

ASPIRATION AND NATIVE BALTIC FORMS

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By curious coincidence, no trace of aspiration in native forms can be found in only two Indo-European language families. Tokharian and Baltic.[1](#)

This is striking when one considers that aspiration in the latter stages of the Indo-European protolanguage was a prominent feature. In a useful book, *Indo-European and the Indo-Europeans*, [2](#) one can readily see how pervasive the feature of aspiration was in Indo-European. The authors, T. V. Gamkrelidze and V. V. Ivanov, offer as their primary contribution thorough documentation for their glottalic theory which revises the traditional description of the Indo-European system of stops based essentially on Sanskrit and, with it, Grimm's Law. Yet on page 962 the authors despair over the lack of general acceptance of this theory. Since their glottalic theory eliminates the main objections on typological grounds to the old theory,[3](#) it would truly be a calamity if it were not universally accepted, especially since the real cause of its non-acceptance, I believe, involves, principally, transcription, not fact.

The traditional description of Indo-European stops looks like this:

p	t	k	k^w
b	d	g	g^w
bh	dh	gh	g^wh

The new description could be represented in the following way basically using the authors' symbols[4](#)

p(h)	t(h)	k(h)	k(h)^w
p'	t'	k'	k'^w
b(h)	d(h)	g(h)	g(h)^w

The authors tell us that 1. aspiration is allophonic, and 2. since one cannot successfully explain typologically the low occurrence of b versus the high one of bh with the traditional description, one needs to replace unaspirated voiced b, d, g, g^w with glottalized, obligatorily voiceless p', t', k', k'^w where p' is rare in languages known to have a glottalized series of consonants. Then they say that Armenian, Germanic, Hittite and, possibly, Tokharian are closer to Indo-European, that it was not they that deviated, but rather, all the others, including Sanskrit that had been the languages to have undergone profound changes.

All this, I believe, is true. But I suggest the following changes in notation for the new system to make it more palatable for traditionalists.

p	t	k	k^w
b^{'''}	d^{'''}	g^{'''}	g^{'''w}
bh	dh	gh	g^wh

In this way, we have a merely graphic fusion of the traditional and glottalic systems which I justify with the following remarks.

We can write p, t, k, k^w as unaspirated and bh, dh, gh, g^wh as aspirated, which conveniently reflects the majority of attestations of reflexes of all these allophones in the daughter languages of Indo-European as long as it is understood that these symbols arbitrarily represent selected allophones of p, t, k, k^w, b, d, g, g^w with or without the sometimes concomitant, redundant feature of aspiration which, if shown as it truly is, that is, fluctuating, would appear as Gamkrelidze and Ivanov might write them: p(h), t(h), k(h), k^w(h), b(h), d(h), g(h), g^w(h).

Since Gamkrelidze and Ivanov tell us that voicing and glottalization are incompatible, that is, that the features voiced/voiceless and checked/unchecked⁵ are mutually exclusive, I can see no harm in representing Indo-European glottalized stops as b^h, d^h, g^h, g^w when one refers to them in a general way. The good it does is that everyone, including traditionalists will recognize with far lesser impediment the forms they have been used to reading with the symbols b, d, g, g^w. The marking "h" will remind them that b^h, d^h, g^h, g^w are special units, not to be confused with palatal or palatalized b¹, d¹, g, g^{*}. and, therefore, are also subject to various changes like disappearance in the case of b^h, or eventual voicing through the procedure of prolongation of a sometimes concomitant vibration of the vocal cords on release, mentioned by Gamkrelidze and Ivanov to explain the more widespread change of Indo-European globalized stops to unaspirated voiced stops to unaspirated voiceless ones. Since glottalization precludes voicing, that is, does not provide a neutral environment for the feature voiced/voiceless, and since, therefore, that feature cannot be distinctive, it does not matter how one specifically notes it. Therefore, why not use the notations b^h, d^h, g^h, g^w which can be neither phonetic, nor phonemic, but only morphophonemic with either a general reference to Indo-European, or a specific reference to those Indo-European dialects which changed b^h, d^h, g^h, g^w to b, d, g, g^w? Especially since, similarly, in the end, if one uses Gamkrelidze's and Ivanov's p^h, t^h, k^h, k^w (or, as they prefer to write it, k^o), one must understand that they are also merely morphophonemic with the same general reference to Indo-European, but with a specific reference to Armenian, Germanic, Hittite, and, possibly, Tokharian, that is, to those Indo-European dialects which changed their p^h, t^h, k^h, k^o to p, t, k, k^w? In fact, with these specific references in mind, specialists could use either the symbols b^h, d^h, g^h, g^w or the symbols p^h, t^h, k^h, k^w similarly to the way that Gamkrelidze and Ivanov use alternating notations of non-glottalized stops as either *Teth- with reference to Indie and Greek or as *TheT- with reference to Italic and Germanic.⁶

