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THE PROTO-INDO-EUROPEAN VOWEL SYSTEM FROM THE TYPOLOGICAL POINT OF VIEW

SUMMARY

In this paper I examine the proposed reconstructions of the PIE vowel system from a typological point of view. It is argued that the monovocalic or vowelless systems are improbable, because no such systems are attested in the languages of the world. On the other hand, the maximalistic view of the PIE vowel system is equally unacceptable, because the alleged instances of PIE *a can be explained away as containing *h_2, and the PIE long vowels *e and *o are best treated as short *e and *o with the additional suprasegmental feature of length. However, the most usual phonetic interpretation of the ablauting PIE vowels *e and *o is not convincing, because there are no languages containing /e/ and /o/ but no /a/. Although the final solution of this problem is not offered, it is argued that it would be possible to interpret PIE e as /a/, and * PIE *o as /∂/ to achieve a typologically plausible reconstruction of the PIE vowel system.

Key words: *Proto-Indo-European, vowel system, phonetic typology*

After almost two centuries since Bopp's pioneering works, the Indo-European linguistics has still not reached the consensus about the number and the phonetic interpretation of the PIE vowel segments. The number of PIE vowels suggested in the literature varies between zero[1] and the Brugmannian ten-vowel system. The proponents of the no-vowel theory are rare, but their works still appear now and then (e. g. Kacnel'son, 1989). However, this theory, as well as its offspring, a "one vowel theory", has been successfully refuted by taking into account the observations of the linguistic typology: there are no languages without vowels or with a single vowel. Although this fact has been sometimes disputed, it was established already by Trubetzkoy, and applied in discussions concerning the PIE vowel systems by Jakobson, Szemerényi (1967), and others. As typological reasoning will be very prominent in the rest of this paper, I would like to stress two points concerning the use of typology in linguistic reconstruction at this moment: first, it is not <u>impossible</u> that the PIE vowel system contradicted the established linguistic universal about vowel systems. It is possible that PIE had only one, or no vowels, but this reconstruction is improbable, due to a simple argument: it is empirically established that, for whatever reason, natural languages never have less than two vowels; PIE was a natural language; therefore, it probably had at least two vowels. Secondly, typological considerations can never tell us which particular reconstruction is the right one: it can only teach us which reconstructions are utterly improbable, i. e., probably wrong. In this sense, we can speak of a "typological filter", which should be used in evaluating theories in comparative linguistics.

The maximalistic view of the PIE vowel system, expressed in the handbooks of Szemerényi (1989) and Mayrhofer (1986) attributes to PIE a typologically very well attested five-vowel system akin to that of Classical Latin, with a length contrast:

$$
\begin{array}{cccc}
i & u & \bar{\imath} & \bar{u} \\
e & o & \bar{e} & \bar{o} \\
 & a & & \bar{a}
\end{array}
$$

According to Maddieson (1984) the qualities of the vowels assumed in this table are the most common in the languages of the world. The trouble with this reconstruction, however, is that it has to rely on a small number of very doubtful reconstructions on the basis of which PIE *a and *ā are established. I shall not go into details here, but I must say that I hold that neither existence nor non-existence of PIE *a are self-evident truths. However[2], the communis opinio nowadays seems to be that PIE had no vowel *a (and no *ā), and I shall take this, so to say, for granted. Those who disagree with me are asked to accept my supposition for the sake of the argument, and to look for the argumentation against PIE *a in a paper by Alexander Lubotsky (1989), where almost all of the PIE roots with a proposed PIE a are shown to have *a contained $*h_2$. We are left, then, with a four-vowel system with a length contrast, i. e.

i u (ī ū)
e o   ē ō

Now, the problem with this system is that it is again typologically unattested, or extremely rare. In the databases of phonological systems of Maddieson (1984) and Ruhlen (1978) I have been able to find only <u>one</u> language with a four-vowel system distinguishing exactly those vowels, namely Arapaho, an Algonquian language which is very near to extinction. Of course, I cannot check the data upon which this particular analysis of Arapaho vowels is made, but I think that it has to be taken *cum grano salis*, and that we have a strong reason to doubt that such a system could ever persist through a longer period of time (from Ruhlen's book I learn that another dialect of Arapaho has a significantly different system.). The impossibility, or extreme scarceness of such a system is a consequence of a typological universal⸺or quasi-universal⸺noted by Crothers, Maddieson and Lindblom[3], among others, that all languages of the world have the vowel /a/, exactly the vowel we are denying to PIE. If all languages must have /a/, then PIE had to have *a as well. Well, not quite. Firstly, the generalization should be stated as follows: no language can persist for a long period of time without having at least one low vowel. For various reasons, a temporary state of affairs can occur, as it seems to have occured in Arapaho, in which a low vowel is missing, but this "hole in the system" is always filled rather quickly. Besides that, there are languages which do not have /a/, but which have more than one low vowel. This is particularly characteristic of Finno-Ugric and Altaic languages with their vowel harmonies, which require of all vowels to be either front or back, but among front and back vowels in those languages at least one is always low (e. g. Hungarian does not have /a/, but it has / å / and /a:/ which are both [+ low]; Karakalpak, Karelian and Kazakh have / æ / and /å / etc.).

