

Stupňánek, Bronislav

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BRONISLAV STUPŇÁNEK

## ANAXIMANDER'S ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ

Although *πρηστήρ* was relatively a common term, its meaning is not entirely clear. It is understood that it indicates a tornado or a waterspout (a tornado above the water surface), but in the same contexts this phenomenon is said to be fiery. It is translated also as “lightning” or “firewind” but these meanings are missing in *LSJ*.<sup>1</sup> On the other hand, the meaning “bellows” is not missing, but there are doubts whether it existed at all. Aristotle talks about the *πρηστήρ* ambiguously, *πρηστήρ* is used inconsistently at first sight in *De mundo*, it raises discussions in Heraclitus, and *πρηστήρ* is as well the core of a controversy in Anaximander, where it is a part of the expression *πρηστήρος αὐλός*. Thanks to this dispute, which has been recently renewed by Couprie<sup>2</sup> and Hahn<sup>3</sup>, I got to this topic as well. Couprie builds on systematics of the Anaximander’s celestial mechanics, Hahn examines thoroughly the archeology of bellows, but neither of them heads to the target the way which would seem straightforward to me – by investigating what the expression *πρηστήρ* actually means in Greek. The three following texts are debatable:

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- 1 The meaning “*a flash of lightning or a thunderbolt*” was even up to sixth edition of *LSJ* on the first place. It formed the first part of the lexicon entry together with the meaning “*a violent wind, hurricane*”. In the seventh edition, the two meanings were summarized under “*a hurricane attended with lightning, a fiery whirlwind descending like waterspout*”. In the ninth edition, the meaning was modified to “*hurricane or waterspout attended with lightning*”. The meaning “*a pair of bellows*” was listed as a metaphorical one in earlier editions (under the meaning “*a violent wind*”), and separately since the seventh edition.
- 2 D. Couprie, *Heaven and Earth in Ancient Greek Cosmology: From Thales to Heraclides Ponticus*, New York: Springer 2011, p. 145–151.
- 3 R. Hahn, *Archaeology and the Origins of Philosophy*, Albany: SUNY Press 2010, p. 87–114.

Ἀναξίμανδρος [sc. τὸν ἥλιον] κύκλον εἶναι [...] ἄρματιῦ τροχῶ παραπλήσιον, τὴν ἀψίδα ἔχοντα κοίλην, πλήρη πυρός, κατὰ τι μέρος ἐκφαίνουσαν διὰ στομίῳ τὸ πῦρ ὥσπερ διὰ πρηστήρος αὐλοῦ·

Anaximander says the sun is a circle resembling a chariot wheel, having a hollow fellow full of fire, which shows the fire in its certain part through the mouth like through a *presteros aulos*.<sup>4</sup>

(Aët. *Plac.* 2.20.1 DK 12A21)

[sc. τὴν σελήνην] κύκλον εἶναι [...], καθάπερ τὸν τοῦ ἡλίου [...], ἔχοντα μίαν ἐκποινήν, οἶον πρηστήρος αὐλόν·

Moon is a circle like the solar one having one blow-hole like a *presteros aulos*.

(Aët. *Plac.* 2.25.1 DK 12A22)

ὡς ἀπὸ σάλπιγγος ἐκ κοίλου τόπου καὶ στενοῦ ἐκπέμπειν αὐτὸν [sc. τὸν ἥλιον] τὸ φῶς ὥσπερ πρηστήρα.

Like from a trumpet, the sun emits the light from a hollow and narrow place, just like a *prester*.

(Achill. *Tat. Intr. Arat.* 19.22 DK 12A21)

There are basically three opinions on what the expression πρηστήρος αὐλός could mean.

- 1) H. Diels:<sup>5</sup> the nozzle of a bellows (πρηστήρ = bellows),
- 2) J. J. Hall:<sup>6</sup> the funnel of a tornado (πρηστήρ = tornado/waterspout) and
- 3) D. Couprie:<sup>7</sup> a stream of lightning fire (πρηστήρ = lightning).

