

# The problem of Proto-Balto-Slavic ‘aspirates’ revisited

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**ABSTRACT:** The topic of this paper, as its title suggests, is the fate of the original Indo-European (IE) aspirates in Balto-Slavic, or possibly in its direct precursor, Proto-Balto-Slavic. In contrast with the Indo-European protolanguage, which is generally reconstructed with three modal classes of stops, both the Baltic and the Slavic languages are modeled on the opposition based on the feature /±voice/ only, with the opposition based on the feature /±aspiration/ not directly attested. Due to this distinction between IE and Balto-Slavic, it is assumed that the original opposition of aspiration was lost at some point during the Proto-Balto-Slavic period. The mechanism of this loss and the question of ‘voiceless aspirates’ are discussed as well. In the paper it is demonstrated that there is no reason to believe that ‘voiceless aspirates’ and ‘voiced aspirates’ ever formed a category of ‘aspirates’, proportional to the opposition between ‘voiceless unaspirates’ and ‘voiced unaspirates’, or to assume that both ‘aspirates’ ever existed at the same moment.

**Key words:** Indo-European, phonology, aspiration, voice, stops

## 1. The Indo-European system of modal opposition

As it is widely known, the traditional reconstruction of the Indo-European (IE) phonemic system of modal oppositions leads to a triadic or quaternary structure of four modal classes,<sup>1</sup> based on two features: /±voice/ and /±aspiration/<sup>2</sup> (for recent examples see Szemerényi 1996: 54; Clackson 2007: 40–44; Beekes 2011: 124).<sup>3</sup>

The given modal classes are thus: ‘voiceless unaspirated’ stops (schematically *T*), ‘voiced unaspirated’ stops (*D*), and ‘voiced aspirated’ stops (*D<sup>h</sup>*). Quaternary models even feature ‘voiceless aspirated’ stops (schematically marked *T<sup>h</sup>*).

This paper employs the classical model and its features, since the glottalic theory never gained major acceptance.<sup>4</sup> Furthermore, for us the fact that the reconstructed protolanguage originally had two distinctive features is far more important than the specific phonetic values of these features, since the phonetic values could be only guessed at and not objectively determined. All values are thus more of an algebraic nature than a phonetic one.

The feature /±voice/ has two mutually opposed values: /–voice/ and /+voice/, while the feature /±aspiration/ has two opposed values /–aspiration/ and /+aspiration/.

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<sup>1</sup> As modal oppositions we classify oppositions based on the manner of overcoming the obstruction of the second degree (Trubetzkoy 1939: 134 terms it *Überwindungsarteigenschaften*, the English translation of 1969: 140–141 terms it in a precisely but overly wordy manner *properties based on the manner of overcoming an obstruction*), or in more descriptive ways, as oppositions related to the minor modifications of the sound inside the sonority scale.

<sup>2</sup> Since we speak of phonemic values of features here (and it is impossible to speak about phonetic values anyway, since we are dealing with reconstructed languages), we prefer to use slash brackets // instead of square brackets [] for both values and features.

<sup>3</sup> It should be noted that both Beekes and Clackson tend toward a glottalic interpretation of the Indo-European triad.

<sup>4</sup> But later we will see that glottalic solutions may help us to solve some questions in the easiest way.

To begin with, we suppose that the value */+voiced/* is a marked member of the feature */±voice/* and that the value */+aspirated/* is a marked member of another feature */±aspiration/*.

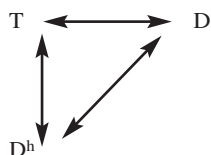
The first value is linked to the voiced member */D/* and the second value is then linked to the aspirated member */D<sup>h</sup>/*. Both values */+voiced/* and */+aspirated/* are the **positive values** of their respective features, since they are obviously manifested with some positive value. On the contrary, values like */-voiced/* and */-aspirated/* are the **negative values** of their respective features, since they are not manifested, but rather they are deducted on a purely abstract basis. Because of their ‘negativity’, both values */-voiced/* and */-aspirated/* are considered to be unmarked values of their features. And logically, both ‘positive’ values are considered marked values of their features. Note that in this model */+voiced/* is an irrelevant feature for *D<sup>h</sup>*, since markedness is sufficiently expressed by the value */+aspirated/*.

The positive values of both features are mutually incompatible in the classic triadic model, as they cannot be present together with the same member of opposition, but are mutually compatible in the quaternary model.

On the other hand, both negative values are mutually always compatible, for they are present on one member of the opposition, i.e. on the ‘voiceless unaspirated’ stop (= *T*).

Because both features are based around one single member *T*, which shares both unmarked values, we consider them **orthogonal**.

The supposed traditional IE system of modal oppositions can be demonstrated graphically as follows (note that the original system is not attested in any known language):



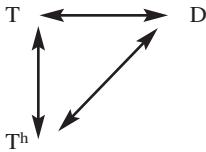
**Figure 1:** Traditional IE system of modal oppositions

## 2. Modal systems in IE daughter languages

The Indo-European languages differ in the number of features used (most often */±aspiration/* is omitted, as in Balto-Slavic, Iranian, etc.), in the number of members in opposition (new phonemes created), and in the neutral phoneme on which basis of the system is formed (in systems with shifts as in Germanic). All three differences may be mutually bound, as we will demonstrate.

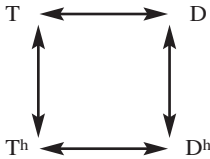
Generally, four types of modal systems in specific IE daughter languages are found:

**Type 1.** The original IE triad is preserved in principle. This holds for Ancient Greek and Osco-Umbrian. The */+voice/* quality of *\*D<sup>h</sup>* is lost (*\*D<sup>h</sup> > \*T<sup>h</sup>*), due to its irrelevance, as described earlier. Even languages that have undergone shifts still represent the old triad, as in Germanic and Armenian (for Armenian, see section 5 below).



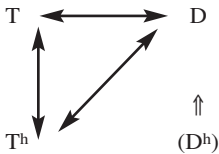
**Figure 2:** Preserved IE triad

**Type 2.** The original triad is extended to a quaternary system, with a ‘voiceless aspirated’ stop  $*T^h$  filling the gap both in opposition to  $*T$  and  $*D^h$ . This system is attested in Old Indo-Aryan.