Another problem concerns the interpretation of PIE *i and *u. It is very often assumed that these sounds were not vowels, but only syllabic allophones of the resonants *y and *w. It has been known for a long time that *i and *u form a natural class with the vocalic allophones of the resonants *r, *l, *m and *n, because they represent the zero-grades of the diphthongal roots containing *y and *w, but it is not easy to see immediately why they should not be counted as vowels with non-syllabic allophones rather than vice-versa. As was pointed out by Francisco Villar, "the fact that /i/, /u/ do not alternate within roots, suffixes and endings does not prove that /i/ and /u/ were not vowels, but merely that not all the vowels alternated" (1993:144).

There might, indeed, be some reconstructed PIE roots containing *i and *u for which no full grade has been preserved[4], but this is largely irrelevant to the question whether to count *i and *u as vowels or as resonants. The best solution is to accept that *i and *u are consonants in PIE, and this, in my opinion, follows from the fact that *i and *y, and *u and *w, respectively, have

the same underlying feature specifications and are distinguished only by their position within the syllable[5] (cp. Matasović, 1997): the syllabic resonants could occur only in the nucleus of a syllable, never in the onset or in the coda, whereas the non-syllabic resonants could occur in the other positions within the syllable. However, when syllabic resonants occur in the reconstructed PIE lexicon, they occur in the zero-grade of syllables, for which underlying vowels in their nuclei must be posited. That is to say, the syllabic resonants, occurring in the morphologically determined zero-grades of morphemes, could be associated only with that position on the skeletal tier, which was <u>not</u> associated with the syllable nucleus in the lexical representation of the morpheme. The consequence of this is that in each case when a syllabic resonant occured in the derivation, there was also a vowel (*e or *o) which had been left unassociated; for example, in the PIE passive participle*bʰr̥to- "carried" (OInd. *bhr̥ta-*) the underlying representation of the first syllable includes a vowel, which was lost in the derivation:
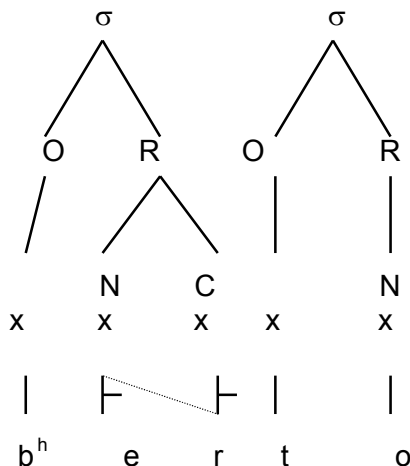
That is to say, in every case where a PIE morpheme occurs with a syllabic resonant, in the lexical representation of that morpheme there is a vowel (*e or *o) immediately preceding or following that resonant, and that vowel had been unassociated with the segment of the nucleus to which the resonant is associated, during the phonological derivation of the surface phonological representation[6]. In this lies the difference between the system of resonants in PIE[7] and the similar systems of Kartvelian and Afro-Asiatic languages. In Proto-Kartvelian, for example, /er/ alternates with /r̥/, as in PIE, but also with /ri/ and even /r̥i/ (Colarusso, 1981:490ff). From the distribution of the resonants and vowels we see that in Proto-Kartvelian /i/ can occur <u>underlyingly</u> in the same position as the other vowels, and that therefore it should be treated as a vowel. In PIE, as we have seen, /i/ and /u/ are underlyingly never in the nucleus, but can only be attached to the nuclear position by the re-syllabification rules in the

derivation of the surface representation. In order to see whether the remaining vowels, *e, *o, *ē and *ō can be reduced to a simpler system, we must now look at their distribution. In the following table, I have tried to choose the reconstructed forms with respect to which there is general agreement.