When Couprie overviewed various existing interpretations in the last reappraisal of this topic, he mentioned Hall's theory only marginally among others and was defining himself mainly against Diels. Yet, it is the neglected Hall's view that can be best proven by non-interpretive evidence. My goal in this study is primarily to present much broader textual evidence than Hall (I went through all occurrences of the word πρηστήρ and through most ancient meteorological and metallurgical texts) and to demonstrate the strength of Hall's theory. Necessarily, I had to deal with an issue that has not been satisfactorily answered yet: What is actually the ancient πρηστήρ in the view of the modern meteorology? Taking the ancient descriptions of the πρηστήρ literally, they often do not seem to correspond to anything real, or more precisely, common (they usually describe something as a fiery tornado). If we figure out how the Greeks understood the word πρηστήρ, we

<sup>4</sup> All the translations from Greek and Latin are mine.

<sup>5</sup> H. Diels, *Doxographi Graeci*, Berlin: Reimer 1879, p. 25–26.

<sup>6</sup> J. J. Hall, ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ, *JHS* 89, 1969, p. 57–59.

<sup>7</sup> D. Couprie, *Heaven and Earth...*, p. 145–51; D. Couprie, πρηστήρος αὐλός Revisited, *Apeiron* 34, 2001, p. 195–205.

will understand better the Anaximander's image of the heavenly bodies whose fire goes out through the vents resembling the πρηστῆρος αὐλός.

### Couprie's "stream of lightning fire"

My research was prompted by Couprie's interpretation. I found out it had a major problem. Couprie says that πρηστῆρ indicates lightning, so he puts the whole passage in connection with Anaximander's explanation of lightning. According to him, Anaximander did not want to say anything other than that the fire of celestial bodies is flowing from their cloudy coverings by the same principle as a lightning darts from a storm cloud.<sup>8</sup>

If so, there is a troublesome question in all three fragments: Why is the comparison to lightning always chosen to describe an opening in a cloud when this opening is of a different form in the case of lightning? Lightning is described as a cleft in the cloud in the doxography,<sup>9</sup> so the comparison is used just at the point where the similarities between the two phenomena diverge.

Perhaps even more serious issue is that πρηστῆρος αὐλός as "a stream of lightning fire" does not fit into the text of two of the three fragments (Aëtius A21 and Achilles). The context makes it clear that it was the shape of the opening what was being described by the analogy, not the stream. Both the doxographers understood the expression πρηστῆρος αὐλός differently than Couprie.<sup>10</sup>

Still, the biggest weakness is Couprie's translation of αὐλός as a stream. This meaning of αὐλός appears once (or maybe twice) in Homer,<sup>11</sup> where, however, αὐλός of blood is of a metaphorical character based on the shape similarity with an αὐλός (pipe).<sup>12</sup> Later usage in this sense is rare and is limited to denoting pipe-like jets of blood.<sup>13</sup> Couprie's theory is linguistically untenable.

<sup>8</sup> D. Couprie, *Heaven and Earth*..., p. 150–151.

<sup>9</sup> The cleft is described as a ρῆξις (bursting) and διαστολή (drawing asunder, parting; Aët. *Plac.* 3.3.1 DK 12A23) and that the wind διστᾶ (splits) clouds (Hippol. *Haer.* 1.6.7.4 DK 12A11).

<sup>10</sup> Couprie admits it, even though he is trying to show by questionable translations of fragments that it is not a necessary consequence of his interpretation. He desisted from this effort in the case of Aëtius in his later text.

<sup>11</sup> *Od.* 22.18, cf. *Il.* 17.297.

<sup>12</sup> Homer commentators say it is a metaphor and emphasize the shape of a blood jet. Eust. *ad Il.* 4.234.3; 4.57.5; *ad Od.* 2.270.9; Apollon. *Lex.* 47.15 <αὐλός>; *EM* 169.44 <Αὐλός>; 338.5, etc.