Considering the changes of glottalized stops to either unaspirated voiced stops or unaspirated voiceless stops, it appears that glottalization is basically incompatible not so much with voicing as it is with aspiration. Thus, Indo-European stops no longer glottalized do not necessarily continue to retain their voiceless feature, but do necessarily continue to retain their unaspirated feature. This indicates that though the features voiced/voiceless and checked/unchecked (glottalized/unglottalized) are mutually exclusive and thus cannot be redundantly concomitant with one another, the features checked/unchecked (glottalized/unglottalized) and tense/lax (including aspirated/unaspirated⁷) are polar opposites. Yet, curiously, though this is so, the loss of either one of these polar opposite features can occur with compensative lengthening of a preceding vowel or syllable as it happened in the case of the st0d from lost glottalization of consonants in Danish or in the case, in Indo-European, of vowels lengthened via loss of a laryngeal, a segment marked primarily as aspirated.

The mentioning of laryngeals brings us to the immediate source of Indo-European's problems with aspirated and globalized segments and why glottalized ones were created. Though Gamkrelidze and Ivanov claim to have consulted regularly with Roman O. Jakobson who even wrote the foreword to their book, they were not fortunate enough to have sat several years in his classes where, from time to time, he would mention some off-hand ideas of his about "laws of implication" and "distinctive feature stratification". Had they been that fortunate, they would surely have noticed among all their examples that not one, single language with glottalization occurs without aspiration as well. They would have proposed, as I do now, that the existence of the feature checked/unchecked (glottalized/non-glottalized) necessarily implies the existence of the feature tense/lax (aspirated/non-aspirated). Since Jakobson makes scant reference, if any, to his concepts of "laws of implication" and "distinctive feature stratification" in his writings, his readers including Gamkrelidze and Ivanov, unlike his students, could not be expected to know where to look for clues to making statements of this kind.

To me, the problem of the laryngeals (the fact that there were three of them, each with special features, justifying their systemic representation among the obstruents of a latter stage of Indo-European as

p	t	k	k ^w
b	d	g	g
bh	dh	gh	g ^w h
H ₁	s	H ₂	H ₃) ⁸

was the ultimate source of the, what I call, laryngealization, that is, tense/lax-ing of Indo-European. This tense-lax feature started becoming dominant over the voiced/voiceless one generally and blurring its former distinctions which thus opened up a need for a new distinctive feature. To provide a better understanding of how all this came about, I offer the following scenario.

At a very early stage, Indo-European had the following, very standard-seeming system of phonemes displaying voiced-voiceless as a thoroughly consistent feature:

p	t	k
b	d	g
f	s	
v	z	g'
	m	n
	l	r
	i	u
	e	o
	a.	

g' = voiced velar fricative.