**Figure 3:** Extended modal system of OIA

**Type 3.** The original triad is extended by a fourth member as type 2 above, but later the opposition between  $*D$  and  $*D^h$  is neutralized and a new triadic system is derived. This type is attested in Avestan and in Iranian generally, with the aspirates later becoming fricatives.



**Figure 4:** Extended and reduced modal system of Iranian

**Type 4.** In the original triad, the opposition between  $*D$  and  $*D^h$  is leveled. This is valid for Balto-Slavic, but this innovation is shared with (in addition to Iranian) Albanian and the Celtic languages, too.<sup>5</sup> A similar process is found even for Anatolian and Tocharian (where, however, all stops eventually merged, with evidence for an earlier system of type 1). A common isogloss (i.e. an areal development) could be assumed probably only for Iranian or Albanian, if it is possible to draw a common isogloss at all.



**Figure 5:** Reduced system of Balto-Slavic, Albanian and Celtic

<sup>5</sup> At least in the Brythonic languages we can partially trace the former distinction between voiced and aspirated stops, since Welsh has *b* for original IE  $*g^h$  and *gw* for original IE  $*g^{wh}$ : Welsh *bwyd* ‘food’ vs. Gr. *βίος* ‘life’, but Welsh *gweddi* ‘prayer’ vs. Gr. *ποθέω* ‘I wish’ (Kortlandt 1978a: 115).

It seems clear that type 3 shares some developments both with type 2 and with type 4. We will demonstrate that the close relationship between types 3 and 4 could, in the case of Balto-Slavic, be even closer than it seems from the lines above.

To reach our goal, we will first survey the undisputed reflexes of IE stops in Baltic and Slavic (section 3). We will then focus on the question of the IE ‘voiced aspirated’ stops (section 4) and on the question of ‘voiceless aspirated’ in Proto-Balto-Slavic (section 5).

### 3. Undisputed stops: ‘voiceless unaspirated’ stops and ‘voiced unaspirated’ stops

Our reconstruction of the Proto-Balto-Slavic modal oppositions will start with the members of the system of modality about which there is no doubt concerning to their original modal class.

‘Voiceless unaspirated’ stops (\**T*) are reconstructed for the reflexes (excerpted from Pokorny 1959–1969; Rix 2001, hereafter LIV):

- \**p*: OCS *petь*, Lith. *penkì*, OIA *pañca-*, Av. *panča*, Gr. *πέντε*, Goth. *fimf* ‘5’; OCS *poťb* ‘way’, Pruss. *pintis*, OIA *pánthāh*, Av. *pantā*, ‘way’, Gr. *πόντος* ‘sea, sea route’, Lat. *pons* ‘fascine, bridge’, Goth. *finþan* ‘to find (a way)’;
- \**t*: OCS *trije*, Lith. *trỹs*, OIA *tráyah*, Gr. *τρεῖς*, Goth. *þreis*, W. *tri*, ‘3’; OCS *ty*, Lith. *tù*, OIA *t(u)vám*, Gr. Dor. *τύ*, Lat. *tū*, Goth. *þu*, W. *ti* ‘thou’;
- \**k*: OCS *krǫnb*, Lith. *kraũjas* ‘blood’, OIA *kravís-* ‘raw meat’, Gr. *κρέας* ‘(raw) meat’, Lat. *cruor* ‘(raw) blood’, ON *hrār* ‘raw’, W. *crau* ‘blood’;
- \**kʷ*: OCS *četyre*, Lith. *keturì*, OIA *catur-*, Gr. Hom. *τέσσαρες*, Att. *τέτταρες*, Boeot. *πέτταρες*, Lat. *quattuor*, Goth. *fidwōr*, ‘4’; OCS *kǫ(to)*, *čb(to)*, Lith. *kàs*, OIA *káh*, Gr. Hom. *τέο* (gen.), Lat. *quī*, *quod*, Goth. *hwas* ‘who’;
- \**k̑*: OCS *sǫto*, Lith. *šiũntas*, OIA *śatám*, Gr. *έκατόν*, Lat. *centum*, Goth. *hund* ‘100’; OCS *srǫdьce*, Lith. *širdis*, Gr. *καρδίᾱ*, Lat. *cor*, Goth. *hairto* ‘heart’.

From the reflexes as listed here we reconstruct four ‘voiceless unaspirated’ stops for Proto-Balto-Slavic: \**p*, \**t*, \**k* (for merged IE \**k* and \**kʷ*, some instances of it later palatalized in Slavic) and \**ś* (if already sibilantized).

Similarly, ‘voiced unaspirated’ stops (\**D*) are reconstructed on the basis of the following reflexes (again excerpted from Pokorny 1959–1969; LIV):

- \**b*: OCS *bolьbь* ‘greater’, OIA *bála-* ‘strength’, Gr. *βέλτερος*, *βελτίων* ‘better’, Lat. *dēbilis* ‘weak’;<sup>6</sup>
- \**d*: OCS *desetь*, Lith. *dešiũntas*, OIA *dása*, Gr. *δέκα*, Lat. *decem*, Goth. *taihun*, W. *deg* ‘10’; OCS *viděti*, Lith. *pavydėti*, OIA *avidat* ‘(has) found’, *vēda* ‘know’, Gr. *οἶδα* ‘know’, Lat. *videō*, Goth. *witan* ‘see’;
- \**g*: OCS *stogь* ‘rick, haystack’, Gr. *στέγω* ‘cover’, Lat. *tegō* ‘cover’, ON *þekja* ‘cover’;
- \**gʷ*: OCS *živь*, Lith. *gývas*, OIA *jīvā-*, Gr. *βίος*, Lat. *vīvus*, ON *kvikr* ‘living’; OCS *žena*, Pruss. *genna*, OIA *jáni-*, *gnā-*, Gr. *γυνή*, Goth. *qino* ‘woman’;

<sup>6</sup> The reconstruction of IE initial \**b* is, of course, infamously based almost solely on the list of reflexes given here. Only a few secure examples of the sound in word-internal position are found as well.