THE DISTRIBUTION OF PIE VOWELS

under accent

unaccented

PIE *e

*e in the first syllable   *k'léwos "glory" (Gr. κλέος)   ?only when initial
                *bʰére "carry", ipv. (Gr. φέρε)   *eg'h₂óm
                                (Ved.

ahám)

*e in the medial syllable   *ph₂térm̥ "father" (acc.)   *kléwesos "of glory"
                (Gr. πατέρα)   (*Ved.

śrávasas)

*e in the last syllable   *mn̥teys "of thought"   *bʰérete "you (pl.)
                (Ved. *mates*)   carry",

Gr. φέρετε

initial *e-   *ey "those" (Lat. *ī*)
    *eg'h₂óm "I"

                            Ved.

ahám

final *-e   *widmé "we saw" (pf.)   *bʰérete "you (pl.)
                 carry", *-kʷe "and"

PIE *o

*o in the first syllable   *g'onu "knee" (Gr. γόνυ)   *podós "of foot"
                *potis "master" (OInd. *pati*-)   (Gr. ποδός)

*o in the medial syllable   *yugóbʰ(y)os "to yokes"   *bʰeromes "we
                (Ved. *yugébhyas*)   carry"
                                (Gr.

φέρομεν)

*o in the last syllable   *podós "of foot"   *k'léwesos
                *yugóm "yoke" (Gr. ζυγόν)   "of glory"

                            *nébʰos
"cloud"

(Gr. νέφος)

*initial *o-*   ?
       ?*ok'téh₃ "eight"

       (Gr. ὀκτώ)

*final *-o*   ?   *bʰéreto "was

       carried" (Gr.

       ἐ–φέρετο

PIE *ē

ē in the first syllable   ?*stēwti "he praises"   ?
                                      (OInd. *stáuti*)

ē in the medial syllable   ?   ?*bʰérēte (2. pl.
                                                                              subj.

pres.)

                                                                              "carry"

ē in the last syllable   *ph₂tér "father"   *méh₂tēr
                                      (Gr. πατήρ)

       "mother" (Gr.

                                                                              μήτηρ)

*initial *ē*   ?   ?

*final *-ē*   ?   ?

PIE *ō

ō in the first syllable   *póds "foot" (OInd. *pát*)   ?
                                      *bʰōr "thief" (Gr. φώρ)
                                   (only in monosyllables)

ō in the medial syllable   ?   ?*bʰérōmes
                                                                              (1.pl.

subj. pres.),

		Gr. φέρωμεν	
ō in the last syllable	*podṓm "of feet" (OInd. padā́m)*	*déh₃tōr "giver" Gr. δώτωρ)*	
*initial *ō*	?	?	

The analysis of the preceding table leads me to the following conclusions:

1. All PIE syllabic segments could bear the stress.

2. Both *e and *o could occur in the middle and in the end of a word.

3. Only *e could occur at the beginning of a word; the only PIE etymons that could have contained the initial *o- are the numbers "8", *ok'teh₃, and perhaps "1" *oywo-, *oyno- (Lat. *ūnus* etc.), but even in these cases, the interpretation with the initial *h₃- is possible; it should also be noted that the only words beginning with a vowel (*e) are either syntactic particles, prepositions, or pronouns.

4. Every syllable of the word (except the unaccented first syllable) could contain long *ē and *ō. However, if we do not accept the subjunctive present of thematic verbs to be a PIE formation, then the occurence of the long vowels is limited to the stressed initial and medial syllables, and the final syllables. With respect to long vowels, it should therefore probably be concluded that (1) their occurence is partially dependent on the stress, and (2) in PIE all vowels (i. e. both vowels) can be either short or long, whereas other segments (consonants and resonants) cannot be geminated, as is generally assumed. From this I conclude that vowel length is best treated as a suprasegmental feature, so that there is no need to suppose *ē and *ō as independent segments. Or, in autosegmental terms, long vowel segments are not needed in the lexical representation of a word, they appear in the derivation only.

I conclude, then, that PIE had a two-vowel system; such systems are rare indeed among the languages of the world, but they are attested in a linguistic area that has been proposed as a homeland of the Indo-Europeans, namely North Caucasus (Gamkrelidze & Ivanov, 1984); it is worth noting that Caucasus as a linguistic area shares other linguistic features with the reconstructed PIE (Colarusso, 1981; Matasović, 1993)[8].