<sup>13</sup> "And everything stretched to a straight shape we call an αὐλός, such as a racetrack and a spout of blood." (Ath. *Deipn.* 5.15.6). Ph. *De vita Mosis* 1.99.6, Nonn. *D.* 4.454; 30.143; 44.105; Philost. *HE* 7 fr. 9.10; Hsch. <αὐλόν> etc.

### Diels's "nozzle of bellows"

Since Couprie defines himself primarily against most accepted Diels' translation "the nozzle of a bellows", my first hypothesis was that it is Diels who is right. But the problem of Diels's interpretation is the lack of evidence for *πρηστήρ* in the meaning of "bellows". The only and questioned evidence is in Apollonius' *Argonautica* 4.777, where Hephaestus stops his work: ἔσχοντο δ' ἀυτιμῆς αἰθαλέοι πρηστήρες (the smoky *presters* stopped their breath). The term *πρηστήρες* can here refer either to bellows or to violent winds from them. Thus, my goal was to investigate all occurrences of the word *πρηστήρ* to find more pieces of evidence for the meaning "bellows". I found none.

Moreover, Apollonius Rhodius was among often read and excerpted authors, lexicographers excerpted from him, and some lexicons even quoted directly our verse with *πρηστήρ*,<sup>14</sup> yet no grammarian had found the meaning of "πρηστήρ" remarkable here and the meaning "bellows" had not entered any extant lexicon. The basic meaning (violent wind) is obviously sufficient for understanding. Thus, the total lack of evidence is undermining Diels's interpretation and consequently all the other based on it, including Hahn's last one.<sup>15</sup>

### What is *πρηστήρ*?

When I was collecting individual occurrences of the word *πρηστήρ*, it proved that the word in most cases has a meteorological meaning – in total of about 300 known occurrences,<sup>16</sup> in 93 %, it meant a meteorological phenomenon, in 6 % it indicated the species of snake (also called *καύσων* or *διψάς*, whose bite caused unquenchable thirst), and 1 % were other meanings ("swollen veins on a neck" and "spout").<sup>17</sup> Aside from "spout" (documented only

<sup>14</sup> Zonar. delta 474.27; *EM* 262.5.

<sup>15</sup> R. Hahn, *Archaeology...*, p. 87–114, taking the analogy with bellows literally (as "celestial bellows"), studies the Greek archeology of bellows. But he ignores the specific Milesian archeology which documents that Miletus did not have its own metalworking tradition in the sixth century, this was apparently provided by the Syrian immigrants; see M. Treister, *The Role of Metals in Ancient Greek History*, Leiden: Brill 1996, p. 70, 75–76, 162–164.

<sup>16</sup> It is virtually the entire history of using of the term. In Modern Greek the word *πρηστήρ* does not occur.

<sup>17</sup> All the meanings of *πρηστήρ* were derived from individual meanings of the verb *πρήθω/πίμπρημι* – to blow, to burn, to inflate, to swell, to spout. In the meaning of "tornado" and "snake" the expression *πρηστήρ* passed into Latin, where the zoological meaning is more frequent.

once in Eur. *Fr.* 384 and obviously metaphorical), all the non-meteorological occurrences are late (from the Roman and Byzantine era).

The meteorological sense is undoubtedly problematic. It can be divided into at least two more: “tornado” (more vaguely “violent wind”) and “lightning”. The context provides not always a sufficient support for their distinction. As for the meaning “lightning”, it is more often used in later periods, and it clearly outweighs the meaning “tornado” in the Byzantine period. It can be convincingly proved from the second century AD,<sup>18</sup> two occurrences can be then uncertainly dated one or two centuries earlier.<sup>19</sup> There are several older occurrences which allow the meaning “lightning” (Heraclit. *DK* 22B31; Hdt. 7.42.8; Xen. *HG* 1.3.1.2; Str. 13.4.11.9), but the context is not clear enough to determine the exact meaning. It is “lightning” most likely in Herodotus, but a conclusive argument is not possible even here.<sup>20</sup> Authors dealing with meteorological phenomena have not, however, used *πρηστήρ* in the meaning of “lightning” at least until fifth century AD.<sup>21</sup>

The second and apparently original meteorological meaning is even further differentiated. It denotes a tornado, a waterspout in the narrower sense, a violent wind in a vague sense. The problem is that it is often referred as a fiery phenomenon in all these subsenses – which is contrary to our current understanding of these phenomena. And that is what creates all the controversy and confusion over the term *πρηστήρ*.