\*ǵ: OCS *znati*, Lith. *žinóti*, OIA *jānāti*, Gr. *γινώσκω*, Lat. *gnōscō*, Goth. *kunnan* ‘know’; ORu. *mǫlzu*, *mǫlsti*, Lith. *mélžu*, *mǫlsti* ‘milk’, Gr. *ἀμέλω*, Lat. *mulgō*, OHG *milchu*, *melchan* ‘milk’.

Analogously, we reconstruct four given ‘voiced unaspirated’ stops for Proto-Balto-Slavic: \**b*, \**d*, \**g* (merged IE \**g* and \**gʷ*) and \**z* (again, if already sibilantized). The merger of \**D* with \**Dʰ* means that the Proto-Baltic stops \**b*, \**d*, \**g*, \**z* could represent the original IE ‘voiced aspirates’ as well.

#### 4. IE ‘voiced aspirated’ stops in Proto-Balto-Slavic

The original IE ‘voiced aspirated’ stops (\**Dʰ*) are reconstructed for Proto-Balto-Slavic using the following reflexes (again, excerpted from Pokorny 1959–1969; LIV):

- \**bʰ*: OCS *bratǫ*, Lith. *bro(terē)lis*,<sup>7</sup> OIA *bhrātār-*, Av. *brātar-* ‘brother’, Gr. *φράτηρ* ‘member of a brotherhood’, Lat. *frāter*, Goth. *brōþar*, W. *brawd* ‘brother’; OCS *nebo* ‘sky’, Lith. *debesis*<sup>8</sup> ‘sky’, OIA *nābhas-* ‘fog, air, sky’, Av. *nabah-* ‘air, sky’, Gr. *νέφος* ‘cloud, fog’, Lat. *nēbula* ‘haze, fog’, OHG *nebul* ‘fog’, W. *nef* ‘sky’;
- \**dʰ*: OCS *medǫ* ‘honey, mead’, Lith. *medūs* ‘honey’, OIA *mādhu-* ‘honey, mead’, Av. *maðu-* ‘berry wine’, Gr. *μέθυ* ‘wine’, OHG *metu*, W. *medd* ‘mead’; OCS *dymǫ*, Lith. *dūmai* ‘smoke’, OIA *dhūmá-* ‘smoke, steam’, Gr. *θῦμός* ‘breath, smoke’, Lat. *fumāre* ‘smoke’;
- \**gʰ*: OCS *mǫgla* ‘fog’, Lith. *mìgla* ‘fog’, OIA *mégħa-* ‘cloud’, Av. *maēga-* ‘cloud’, Gr. *ὀμίχλη* ‘cloud, fog’, ON *mistr* ‘cloudy weather’;
- \**gʷʰ*: OCS *ženq*, *gǫnati* ‘drive’, Lith. *genù*, *giñti* ‘drive’, OIA *hánti* ‘kills’, Gr. *θείνω* ‘beat’, Lat. *dē-fendō* ‘defend’, ON *guðr* ‘fight’; OCS *gorěti*, *grěti* ‘burn’, Lith. *gāras* ‘steam’, OIA *hāras-* ‘embers’, Gr. *θέρω* ‘summer hear, harvest’, Lat. *formus* ‘warm’;
- \**ǵʰ*: OCS *zima*, Lith. *žiemà*, OIA *hemantá-*, Av. acc. *ziiqm*, Gr. *χειμα*, Lat. *hiems* ‘winter’; OCS *lizati*, Lith. *ližti*, OIA *rédhi*, *lédhi*, YAv. *raērizaitē*, Gr. *λείχω*, Lat. *lingō*, Goth. *bi-laigōn* ‘to lick’.

The traditional reconstruction, based on the given reflexes, leads us toward the class of IE ‘voiced aspirated’ *Dʰ*, but, as it is known, in Balto-Slavic this original class merged with the class *D* into a single class.

For a long time, the internal reconstruction of \**D* and \**Dʰ* in Balto-Slavic seemed impossible and the reconstruction of such an opposition was based solely on reflexes outside of Balto-Slavic. In 1978, however, Winter proposed a law of vowel lengthening in Balto-Slavic, stated as follows: ‘In Baltic and Slavic languages, the Proto-Indo-European sequence of short vowel plus voiced vowel was reflected by lengthened vowel plus voiced stop, while short vowel plus aspirate developed into short vowel plus voiced stop’ (Winter 1978: 439).

<sup>7</sup> A diminutive, the middle section is in modern Lithuanian usually omitted.

<sup>8</sup> Lith. *debesis* shows an irregularity in the first consonant, but this does not affect our reflexes.

His observations were modified and repeatedly voiced by Kortlandt, who proposed that ‘lengthening’ is tied to acute tone, or more precisely, that the lengthening is due to a new acute in a preceding syllable (see modifications of his views in, for example: Kortlandt 1978a: 91–112; 1978b: 447; 1979: 57–63; 1985: 112–124; 1988: 387–396; 2011: 245–250). In the following, I will simply reiterate the general idea as postulated by Winter and Kortlandt. For further discussion, though now slightly antiquated, on Winter’s Law, see Collinge (1985: 224–225). On its further reception see (Derksen 2002: 5–13). Some further consequences will be discussed below in Table 1 (data taken with a regard to Derksen 2008; Fraenkel 1962–1965; Smoczyński 2007; Vasmer 1953–1958; *Etymologický slovník jazyka staroslověnského* 1989–2014).