However, to establish the number of contrasts in a proto-language is not the same thing as to interpret the reconstructed segments in phonetic terms. Linguistic reconstruction should be viewed as a procedure constisting of several logically independent steps (Matasović, 1996), and the next step for us is to try to reconstruct the phonetic content of the reconstructed vowels traditionally labeled as *e and *o. To stick to the tradition and interpret *e as /e/ and *o as /o/ seems impossible, again for typological reasons. Namely, typology teaches us

that two-vowel systems are <u>linear</u> systems in which the relevant oposition is between a low and a high vowel, and not between a front and a back vowel[9], as should be the case in PIE. As a noted caucasologist John Colarusso has stated, "the PIE system e / o is typologically <u>utterly</u> bizarre" (1981:499). Or, to quote another authority, Allan Bomhard (Bomhard & Kerns, 1994:76), "Perhaps the most typologically unusual thing about the PIE vowel system as traditionally reconstructed is the great importance of the *e / *o ablaut and the concommitant marginality of *a".

The idea that PIE *e and *o should be interpreted differently is not new. It goes back to Edwin Pulleyblank's article in 1965, where it was argued that PIE *e was phonetically /∂/, while *o was /a/. This is also the opinion of William Schmalstieg, and a similar view was expressed recently by Francisco Villar (1993), who holds, nevertheless, that the correct reconstruction is PIE e = /e/, and PIE *o = /a/. The main reason for such an interpretation is that, in many languages, PIE *o yields a vowel, which is phonetically /a/, so that Villar and others suppose that in Balto-Slavic, Germanic and Anatolian no change ever occured, and that they preserved the phonetic properties of PIE *o = /a/; according to this theory, /o/ and /a/ were never distinguished in those IE branches. However, this view is probably incorrect for Balto-Slavic. In Baltic generally, and in Latvian even today, PIE *o and *eh₂ have been kept distinct, whereas *o and *h₂e have merged, but, as it appears, not without a trace. If Winter's law is to be accepted, as I think it is, it seems that PIE *o and *h₂e were still distinct at the time of the operation of the law, because PIE *o before voiced stops yields *o in Baltic, and *h₂e yields Baltic *a (cf. PIE *dodh₂mi "I give" > Lith. *dúomi*, whereas PIE *h₂eg'yos "goat" > Lith. *ožys*, *h₂eph₃ōl / *h₂eph₃lo- "apple" > Lith. *obuolys*).

Most accounts of Anatolian historical phonology give no evidence of a former distinction of /a/ and /o/ in that branch, but this might be due to the fact that Anatolian languages were written with the help of rather ill-suited writing systems, and that /o/ and /a/ were not distinguished in Akkadian and Sumerian, the languages originally written with the cuneiform script. One must also mention that at least one authority on Anatolian, H. Craig Melchert, holds that Proto-Anatolian distinguished both long and short /a/ and /o/ (Melchert, 1993). Therefore, I conclude that there are no compelling reasons to interpret PIE *o as /a/[10].

In order to interpret the traditional PIE vowels correctly, we must see how the vowels /a/ and /∂ / behave cross-linguistically, in particular in those languages in which these are the only vowels. The following observations are relevant:

1. /a/ is more common cross-linguistically; in most systems, it is the least marked vowel, and as such it has the highest frequency of all vowels (see the frequency tables for various languages, e. g., in Greenberg, 1970:67ff). In his 1989 paper, Greenberg points out that, typologically, /a/ is usually more functionally loaded than other vowels (Greenberg, 1989:13); that is, /a/ occurs in

a greater number of morphological categories in the given language. In Indo-European, the less marked vowel seems to be the traditional *e; it is difficult to see the relative frequency of *e and *o in PIE, but a statistics based on Pokorny's dictionary (Matasović, 1992), although not very reliable, shows that the frequency of *e is by far greater than that of *o. PIE *e also seems to be more functionally loaded, as it appears in the basic morphological categories, whereas *o seems to appear in the derived categories (perfect, causative etc.).

