. in the *vetustissimus* MS. *Vind.phil.gr.* 100 (mid-9th cent.)[28] fol. 118r. Moreover, the same description can also be read in Olympiodorus' commentary[29] and, more importantly for the present investigation, in Alexander.[30] It is important to stress that both commentaries follow the order of the Aristotelian text in describing the cardinal points and the names of the winds: West (equinoctial sunset), East (equinoctial sunrise), North, South, East-north-east (summer solstice sunrise), West-north-west (summer solstice sunset), East-south-east (winter solstice sunrise), West-south-west (winter solstice sunset), plus North-north-east and

winds] must be followed with the help of the figure. For clearness' sake we have drawn the circle of the horizon, which is round, but it represents the zone in which we live; for that can be divided in the same way." See also H. Strohm (transl.), *Aristoteles. Meteorologie. Über die Welt* (Darmstadt 1970) 60. On this passage see F. Dirlmeier, "Merkwürdige Zitate in der Eudemischen Ethik des Aristoteles," *SBHeid* 18.2 (1962). In the first book of the *Meteorologica* Aristotle used an illustration of the Milky Way (346a31–32): θεωρείσθω δ' ὅ τε κύκλος καὶ τὰ ἐν αὐτῷ ἄστρα ἐκ τῆς ὑπογραφῆς, "the circle and the constellations in it may be seen in the diagram" (cf. E. W. Webster, *The Works of Aristotle* [Oxford 1931] ad loc. with n.3: "Aristotle must be supposed to have illustrated his theory here by a diagram of the milky way, but the Greek commentators have not preserved any tradition of the particular diagram"). See also Strohm 149. Cf. Arist. *Eth.Eud.* 1220b37, *Hist.An.* 510a30, *Int.* 22a22.

[27] *Mete.* 363b11–364a4. On wind-roses see A. Rehm, "Griechische Windrosen," *SBMünch* 1916.3 (36–47 on Aristotle); Wilson, *Structure* 211–215.

[28] Described (with rich bibliography) by Lutz Koch on Teuchos (http://beta.teuchos.uni-hamburg.de, with digital images of the entire manuscript); also CAGB (http://cagb-db.bbaw.de/handschriften/handschrift.xql?id=71214) (last seen 3 March 2016). See also P. Isépy, *Zur mittelalterlichen Überlieferung von Aristoteles' De motu animalium* (Wiesbaden 2016) 236–276, and "The Vind. phil. gr. 100 Travelling between East and West in the 13th c.," in *The Scholar and his Library.*

[29] Olymp. *In Mete.* p.185.15–187.14 Stuve.

[30] Alex. Aphr. *In Mete.* p.107.13–110.10.

North-north-west. The commentators supply the missing winds South-south-east and South-south-west with Euronotos and Libonotos respectively, which were not recorded by Aristotle. After that, Aristotle went on to describe the peculiarities of each wind (364a4–365a13).

In this part of the chapter, Blemmydes significantly changes the order of the exposition, splitting the topic into two sections. In the first (17.10) he simply enumerates the twelve winds, listing their names and origin.[31] However, the order is quite different from that in Aristotle and his commentators, for he starts with East (Apeliotes) and West (Zephyrus). Then he lists: North-east (Caecias) and South-east (Argestes), North-west (Euros) and South-west (Lips). After that he adds the remaining: North (Boreas/Aparktias), South (Notos), North-north-west (Thraskias) and North-north-east (Meses), South-

