

How do We Know the Ancient Slavs also Knew Gnomons?

==== Tomislav Bilić =====

Poskušal bom dokazati, da hipoteze o 'svetih trikotnikih, ki temeljijo na sončnem kotu', ni mogoče šteti za resno znanstveno trditev, ker se zdi, da ni podkrepljena z nobenim trdnim dokazom. Gre bolj za primer krožnega sklepanja, ki vključuje podporo ideji, da so stari Slovani vedeli za nagnjenost ekliptike, tako da kažejo na domnevni obstoj »svetih trikotnikov«, hkrati pa dokazujejo obstoj teh »svetih trikotnikov« z dokazovanjem, da so stari Slovani poznali vrednost poševnice. Izkazalo se je, da so sodobni raziskovalci preveč vneto interpretirali nekatere strukture, ki so bile v staroslovanskem kontekstu prikazane kot gnomoni. To se razkrije v podrobni analizi več teh »gnomonov«. Nazadnje je opaženo, da se študija »svetih trikotnikov« ne ukvarja niti s sodobno zgodovino znanosti niti s sodobnimi študijami mitov, s tistimi disciplinami, ki bi vpletenim raziskovalcem lahko zagotovile boljši pogled na teme, ki so se jim tako strastno predani.

KLJUČNE BESEDE: stari Slovani, starodavna astronomija, sveti trikotniki, sončni kot, gnomon, krožno sklepanje

I will attempt to demonstrate that the 'sacred triangles based on the solar angle' hypothesis cannot be regarded as a serious scientific proposition because it seems uncorroborated by any solid evidence. It is more an example of circular reasoning, which entails supporting the idea that the ancient Slavs knew about the obliquity of the ecliptic by pointing to the purported existence of 'sacred triangles', while also proving the existence of these 'sacred triangles' by demonstrating the ancient Slavs were familiar with the value for the obliquity. Certain structures portrayed as gnomons in ancient Slavic contexts are shown to have been overzealously interpreted by modern scholars. This is revealed in a detailed analysis of several of these 'gnomons'. Finally, it is observed that the 'sacred triangles' scholarship engages with neither the modern history of science nor modern studies of myth, the very disciplines that could provide the scholars involved with a better perspective on the subjects to which they are so passionately committed.

KEYWORDS: ancient Slavs, ancient astronomy, sacred triangles, solar angle, gnomon, circular reasoning

In a truly stimulating yet also admirably civil response to my paper on the 'sacred triangles' hypothesis (Pleterski 2021), Andrej Pleterski raises some interesting points in defence of this intriguing scholarly insight into ancient Slavic cosmological beliefs. In this paper, I seek to show why I believe his attempt is not fully successful, especially as concerns the significant question of how familiar, if at all, the ancient Slavs were with gnomons.

The paper should thus be viewed as a modest contribution to the apparently developing intellectual debate on the set of pertaining issues.

I generally do not see how my main thesis is challenged by Pleterski's response. In short, I have claimed that those adhering to the 'sacred triangles' hypothesis – specifically, those who introduce the notion of a “solar angle” into the discussion – have unwillingly fallen victim to circular reasoning. Indeed, their ‘proof’ the ancient Slavs knew about the obliquity of the ecliptic builds on the allegation that they displayed this knowledge while reifying the ‘sacred triangles’ across the landscape. Yet, at the same time they seek to substantiate the existence of the ‘sacred triangles’ by pointing to the ancient Slavs’ knowledge of the obliquity (Bilić 2020). To add weight to either claim, scholars subscribing to the ‘sacred triangles based on the solar angle’ hypothesis need to present proof that these claims are independent of each other, i.e., to show the ancient Slavs were familiar with the obliquity – with its quite peculiar value, more specifically – beyond the ‘sacred triangles’ framework. To the best of my knowledge, such proof has yet to be offered. For instance, no support can be found in narrative sources for the idea that the ancient Slavs knew about the obliquity, despite the reasonable expectation that such an apparently important feature in their cosmology would have left at least some trace in their narrative tradition.¹ However, Pleterski does not address this crucial issue in his response.

Turning now to more specific, yet still essential points, Pleterski questions my understanding of the difference between ancient and modern science, namely of astronomy (Pleterski 2021: 262). Yet, this is a misinterpretation of the *rigorousness* demanded by the modern history of science that should not be confused with *insensitivity* to the issues with which Pleterski and I are both concerned. The study of ancient science in terms of modern is today treated by majority of scholars in this field of study as an anachronistic approach (see, for example, the writings of Francesca Rochberg) and I am fully aware of the anachronism in approaching the former in terms of the latter.² Still, it is true that I did not discuss this question at any length in my paper.