2. In many languages, /∂/ is usualy the "default vowel" used to break difficult consonant clusters; of the more familiar languages in which this is the case, we can mention French and German, but /∂/ also has this function in the NW Caucasian languages (see Lomtitadze, 1967 for Abkhaz and Abaza). Thus, in the Abkhaz word for "tongue" both *b∂z* and *bz∂* are possible pronunciations. It has been noted that in PIE *o sometimes appears as a "breaker" of impossible consonant clusters; thus, roots of the form CVC containing two aspirated stops, or a voiced stop and an unvoiced stop do not have the zero-grade, but they do have an o-grade in exactly the same morphological categories in which the zero-grade is expected. Thus, there is no zero-grade of the roots *b^{h}ed^h - "dig" (Lith. *bedu* Lat. *fodiō*), *d^{h}eg^{wh}- "burn" (Proto-Slav. *žegoN* Lat. *foveō*), *ped- "foot" (Gr. πούς, Lat. *pēs*)[11], etc., but all those roots have *o-grades. It seems, then, that if there was a "default vowel" in PIE, it was *o, not *e (see Gamkrelidze & Ivanov, 1984:153ff.). This is very similar to the view, expressed by Beekes (1985:195ff), that PIE o-grade was in some sense equivalent to the zero-grade.

3. It is usual for /∂/ to have a very limited distribution; in many languages, including Abkhazian and Abaza (also in French), /∂/ cannot appear word-initially (Lomtatidze, o. c.); in PIE, it is *o that seems not to occur word-initially, whereas *e can occur at the beginning of pronouns, particles and prepositions.

4. One of the criteria for markedness in phonology is that unmarked phonemes typically have more allophones than their marked counterparts (see Croft, 1993:70). In NW Caucasian languages, it seems that /a/ has the widest allophonic variation, although the data are very difficult to analyze[12]. In PIE, it is *e, not *o that is affected by the adjacent laryngeals (at least, that is the majority opinion). Thus, *h$_2$o and *oh$_2$ give the same reflexes as *o and *ō respectively.

The preceding arguments seem to imply that the correct interpretation is that the traditional PIE *e was phonetically /a/, whereas *o was /∂/. This interpretation is then exactly the reverse of Pulleyblank's, Schmalstieg's, and, to some extent, Villar's proposal. It requires us to change our views about the development from PIE to the attested vocalic systems. The cause of the thorough rearrangement of the PIE vowel system lies in two processes that had started already during the PIE period: the reduction of the role of ablaut in morphology, which brought about phonemic /i/ and /u/ in all IE languages, and the loss of the laryngeals. It is generally agreed that *h$_2$ was lost before final *-m (after *e) already in PIE (Mayrhofer, 1986); this is the so-called "Stang's law". After the loss of the other laryngeals in the individual languages, the original phonetic

value of *e was retained only in the position in which it had been adjacent to *h$_2$. In other positions, the allophone that had occurred adjacent to *h$_1$ was generalized, so that /e/ became phonemic.

Finally, we must ask ourselves—what do we gain and what do we lose with the proposed reinterpretation of the PIE vowel system. We clearly gain a system that is typologically in accordance with the behaviour of the linear two-vowel systems of the languages that share other, independently motivated areal features with PIE. We lose some naturalness in the diachronic derivability of the attested vowel systems, a great virtue of the traditional reconstruction. I certainly do not think all problems are solved by my argument, but I hope that I have shown to what consequences our suppositions lead; for those who remain unconvinced by my argument, the most natural thing to do is to take it as a sort of a *reductio ad absurdum* of the initial presuppositions, shared by many linguists today: that PIE had no vowel *a, and that *i and *u were only syllabic allophones of *y and *w.

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NOTES

[1] Such a system was suggested, e. g., for Early PIE by Lehmann in 1952 (1955). He claimed that early PIE had no vowels in the phonological sense, but only a suprasegmental feature called "syllabicity". He still thinks that "the earliest reconstructible stage" of PIE had no vowels, only "syllabicity" (Lehmann 1993b: 139), but he does not consider any typological parallels. Gamkrelidze (1966) reconstructed a monovocalic phonological system for Proto-Kartvelian, whereas Kuipers (1960) and Allen (1965) suggested that Kabardian and Abaza, respectively, were vowelles languages. The alleged "monovocalic" or "non-vocalic" nature of these NW Caucasian languages was refuted by Halle (1970) and Kumakhov (1973).

[2] A computer statistics of the roots contained in Pokorny's dictionary (Matasović 1992) shows that the roots that allegedly contained *a were not only much rarer than those containing *e, *i, *u etc., but that the average attestation of roots containing *a (i. e., the average number of languages containing a root with *a) is also significantly smaller; the average attestation for *e is 4. 7, and for *a 4. 0. The average attestation of roots

containing *o is smaller (3. 6), because only the roots containing "non-apophonic" *o were included as separate entries by Pokorny. Also, the roots counted as containing *a include also those that had doubtlessly contained *h$_2$, so the real average attestation for *a should be much lower.

[3] See Crothers 1978, Maddieson 1984, Lindblom 1986.