[31] The Vatican version: δυοκαίδεκα πάντες ἄνεμοι φαίνονται πνέοντες· ἀπὸ τῆς ἰσημερινῆς ἀνατολῆς, ἀπηλιώτης· ὁ παρὰ Σικελιώταις ἑλλησποντίας καλούμενος· καρβάνας δὲ παρὰ Φοίνιξι καὶ παρὰ τοῖς ἐν Πόντῳ βερεκυτίας· ἀπὸ τῆς ἰσημερινῆς δυσμῆς, ζέφυρος· ἀπὸ τῆς θερινῆς ἀνατολῆς, καικίας· καὶ ἀπὸ τῆς θερινῆς δυσμῆς, ἀργέστης· ὁ καὶ ὀλυμπίας καὶ ἰάπυξ καὶ σκίρρων ὀνομαζόμενος· ἀπὸ τῆς χειμερινῆς ἀνατολῆς, εὖρος· καὶ ἀπὸ τῆς χειμερινῆς δυσμῆς, λίψ· ἀπὸ τῶν περὶ τὴν ἄρκτον τόπων, βορέας· ὁ κυρίως ἀπαρκτίας λεγόμενος· ἀπὸ δὲ τῶν περὶ τὴν μεσημβρίαν, νότος· μεταξὺ δ' ἀπαρκτίου καὶ ἀργέστου, θρασκίας· μεταξὺ ἀπαρκτίου καὶ καικίου, ὁ καλούμενος μέσης· νότου δὲ καὶ λιβὸς λιβόνοτος μεταξύ· καὶ νότου καὶ εὔρου, φοινικίας, ὁ καὶ εὐρόνοτος, "It appears that all the winds that blow are twelve. The one blowing from the point where the sun rises at the equinox is Apeliotes, which is called Hellespontias by the Sicilians, Karbanas by the Phoenicians, and Berekuntias by those who live in Pontus; from the equinoctial setting, Zephyrus; from the summer solstice rising, Caecias; from the summer solstice setting, Argestes, also called Olympias, Iapyx, and Skirron; from the point where the sun rises at the winter solstice, Euros; from the point where the sun sets at the winter solstice, Lips; from the north, Boreas, which is more properly called Aparktias; from the south, Notos. Between Aparktias and Argestes, Thraskias; between Caecias and Aparktias, the so-called Meses, which is usually rather called Boreas; between Notos and Lips, Libonotos; between Euros and Notos, Phoenikias, also called Euronotos."

south-west (Libonotos), and South-south-east (Euronotos/ Phoenikias).

After two sections containing detailed information about the winds' qualities and effects (17.11–12), Blemmydes returns to discuss their position (17.13),[32] and concludes his discussion by stressing that "it is necessary to understand the position of the winds and their opposition regarding their locations from the diagram" (δεῖ δὲ τὴν θέσιν τῶν ἀνέμων καὶ τὴν τοπικὴν αὐτῶν ἐναντίωσιν κατανοεῖν ἐκ τοῦ διαγράμματος). The presence of a wind-rose is clearly presupposed by the text just as in Aristotle and his commentators. However, they described how to draw it and how to read it, while Blemmydes at first only makes reference to the winds and their placement (17.10), and later on introduces the wind-rose (17.13). Nevertheless, there is no trace of any diagram in either of the printed editions of the *Epitome physica*—yet a detailed drawing is provided in almost all the manuscripts,[33] and it can already be found in *Vat.gr.* 434

[32] The Vatican version: ἐπεὶ δὲ τὰ πλεῖστον ἀπέχοντα κατὰ τόπον, ἐναντία κατὰ τόπον εἰσί, πλεῖστον δὲ ἀπέχει τὰ κατὰ διάμετρον, ἡ δὲ ἰσημερινὴ ἀνατολὴ καὶ ἡ ἰσημερινὴ δυσμή, διαμετροῦσιν ἀλλήλας κατὰ τὸν αὐτὸν ὁρίζοντα θεωρούμεναι, καὶ πάλιν ἡ θερινὴ ἀνατολὴ καὶ ἡ χειμερινὴ δυσμή, καὶ αὖθις ἡ χειμερινὴ καὶ ἡ θερινὴ δυσμή, ὁμοίως δὲ καὶ ἡ ἄρκτος καὶ ἡ μεσημβρία, εὔδηλον πάντως, ὡς ἀντιπνέουσιν ἀλλήλοις οἱ ἐκ τῶν ἐναντίων τόπων πνέοντες ἄνεμοι· ὅθεν ὁ μὲν ἀπηλιώτης, ἀντιπνεῖ τῷ ζεφύρῳ· ὁ καικίας δὲ τῷ λιβί· ὁ δὲ εὖρος τῷ ἀργέστῃ, καὶ ὁ βορέας τῷ νότῳ· ὡσαύτως ὁ μὲν θρασκίας, τῷ φοίνικι [*sic*, i.e. φοινικίᾳ]· ὁ δὲ μέσης τῷ λιβονότῳ, "Since the locally most distant things are locally opposite, those at opposite ends of a diameter are the most distant of all. The points where the sun rises and sets at the equinox are diametrically opposed when considered on the same horizon, and in turn the points where the sun rises at the summer solstice and where it sets at the winter solstice, and the points where the sun rises at the winter solstice and where the sun sets at the summer solstice. North and south are positioned in the same way. According to this disposition, it is clear that the winds blowing from opposite directions blow one against the other. Thus, Apeliotes blows against Zephyros, Caecias against Lips, Euros against Argestes, Boreas against Notos, just as Thraskias does against Phoenikias and Meses against Libonotos."

