TOMISLAV BILIĆ
Archaeological museum in Zagreb
Croatia

UDC: 821.14'02-13.09

FOLLOWING HEAVENLY FIRE: LATITUDE SAILING IN APOLLONIUS OF RHODES AND PLUTARCH?

Abstract: Two almost identical descriptions of an unusual nautical voyage are found in Apollonius' Argonautica and in Plutarch's Life of Timoleon. Even though the contexts of these two episodes are different, their syntagmatic structure is surprisingly similar. This is due to their derivation from a common literary topos, which might be called 'the topos of following heavenly fire'. This literary construction was derived from contemporary navigational practices, which included the use of stars in navigating the open sea. Even though it cannot be positively concluded that the particular navigational method underlying this topos is latitude sailing, some elements of this technique entered into its formation.

Stellar navigation in Apollonius' *Argonautica*?

In a previous work (Bilić 2009) I have analysed an episode from Apollonius' *Argonautica* (4.294-302) where Argo is described sailing from the mouth of the Halis river in Paphlagonia to the mouth of the Danube (Ister). After sailing towards the east with a view of Paphlagonian mountains (4.300), that is, presumably, along the shore, instead of rounding Cape Carambis down the coast, the Argonauts sailed straight across the open waters of the Pontus to the mouth of the Ister. This route was chosen for them by the goddess Hera, who sent them a τέρας αἴσιον, 'happy portent' (4.294-295) 'seen by all', πάντες ἰδόντες (4.295). The Argonauts thus choose not to round Cape Carambis, but followed 'the gleam of heavenly fire', οὐρανίου πυρὸς αἴγλη, as well as winds, all the way to the Ister (4.300-302; or, rather, the light was following *them*). This heavenly portent is also called by Apollonius the ὀλκὸς οὐρανίης ἀκτῖνος, 'trail of heavenly ray' (4.296) that showed them 'where they might pass', ὅπῃ καὶ ἀμεύσιμον ἦεν (4.297) (Katičić 1995: 53-54). This is all information provided by Apollonius on this section of the return voyage. It seems as he used a *deus ex machina* solution for redirecting his heroes from sailing eastward along the shoreline from Colchis to Propontis to a curi-

ous northeastern detour in order to describe his complicated version of the Argonauts' return through the Ister and beyond. His way of achieving this roundabout route is by introducing a divine portent that appeared in the sky and guided the crew of the Argo (see the comments on this episode in Green 2007: 306). But Apollonius is frustratingly vague in his description of the nature of this heavenly portent, and the scholia do not help much in this regard. The scholiast understood the ὁλκός from verse 296 as 'a course of a star', ἡ διαδρομὴ τοῦ ἀστέρος (Σ L^{g}(P) 296, p. 282.8 Wendel), which points to the right direction, while his explanation for verses 301-302 is only a paraphrase: ἡ φανεῖσα αὐτοῖς οὐρανία λαμπηδὼν ἡ τὸν ἐπὶ Ἴστρον διάπλουν σημαίνουσα, 'a heavenly light that appeared to them and indicated the course of sailing towards the Ister' (Σ 301-302, p. 282.10-11 Wendel) (Katičić 1995: 54). In an earlier paper, I have discussed (Bilić 2009: 75-76) the possibility that Apollonius attempted to describe the latitude sailing (on this sailing technique see Bilić 2005: 125-133, 136-147, 2008: 122-130, 2009: 79-80; Davies 2009: 147-148) from the northernmost point of the southern Pontic coast at Sinope (42°06') to the mouth of the Ister, whose southernmost branch empties into the Pontus at 44°52'30''. The almost three degrees of difference in latitude made me reject this possibility (perhaps somewhat rashly, at least on this argument, since the technique does not require that one should only follow a single latitude on his course, which is merely the simplest form of this method of navigation), although I still maintained that Apollonius probably had some form of stellar navigation in mind – however imprecise his knowledge of this particular sailing technique or stellar navigation in general might have been - when he composed this episode.