**Table 1:** Winter’s Law in Balto-Slavic

*D	<p>Baltic: Lith. <i>ėsti</i>; Latv. <i>ēst</i> ‘to eat’            Slavic: OCS <i>jamь, jasti</i>; Ru. <i>em, est</i>; Cz. <i>jím, jísti</i>; SCr. <i>jědem, jěsti</i>; Sln. <i>jém, jěsti</i> ‘to eat’            Cf. OIA <i>ádmī, átti</i>; Hit. <i>e-ed-mi</i>; Lat. <i>edō</i>; Goth. <i>itan</i> ‘to eat’            &lt; IE *<math>\sqrt{H_2}ed-</math> ‘eat’</p> <p>Baltic: Pruss. <i>waist</i> ‘to know’            Slavic: OCS <i>věmь, věděti</i>; Cz. <i>vím, věděti</i>; P. <i>wiem, wiedzieć</i>; Sln. <i>vém, věděti</i> ‘to know’            Cf. OIA <i>vēda</i>; Gr. <i>oĩd̥x</i>; Goth. <i>wait</i> ‘to know’            &lt; IE *<math>\sqrt{uoid-}</math> ‘know’</p> <p>Slavic: OCS <i>azъ</i>; ORu. <i>(j)azъ</i>; Ru. <i>ja</i>; OCz. <i>jáz</i>; Cz. <i>já</i>; SCr. <i>jâ, jâz</i>; Sln. <i>jâz</i> ‘I’            Cf. OIA <i>ahám</i>; Gr. <i>éyô</i>; Lat. <i>ego</i>; Goth. <i>ik</i> ‘I’            &lt; IE *<math>\sqrt{H_2}egHom</math> ‘I’</p> <p>Baltic: Lith. <i>vėdaras</i> ‘sausage, (dial.) belly’; Latv. <i>vėdars</i> ‘belly’            Slavic: OCS <i>vědro</i>; Ru. <i>vedrô</i>; Cz. <i>vědro</i>; SCr. <i>vjědro</i> ‘bucket’            Cf. OIA <i>udára-</i> ‘belly, womb’; Lat. <i>uterus</i> ‘belly’            &lt; IE *<math>\sqrt{ued-}</math> ‘womb’</p>
*D <sup>h</sup>	<p>Baltic: Lith. <i>vėsti, vežù</i>; Latv. <i>vezums</i>; ‘to cart, convey’            Slavic: OCS <i>vesti, vezq</i>; Ru. <i>vezù, vezťi</i>; Cz. <i>vezu, vezťi</i>; SCr. <i>vězēm, vèsti</i> ‘to cart, convey’            Cf. OIA <i>váhati</i>; Av. <i>vazaiti</i> ‘to carry’; Gr. <i>ὄχος</i> ‘wagon’; Lat. <i>vehō</i>; OHG <i>wegan</i> ‘to bear, carry’            &lt; IE *<math>\sqrt{uegh-}</math> ‘cart’</p> <p>Baltic: Lith. <i>gaĩdas</i> ‘fence, enclosure, stall’            Slavic: OCS <i>gradъ</i> ‘walled place’; Ru. <i>górod</i> ‘town’; Cz. <i>hrad</i> ‘castle’; SCr. + Sln. <i>grâd</i> ‘city, fortress, castle’            Cf. OIA <i>grhá-</i> ‘house’; Goth. <i>gards</i> ‘house’; TochB. <i>kerciye</i> ‘palace’; Phryg. <i>-gordum</i> (toponymy)            &lt; IE *<math>\sqrt{ghordh-o-}</math> ‘walled place’ (but cf. different ablaut in OIA)</p> <p>Baltic: Lith. <i>medùs</i>; Latv. <i>mēdus</i> ‘honey’            Slavic: OCS <i>medъ-</i> ‘honey’; Ru. <i>měd</i> ‘honey, mead’; Cz. <i>med</i> ‘honey’; SCr. <i>měd</i> ‘honey’; Sln. <i>měd</i> ‘honey’            Cf. OIA <i>mádhu-</i> ‘honey, mead’; OHG <i>mito</i> ‘mead’; Gr. <i>μέθv</i> ‘wine’            &lt; IE *<math>\sqrt{medh_u-}</math> ‘honey, mead’</p> <p>Baltic: Lith. <i>vėsti, vedù</i> ‘to lead’            Slavic: OCS <i>vesti, vedq</i>; Ru. <i>vedù, vestí</i>; Cz. <i>vedu, vésti</i>; Sln. <i>vědem, vèsti</i> ‘to lead’            Cf. OIA <i>vadhū-</i> ‘bride’; OIrish <i>fedid</i> ‘go, bring’            &lt; IE *<math>\sqrt{uedh-}</math> ‘lead’</p>

It should be kept in mind that Winter’s Law provides a positive argument for the reconstruction not of a ‘voiced aspirate’ (i.e. *D<sup>h</sup>*) but of a ‘voiced unaspirated’ stop (i.e. *D*). Generally, all examples which do not yield to Winter’s Law are suspected of being original ‘voiced aspirates’, but it is not proven by Winter’s Law that they were

originally aspirated! In other words, if we encounter a non-initial voiced stop after a lengthened acute vowel, we can be sure that we are dealing with an original IE ‘voiced unaspirated’ stop (if no laryngeal is to be reconstructed), while in all other examples we can suspect either an original ‘voiced unaspirate’ or an original ‘voiced aspirate’. Winter’s Law is therefore not a positive proof of original ‘voiced aspirates’ in Balto-Slavic, but rather, we can label it more correctly as a ‘negative’ proof of ‘voiced aspirates’ in non-initial position.

Though there are some notable (and not always fully explained) exceptions for Winter’s Law (e.g. OCS *voda* ‘water’ and *ogŋb* ‘fire’ are exceptions which demand closer examination), generally the law is accepted today as a fact.

The acceptance of Winter’s Law is strengthened by the analogous (if not directly related) process of lengthening before an original ‘voiced unaspirated’ stop, which is known from Latin and labeled Lachmann’s Law, where vowels in perfect passive participles are lengthened if the roots end in an original *\*D*, but they are not lengthened when the roots end in an original *\*D<sup>h</sup>*: Lat. *āctus, frāctus, lēctus, tāctus* (cf. Lat. *agō, frangō, legō, tangō*) × *lectus, tractus, nictō, vectus* (cf. Greek *λεχος*, Lat. *trahō, cō-nīveō, vehō*) (Collinge 1985: 105–114; Kortlandt 1989: 103–105; Kortlandt 1999: 246–248; Jasanoff 2004: 405–416; Sukač 2012: 13–36).