Further, crucially, this familiarity with gnomons is relied on by Pleterski as a strong point in his argument concerning the ancient Slavs’ astronomical knowledge as regards this particular set of issues (Pleterski 2021: 264). In his response, Pleterski stresses the deductive nature of my approach, contrasting it with his own inductive reasoning, based on ‘hard evidence’. While delivering some sort of *coup de grace* to my criticism, he somewhat misleadingly finishes his response (introducing it with “[f]inally: some concreteness”) with the following bold statement:

“We [Pleterski & Mareš 2003] also represented two preserved gnomons and traces of the other two in the ancient Slavs (Pleterski & Mareš 2003: 18–24). In *The Cultural Genome*, I additionally show traces of two gnomons (Pleterski 2014: 205–207, 211), while in my most recent publication I add

¹ Cf. Kale 2012: 388, who raises this objection to the role of Mokoš in the ‘sacred triangles based on the solar angle’ idea.

² See Bilić 2021: 5–6 (with literature).

four more gnomons (Pleterski 2020: 267–271). No further accumulation of gnomons seems necessary”.³

Indeed, if Pleterski is right, we may declare the matter settled (as concerns the ancient Slavs’ use of gnomons, not the entire question of the ‘sacred triangles’). Yet, is he actually correct? One thing that instantly draws the reader’s attention: Pleterski only cites his own papers as corroborating evidence for his own assertion (Pleterski 2014; Pleterski 2020; Pleterski & Mareš 2003). Of course, he might simply be doing this to keep matters concise. Still, he could have supported his claims in the works he published earlier, the very ones that he cites. This is manifestly not the case as anyone making an effort to track these references down will soon discover. The references Pleterski cites are as a rule reports of archaeological excavations to which he adds his own interpretations. Any supporting literature he cites stems from the domains of linguistics and ethnographic studies of Slavic myth, without seeking to engage with modern studies of the history of science, or myth generally.⁴ What we basically have here is an author trying to support the existence of ancient Slavic gnomons with his own interpretations of various structures that he believes may be representing the gnomons of the ancient Slavs. This is surely not enough to refute my main complaint concerning the ‘sacred triangles’ hypothesis, i.e., the unwitting use of circular reasoning (Bilić 2020: 50). Quite the contrary, it is yet another example of this fallacy in the ‘solar triangles’ scholarship.

To start with, one should briefly discuss what a gnomon actually is: a multi-purpose, yet simple astronomical instrument whose main component is an upright object that casts a shadow. With a gnomon it is possible to determine the local noon, the north–south line (meridian), the (approximate) date of the solstices and (more controversially in practice) the equinoxes, the (approximate) value for the obliquity of the ecliptic, the latitude of the observer, the solar azimuth (including the solstitial sunrise/sunset azimuths), the time of day (most efficiently achieved when the gnomon of a sundial is placed parallel to the earth’s or celestial axis, i.e., when inclined at an angle equal to the latitude of the observer) (Coupric 2011: 28–41, 79–81). I note that Coupric’s definition of a gnomon’s functions is generously inclusive, and that perhaps many historians of science would not agree with the charitable view he holds of the ancient practitioners of astronomy, including those who actually used gnomons. Moreover, these uses of a gnomon are, naturally, theoretical, given that in practice one can use it in any or all of the ways listed above. Nevertheless, while discussing a particular object or structure that one contends is a gnomon, any author should define this instrument’s function in the context being studied within the framework of gnomon usage. This seems to have never been done with the Slavic ‘gnomons’, as will become clear in the following analysis.

One may ask: in which way are the Slavic ‘gnomons’ actually gnomons? Pleterski, in the first paper he cites, one that he wrote along with Mareš, states that he could recognise

³ Pleterski 2020: 265. The end of the first sentence is more meaningful in Slovenian: “Prav tako tam predstavlja dva ohranjena gnomona in sledove drugih dveh pri starih Slovanih” (Pleterski 2020: 260).