Latitude sailing in antiquity

In two other papers (Bilić 2005: 136-140, 2008: 122-124, 127-129) I have discussed possible routes used for direct open-sea crossings of the Ionian Sea and attempted to reconstruct in what way certain asterisms might have actually been used on these crossings, focusing only on the simplest form of latitude sailing, that is, when only a single latitude is followed on a voyage. I have thus specifically discussed the route from the Messenian Pylos to Syracuse along the 37th and from Cephallenia to the Straits of Messina along the 38th parallel, as well as the route from Cape Taenarum to Cape Pachynus along the latitude of 36°30'. The course on a direct crossing, I argued, could have been kept – if both the starting and ending points of the voyage were known to lie on the same latitude – by observing at least four different stellar positions:

(1) the altitude of the north celestial pole;

(2) the altitude of the lower culmination of a circumpolar star determinative of the latitude;

(3) the altitude of the upper culmination of a southern star determinative of the latitude;

(4) the upper culmination of a zenith star for the latitude.

All these observations are basically methods to determine latitude of a place, and all were used in this way in antiquity. I will now offer and summarily discuss the most important sources for these observations:

(1) According to Ptolemy (*Geog*. 1.4), Hipparchus has transmitted the observed elevations of the north celestial pole (ἐξάρματα τοῦ βορείου πόλου), as well as a list of cities under the same parallel (Berggren and Jones 2000, 62-63; cf. Shcheglov 2003-2007: 165). Indeed, Hipparchus used the expression ἔξαρμα τοῦ πόλου to define latitude in degrees, of 'Greece', Hellespont and Athens (Hipparch. 1.3.6-7, 12; cf. 1.11.8 for Rhodes and Athens) (Shcheglov 2003-2007: 161, 165). But perhaps already Eratosthenes (Geus 2004: 14-15, 2011[2002]: 224) discussed distances of latitudinal belts from the north pole in degrees. Moreover, it is possible that even earlier Pytheas determined the latitudes of the places he visited with observing the elevation of the pole (Nansen 1911: i.46-48), since we know he showed interest in its nature and position (fr. 1 Bianchetti = fr. 1 Mette *ap*. Hipparch. 1.4.1); on the other hand, Davies (2009: 127) argues that his near-contemporary Dicaearchus used observations of the elevations of the pole to assign several locations to a latitude zero, but there is no confirmation of this in extant sources. There are no earlier sources discussing this method. After the time of Hipparchus, the correlation of the altitude of the north celestial pole with latitude was discussed by Gemin. 5.58-61; Str. 1.1.21, 10.2.12; *HN* 2.71.179; Cleom. 1.3-5; Marinus of Tyre (Ptol. *Geog*. 1.7, Berggren and Jones 2000: 65) (Davies 2009: 143, 146). However, no sources mentioned thus far acknowledged the use of the observation of the altitude of the north celestial pole in navigation. A single source perhaps does just that: according to Lucan (8.172-184) the navigators determined the latitude by the altitude of circumpolar stars (Davies 2009: 143, 145-146), to which all standard English translations add the 'pole star', the *axis* of verse 175 (Riley 1853: 301; Ridley 1896: 233; Duff 1928: 449; Graves 1956: 154; Widdows 1988: 190; Joyce 1993: 203; Braund 1992: 157; cf. Arnaud 2014: 49-50). This would be the only ancient testimony for this navigational practice in antiquity, and it dates only from the 60s AD.

(2) As noted under (1), Lucan described how the navigators determined the latitude by the altitude of some circumpolar stars in general, rather than taking specifically their lower culmination into account. But lower culmination of circumpolar stars was observed to determine the latitude of a place, even if not in association with navigation. The earliest reference to such practice is found in Hipparchus' account (Hipparch. 1.4.7-8), who cites his predecessors Eudoxus (fr. 16 Lasserre), Aratus (61-62) and Attalus (fr. 5 Maass) on the same subject, famously discussing the circumpolar nature of Draco's head as observed from Athens. The altitude of circumpolar stars in general was often discussed in relation to changes in latitude at least from the mid-4th c. BC onwards (e. g. Arist. *De caelo* 2.14.198a3-6; Baiton *FGrHist* 119F4 *ap*. *HN* 6.22.29 (cf. 2.75.184, Solin. 52.13); Nearchos *FGrHist* 133F16 *ap*. Str. 2.1.20 (cf. 133F1 *ap*. Arr. *Ind*. 25.6); Onesikritos *FGrHist* 134F28 = Juba *FGrHist* 275F28 *ap*. *HN* 6.26.98, Solin. 54.5 and Mart. Cap. 6.699, 134F10 *ap*. HN 2.75.185; Megasth. *FGrHist* 715F7a *ap*. Str. 2.1.19, cf. F7b *ap*. *HN* VI.22.69 and F4 *ap*. D. S. II.35.2; Deimach. *FGrHist* 716F3 *ap*. Str. 2.1.19-20; Eratosth. fr. 67 Roller *ap*. Str. 2.1.19; Hipparch. fr. 43 Dicks *ap*. Str. 2.5.35 = Eratosth. fr. 57 Roller; D. S. 2.35.2; Str. 2.5.36, 41, 43; Manil. *Astron*. I.218-220; Pomp. Mel. 3.7.61; Col. *RR* 11.2.15; Luc. *Phars*. 3.250-251, 9.540-541; *HN* 2.71.178; Marinus of Tyre *ap*. Ptol. *Geog*. 1.7, Berggren and Jones 2000: 65; Cleom. 1.3), while they were also occasionally described as used in navigation (by far the earliest such reference is *Od*. 5.270-277; cf. Callim. *Iambi* 1.52-56 *ap*. D. L. 1.23 = Thales D-K 18A1, 3a; A. R. 3.744-746; Anon. *Stad. Mar. Mag.* 117, 137, 158-159, 164-165, 186, *GGM* i.470, 473, 479, 481, 484; also *HN* 6.24.83, Solin. 53.6), sometimes specifically with reference to their circumpolarity (Luc. *Phars*. 8.174-176; Val. Flacc. 2.61-65), or simply as observed by mariners (D. S. 3.48.1, after Agath. *De mar. er.* 104, *GGM* i.191; *HN* 2.71.178-179).