This more or less resembled the Modern Greek one minus the mellow sibilants *θ* (th), *δ* (dh). Possibly, to protect the voiced velar fricative, which typologically seem fragile in so simple a system, unlike Greek with additional *θ* (th), *δ* (dh), the labio-velars *k^w*, *g^w*, *x^w*, *g^{w'}* were added. Now the sound system looked like this:

p	t	k	k^w
b	d	g	g^w
f	s	x	x^w
v	z	g'	g^{w'}
	m	n	
	l	r	
	i	u	
	e	o	
	a.		

g' = voiced velar fricative.

The creation of the labio-velar series followed the natural drift of development of Indo-European obstruents of that time which was purely symmetrical. In one series it embodied each of those articulatory features, velarization and labialization, which respectively set the old extreme series, the velars on the one hand, and the labials on the other, apart from the old middle series, the dental one. But in doing so, it created a new middle series, a purely velar one from the old extreme one and set the following new trend in employing added, new features for purposes of emphasizing differences between various series, a trend which brought about the creation, ultimately, of globalized (checked) stops.

The labio-velar series replaced the pure velar series as the one marked by gravity. Both labio-velars and velars were marked as compact versus the diffuse labial and dental series. The velars were acute versus the grave labio-velars. This acuteness led to a sometimes concomitant palatalization of the velars to accentuate, to emphasize the differentness of the velar series from the labio-velar series. Though this palatalization, as Gamkrelidze and Ivanov say, was unstable, yet, I believe, it had a lot to do with drawing *i* into the orbit of compact-acute consonantism. In parallel fashion, and in keeping with Indo-European's increasing drift toward the symmetrical structuring of its sound system, *u* was also drawn into the parallel but opposing, rival orbit of compact-grave consonantism. Thus *i* as *y* and *u* as *w* became primarily marked as consonants in the following new scheme of Indo-European consonants:

p	t	k	k^w
b	d	g	g^w
f	s	x	x^w
v	z	g'	g^{w'}
m	n	y	w
	l	r.	

Naturally, in certain environments *y* and *w* functioned as syllables, that is, as vowels *i* and *u*. But they would be separated from following vowels by their corresponding consonantal forms serving as hiatus-breakers. Thus a sequencing of *Ti-a*, *Ti-u*

would become Ti-y-a, Tu-w-a. This was to become part of a general fixing of Indo-European syllabic structure as consonant-vowel, or consonant-vowel-consonant.

Since the labio-velar and labial series shared the feature of gravity versus the acuteness of the velar and dental series, since, specifically, labialness was common to both, it was natural that mutual influences developed and continued to develop between them. This is notable when one compares it with the lesser mutual influences noticeable between the velar and dental series which shared the general, but relative feature of acuteness, but otherwise no specific feature. The weakest members of both grave series were the fricatives f, v.

The trend toward mutual influencing of the grave labio-velar and labial series, a further reflection of the Indo-European general drift toward parallelism in its sound system, led toward the ultimate aspiration of f and v, and, later other sounds which finally resulted in the countering move of glottalization. At first f and v were velarized to fx, vg' in parallel fashion to the way x and g had been labialized to x^w, g' ^w with the following resulting Indo-European consonantal system:

p	t	k	k^w
b	d	g	g^w
fx	s	x	x^w
vg'	z	g'	g'^w
m	n	y	w
	l	r.	

Then, as part of this drift toward parallelism, the labial element of fx, vg changed from fricative to glide resulting in ^wx, ^wg' which represented merely the reverse ordering of their labio-velar counterparts, x^w, g' ^w. In all four sequences, ^wx, ^wg' , x^w, g' ^w , the mellowness of the labializing element,^w, was universal and ultimately prevailed over the stridency of the fricative elements, x, g. This extended to x, g' in the velar sequence. Once that happened and the fricative elements, x, g', all became essentially glides, it became too difficult to distinguish between voiced and voiceless (a trend which continued and brought on the creation of glottalized obstruents). This ultimately resulted in the general loss of phonemic voiced spirants-fricatives (including z which became an allophone of s). In this series we now had s and laryngeals ^wH, H, H^w, respectively, from ^wx, ^wg' , x, g; x^w, g^w, resulting in the following consonantal system:

p	t	k	k^w
b	d	g	g^w
^wH	s	H	H^w
m	n	y	w
	l	r.	