<sup>18</sup> See Hdn. *Epim.* 111.12 (cf. 136.11 and Poll. 1.110.1, also from the second century); Luc. *Astr.* 19.14 (Phaethon is there smitten by a *πρηστήρ*, in other versions of the myth by a *κεραυνός* cf. A.R. 4.597; D.S. 5.23.3.2, etc.).

<sup>19</sup> Erucius in *AP* 7.174.5 (about the 2nd half of the first century BC) and Geminus in *AP* 16.30.5 (about half of the first century AD). For dating see A. S. F. Gow – D. L. Page, *The Greek Anthology* 2. Commentary and Indexes, Cambridge: Cambridge University Press 1968, p. 278–279, 294–295.

<sup>20</sup> Herodotus records an event when the Persian army, encamped for the night under the mountain Ida, gets struck by thunders and *πρηστήρες*, killing a large number of soldiers. Both lightning and a tornado are being accompanied by thundering.

<sup>21</sup> The first such author was Olympiodorus (in *Mete.* 13.3, 37.32, 202.11) which reinterpreted Aristotle’s conceptual distinction (12.20–13.18) and subsequently talked about the *πρηστήρ* where Aristotle talks about the *κεραυνός* (Olymp. in *Mete.* 202.14, 208.29, 209.8; 202.22, 208.25 vs. Arist. *Mete.* 371a27; 371a31). Sometimes the meaning “lightning” is being attributed to *πρηστήρ* in Heraclitus and Metrodorus. Heraclitus’ B31 does not indicate the meaning of *πρηστήρ*. In *DK* 22A14 (ap. Aët. *Plac.* 3.3.9), where the *πρηστήρ* is unlike the *ὑστραπή* an igniting and extinguishing *cloud*, it looks like either an intra-cloud lightning or – more likely in Aëtius’ context – a luminous tornado (see further). Metrodorus (ap. Aët. *Plac.* 3.3.3 *DK* 70A15) says that the *κεραυνός* when fading away converts to a *πρηστήρ* which is certainly not a different type of lightning, but the phenomenon of a strong blast after a lightning strike (the shock wave of a thunder capable of tearing leaves from trees or even throwing people) which was known to the ancient philosophers (Arist. *Mete.* 371a27).

Already the first known occurrence in Hesiod is characteristic. During the fight between Typhon and Zeus, Hesiod (Th. 844) talks about the heat of their weapons. One of the weapons causing boiling of the world are winds of *πρηστήρες*. This implies that the *πρηστήρ* is a wind phenomenon but also something that is able to cause heat and boiling at the same time. Both of these attributes are, therefore, already included in the folk, pre-philosophical idea of a *πρηστήρ*. This ambiguity confirms also other literary usage of *πρηστήρ*.<sup>22</sup>