(3) In the same passage discussed under (1) and (2) Lucan names Canopus as the star used in navigation, as does Marinus of Tyre (*ap*. Ptol. *Geog*. 1.7, Berggren and Jones 2000: 66), yet without referring specifically to the observation of its upper culmination. Besides Canopus (for which see further *HN* 2.71.178-179 and Solin. 53.7), other southern stars were observed by navigators, such as Orion (Arat. *Phaen*. 728-731; A. R. 3.744-746; Verg. *Aen*. 3.517), their altitude was sometimes discussed in relation to changes in latitude (e. g. Manil. *Astron*. 1.218-220; *HN* 2.71.178), while their upper culmination was also regularly observed, sometimes with reference to the relative latitude of a location (Eudox. fr. 74 Lasserre *ap*. Hipparch. 1.11.6; Hipparch. 1.11.7-8; Posid. fr. 202 E-K *ap*. Str. 2.5.14, 205 E-K *ap*. Procl. *In. Tim.* iii.125.13-14 Diehl).

(4) Already Aristotle stated that Corona Borealis, observed from the northern temperate zone, is at its zenith when it passes the meridian (*Mete*. 2.5.362b9-12), Posidonius (Dreyer 1906: 173; Bowen and Todd 2004: 69 n. 22) or perhaps Dicaearchus (Tozer 1897: 169-170; Dreyer 1906: 174; Keyser 2001: 363-365) (erroneously) noted the zenith passage of the head of Draco at Lysimachia (Cleom. 1.8), Strabo defined latitude by the zenith position of Arcturus (2.5.38) or the always-visible circle (2.5.41), while Ptolemy claimed he could name a zenith star for each principal locality appearing on his maps (*Geog*. 8.2, Berggren and Jones 2000: 10). No sources acknowledge the use of zenith stars in navigation, though.

Thus it seems that all four methods were used to determine latitude in antiquity, and, additionally, methods (1)-(3) were most probably used by mariners. However, no source, except perhaps for Lucan with respect to (1), where there is no other possibility, since the pole is immovable (ignoring the long-term effects of precession, naturally), explicitly describes the precise moments in stellar orbits referred to above, i.e. the observation of lower (2) or upper culminations (3) of stars is nowhere specifically mentioned, although these are the only moments in their orbits that could be effectively used in determining latitude (the same applies to (4), but the observation of zenith stars by mariners was not mentioned by ancient sources). Even so, it is safe to presume that these characteristic points in the orbits of targeted stars were precisely the moments to which the ancient sources refer.

The direct crossing of the Ionian Gulf

The examples of parallels used for latitude sailing noted above were not chosen fortuitously. They are pertinent to the route frequently used for direct crossing in antiquity, as supported by numerous literary sources (see Table 1). Already Thucydides (6.13.1) acknowledged the existence of a direct open-sea route between the Peloponnesus and Sicily, distinguishing the Ionian Sea used for coastal voyage (παρὰ γῆν) from the Sicilian Sea used for direct crossing, διὰ πελάγους (Bilić 2008: 119; on the crossings of the Ionian Sea cf. Davies 2009: 80 with n. 116, 114, 154, 223-225). It is believed that this very term (the Sicilian Sea) actually derives from the experience of utilizing the high-sea routes across the modern Ionian Sea (Prontera 1996: 205), and the earliest – even if fictional – account of a crossing – although accidental – is given by Euripides (*Cyclops* 18-20, from Cape Malea to Aetna).