## 5. ‘Voiceless aspirated’ stops in (Balto-)Slavic?

It should be noted that some scholars still advocate the quaternary system originally proposed by the Neogrammarians (for the classic Neogrammarian point of view, see e.g. Brugmann 1922: 157–178; in recent years e.g. Rasmussen 1987: 81–89 or Elbourne 1998: 1–30; Elbourne 2000: 2–28).

The reasons are generally twofold: firstly, there are ‘voiceless unaspirated’ stops (*T<sup>h</sup>*) in Old Indo-Aryan and presupposed by Avestan as well. Secondly, the quaternary system is more proportional than the triadic one, since beside one unmarked member (the ‘voiceless unaspirated’ stop) and two marked members (the ‘voiced unaspirated’ stop and ‘voiceless aspirated’ stop) there exists a double-marked member, too (the ‘voiced aspirated’ stop). The proposed quaternary Indo-European system of modal opposition is then reconstructed according to the quaternary system of Indo-Iranian and later of Indo-Aryan.

This paper nevertheless does not accept the phonemic status of ‘voiceless aspirated’ in Indo-European, because it seems that all examples, as cited in various sources, can be explained through a secondary development.

In general, the ‘voiceless aspirated’ class arose from the following sources, leaving aside onomatopoeia:

- A clusters of a stop and laryngeal (*TH* > *T<sup>h</sup>*);
- B a positional variant of clusters *sT* (*sT* > *T<sup>h</sup>*) – here belong the results given by Siebs’ Law<sup>9</sup> from the original clusters *SD<sup>h</sup>* (*SD<sup>h</sup>* > *ST<sup>h</sup>* > (*s*)*T<sup>h</sup>*).

<sup>9</sup> As formulated by Siebs (1904: 277–324).

**Table 2:** Reflexes for IE \*T<sup>h</sup>

	as *T <sup>h</sup>	as *T	*IE	
A	<i>tH</i>	OIA <i>ratha-</i> ‘chariot’ YAv. <i>raθa</i> ‘chariot’	Lat. <i>rota</i> ‘wheel’ OIrish <i>roth</i> ‘wheel’ OHG <i>rad</i> ‘wheel’ Lith. <i>rātas</i> ‘wheel, pl. (arch.) wagon’	*rot-H <sub>2</sub> -o-
		OIA <i>pánthā</i> ‘path’ OAv. <i>paθō</i> YAv. <i>pañtā</i> ‘path’	OCS. <i>pqtъ</i> ‘path’ Pruss. <i>pintis</i> ‘road’ Gr. <i>πάτος</i> ‘path’ Lat. <i>pons</i> ‘bridge’ Arm. <i>hown</i> ‘ford’	*pontH <sub>2</sub> -
		OIA <i>mánthāh</i> ‘twirling-stick’	Lith. <i>meniē</i> ‘twirling-stick’ OCS <i>meťeťъ</i> ‘confuse’ P. <i>mqtew</i> ‘whisk’	*mentH <sub>2</sub> -
		OIA <i>pṛthú-</i> ‘broad’ OAv. <i>pæerəthu-</i> ‘broad’	Gr. <i>πλατύς</i> ‘broad’ Lith. <i>platūs</i> ‘broad’ OP. <i>plota</i> ‘roach’ <sup>10</sup> Ru. <i>plotíca, plotvá*</i>	<i>pl̥t̥H<sub>2</sub>-u-</i>
		OIA <i>sthā-</i> ‘stand’	Av. <i>stāna-</i> ‘stable’ Lat. <i>stō</i> ‘stand’ OCS <i>stati</i> ‘stand’ Lith. <i>stoti</i> ‘stand’	*steH <sub>2</sub> -
	<i>pH</i>	NA <sup>11</sup>		
kH		OIA <i>sákhā</i> ‘branch, twig’ Arm. <i>c’ax</i> ‘branch’ Ru. <i>soxá</i> ‘plough’ Cz. <i>socha</i> ‘sculpture’ SCr. <i>sōha</i> ‘forked stick’	Goth. <i>hoha</i> ‘plough’ Lith. <i>šakà</i> ‘branch’	*k <sup>h</sup> okH <sub>2</sub> -o-
		Arm. <i>xap’anem</i> ‘hinder’ OCS. <i>xapъjōšte</i> (Supr.) ‘biting’ Ru. <i>xapat’</i> ‘grab’ Cz. <i>chápat</i> ‘seize’	Lat. <i>capīō</i> ‘I take’	*kH <sub>2</sub> ep-
		Ru., P. <i>xuj</i> ‘penis’ OIA <i>khudāti</i> ‘fuck’	Lat. <i>cauda</i> ‘tail, trail, penis’	*kHoy-i/kHoy-d-
B	<i>st</i>	OIA <i>sthag-</i> ‘to cover’	Lat. <i>tegō</i> ‘I cover’ Gr. <i>στέγω</i> ‘I cover’ OCS <i>stogъ</i> ‘rick, haystack’, ON <i>þekja</i> ‘cover’	*steg-
	<i>sp</i>	OIA <i>phéna-</i> ‘foam’	Lat. <i>spūma</i> ‘foam’ OE <i>fām</i> ‘foam’ OCS <i>pěny</i> ‘foam’ Lith. <i>spáiné</i> ‘foam’	*(s)p <sup>(h)</sup> oiH-n- (~m-)
		OIA <i>sphya-</i> ‘chip’ Gr. <i>σφήν</i> ‘I yank’	OHG <i>spān</i> ‘chip’	*sp <sup>(h)</sup> e-
	<i>sk</i>	OCS <i>xrab(ъ)rъ</i> ‘brave’	Germ. <i>scharf</i> ‘sharp’ Latv. <i>skārbs</i> ‘sharp’	*(s)k <sup>(h)</sup> or-b <sup>h</sup> -
		OCS <i>xladъ</i> R. <i>xólod</i> P. <i>chłód</i> ‘cold’	Goth. <i>kalds</i> ‘cold’ Lat. <i>gelidus</i> ‘cold’	*(s)g <sup>(h)</sup> el-d <sup>h</sup> -

<sup>10</sup> With the meaning ‘broad (and thin) fish’.

<sup>11</sup> No sure examples of this cluster.