The new laryngeals, ^wH, H, H^w, united by the feature of aspiration, became the prevalent glides. As such, their functions grew and eventually included hiatus breaking. Parallel to the hiatus breaking of y and w in such sequencing as Ti-y-a and Tu-w-a, ^wH, H, H^w appeared in similar roles with the vowels e, a, o, so that we got the following new sorts of sequencing: Te-^wH-a, Ta-H-a, To-H^w-a. The respective connections between e and ^wH, a and H, o and H^w became fixed as those between i and y, u and w, so that in initial position all were used as on-glides resulting in initial rising diphthongs yi-, wu-, "He-, H^wo- Ha-. When this became universal, the syllabic structure of Indo-European became fixed as consonant-vowel (-consonant).

An extension of these developments was the respective fixing of the vowels e, a, o to specific types of syllables with e attached to syllables beginning with any labial sequence, o to syllables beginning with any labio-velar sequence including w (allophonically u), and a with any acute sequence. Since acute sequences made up the largest class, they eventually colored any e or o they followed into becoming a. Thus, with the exception of i and u (syllabic allophones of y and w) which could occur anywhere, e followed labials, o followed labio-velars, as long as both were nt)t followed by dentals or velars, and a followed or preceded dentals and velars. This resulted in the vowel system described for an early stage of indo-European by Gemkrelidze and Ivanov as

i u
 v

where V consisted of a, o, e as positional variants of one another, but in all positions opposable by i or u. This situation ended when, for morphological purposes, e was extended to sequences with k ^w, g^w, H*, w and o was extended to

sequences with p, b, ^WH, m. Then e and o became phonemic rendering the following total Indo-European sound system (with traditional notation of ^WH as H₁, H as H₂, H^W as H₃):

p	t	k	k ^W
b	d	g	g ^W
H	s	H ₂	H ₃
m	n	y	w
e	l	r	o. ⁹

With laryngeals extended beyond their original (labio)velar confines to the labial series (H₁), and with their growth in function as hiatus breakers and prothetics, their influence expanded until it affected the whole consonantal system of Indo-European. We now got aspiration, that is, the tense/lax feature, everywhere as a concomitant, redundant feature with all consonants giving us: p(h), b(h). m(h), s(h), n(h), l(h), k(h), g(h). y(h), r(h), k^W(h), g^W(h), w(h)¹⁰.

This continued until the tense/lax feature of this redundant aspiration of consonants began to absorb the distinctive functioning of the feature voiced/voiceless. Eventually, the distinctive opposition of voiced/voiceless was beginning to be blurred yielding results like Sanskrit pibá'ti 'he drinks' versus páli 'drinks', Latin bibō 'I drink' versus pōtus 'beverage', 'drinking'. This, I believe, was an outgrowth of continuing fluctuations between aspirated and unaspirated consonants of the same root with different results not only between Indo-European dialects but within branches of the same basic dialects, as, for example, with the root *dhabh- which could also be *dhab-: Russian dobroj 'kind', doba 'time', Latin faber 'artist', Armenian darbin from *dhabhro- '(black)smith', Lithuanian dabà 'nature', Latvian daba 'nature', dabāt 'be pleasing', labdabls 'good-looking', Gothic gadaban 'to suit' all from *dhabh- versus *dhab- in Old High German tapfer 'brave', German tapfer 'brave', Old Norse dapr 'sad', English dapper. These fluctuations of bh/b, etc. confirm the concept of only voiced/voiceless stops in Indo-European up to that time.