⁴ On this characteristic of the ‘sacred triangles’ scholarship see more below.

a gnomon in what excavators had identified as a baptistery (Pleterski & Mareš 2003: 20), in fact, a funnel-shaped pit less than 1.5 m deep inside the present Church of St Peter and Paul at the Vyšehrad castle in Prague (Pleterski & Mareš 2003: 19–20). The authors believe the excavators are in error (Pleterski & Mareš 2003: 20) and connect the pit with the ‘Devil’s Column’, a three-piece 7-m-tall stone column that currently sits in a nearby park but which, according to our earliest source, stood in 1609 in the cemetery nearby (ca. 250 m away) at the Church of the Beheading of St. John. It was only later placed inside the St Peter and Paul’s Church (Pleterski & Mareš 2003: 21). An earlier hypothesis proposed by an amateur researcher, who saw in the column “eine altslawische Säule zum Zweck des Zeitmessens”, but which has been rejected by modern scholars, was revived by Pleterski and Mareš (2003: 21).⁵ With little supporting evidence, they transferred the mentioned column from its attested setting and planted it in the “baptistery” pit (Pleterski & Mareš 2003: 21–23). They interpret this construction as a gnomon, yet not one that forms part of the “sacred solar triangle” they claim exists in the Prague area (Pleterski & Mareš 2003: 25–26), while its actual function is also never explicated.

On pages 23 and 24, they mention certain additional “ancient Slavic cult columns”, presumably the other “gnomons” that Pleterski refers to while responding to my paper. Pleterski subsequently repeats and somewhat updates the compelling story of this “gnomon” (Pleterski 2014: 226–232), but still without discussing the use of this ‘gnomon’ as a *gnomon* at the Vyšehrad castle. In this interpretation, it is merely an upright column serving the same purpose as another landscape point that is now occupied by a church (a rotunda of St Martin), even though previously a completely hypothetical ‘gnomon’ also apparently stood there, whose existence is not supported by any evidence (Pleterski 2014: 232–233). It does not therefore seem justifiable to admit this ‘gnomon’ at St Martin’s as evidence of the ancient Slavs being familiar with the instrument, given that its existence was initially hypothesised in order to support the very interpretation that Pleterski himself advocates.

Pleterski also refers to two further gnomons in his book *Kulturni genom*. The ‘gnomon’ he describes here (Pleterski 2014: 205–207) is a mound found near Cracow (*kopiec Krakusa*) with a pillar at the top – or successive stone pillars/a tree/a wooden cross atop a successive mound of layers – which is interpreted, with little solid evidence, as “[t]ak navpičen steber lahko koristno uporabimo kot orientir in kot gnomon za opazovanje ter merjenje gibanja sonca” (Pleterski 2014: 207). The other ‘gnomon’ mentioned here is presumably a stone pillar on a mound called *kopiec Wandy*, some 9 km in distance from the Cracow mound (Pleterski 2014: 209).⁶ However, the extensive archaeoastronomical analysis of the mounds that follows does not discuss these structures’ function as *gnomons* (Pleterski 2014: 212–215). Both ‘gnomons’ are merely points of a “sacred triangle” (apparently defined by an angle of 28.5°, one that does not correlate with the value for the obliquity), with a third point that is not demarcated by any ‘gnomon’ at all.

⁵ The author in question is Miloš Josef Pulec, whose biography is quite colourful (see Wagner 2014); his idea was published in a tourist guide (Pulec 1960).

⁶ “Lahko da je bil to [kamniti steber] še zgodnjerednjeveški gnomon” (Pleterski 2014: 209). Pleterski eventually hypothesised the existence of another ‘gnomon’ at the *Babki Krakusa* mound next to the *kopiec Krakusa*, also without any supporting evidence (Pleterski 2014: 217–218).

The discrepancy between the angle of the obliquity and the angle that apparently defines the Cracow triangle is recognised by Pleterski: “Zakaj kot med gomilami z vrhom pri Vandini gomili meri kar 28,53°, kar nikakor ni velikost obrednega kota...” (Pleterski 2014: 215). The way in which he addresses this inconsistency is a good example of the overall method often used by those adhering to the ‘sacred triangles’ hypothesis. With the initial ‘sacred triangle’ not fitting with the general postulates of the hypothesis, he advances another set of points that he contends form the desired triangle (Pleterski 2014: 217–218). The fact that one of the points of this new triangle does not quite fit into this alternative set is explained away all too easily: “[t]orej je čisto verjetno, da cerkev sv. Vojteha ne stoji natančno na nekdanjem obrednem mestu, ampak ob njem” (Pleterski 2014: 218). Moreover, another point is also not located where it is supposed to be according to the postulates of the ‘sacred triangles’ hypothesis (the *Babki Krakusa* mound is used in measurements instead of the *kopiec Krakusa*) (Pleterski 2014: 216–217, 219).⁷ It seems that we cannot seriously speak of a ‘sacred triangle’ here, let alone a gnomon.