It was the influence of de Saussure (1892: 118) and his followers, namely Pedersen (1926: 48) and Kuryłowicz (1927: 202–204; 1936: 46–54), that led to rejecting the regular phonemic status of ‘voiceless aspirated’ in Indo-European and to the statement that the supposed ‘voiceless aspirated’ are the results of clusters of a stop + laryngeal (*\*T+H*), which is now the prevailing opinion (cf. Shevelov 1964: 35–37; Arumaa 1979: 13–19; Lindeman 1997: 142–148).

At least some portion of the ‘voiceless aspirated’ class are not the product of the assimilation of a *TH* cluster, but rather a positional variant of a ‘voiceless unaspirated’ stop in a cluster with the sibilant *s* (Hiersche provided a very detailed review of the relevant data, see Hiersche 1964; briefly summarized on pages 254–258, though it is debatable whether this secondary aspiration after a sibilant is not limited to Indo-Aryan only). A considerable amount of data is reviewed by Sturtevant (1941: 1–11), Hiersche (1964), Merlingen (1958) and Bičovský (2008), though we do not accept all explanations given therein. In Table 2, onomatopoeia are omitted, as are borrowings from other languages. It should be kept in mind that for some examples of a positional aspiration in clusters *sT<sup>(h)</sup>* other explanations may be possible, since here aspiration could be the result of a lost laryngeal, too.

Reviewing the data above, we can see that in both Baltic and Slavic there are no traces of the supposed ‘voiceless aspirated’ stops in the case of IE *\*p<sup>h</sup>* and *\*t<sup>h</sup>*. Only *k<sup>h</sup>* (either from original *k*, *ḱ* or *k<sup>h</sup>*) is preserved in Slavic, either from an original cluster *\*kH* or *\*sk*, which is probably only a positional variant after *s*, similar to the often encountered combinatory aspiration of voiceless stops in OIA, as noted above. Two different origins for Slavic *x* were already noted by Kozlovskij (1888: 387).

In the case of Slavic *k<sup>h</sup>* we observe a similar process of spirantization as in Iranian, where the newly formed ‘voiceless aspirated’ stops are also spirantized (Indo-Iranian *k<sup>h</sup>*, *t<sup>h</sup>*, *p<sup>h</sup>* > *x*, *θ*, *φ*). This analogy with Iranian becomes even more interesting if we consider the fact that in Iranian, *x* is the product of a syntagmatic alternation as well, e.g. in the clusters *k+t* (*č+t*), *g+t* > *xt* (cf. Av. *draoga-* ~ *druxta*; *vačo-* ~ *vāxš*). In some Slavic dialects, as in OCS,<sup>12</sup> *š* (as a front variant of *x*) could be the product of the alternation of a stop before *\*t-*, cf. OCS *tekq* ~ *tešti*, *pekq* ~ *pešti*, ORu. *vr̥gq* ~ *vr̥šti*. This alternation is not known in Baltic, cf. Lith. *seku* ~ *sekti*, *dėgiu* ~ *dėgti*.

An important influence on the status of *x* in Slavic came from Pedersen’s Law (the *ruki*-rule), which increased the frequency of *x/š* in Slavic. The *ruki*-rule added more examples of the spirantized back velar, which merged with the original instances of *k<sup>h</sup>* of other origin (cf. Pedersen 1895: 74; Shevelov 1964: 127; Arumaa 1976: 42; Collinge 1985: 143–145; Townsend & Janda 1996: 42–45; Vennemann 1974: 91–97).

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<sup>12</sup> Note however that in other Slavic dialects, the cluster *\*kt* is realized as *c*: OCz. *teku* ~ *téci*, *peku* ~ *péci*, *vrhu* ~ *vr̥ci*. Nonetheless, even here we suppose the original cluster with some spirant, secondarily shifted in *c*, hence IE *\*kt* gave first *xt*, which was changed into *št* before a palatalizing environment in OCS and into *tj* in other Slavic dialects, while before other vowels it was later changed into *t* only (hence we find on the one hand Ru., Pol, Cz. *pot* ‘sweat’ from *\*pok-t-*, but on the other hand OCS *pešti*, Cz. *péci* from *\*pek-t-i*, cf. Shevelov 1964: 191).



‘voiceless aspirated’ consonants are realized in the different form than the IE ‘voiceless unaspirated’ *T* (cf. Schmitt 2007: 57–79; Hiersche 1964: 232–253).<sup>13</sup> In that regard, Armenian is more likely an example of type 2 (like Indic, but with a shift of modality), not of type 1 (like Greek, Italic or Germanic).

## 6. Proportionality of aspirates in Proto-Balto-Slavic and Indo-Iranian

Considering all the data above, we see that for Proto-Balto-Slavic the following classes must be reconstructed: ‘voiceless unaspirated’, ‘voiced unaspirated’, ‘voiced aspirated’ and ‘voiceless aspirated’. This is confirmed by both external parallels outside Balto-Slavic and by internal reconstruction (especially by the results of Winter’s Law). From those four, only the first three are inherited from the IE period, while the fourth developed later from various clusters or positional variants of other phonemes.

The class of ‘voiceless aspirated’ probably held a phonemic status only for a short time and during this time *k<sup>h</sup>* in Slavic merged with the *x* created by Pedersen’s Law (the *ruki*-rule). After this merger, the ‘voiceless aspirated’ in both Slavic (other than *x*) and Baltic fused with the original ‘voiceless unaspirated’ *T*.