To offset this over-extension of aspiration, Indo-European, for its own internal reasons, I believe, probably now susceptible to neighboring South-Caucasian and possible Common Semitic influences,¹¹ developed glottalized consonants, first among the stops, to mark certain morphemes unmistakably. I believe that the appearance of glottalized phonemes might in every case indicate morphemes where ambiguities as to voicing/non-voicing and aspiration/non-aspiration (both concomitant features with one another) arose. The resulting sound system of Indo-European was now:

p(h)	t(h)	k(h)	k ^W (h)
b''	d''	g''	g'' ^W
b(h)	d(h)	g(h)	g ^W (h)
H ₁	H	H ₂	H ₃
m	n	y	w
e	l	rr	o.

which, for purposes of efficiency in notation, I characterize arbitrarily as

p	t	k	k ^W
b''	d''	g''	g'' ^W
H ₁	s	H ₂	H ₃
m	n	y	w
e	l	r	o.

In certain positions glottalization (the feature checked/ unchecked) extended to other sequences. Results of this are clearest where initial vowels occur. There, glottalization cancelled the aspirating quality of laryngeals giving us such forms in Lithuanian as aušti 'to dawn', élnis 'deer' from Later Indo-European *aus-, *eln- where no trace of a laryngeal's previous existence can be found anywhere in Indo-European languages.¹²

Once this happened, a became phonemic yielding the following Indo-European sound system:

a.¹³

p	t	k	k ^W
b''	d''	g''	g'' ^W
bh	dh	gh	

			g^{wh}
H₁	s	H₂	H₃
m	n	y	w
e	l	r	o

Now, in initial position, three vowel phonemes, a, e, o, could fluctuate which opened up new possibilities for vocalic morphophonemic alternations. Soon e and o also appeared in syllables with dentals and velar-palatals where once only a (i or u) could appear. Later, with the loss of laryngeals, that is, of the aspirational aspect of the tense/lax feature, compensative lengthening of preceding vowels occurred as it occurred in other environments where features in similar positions were lost including, possibly, glottalization.

De-aspiration, initiated, I believe, by glottalization in Indo-European, continued to progress to various extents in its dialects. In Anatolian it did not entirely eliminate the laryngeals where consonantal reflexes of them, h, hh, persisted in many positions. In Non-Anatolian it did eliminate the laryngeals as consonants. Specifically, in Celtic, Albanian, Iranian, Slavic, Lithuanian, Latvian, Prussian, and, evidently, Tokharian, aspiration was removed entirely from Indo-European bh, dh, gh, g^{wh}. In Albanian, Slavic, Lithuanian, Latvian, and Prussian for certain, it was eliminated from Indo-European ph, th, kh, k^{wh}.

But previous linguistic states tend to restore themselves, at least,

to some extent. As Modern Greek faintly resembles a restored state of my version of Early Indo-European phonologically with a complete set of voiced/voiceless obstruents, aspiration of some kind in native words seems to have reappeared everywhere where it might not originally have been continued, everywhere with the definite exception of the Baltic languages. This is a striking fact when seen against the background of the continuous presence of aspiration of some kind in Indo-European and most of its daughter languages.

Aspiration, that is, the tense/lax feature, was so pervasive in some Indo-European dialects, and, later, languages, that it tended as much as possible to diminish the feature of voicing so that, for example, in Germanic, according to Gamkrelidze and Ivanov (p. 40), b, d, g, g^w from bh, dh, gh, g^{wh} were faintly voiced (although they did not give the reason I gave for this).

In others, like Welsh, Iranian, Indie, Albanian, Greek, and Slavic (via the ruki law), it arose again from an s, or from some other sound. Yet in Lithuanian, Latvian, and Prussian, the Baltic languages, there was something that inhibited its reappearance. Though one can find no visible trace of the feature checked/unchecked (glottalization) in the Baltic languages, one might be tempted to say, considering the scenario I furnished above as background, that the Baltic languages in their attested condition, that is, minus any trace whatever of aspiration in native forms, represent the most permanently deaspirated daughter-languages of Indo-European. One could add that they also represent the most thoroughly glottalized Indo-European dialects. The lack of glottalization in them today stands as further proof of their thorough deaspiration since glottalization (the feature checked/unchecked) can, apparently, exist in a language only if that language has aspiration (the feature tense/lax).