From	*Via*	To	Number and type of vessel(s)	Source	Distance (nm)	Length (days)	Speed (knots)	Season	Winds
Cape Malea		Aetna	Sculling-boat	Eur. *Cycl*. 18-20 (A fictional voyage of Silenus)	390				Strong (?) east wind
Thurii		Cyllene	Trading vessel	Thuc.6.61.6-7, 88.9 (cf. Plut. *Alc*. 23.1)	245			Late summer or autumn	[Favourable]
Leucas		Syracuse	War galley	Thuc. 7.2.1	280			Summer*	
Leucas		Syracuse	12 war gall.	Thuc. 7.7.1	280			Summer*	
Taenarus		Syracuse	Small fleet	Thuc. 7.19.4	360			Summer*	
Leucas		Tarentum	4	Thuc. 6.104.1	195			Summer*	
Syracuse		Peloponnese	1	Thuc. 7.25.1	c. 300			Summer*	
Peloponnese		Locri	1	Thuc. 7.25.3-4	c. 250			Summer*	
Syracuse		Kephallenia	Trading vess.	Dem. 32.4-8	260	2 ½	4.3	[Summer]	[Favourable]
Neapolis or Strait of Messina	Strait of Messina	Kephallenia	40 (war fleet)	Liv. 42.48.9	430 or 250	5	3.6 or 2.1	Winter	
Lacinian pr.		Corcyra	56+ (war fleet)	Liv. 36.42.2-3	125			[Spring/ summer]	
Corinth	Corcyra	Cape Zephyrion	Colonists' fleet	Str. 6.2.4	410				

Table 1. Crossings of the Ionian Sea.

From	*Via*	To	Number and type of vessel(s)	Source	Distance (nm)	Length (days)	Speed (knots)	Season	Winds
Puteoli		Alexandria	Merchant vessel(s)	Philo *In Flacc*. 5.26-27, 13.109-110	1000	'a few days'		[Summer]	Favourable
Puteoli		Alexandria	Merchant vessel(s)	Plin. *HN* 19.1.3	1000	9	4.6	[Summer]	'the lightest possible breeze'
Messina		Alexandria	Merchant vessel(s)	Plin. *HN* 19.1.3	830	6 or 7	5.8 or 4.9	[Summer]	[Favourable]
Cauda (Crete)		Malta	Merchant vessel	Acts 27:13-28:1	520	14	1.5	Late autumn, early winter	Storm
Syracuse		Peloponnese	1	Thuc. 7.25.1	c. 300			Summer*	
Peloponnese		Locri	1	Thuc. 7.25.3-4	c. 250			Summer*	
Zacynthus		Cape Pachynus	5 (two galleys, two cargo ships, one smaller ship)	Plut. *Dion* 25	295	12 ½	1	Middle of summer	'fresh and gentle breeze'
Italy		Peloponn.	Merchant-vessel	Plut. *Sept. sapient. conviv.* 18.161B-D (A fictional voyage of Arion)	c. 240	3 days	3.3		Moderate breeze

From	*Via*	To	Number and type of vessel(s)	Source	Distance (nm)	Length (days)	Speed (knots)	Season	Winds
Corinth?	open sea (διαπλέοντες)	Rhegium?	10 war ships	Plut. *Timol.* 8.4-6, 9.1-2, 7	c. 370				Favourable, fast voyage
(Italy→ Straits)		Zacynthos (cont.Athens)	Passenger ship	Luc. *Tox.* 19	250	Arrived about midnight; no starting time given		Setting of the Pleiades	Huge storm
Straits (starting from Rome)		Kephallenia (to Miletus)	Passenger ship?	Aristid. *Hieroi logoi* 2.66	245	2 nights and a day	6.8	Several days prior to the vernal equinox	Noiselessly carried by a current
Corinth		Puteoli		Philost. *VA* 7.10	680	4-4 ½	6.3-7.1	Summer	Favourable
Syracuse		Mouth of the Alpheus		Philostr. *VA* 8.15	300	2 ½ or 6	5 or 2.1	Early autumn	Favourable
Puteoli	Taormina, Syracuse	Mouth of the Alpheus		Philostr. *VA* 8.15	540	6 or 8 ½	3.8 or 2.7	Early autumn	Favourable
Epidamnus		Rome		Procop. *Goth.* 3.18.4	600	5	5	[Summer]	Favourable
Zacynthus		Mount Etna	Great war fleet	Procop. *Van.* 1.13.22	280	16	0.7	Early spring	'very gentle and languid'