[33] Rose, *Anecdota Graeca* 26, noticed the presence of a diagram in two 15th-

with the first version of the text (fol. 198r).[34]

In the final version of the *Epitome physica*, Blemmydes revised and augmented both the text of the chapter and the wind-rose. After the diagram, two new sections are appended (17.14–15), in which he describes how to read the diagram.[35] Some information concerning the cardinal points North and South is also supplemented in order to better identify them. As the cardinal points East and West are identified by sun-rise and sun-set at the equinoxes and solstices respectively, North and South are defined in the final version as "right," "central," and "left' (δεξιός, μέσος, εὐώνυμος)—terminology that I have not been able to identify in any other text.[36] These designations were

cent. MSS. containing excerpts from the *Epitome physica* (*Harleianus* 5662 [not 5622] foll. 97r–100v and *Bodleianus Canon.gr.* 83 foll. 127r–130r) and published the wind-rose for the first time (pl. 1). Both MSS. contain only ch. 17 and the *Bodleianus* turns out to be a direct copy of the *Harleianus* according to my collations. The *Harleianus* was written by Leon Chalkeopoulos in 1493/5: see T. Martínez Manzano, *Constantino Láscaris. Semblanza de un humanista bizantino* (Madrid 1998) 72. It should be noted that another diagram accompanying ch. 30 is found in most of the manuscripts of the *Epitome*, but not in *Var.gr.* 434: thus, was probably added by Blemmydes while producing the revised version. I will deal with this topic in a paper now in preparation.

[34] For a reproduction of fol. 198r see Valente, in *Griechisch-byzantinische Handschriftenforschung*. The diagram is surrounded by some text written in red ink which might be mistaken for a commentary on it, but it is only the way the scribe distinguished the final sections of the chapter. As already mentioned, those sections deal with other sub-typologies of winds and are taken from the pseudo-Aristotelian treatise *De mundo*.

[35] See Lackner, in *Überlieferungsgeschichtliche Untersuchungen* 358: "Die Beschreibung der Windrose in Kap. 17, 14 bis 15, die gleichfalls in Alexanders Kommentar fehlt, – sie teilt nicht mehr mit, als ohnehin aus der Zeichnung ersichtlich ist – stellte er selbst zusammen…"

[36] I find the same diagram with the same labels only in a 15th-cent. Paris MS. of *De mundo* (*Paris.gr.* 2494 fol. 72v: at http://gallica.bnf.fr/ark:/12148/btv1b10722213d.r=grec 202494, last seen 22 Aug. 2016). It is likely that the scribe of the *Parisinus* took the wind-rose from a MS. of the *Epitome physica*, given that an excerpt from this very work is also transmitted in the Paris MS. (foll. 148r–172r). A slightly different diagram occurs in Scholarios' annotations on Aristotle's *Meteorologica* in *Vat.gr.* 115 fol. 233v (L. Petit, X. A.

probably introduced in order to distinguish the cardinal points North-north-east, North, and North-north-west, as well as the Southern ones, more clearly. All the manuscripts of the final version of the *Epitome physica* with the wind-rose preserve these labels, such as, e.g., *Laur.plut.* 87,16, one the oldest manuscripts of this work, where the wind-rose is on fol. 184r.[37]

The immediate success of Blemmydes' textbook in summarizing and presenting the Aristotelian contents is also attested to in the independent circulation of this chapter in the form of excerpts in some manuscripts. I have been able to identify the oldest excerpt of the final version of the *Epitome physica* in the MS. 180 of the Department of Rare Books and Special Collections of Princeton University Library, dating to the end of the thirteenth century.[38] The work on foll. 154v–155r, labeled in the catalogue "treatise on the origins and names of the winds; with a diagram,"[39] contains only the wind-rose and sections 14–18 of ch. 17 of the *Epitome physica*. A deeper re-working of the diagram can be discovered in other partial copies of the *Epitome*, such as in *Stuttgart.cod.theol. et phil.* 2° 108 (fol. 157r/v) and in *Vat.gr.* 495 (fol. 232r): both derive from the same ancestor and, interestingly enough, transmit the

Sideridès, and M. Jugie, *Gennade Scholarios. Oeuvres complètes* VII *Commentaires et résumés des ouvrages d'Aristote* [Paris 1936] 477).