[4] To quote only the examples most often adduced in the literature (see, e. g., Mayrhofer 1986, or Szemerényi 1989): PIE *snusos "daughter-in- law" (Gr. νυός, OCS *snъxa) is probably from PIE *new- "new" with a s-mobile; PIE *wisos "poison" (Lat. *vīrus*, OInd. *viša-*) is from *weys- "flow" (OInd. *vešati*). In *wih$_1$ro- "man" (Lat. *vir*, Lith. *vyras*) the e-grade *weyh$_1$- is not attested, but it had certainly existed, because *wih$_1$ro- must be a zero-grade (the suffix *-ro- requests the zero-grade of the root); *ni- "down" (OInd. *ni-* etc.) is a Loc. sg. of the deictic *en (cf. Gr. • ni).

[5] For the autosegmental terminology employed here see Goldsmith 1990.

[6] One cannot suppose that the lexical representation of PIE roots contained a syllabic resonant, i. e. a zero-grade, because such a form would be ambiguous: e. g., PIE *wr̥g- could represent both *werg- and *wreg-; the fact that such forms are usually etymologically related (by the so-called "Schwebeablaut") does not change anything to the issue; we expect the lexicon to contain the full information about the morphemes before the morphological and phonological rules are applied to them; the lexicon does not contain etymological information.

[7] Note, however, that Diakonoff (1988:34) reconstructs a system of syllabic resonants (including syllabic laryngeals!) wholly parallel to PIE for Proto-Afrasian. A similar reconstruction of Proto-Kartvelian was proposed by Gamkrelidze (1966).

[8] According to Pulleyblank (1993:64) languages with "vertical vowel-systems" akin to that of the NW Caucasian languages, are attested in Australia and New Guinea as well. Szemerényi (1967) mentions Wishram, a Chinook language, as having a minimal vowel-system; Colarusso (1981) also mentions the Ndu languages of New Guinea; unfortunately, I cannot verify any data on these languages. Finally, a system typologically parallel to the one suggested here for PIE is Klamath, as described by Blevins (1993); in this language there are only two vowels, /a/ and /e/, whereas /i/ and /u/ are only syllabic allophones of /y/ and /w/. Blevins' analysis of Klamath is also important, because it implies that the NW Caucasian "vertical" vowel systems, opposing a low and a high vowel, are not the only possible two-vowel systems. On the other hand, the difference between Klamath and PIE lies in the view endorsed here that in PIE /y-i/ and /w-u/ could never appear in the nucleus underlyingly, but only in the derivation of the surface form by a re-syllabification process. This was not suggested for /y-i/ and /w-u/ in Klamath by Blevins.

[9] See, however, fn. 8.

[10] His evidence is drawn mostly from Lydian, which seems to have /o/ as the reflex of PIE /o/.

[11] Gr. ἐπίβδαι and OInd. *upa-bda-* are parallel formations, not zero-grades of this root. Cf. however, Kuryłowicz 1956 for a different opinion.

[12] See Klimov 1986, Kumakhov 1973, Kuipers 1960.

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INDOEUROPSKI SUSTAV SAMOGLASNIKA S TIPOLOŠKE TOČKE GLEDIŠTA

SAŽETAK

   U ovome se članku razmatraju do sada predložene rekonstrukcije indoeuropskoga samoglasničkog sustava s tipološke točke gledišta. Tvrdis e da su sustavi sa samo jednim samoglasnikom, ili čak bez samoglasnika, malo vjerojatni, jer u jezicima svijeta takvi sustavi nisu posvjedočeni. S druge strane, maksimalistički pogled na ie. samoglasnički sustav također je neprihvatljiv, jer se navodni primjeri s ie. samoglasnikom *a mogu objasniti pomoću laringala *h₂, a ie. duge samoglasnike *e: i *o: treba tumačiti kao kratke *e i *o s dodatnim suprasegmentalnim obilježem duljine. Pa ipak, najčešća fonetska interpretacija ie. prijevojnih samoglasnika *e i *o nije uvjerljiva, jer nema jezika u svijetu koji imaju /e/ i /o/, a da istovremeno nemaju /a/. Premda se ne nudi konačno rješenje razmatranoga problema, tvrdi se da bi bilo moguće protumačiti ie. *e kao /a/, a ie. *o kao /ə/, kako bi se postigla tipološki plauzibilna rekonstrukcija ie. samoglasničkoga sustava.

Ključne riječi: *indoeuropski prajezik, vokalski sustav, fonetska tipologija*