Timoleon's crossing

Another account of the direct crossing of the Ionian Sea made in 344 BC, one that has a lot in common with Apollonius' description of the Argonauts' voyage from Sinope to the mouth of the Ister, was given by Plutarch in his *Life of Timoleon*. Plutarch was well acquainted with this particular open-sea route, since in the *Life of Dion* (23.3, 25.1-3) he described the hero's midsummer crossing from Zachyntus to Cape Pachynus made in 357 BC (Bilić 2008: 117-118), and he also gives a description of a fictitious but plausible crossing made by Arion from Italy to the Peloponnesus (*Sept. sapient. conviv.*18.161B-D). His account of Dion's voyage is quite similar to that of Timoleon's, a consequence of the fact that the nature of their respective voyages was conditioned by the similar nature of their particular undertakings: the overthrow of tyranny in Syracuse. Dion had to avoid approaching the shore, since it was generally hostile to his party, but especially Iapygia, where Dionysius' fleet was based. He is explicitly described as taking the open-sea route – the word used is ποντοποροῦντες, present participle of the verb ποντοπορέω (*Dion* 25.2), which is explicitly contrasted with a coastal voyage. However, in this account there is no mention of stellar navigation or divine portents. In the account of Timoleon's crossing, on the other hand, both these motifs are present. Timoleon started his voyage at night, most probably from Corinth, enjoying a favourable wind. Then, suddenly, the heaven above the ship seemed to burst open and an abundant and conspicuous fire (πῦρ) appeared (*Timol*. 8.5) (compare A. R. 4.301). From this heavenly fire a torch (λαμπάς), compared to those used in mysteries, was raised up, and 'run along with them on their course' (συμπαραθέουσα τὸν αὐτὸν δρόμον). Then the torch 'rushed down upon precisely that [part of] Italy towards which the pilots were steering' (ᾗ μάλιστα τῆς Ἰταλίας ἐπεῖχον οἱ κυβερνῆται, κατέσκηψεν) (*Timol*. 8.6). The occurrence is further referred to as a phenomenon or portent (φάσμα) and a light from heaven (σέλας) sent by Demeter and Kore (*Timol*. 8.7). Plutarch emphasized that the voyage is a direct open-sea crossing – Timoleon was sailing across (διαπλέοντες, present participle of the verb διαπλέω) the Ionian Sea (*Timol*. 9.1). At the end of his voyage, passing by the coast of Italy (ἐκομίζοντο παρὰ τὴν Ἰταλίαν) (*Timol*. 9.1), he finally arrived at Rhegium (*Timol*. 9.7). Plutarch's account is not completely clear on all points, but the main facts seem to be the following: Timoleon sailed from the Peloponnese (most probably at a latitude close to the mouth of the Corinthian channel) following a light that appeared in the sky (or, rather, the light was following *them*; compare A. R. 4.301-302), which descended (κατασκήπτω) to a point on the horizon indicating the position of their intended landing-site in Italy, i.e. its azi-

muthal position with respect to their current position, probably somewhere to the northeast of Rhegium itself. This interpretation of Plutarch's account speaks against Timoleon's use of latitude sailing to cross the Ionian Sea, but rather for his use of a series of stars that set on the same azimuth, over his destination (for the sailing method see Davies 2009: 152-155), even though Plutarch seems to describe a single phenomenon. Alternatively, Plutarch's account of the behaviour of the stellar portent could refer to some of the stars used in ways (2) to (4) noted above, which would then associate it with latitude sailing, even though the stars under (2) specifically do not set, while those of (4) set only for latitudes higher than 45°.

Table 2. Syntagmatic analysis of Apollonius' and Plutarch's accounts.

Apollonius	Plutarch
Coastal W-E sailing along constant latitude,	Open-sea W-E sailing along constant latitude;
interrupted by the appearance of a portent in the sky	interrupted by the appearance of a portent in the sky
sent by Hera	sent by Demeter and Kore
in the form of fire/ray	in the form of fire / torch-like / light
moving across the sky (c.f. ὀλκός)	moving across the sky (συμπαραθέω, κατασκήπτω)
and thus showing the right course (ὅπῃ ἀμεύσιμον ἦεν, c.f. the scholiast's σημαίνω),	and thus showing the right course
	by (somehow) indicating the position of the intended landing-site,
as well as following the ship.	as well as following the ship.