[37] A. M. Bandini, *Catalogus codicum Graecorum Bibliothecae Laurentianae* III (Florence 1770) 396–403; P. Moraux et al. (eds.), *Aristoteles Graecus. Die griechischen Manuskripte des Aristoteles* (Berlin/New York 1976) 311–315 (description by Jürgen Wiesner; see also http://cagb-db.bbaw.de/handschriften/handschrift.xql?id=16833); I. Pérez Martín, "Copying Aristotle and Nikephoros Blemmydes from Nicaea to Constantinople: The Case of Laur. Plut. 87.16," read at ICBS 23 (2016); Valente, in *Griechisch-byzantinische Handschriftenforschung* with further literature. The MS. is on line at http://teca.bmlonline.it/ImageViewer/servlet/ImageViewer?idr=TECA0001112055#page/1/mode/1up (last seen 22 Aug. 2016).

[38] S. Kotzabassi and N. Patterson Ševčenko, *Greek Manuscripts at Princeton* (Princeton 2010) 151–153; Valente, in *Griechisch-byzantinische Handschriftenforschung*.

[39] Kotzabassi and Patterson Ševčenko, *Greek Manuscripts* 152.

wind-rose at the end of ch. 17. In both manuscripts the diagram is followed by a short text containing some instructions on how to read it. The wind-rose itself was supplemented by adding synonyms to the names of the winds as well as other qualifications.[40] Some individual sentences from ch. 17—yet without the wind-rose—are also preserved in the collection of excerpts from Blemmydes' work in the mid-14th century *Bononiensis* BU 3637 (foll. 166v–169v, at 169r).[41]

To conclude, chapter 17 of the *Epitome physica* can be considered paradigmatic to understanding Blemmydes' attitude towards the Aristotelian tradition. His work consisted first of all of a careful selection of passages chosen from Aristotle's text(s) and especially from his commentators, and second a fresh combination of these materials into a new order with almost the same wording, suggestive of an attempt to keep his new creation close to the structure of the Aristotelian text. In this context, the presence of the wind-rose—explicitly presupposed in the text—confirms both the adherence to the Aristotelian tradition and the didactic goal, which was the main concern of Blemmydes. He remained faithful to the Aristotelian tradition despite the innovation: this is probably one of the reasons why

[40] On the *Stuttgartensis* see B. Mondrain, "Un manuscrit méconnu, le *Stuttgartensis Cod. theol. et phil.* 2° 108," in Chr. Brockmann et al. (eds.), *Handschriften- und Textforschung heute. Zur Überlieferung der griechischen Literatur. Festschrift für Dieter Harlfinger* (Wiesbaden 2014) 295–307, with rich bibliography. On the *Vaticanus* see Devreesse, *Codices Vaticani Graeci* II 316–321; I. Pérez Martín, *El patriarca Gregorio de Chipre (ca. 1240—1290) y la trasmisión de los textos clásicos en Bizancio* (Madrid 1996) 340–341; P. Canart, "Additions et corrections au *Repertorium der Griechischen Kopisten 800—1600*, 3," *Vaticana et Medievalia, Etudes en l'honneur de Louis Duval-Arnould* (Florence 2008) 41–63, at 44 (no. 79e); B. Mondrain, "La réutilisation de parchemin ancien dans les livres à Constantinople au XIVe et au XVe siècle," in S. Lucà (ed.), *Libri palinsesti greci. Conservazione, restauro digitale, studio* (Rome 2008) 111—130, at 125–129; M. Mitrea, "A Late Byzantine πεπαιδευμένος: Maximos Neamonites and his Letter Collection," *JÖB* 64 (2014) 197–223, at 198 n.7.

[41] Moraux, *Aristoteles Graecus* 66–69 (description by D. Harlfinger); see also http://cagb-db.bbaw.de/handschriften/handschrift.xql?id=9765.

the *Epitome* soon became widespread as a reference text. This work thus represents an important step in the *fortuna* of Aristotle and his doctrine—both directly, and indirectly through his commentators—first in the late Byzantine age, later in the Italian Renaissance, as well as in Greece during the Turcocracy.[42]

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[42] This paper was conceived within the framework of my investigation into the manuscripts of Nikephoros Blemmydes' *Epitome physica* (DFG-Project "Wissenschaft und Naturphilosophie in der byzantinischen Welt: Das Physiklehrbuch des Nikephoros Blemmydes," University of Hamburg). Some parts of it were presented at the World Congress "Aristotle 2400 Years" (http://aristotleworldcongress2016.web.auth.gr), Aristotle University of Thessaloniki, May 2016. Some preliminary considerations on the use of diagrams and schemata in Blemmydes' *Epitome physica* had already been discussed at the workshop "The Iconicity of Script in Manuscripts from Asia, Africa, America and Europe" (CSMC/SFB 950, University of Hamburg, Nov. 2014). I wish to warmly thank Christian Brockmann, Daniel Deckers, Vito Lorusso, and George Arabatzis for their useful comments on this paper.