Finally, Pleterski refers to a further four ‘gnomons’ in his latest paper (Pleterski 2020: 267–271). He argues there that a posthole found on the Bled island once housed an upright pillar that served as a gnomon. While it was apparently used to determine (1) the date corresponding to the successive churches’ solar orientation, and (2) the buildings’ actual orientation, Pleterski does not attempt to explain *how* exactly this was accomplished with this hypothetical ‘gnomon’ (Pleterski 2020: 268). Whatever its precise function, this single posthole does not constitute solid evidence of the existence of a gnomon in a medieval Slavic context. The other three gnomons mentioned in this paper are introduced only in captions to the figures, including the Vyšehrad ‘gnomon’ (Pleterski 2020: 269–272, Figs. 10.22–26).

In light of all of this, can it still be maintained that the evidence presented by the scholars working under the ‘sacred triangles’ hypothesis is so robust and convincing to dispel any possible objection that might arise from the deductive standpoint? In my view, the ‘facts’ in this particular case are inadequate to support the conclusions these ‘sacred triangles’ scholars seem inclined to make. This does not mean that I question that the landscape is an important element in the study of our intellectual past, as Pleterski appears to imply (Pleterski 2021: 263) – quite the opposite, this is precisely what lies behind my attempt to question the validity of the ‘sacred triangles based on the solar angle’ hypothesis. I also do not question the presence of upright columns and other objects in the ancient Slavic landscape and/or cultic arrangements, but I do insist on solid proof that these structures may be interpreted as gnomons.

In conclusion, I believe the issue of what the ancient Slavs knew about the obliquity deserves a more studious investigation, primarily, but not exclusively, in dialogue with the modern history of science. In carefully chosen words, Pleterski maintains that I do not truly understand the ancient Slavs’ mind-set and that I have confused it with the Greek (= Western scientific) ‘mentality’ (my paraphrasing of Pleterski’s claims made on p. 262 in Pleterski 2021). This appears as an easy dodge of the difficult questions I

⁷ Pleterski is aware of these inconsistencies, but does not seem to address them: “Natančnost umestitve točk, ki sem jih uporabil pri meritvah, *razen* gnomona v Krakovi gomili...” (Pleterski 2014: 218, my italics).

have raised in my assessment of the ‘sacred triangles’ hypothesis.⁸ One should always be wary of bold statements like “[s]etting an angle of 23.5° according to the principles of imitative magic ensures a natural balance of the seasons’ proper course” (Pleterski 2021: 262), especially when they are not supported by solid evidence. The reconstruction of the ancient Slavs’ astronomical insights, I strongly believe, demands the same level of scrutiny, epistemological and otherwise, as that of any other ancient tradition, including Greek, with no shortcuts in the form of ‘special insights’.

A related issue urgently in need of addressing concerns the relation of ‘sacred triangles’ idea with the modern study of myth, which is all but ignored by those who adhere to this approach.⁹ Pleterski’s assertion that “when quoting, I personally adhere to the principle of *less is more*” (2021: 262, his italics) seems programmatic for this method. Still, using and, where appropriate, quoting the key modern works in this burgeoning field of study might be worthwhile for scholars who study myth with such commitment.

Leaving our comfort zone is sometimes the only way forward. However, seeing faults in a paradigm that one passionately subscribes to, an interpretative framework that one personally helped to develop almost *ex nihilo*, cannot be an easy task.¹⁰

BIBLIOGRAPHY

- Bilić, Tomislav, 2020: Mit o “svetim trokutima” temeljenima na “sunčevom kutu” – analiza “astronomije” ranih Slavena. *Studia mythologica Slavica* 23, 35–50.
- Bilić, Tomislav, 2021: *The Land of the Solstices: Myth, geography and astronomy in ancient Greece*. Oxford: BAR Publishing (BAR International Series 3039).
- Coupric, Dirk L., 2011: *Heaven and Earth in Ancient Greek Cosmology. From Thales to Heraclides Ponticus*. New York: Springer.
- Gamkrelidze, Thomas V.; Ivanov, Vjaceslav V., 1995: *Indo-European and the Indo-Europeans: A reconstruction and historical analysis of a proto-language and a proto-culture*. 2 vols. Berlin: Mouton de Gruyter (Trends in Linguistics. Studies and Monographs 80).
- Kale, Jadran, 2010: Kamo idu hrvatske zvijezde? In: Marjanić, Suzana; Prica, Ines (eds.), *Mitski zbornik*. Zagreb: Institut za etnologiju i folkloristiku, Hrvatsko etnološko društvo, Scarabeus-naklada, 379–392.