*Πρηστήρ* is referred to be a fiery or semi-fiery windy phenomenon even in the natural philosophy. Influential Aristotle's classification (*Mete.* 339a3; 370b17-371b14) puts a *πρηστήρ* between three rotating phenomena: a *τυφών*, *πρηστήρ* and *κεραυνός*.<sup>23</sup> He understood all three as rotating *πνεῦμα* descending from a cloud to the ground: in case of the *τυφών* and *πρηστήρ*, the wind pulls down also the cloud, in case of the *πρηστήρ* and *κεραυνός*, the air ignites. The *τυφών* is clearly described as a tornado, the *κεραυνός* as ground lightning, the *πρηστήρ* is only briefly mentioned after the explanation of the *τυφών*. It is apparently an ignited *τυφών* but it is not clear how this phenomenon should look like (*Mete.* 371a15). The even more copied and excerpted passage of pseudo-Aristotelic *De mundo* (395a21) calls the *τυφών* as *ἄπυρος*, the *πρηστήρ* as *ἡμίπυρος*, and the *κεραυνός* as *ἀναπυρωθεῖς*. And also other authors talk about the fire of the *πρηστήρ* to be somehow weaker, softer.<sup>24</sup> Latin authors then describe the *πρηστήρ* explicitly as a fiery tornado, inflamed gradually by its moving (Sen. *NQ* 5.13.3; Plin. *NH* 2.133).

But there are other authors (mostly travelers and meteorologists) who do not indicate there would be any fire at all. E.g. Ctesias (fr. 45.131) claims that there are no thunders, lightnings and rains in India, only *πρηστήρες* and winds. Implicitly, he hereby says that no lightnings occur during the *πρηστήρ*, which questions the explanation of *πρηστήρ* in *LSJ* ("a waterspout attended with lightnings"). Nearchus and Onesicritus, members of Alexander's expedition, both recorded a story of how they first came across a whale at the sea, which emitted a typical whale spout of water or steam.

<sup>22</sup> "The sails outspread for the northerly gusts of fiery *πρηστήρ*" (Lyc. 26). Note that despite its "fire", the *πρηστήρ* is supposed to push against sails, not to burn them. See also Plut. *Fab.* 16.1.3, cf. *Crass.* 19.4.4.

<sup>23</sup> *Κεραυνός* stood for cloud-to-ground lightning (as distinct from *ἀστραπή* – cloud-to-cloud lightning), so Aristotle explained the movement of this "inflamed wind" towards the ground by means of whirlwind.

<sup>24</sup> Chrysippus and the Stoics ap. Aet. *Plac.* 3.3.12-13 (π. less inflamed, dull); Ar.Did. fr. 12.6 commenting Arist. (a mention that the *πρηστήρ* also shines at night shows its shine was not quite self-evident), Jo.D. *Dial.* 68.47 (the *κεραυνός* is fiery, the *τυφών* dark, the *πρηστήρ* translucent or radiant – *διαυγής*).

The sailors were afraid that it was a πρηστήρ.<sup>25</sup> Apparently, they were afraid of the waterspout which causes a similar effect of sprayed water and water vapor above the water surface. They could not see even a hint of fire above the whale, yet they identified the phenomenon as a πρηστήρ. Epicurus (*Ep.* 104.5), when trying to “non-mythically” explicate meteorological phenomena, explains the formation and movement of the funnel of the πρηστήρ, but does not mention a word about the fire which would be arising there and needing an explanation. Eratosthenes describes the πρηστήρ as a whirling eddy of wind.<sup>26</sup> Lucretius (6.423) portrays the πρηστήρ vividly and in detail in his poem, but does not mention the fire. He describes the classic waterspout. The same applies to the description of the πρηστήρ in Theophrastus *Meteorology* (13.43).<sup>27</sup> Fire is not mentioned in a connection with the πρηστήρ even in his *On winds* (fr. 5.53.12). However, in *De igne* 1.9, Theophrastus states the πρηστήρ (and the κεραυνός) as the case when fire arises from air. So how could be this contradiction explained?

Lucretius’ text offers us a partial explanation. Lucretius does not describe presence of any fire but speaks three times on how the πρηστήρ forces the sea to boil.<sup>28</sup> In reality, it seems as if the water smoked heavily within the contact of a waterspout with the surface. The lowest part of the funnel is lost in the rising steam and water mist which is being scattered by the tornadic updraft. The same phenomenon occurs even with terrestrial tornadoes, only the cloud of “smoke” is created by raised dust (clay, sand, etc.). Already Hesiod has talked about the ability of the πρηστήρ to cause boiling of earth and sea, and also the confusion of whale spout of steam and waterspout has its origin in this phenomenon. The phenomenon was even described by Theophrastus (*Meteorology* 13.48), but he did not relate it to fire or heat, but correctly to the updraft of wind. Yet, it is an obvious reason why consider tornado to be hot.