In any case, the clear syntagmatic similarities between Apollonius' and Plutarch's account suggest the existence of a common literary *topos*, which might be called 'the *topos* of following heavenly fire'. This literary construction, however, was necessarily derived from contemporary navigational practices, which undoubtedly included the use of stars in navigating the open sea.

The literary reworking of these practices, which is what we have in Apollonius' and Plutarch's accounts, do not allow the recognition of clear references to latitude sailing as practiced in contemporary Mediterranean. In the former narrative, it cannot be excluded that some form of latitude sailing actually underlies Apollonius' account;[1] with respect to the latter, it seems more likely that it actually does not, or that Plutarch's narrative merges two different forms of stellar navigation, i.e. latitude sailing and use of a series of stars with same azimuths of setting/rising.

BIBLIOGRAPHY

Arnaud, P., "Ancient mariners between experience and common sense geography", in K. Geus, M. Thiering (eds.), Features of Common Sense Geography. Implicit Knowledge Structures in Ancient Geographical Texts, Berlin etc. 2014, 39-68.

Berggren, J. L., Jones, A., *Ptolemy's Geography: An Annotated Translation of the Theoretical Chapters*, Princeton 2000.

Bilić, T., "Plovidba po geografskoj širini na Mediteranu – Latitude sailing on the Mediterranean", *Opvscvla archaeologica* 29/2005, 121-156.

Bilić, T., "The Myth of Alpheus and Arethusa and Open-Sea Voyages on the Mediterranean – Stellar Navigation in the Antiquity", *International Journal of Nautical Archaeology* 38.1/2008, 116-132

Bilić, T.: "Ogledi o stelarnoj navigaciji u antici", in L. Bekić (ed.), *Jurišićev zbornik*, Zagreb 2009, 75-81.

Bowen, A. C., Todd, R. B., *Cleomedes' Lectures on Astronomy. A Translation of The Heavens with an Introduction and Commentary*, Berkeley 2004.

Braund, S. (trans.), *Lucan. Civil War*, Oxford 1992.

Davies, D. L., *Commercial Navigation in the Greek and Roman World*, diss. University of Texas, Austin 2009.

Dreyer, J. L. E., *History of the Planetary Systems from Thales to Kepler*, Cambridge 1906.

Duff, J. D. (trans.), *Lucan*, London-Cambridge 1928.

Geus, K., "Measuring the Earth and the *Oikoumene*: zones, meridians, *sphragides* and some other geographical terms used by Eratosthenes of Cyrene", in R. Talbert, K. Brodersen (eds.), *Space in the Roman World*, Münster 2004, 11-26.

Geus, K., *Eratosthenes von Kyrene*, Oberhaid 2011[= München 2002].

Graves, R. (trans.), Pharsalia: dramatic episodes of the civil wars, Harmondswort 1956.

Green, P., *The* Argonautika *of Apollonios Rhodios*, Berkeley-LA-London 2007.

[1] For observation of northern stars (Arcturus, the Haedi, Draco), by mariners in the Pontic area see Verg. *Georg*. 1.204-207.

Joyce, J. W. (trans.), *Lucan: Pharsalia*, Ithaca 1993.

Katičić, R., *Illyricum mythologicum*, Zagreb 1995.

Keyser, P. T., "The Geographical Work of Dikaiarchos", in W. W. Fortenbaugh, E. Schütrumpf (eds.), *Dicaearchus of Messana: Text, Translation, and Discussion*, New Brunswick-London 2001, 353-372.

Nansen, F., *In Northern Mists. Arctic Exploration in Early Times*, 2 vols, London 1911.

Prontera, F., "Maritime Communications", in G. Pugliese Carratelli (ed.), *The Western Greeks*, Milan 1996, 201-208.

Riley, H. T. (trans.), *The Pharsalia of Lucan*, London 1853.

Ridley, E. (trans.), *The Pharsalia of Lucan*, London-New York-Bombay 1896.

Shcheglov, D., "Hipparchus' Table of Climata and Ptolemy's Geography", *Orbis Terrarum* 9/2003-2007, 159-191.

Tozer, H. F., *A History of Ancient Geography*, Cambridge 1897.

Widdows, P. F. (trans.), *Lucan's Civil War*, Bloomington 1988.