One might ask if the ‘voiceless aspirated’ and ‘voiced aspirated’ formed a category of ‘aspirated’, contrasting with the category of ‘unaspirated’. In other words, was there a proportional system based on oppositions of voice and aspiration, with categories of ‘voiced stops’, ‘voiceless stops’, ‘aspirated stops’, ‘unaspirated stops’ and the four classes ‘voiceless unaspirated’, ‘voiceless aspirated’, ‘voiced aspirated’ and ‘voiced unaspirated’? This would be a quaternary proportional system similar to those known from Modern Central Indo-Aryan languages (Hindi, Nepali, Assamese, Gujarati, Marathi, Oriya, Bengali), which can be demonstrated graphically as follows (cf. Masica 1991: 100–104, 106–107):

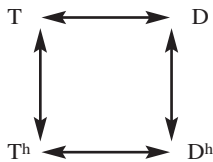


Figure 7: Indo-Aryan modal system

The proportional quaternary system tends to be a very stable one, since in the Central Indo-Aryan languages it has survived for millennia. This is in stark contrast to the situation in Old Iranian (Avestan, Old Persian), which originally inherited the original

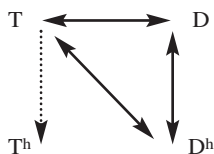
<sup>13</sup> Generally, IE \**T* is realized as Arm. *t*’ (and other forms due to its position) in Armenian, similarly to \**ph* (of different origin), cf. Lat. *octō* but Arm. *owt* ‘eight’ for \**T* and Gr. *ὀκτώλις* and Arm. *awt* ‘night camp’. But same results for IE \**T* and \**Th* are not a standard in Armenian, since \**p* is realized in Armenian as zero or *h* (alongside numerous other realizations, cf. Lat. *pater* ‘father’, OIA *pāñca-* ‘five’ and Arm. *hayr* ‘father’ and *hing* ‘five’) but \**ph* as Arm. *p*’ (cf. with Gr. *λαφύσσω*, OHG *laffan* ‘to lick’ and Arm. *lap’em* ‘I lick’); IE \**k* and \**k<sup>h</sup>* are realized as Arm. *k*’ (cf. Lat. *quam* ‘how, as’ and Arm. *k’an* ‘as’) but *k<sup>w</sup>* as Arm. *x* (cf. OIA *śākḥā* ‘branch, twig’, Goth. *hoha* ‘plough’, Lith. *šakà* ‘branch’, Ru. *soxá* ‘plough’ and Arm. *c’ax* ‘branch’). It should be kept in mind, however, that examples are scarce and often doubtful.

IE triad as well, and developed (or inherited) a new class of ‘voiceless aspirates’ like Old Indo-Aryan. Later, the original Indo-European class of ‘voiced aspirates’ was lost in Iranian, similarly as in Balto-Slavic.

As demonstrated in Šefčík (2012), the reason for this is that in Indo-Aryan, the system of oppositions of stops became proportional at least in the Middle Indo-Aryan period, but in Iranian and Balto-Slavic this never happened, there never was a category of ‘aspirated stops’ with a corresponding category of ‘unaspirated stops’.

The proposed ideal model for covering both Balto-Slavic and Indo-Iranian (Late Eastern Indo-European) is thus quaternary, but without proportionality between the oppositions of ‘unaspirated stops’  $T - D$  and ‘aspirated stops’  $T^h - D^h$ .

The lack of this proportionality is due to the differing phonetic status,<sup>14</sup> which resulted from the different origins of  $T^h$ . The model of the Late Eastern IE retains the original IE triad, but outside of it there exists a solitary opposition of  $T^h$  and  $T$ , not proportional with  $D^h$  and  $D$  (cf. Figure 8).



**Figure 8:** The modal system of Late IE

The relative independence of the  $T - T^h$  opposition from the old triad is demonstrated by the merger of  $D^h$  with  $D$  in Balto-Slavic and Iranian: had the system ever been proportional, this could never have happened, as it indeed did not happen in Indo-Aryan. The truth is, we do not have any reasons to suppose that the model shown in Figure 8 ever existed for Balto-Slavic. We suppose that the model is adequate for Indo-Iranian, but here it could be used as a panchronic working model, which we will modify later.

Here we can mention again Kortlandt’s interpretation of Winter’s Law. For him (Kortlandt 1978a: 91–112; 1978b: 447; 1979: 57–63; 1985: 112–124; 1988: 387–396; 2011: 245–250) the IE triad, in the moment when Winter’s Law was active, was not the traditional triad  $*T - *D - *D^h$ , but rather  $*T - *D - *D$ , which is close to a glottalic interpretation of the IE triad.<sup>15</sup> However, if we accept this system for Balto-Slavic, it is clear that there were no phonetic reasons to form a quaternary proportional system, since a value /+aspiration/ was no longer attached to the original IE  $*D^h$ . If we consider the place of  $*T^h$  in Kortlandt’s glottalic model, the final form could then be formed as  $*T^h - *T - *D - *D$ , without any proportionality between the ‘aspirates’. Such an application of Kortlandt’s model is even less stable than that described in Figure 8, though both models are inherently unstable and tending to be restructured, which is what indeed happened.

<sup>14</sup> Hiersche strongly doubts the aspirated value of  $T^h$  (Hiersche 1964: 254).

<sup>15</sup> It worth of note that Winter himself repeatedly rejected ‘glottalic’ interpretation of his law, stating that lengthening before voiced stops occurs elsewhere without glottalization present (Winter 1979; Winter 2011).

The different languages in which ‘voiceless aspirates’ occurred developed different strategies for how to stabilize the system. The following developments occurred:

- A Indo-Aryan made the system proportional, setting  $T^h$  as the fourth member of the old triad and hence expanding it into a quaternary system with the categories ‘aspirated stops’ vs. ‘unaspirated stops’.
- B Iranian spirantized all phonemes of the  $T^h$  class and, following the merger of  $D^h$  with the  $D$  class, created a new triad.
- C Baltic merged  $D$  and  $D^h$  and, in addition, abandoned any phonemic distinction between  $T$  and  $T^h$  (if there ever was any at all), directly creating a binary system.
- D Slavic merged  $D$  and  $D^h$ , abandoning a phonemic distinction between  $T$  and  $T^h$  for all pairs with the exception of  $k - x/\check{s}$  proportional to the pair  $t - s$ . Again, if Kortlandt’s interpretation of Proto-Balto-Slavic triad is correct, a merger of IE  $*D$  and  $*D^h$  (Kortlandt’s  $*'D - *D$ ) would be even easier.