This alone merits viewing the Baltic languages as entities separate entirely from Slavic. But there are other reasons for doing this. Gamkrelidze and Ivanov mentioned several Welsh words matching ones in the Baltic languages minus Slavic correspondences, and several Irish words matching ones in Slavic minus Baltic correspondences (pp. 30₂, 689, 123, 788₄, 466, 808₂). I, in my own research, marveled at these surprising facts, surprising against what recent geography suggests, namely, that today's more northerly located Irish should correspond better with history's more northerly located Baltic, while today's more southerly located Welsh should correspond better with history's more southerly located Slavic. Yet the opposite of our expectations occurs. According to M. Fasmer, *Etimologičeskij slovar' russkogo jazyka* with 489 Q-Celtic and 166 P-Celtic entries and E. Fraenkel, *Litauisches etymologisches Wörterbuch* with 415 Q-Celtic and 222 P-Celtic entries, Russian has 74 more correspondences with Q-Celtic than Lithuanian, while Lithuanian has 56 more correspondences with P-Celtic than Russian. [14](#)

If for no other reason, at least for sound methodological purposes, fine scholars like Gamkrelidze and Ivanov should encourage a large portion of their most talented students to pursue an inquiry into the nature of the relationship between the Baltic and Slavic languages consistently viewed as having developed fundamentally independently from Indo-European without having arisen at all from any special intermediary genetic "Balto-Slavic" linguistic unity.

After all, if one assumes that Baits and Slavs are the same people, one will surely say about Baltic-Welsh, Slavic-Irish correspondences: "Why bother looking further?" And something that could be discovered about who once was whose neighbor and why this was so might well remain in the shadows of ignorance. And this, like Gamkrelidze's and Ivanov's useful glottalic theory, because of preconceived notions resulting in unscientific attitudes, could perish undeservedly.

Notes

1 This assumes that there was a Common Baltic. If one assumes the opposite, a position I took in "Two Linguistic Myths: Balto-Slavic and Common Baltic", Lituanus 27.1, 1981, then one may say that aspiration in native forms does not occur in Lithuanian, Latvian, and Prussian.

2 Russian title: Indo-evropeiskii iazvk i indo-evrooeicy, by T. V. Gamkrelidze and V. V. Ivanov, Tbilisi, 1984.

3 There have been two main typological inconsistencies with the old theory. One involves the existence of aspirated voiced stops without aspirated voiceless stops. The other involves the, at best, very restricted attestation of unaspirated b vis-a-vis the heavy attestation of unaspirated g. Both these features do not occur in known languages.

4 The authors use a different arrangement of these symbols. For purposes of convenience, I use my arrangement of them as well as the traditional

5 representation of labialization via superscript⁰ rather than the authors' superscript⁰.

I prefer to use these and other terms of acoustic phonetics applied by R. Jakobson, C. G. M. Fant, and M. Halle in their Preliminaries to Speech Analysis. Cambridge, Massachusetts, 1965 despite Gamkrelidze's and

6 Ivanov's stated preference for employing terms of articulatory phonetics which they say is more in tune with recent trends. Though Gamkrelidze and Ivanov might ultimately propose noting glottalized stops as p"/b", t"/d", k"/g", k"/g"" to reflect the general range of their allophonic distributions as they do with non-glottalized, aspirated stops p(h), b(h), etc., I, personally, would not advise this since notation of forms would

7 tend to look clumsy: " T"/D"eT(h)- rather than a much (simpler "D"eT- where D>equals any glottalized stop, e any vowel and T any non-glottalized stop.

This is where the terminology of acoustic phonetics is superior to that of articulatory phonetics. It has a broader, more inclusive application. Tense

8 vowels are not necessarily aspirated, but are longer than lax ones. See Jakobson, Fant, Halle, 1965, p. 36.