Although this phenomenon of “the rising smoke” can explain why it was believed that things are burned under the πρηστήρ (Str. 13.4.11.9, Plin. *NH* 2.133), it does not explain the belief that the πρηστήρ is a tornado “colored by fiery skin” (Alex.Aphr. in *Mete.* 136.4), or with some kind of dull glow. Firstly, it should be noted that tornadoes in the Greek area were not too frequent (the current mean is 31 observed tornadic events per year, Aegean

<sup>25</sup> Nearch. ap. Arr. *Ind.* 30.2.1; Onesicritus ap. Ael. *NA* 17.6.26.

<sup>26</sup> Eratosth. ap. Achill. *Intr.Arat.* 33.15.

<sup>27</sup> H. Daiber, *The Meteorology of Theophrastus in Syriac and Arabic Translation*, in W. W. Fortenbaugh – D. Gutas (eds.), *Theophrastus: His Psychological, Doxographical, and Scientific Writings*, New Brunswick: Transactions Publishers 1992, p. 269.

<sup>28</sup> Lucr. 6.428, 437, 442.



and Ionian Sea included),<sup>29</sup> and their records were limited to verbal stories passed on by sailors and eyewitnesses who were often under a great psychological stress during observation.<sup>30</sup> A considerable amount of testimonies of luminous tornadoes exists even nowadays.<sup>31</sup>

Most cases of the observed luminosity are due to a reflection of sunlight or lightning. If the sun is behind the observer and its rays are reflected from the column, the funnel gives the impression of brightness and luminosity. It is also typical that tornado visually lightens and darkens in the course of its development and its movement in relation to observer,<sup>32</sup> which could lead Seneca and Pliny to a speculation that it heats up with movement only, or Heraclitus to the conclusion that it is an igniting and extinguishing cloud.

Lightning may equally cause the same impression when the light is reflected from the funnel toward the observer. In terms of tornadoes associated with the storm system, the greatest rate of lightning occurs right in the neighborhood of the tornado.<sup>33</sup> Although waterspouts rarely occur in the storm systems, the area of Aegean, Ionian and Adriatic Sea is just an exception where this phenomenon (called tornadic waterspout) makes up more than a half of all occurrences of waterspouts.<sup>34</sup> The higher lightning frequency around a tornado could not just light it up but it could also give an impression of a “firewind” spreading out of it.

Furthermore, fires caused by lightning associated with tornado or fireplaces in the ruins of houses could be also considered as a manifestation of the burning of tornado. Fire whirls and fire tornadoes (whirlwinds of flame emerging above fires) could be certainly considered as a *πρηστήρ* too; but they are relatively rare.

To sum it up, the expression *πρηστήρ* in the meaning of a tornado could refer to either a tornado in general or a specifically fiery tornado (mostly

<sup>29</sup> M. V. Sioutas, A tornado and waterspout climatology for Greece, *Atmospheric Research* 100, 2011, p. 345; M. V. Sioutas et al., Waterspout outbreaks over areas of Europe and North America, *Atmospheric Research* 123, 2013, p. 168–171.

<sup>30</sup> H. B. Bluestein – J. H. Golden, A Review of Tornado Observations, in C. Church et al. (eds.), *The Tornado: Its structure, dynamics, prediction, and hazards*, Washington: AGU 1993, p. 319.

<sup>31</sup> For a bibliographic list of observations see W. R. Corliss, *Lightning, auroras, nocturnal lights, and related luminous phenomena: A catalog of geophysical anomalies*, Glen Arm: Sourcebook Project 1982, p. 117–120.