⁸ “To make clear below that Bilić’s critique is totally mistaken, I must first highlight some of his quiet theoretical assumptions... of which he may not even be aware, but which I can conclude from his method of argument, which is distinctly deductive and neglects empiricism in relation to the ancient Slavs... Bilić emphasises the ancient Greek tradition as the origin of modern astronomy, and as a decisive question, how the supposed knowledge of the ancient Slavs – of the relatively accurate value of the obliquity – fits into the knowledge of the modern history of the science that speaks of the development of comparable knowledge in the Greek tradition... The tenacity of Bilić’s reasoning is only apparent... An angle of 23.5° can be placed in the landscape even if we have no knowledge of the value of the obliquity of the ecliptic... The ancient Slavs did not need to know Eratosthenes, Hipparchus, or how to calculate angles...” (Pleterski 2021: 262, my italics). On the now-abandoned concept of “mentalities”, see Lloyd 1990 (admittedly, Pleterski only implicitly adheres to this concept).

⁹ See a selection of modern literature on myth in Bilić 2020: 44 n. 36.

¹⁰ “The older generation is usually unwilling to part with old ideas and views, preferring to continue working, as it were by inertia, within the traditional and therefore more familiar paradigm even when weak and contradictory points of that paradigm become obvious” (Gamkrelidze & Ivanov 1995: 1.857).

- Lloyd, Geoffrey Ernest Richard, 1990: *Demystifying Mentalities*. Cambridge: Cambridge University Press.
- Pleterski, Andrej, 2014: *Kulturni genom: Prostor in njegovi ideogrami mitične zgodbe* (Studia mythologica slavica - Supplementum 10). Ljubljana: Založba ZRC, ZRC SAZU.
- Pleterski, Andrej, 2020: Mitična pokrajina. Preizkusi njenega obstoja z napovednima modeloma na primeru Bleda / A mythical landscape. Tests of its existence with predictive models for the Bled case. In: Štular, Benjamin (ed.), *Srednjeveški Blejski otok v arheoloških virih / Medieval archaeology of Bled Island* (Opera Instituti archaeologici Sloveniae 42). Ljubljana: Založba ZRC. 235–277.
- Pleterski, Andrej, 2021: Tudi stari Slovani so poznali gnomone / The ancient Slavs also knew gnomons. *Studia mythologica Slavica* 24, 257–264.
- Pleterski, Andrej; Mareš, Jiří J., 2003: Astronomische Grundlagen einiger frühmittelalterlichen Kultstellen in Praha. *Studia mythologica Slavica* 6, 9–35.
- Pulec, Miloš Josef, 1960: *Vyšehrad*. Praha: Sportovní a turistické nakladatelství.
- Wagner, David František, 2014: *Miloš Josef Pulec a Starokatolická církev*. Diploma thesis, Universita Karlova v Praze.

KAKO ZNAMO JESU LI I DREVNI SLAVENI POZNAVALI GNOMON?

TOMISLAV BILIĆ



Ideja o “svetim trokutima baziranima na solarnom kutu” ne bi se trebala tretirati kao ozbiljna znanstvena hipoteza, jer se ne čini poduprta čvrstim dokazima. Riječ je zapravo o primjeru cirkularne argumentacije, gdje se poznavanje oblikviteta ekliptike kod starih Slavena podupire navodnim postojanjem “svetih trokuta”, dok se istovremeno postojanje “svetih trokuta” dokazuje poznavanjem iznosa oblikviteta od strane starih Slavena. Pokazalo se da su strukture opisane kao gnomoni u staroslavenskom kontekstu zapravo odraz previše gorljivih interpretacija suvremenih istraživača. Taj zaključak izveden je iz detaljne analize određenog broja tih navodnih gnomona. Naposljetku, istraživači koji se bave proučavanjem “svetih trokuta” ne ulaze u dijalog sa suvremenom povijesti znanosti, kao niti sa suvremenim izučavanjima mita, dakle upravo onim disciplinama koje bi im, kao gorljivim istraživačima upravo takvih tema, mogle ponuditi jasniju perspektivu o promatranjoj materiji.