9 See my article, "Zur fruhen Sonderstellung des Slavischen", Zeitschrift fur, slavische Philologie, 52, 2, 1981.

Unlike other specialists, including Gamkrelidze and Ivanov, I do not assume that stress was phonemic in Early Indo-European whereby o developed along with zero as a reduced grade of e. I believe that, e, like a, originally having no superimposed consonantal features, was characterized by rising sonority and, therefore, maintained its stress better than o which, classified with labio-velars, soon included superimposed labiality and tended to be characterized more by falling sonority. Once o lost its stress, it was sometimes reduced to zero. This view of mine about the lack of phonemic stress in Early Indo-European coincides with Gamkrelidze's and Ivanov's proposal of the agglutinative character of Indo-European affixes which suggests an original integrity of these and other morphemes (pp. 327-333). This implies some sort of non-phonemic stress, if any, and thereby indicates no phonemic prosodic features for Early Indo-European.

Original Indo-European ablaut involved only e and o. Zero grade appeared much later, after stress became phonemic. The vowel a was so completely tied to the acute segments t, d, dh, s, n, i, k, g, gh, H₂, y, r that its appearance after them was optional, as good as zero. An instance of this surviving in the Indo-European daughter-languages is visible in the Gothic demonstratives pata 'that', hita 'this', ita 'it' (originally, a demonstrative) versus Lithuanian B(i)tai, Latin is-tud, id, Armenian -d, Sanskrit tad/tat, Old Irish -d in ua-d where final -a in Gothic secondarily reflects an original -a that could appear for purposes of emphasis connected with the special, deictic function characteristic of demonstratives. The Gothic final -a here is from long -o, from an -a, lengthened for purposes of emphasis after final -t' (-d") in Indo-European "tot", etc. had deglottalized, that is, lost its special marking function for those demonstratives. W. Krause, Handbuch des Gotischen MÜNchen, 1953, p. 184 derives this Gothic final -a from long -o in Proto-Germanic -o" from what he calls an Indo-European particle *-om, which, however, he does not document with matching forms in other Indo-European languages (and for which he supplies no meaning) and, therefore, is, I believe, not true. Since the neuter and masculine normally coincided in form in the genitive, dative, and accusative, the final -a in the nominative-accusative neuter demonstratives pata, etc. was later attached to the masculine accusative forms pan, etc. from *pam, etc., which was attested as pana, etc.

10 This aspiration, influenced by series class laryngeals probably shared their vowel coloring properties so that, for example, the (h) in t(h), k(h), etc. helped fix the a-coloring of neighboring vowels, etc.

11 Gamkrelidze and Ivanov locate the original homeland of Indo-European in an area including the Caucasus and Near East where it was to have bordered on South Caucasian (Kartvelian) and Common Semitic territories chiefly because of one-time glottalized phonemes in all three.

12 The notion of no initial vowels for a stage of Indo-European, disputed by Gamkrelidze and Ivanov (pp. 245-246) can be justified by the above scenario. Gamkrelidze and Ivanov, themselves, indicate their awareness of certain other instances where evidence for possible laryngeals cannot be found, specifically in the sequencing THe- (consonant-laryngeal-vowel) where even Hittite shows no h. I merely extend this notion of theirs about positions where evidence for possible laryngeals cannot be found to include initial position.

13 Jakobson, Fant, and Halle (p. 23) describe checked versus unchecked as follows: "Production. The air stream is checked by the compression or closure of the glottis." In view of this, it is easy to understand by b" is so rare. The air stream may usually not travel far enough for a b" to be realized. Also, checking the air stream means, in effect, checking, that is, stopping aspiration.

14 M. Fasmer. Etimologiceskij slovar'ruskogo jazvka. Moskva. 1964-1973: E. Fraenkel, Litauisches etymologisches Wo'rterbuch. Heidelberg-Göttingen, 1962-1965.