<sup>32</sup> M. Allaby, *Tornadoes*, New York: Facts on File 2004, p. 84–86; J. Erickson, *Violent Storms*, Blue Ridge Summit 1988, p. 147–150.

<sup>33</sup> D. R. MacGorman – W. D. Rust, *The Electrical Nature of Storms*. Oxford: Oxford University Press, p. 248–249.

<sup>34</sup> M. V. Sioutas – A. G. Keul, Waterspouts of the Adriatic, Ionian and Aegean Sea and their meteorological environment, *Atmospheric Research* 83, 2007, p. 545–546.

in contrast with non-fiery τυφών). Such tornado should have been shining or glowing at least in some cases. This phenomenon is in fact very rare, but is reported quite often due to inexperienced and heavily stressed observers subjected to optical illusions. The Greeks, who believed that all tornadoes are hot (even τυφῶνες)<sup>35</sup> and the water and ground boil beneath them (which had an observable sign of rising vapor or “smoke” within the contact of tornado with the ground) had even stronger inclination to such observations. Either way, sailors, travelers and philosophers used the word *πρηστήρ* in the meaning of “tornado”. The meaning “lightning” was rather folk and has possibly emerged only due some speakers’ unknowing of the tornado phenomenon. It does not spread until the time when the interest in natural science decreases among the Greeks. Other meanings are quite minor and late.

### What is “πρηστήρος αὐλός”? (Hall’s “funnel of a tornado”)

Although Hall based on only five texts (Arist., Epicur., Lucr., Sen., Plin.) and felt therefore some confusion regarding the actual form of the *πρηστήρ*, it was obvious to him that it was a tornado. And if *πρηστήρ* means a tornado, its αὐλός (pipe) cannot be anything else than its funnel. But Hall found only one and not entirely satisfactory evidence for αὐλός in the sense of a tornado funnel. Pliny, after speaking of phenomena such as *turbo* (a whirlwind) and *prester*, introduces two more:

When the condensed and firmed moisture supports itself it is called a *columna*; an *aulon* is of the same kind when a cloud draws up water like a pipe.

(Plin. *NH* 2.134)

Hall points out that Lucretius also used the term *columna* meaning the funnel of the *πρηστήρ*, but considers critically that Pliny does not probably regard *columna* and *aulon* as types of wind. I cannot agree with Hall at this point. Pliny is a much more reliable evidence.

Pliny states elsewhere that he uses more than twenty Greek treatises concerning winds (*NH* 2.117-118). In the following text, the terms for different types of winds are mostly bilingual. *Aulon* is thus evidently an authentic expression from Greek meteorology. The passage concerning the tornado

<sup>35</sup> Already Hesiod (*Th.* 869-880) says that stormy sea winds have arisen from dead Typhon, a fire-spouting monster. Even later the τυφών maintains occasionally its fiery characteristics (Anaxag. ap. Aët. *Plac.* 3.3.4; Chrysipp. ap. Aët. *Plac.* 3.3.13 et D.L. 7.154.4; Ar.Did. Fr. 12.9; Olymp. in *Mete.* 13.11; 115.21).

phenomena is introduced with a general statement that it regards winds which coat themselves with skin of cloud when rushing down (2.131). The text speaks of six such phenomena which differ mainly in their compression degree (in order: *procella/ecnephas*, *vertex/typhon*, *turbo*, *prester*, *fulmen*, *columna/aulon*). The text is complicated by mutual comparisons of these phenomena, but proceeds systematically: the *columna/aulon* is, as the most compressed, named at the end. Therefore, it belongs among the whirling winds.

The *aulon* supposedly draws water into the cloud, which was later attributed among Greek sailors to the phenomenon called σίφων<sup>36</sup> (later word for waterspout, also used in Modern Greek). Σίφων, αὐλών and αὐλός mean a hollow pipe in Greek. Synonymous Latin *columna* then meant the funnel of the πρηστήρ in Lucretius and its Syriac equivalent did so in Theophrastus' *Meteorology* (the πρηστήρ is an "airy pillar", 13.43).