This leads to the question of a precise phonetic value of  $T^h$  in Late Eastern IE.<sup>16</sup> We know that in Indo-Aryan, the new fourth member was accepted as a ‘voiceless aspirate’, but we have no proof that in Iranian or Proto-Balto-Slavic it was ever anything other than a voiceless spirant. We could even argue that, instead of spirantization of the ‘voiceless aspirate’ stops in Iranian and Proto-Balto-Slavic, we could equally say that the same modal class was despirantized in Indo-Aryan and the status of spirant in Iranian and Slavic (and Armenian, too) is the original value of  $T^h$ . The situation in Baltic could then be equally considered as deaspiration or despirantization – again, if a distinction between  $T$  and  $T^h$  phonemized ever existed in Baltic, as noted above.

## 7. ‘Aspirates’ in Balto-Slavic

For the development of both ‘aspirates’ in Balto-Slavic, we propose the following stages (see Table 4):

**Table 4:** Development of Proto-Balto-Slavic obstruents

	Slavic	Baltic
1.	$T^{(h)} - D - D^h \mid TH \mid s$	
	⇩	
2.	$T - 'D - D - T^h \mid s$	
	⇩	
3.	$T - D - T^h \mid s$	
	⇩	⇩
4.	$T - D - T^h/x \mid s, \check{s}/x^{17}$	$T - D - T^h \mid s, \check{s}^{18}$
	⇩	⇩
5.	$T - D \mid x \mid s, \check{s}/x$	$T - D \mid s, \check{s}$

<sup>16</sup> An anonymous reviewer of this article offered an interesting solution for the phonemic nature of secondary ‘voiceless aspirates’ in Proto-Balto-Slavic, considering them not aspirates or spirants, but  $TH$  clusters. Such an idea is highly innovative and worth considering *pro futuro*.

<sup>17</sup> The question of whether the original result of the *ruki*-rule in Slavic was  $x$  or  $\check{s}$ , is left aside.

<sup>18</sup> For simplicity’s sake, we shall not speak here about the results of the development of the IE palatovelars.

1. The last stage in the development of Indo-European (Late Eastern IE), with an original triad *\*T*, *\*D*, *\*D<sup>h</sup>*, *TH* clusters, a probably positional aspiration of voiceless stops after a sibilant *sT<sup>(h)</sup>* and one sibilant *\*s*.

2. The post-laryngeal phase, with the original IE triad *\*T*, *\*D*, *\*D<sup>h</sup>* later shifted to *\*T*, *\*'D*, *\*D*, newly established *\*T<sup>h</sup>* (either 'voiceless aspirates' or as 'voiceless spirants') from both original clusters with laryngeal and positional variation, original *s* preserved. Slavic shares this development of *\*T<sup>h</sup>* with Indo-Iranian, Armenian and Greek.

3. The Winter's Law phase, lengthening before original 'voiced unaspirated' stops and for lost preconsonantal laryngeals, the merger of both IE *\*D* (BSl. *\*'D*) and *\*D<sup>h</sup>* (BSl. *\*D*) – this isogloss is common with Iranian – and thus finally *\*T*, *\*D*, *\*T<sup>h</sup>*, *\*s*. The situation is then similar to the state attested in Iranian (cf. Figure 4).

4. A 'Pedersen's phase': Slavic merged original *k<sup>h</sup>* either from *\*kH* or *\*sK* with *x* resulting from Pedersen's Law, but the process did not affect the Baltic languages. We suppose that at least the independent existence of *x* (of any origin) has to share a common period of existence with *x* from Pedersen's Law, otherwise it is hard to imagine the merger of both *x*s into one.

5. The final phase is marked by the loss of a distinction between 'voiceless unaspirated' and 'voiceless aspirated' stops, which completes the process.

Note that in the proposed model, it is implicitly stated that 'voiced aspirates' and 'voiceless aspirates' never existed at the same stage of development of the Balto-Slavic languages. This is probably the easiest solution for the proposed lack of proportionality in Balto-Slavic between both traditional classes of 'aspirates', though at stage 2 we can model a quaternary model, based on a modified panchronic ideal model as presented in Figure 8.

## LIST OF ABBREVIATIONS OF LANGUAGES

Arm.	Armenian	Lat.	Latin	ORu.	Old Russian
Av.	Avestan	Lith.	Lithuanian	Pruss.	Prussian
Bœot.	Bœotian	Latv.	Latvian	P	Polish
Cz.	Czech	MIA	Middle Indo-Aryan	Phryg.	Phrygian
Dor.	Doric	OAv.	Old Avestan	Ru.	Russian
Germ.	German	OCS	Old Church Slavic/Slavonic	SCR.	Serbo-Croatian
Goth.	Gothic	OCz.	Old Czech	Sln.	Slovene
Gr.	Greek	OHG	Old High German	Toch.	Tocharian
Hit.	Hittite	OIA	Old Indo-Aryan (Vedic)	W.	Welsh
Hom.	Homeric	ON	Old Norse	YAv.	Young Avestan
IE	Indo-European	OP	Old Polish		

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## RÉSUMÉ

### Problém protobaltoslovanských „aspirát“ po revizi

Otázka počtu modálních tříd v indoevropských jazycích neztratila dosud své palčivosti. Jak známo, zatímco převládající popis pracuje s třemi modálními třídami (neznělých, znělých a znělých aspirát), některé modely stále pracují i se čtvrtou třídou (neznělých aspirát), případně přehodnocují situaci z pohledu různých variant glotální teorie. Baltoslovanské jazyky pak v historickém období mají jen dvě třídy (neznělou a znělou, s tou splynula i historická aspirovaná).

Díky vnitřní rekonstrukci (s využitím Winterova zákona) dnes můžeme i pro protobaltoslovanskou fázi vývoje rekonstruovat tři modální třídy, nicméně stále zůstává otázka neznělých aspirát (autor tohoto příspěvku rozhodně považuje tzv. neznělé aspiráty za sekundární, nikoliv obecně indoevropské), které v slovanštině (ale ne baltštině) v některých případech reprezentuje \*x/š.

V příspěvku se ukazuje, že není nutné předpokládat, že by neznělé a znělé aspiráty někdy spolu tvořily kategorii aspirovanosti proporční kategorii neaspirovaných, jak je tomu např. v indoárijských jazycích, ba ani časový souběh existence znělých a neznělých aspirát.

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