However, the Greek evidence of αὐλός in this sense is not known. Still, I have discovered one hidden document – covered by emendation so far.

Πρηστήρας ἐνδέχεται γινεσθαι καὶ κατὰ κάθεσιν νέφους εἰς τοὺς κάτω τόπους αὐλοειδῶς.

Usener: στυλοειδῶς, scripsi: ἀλλοειδῶς.

It is assumed that *presters* arise by descent of a cloud to the lower regions in a form of an *aulos*.

Usener: in a form of a column, scripsi: in a different form.

(Epicur. *Ep.* 104.5)

My emendation changes a single letter of a manuscript and the resulting word is documented,<sup>37</sup> unlike the Usener's one. The meaning is the same. Thus, here we have the evidence of αὐλός as the funnel of the πρηστήρ.

"A funnel of a tornado" is then the only verifiable translation of πρηστήρως αὐλός. Anaximander's vent of the celestial bodies is not just an opening as Couprie asserted, not just a short nozzle of the Dielsian interpretations, but a longish pipe, perhaps formed by a whirlwind of the same cloudy matter that encloses the entire celestial bodies in Anaximander.

<sup>36</sup> It has the same characteristics as *columna* and *aulon*. See Sch.Arat. 785.7; Olymp. in *Mete.* 200.18; Ath.Al. *Quaest. ad Antioch.* 684.6; Jo.D. *Fid.* 23.34 etc.

<sup>37</sup> Meletius, *De natura hominis* 40.12; Gr.Nyss. *Hom.in Cant.* 233.20; *Hom.Opif.* 249.54.

## ANOTACE

## ANAXIMANDRŮV ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ

Slovo *πρηστήρ* vyvolává zmatek a spory, téměř kdekoli se objeví. Jeho slovníkové heslo bylo v *LSJ* několikrát významně přepracováno, problémy se však stále vyřešit nepodařilo. Nejasnost výrazu spočívá také v tom, že popisuje tornádové, ohnivé a zářící meteorologické jevy. Nedávná diskuze o výrazu *πρηστήρος αὐλός* u Anaximandra tento problém opět nastolila. Tato studie objasňuje význam výrazu *πρηστήρος αὐλός* stejně tak jako slova *πρηστήρ* na základě zkoumání veškerých známých výskytů tohoto slova. Studie vylučuje význam „měchy“, význam „blesk“ se potvrzuje spíše pro pozdní texty, základní význam „tornádo“ je typický zejména pro autory spojené s námofnictvím a meteorologií. *Πρηστήρος αὐλός* je trychtýř tornáda. Na základě současných meteorologických znalostí (s ohledem na oblast Řecka) je také vysvětleno, proč bylo tornádo často vnímáno jako ohnivé.

**Klíčová slova:** *Anaximandros, přéstěr, přéstéros aulos*

## SUMMARY

## ANAXIMANDER'S ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ

The word *πρηστήρ* creates confusion and controversy almost wherever it occurs. Its lexicon entry in *LSJ* has been revised several times but it is still not very helpful. Lack of clarity of the expression also lies in the fact that it describes tornadic, fiery, and luminous meteorological phenomena. A recent discussion about the term *πρηστήρος αὐλός* in Anaximander raised this issue again. This study clarifies the meaning of *πρηστήρος αὐλός*, as well as the word *πρηστήρ*, on the basis of examination of all known occurrences of this word. The study excludes the meaning “bellows”, the meaning “lightning” is confirmed rather for the late texts, the basic meaning “tornado” is typical especially for authors dealing with marine navigation and meteorology. *Πρηστήρος αὐλός* is the funnel of a tornado. Based on current knowledge of meteorology (with regard to the Greek region), it is also explained why a tornado was often seen as fiery.

**Keywords:** *Anaximander, prester, presteros aulos*

Mgr. Bronislav Stupňánek  
Katedra filozofie FF MU  
Arna Nováka 1, 602 00 Brno  
63652@mail.muni.cz

