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Glottalization and tonogenesis in Athabaskan, Balto-Slavic and Germanic

According to my theory of Slavic accentuation, the Balto-Slavic acute was a glottal stop which developed from the Proto-Indo-European laryngeals and glottalic consonants and yielded a short rising tone in Late Proto-Slavic. The loss of glottalization took place in a number of stages. It appears that most of these developments have striking parallels in Athabaskan.

The rise of distinctive tone in Baltic is quite different from that in Slavic. In West Baltic (Prussian), glottalization yielded a rising tone on long vowels and diphthongs while the absence of glottalization is reflected by a falling tone. In East Baltic (Latvian and Lithuanian), distinctive tone arose from a retraction of the stress which may be compared with the rise of the independent svarita in Vedic Sanskrit.

Elsewhere I have argued that there was a series of preglottalized stops in Proto-Germanic and that all obstruents were voiceless here in recent prehistoric times. Preglottalization has been preserved in British English and in the western dialects of Danish and is reflected as preaspiration in Icelandic and Faroese and under certain conditions as gemination in all North and West Germanic languages.

In Central Franconian, there is a distinctive opposition between a falling tone 1 and a stretched tone 2 that seems to be reversed in a strip of land along the southeastern border. Phonetically, the Franconian tones strongly resemble the Latvian falling and stretched tones and the Lithuanian falling and rising tones, respectively. A larger amount of data from the Central Franconian area would be most welcome.

According to my theory of Slavic accentuation (e.g. 1975, 1989, 2005), the Balto-Slavic acute was a glottal stop which developed from the Proto-Indo-European laryngeals and glottalic consonants (for which see Kortlandt 1985) and yielded a short rising tone in Late Proto-Slavic. The loss of glottalization took place in a number of stages:

- (1) merger of the Indo-European laryngeals into a glottal stop, which was lost between two full vowels: $*H > *ʔ$ and $*VʔV > *V:$,

- (2) loss of the glottal stop after long vowels and before final nasals (with lengthening of the preceding vowel): $*V:ʔ > *V:$ and $*VʔN\# > *V:N\#$,
- (3) dissolution of the Indo–European glottalic stops into a laryngeal part which merged with the reflex of the Indo–European laryngeals and a buccal part which merged with the reflex of the Indo–European lenes stops (i.e. with the traditional “voiced aspirates”): $*Ḍ > *ʔD$ and $*D^h > *D$,
- (4) merger of the syllable–medial and syllable–final glottal stops into a syllable–final feature of constriction: $*VʔR > *VR$ and $*VRʔ > *VR$, also $*Vʔ > *V:$,
- (5) loss of constriction in pretonic and post–posttonic syllables: $*VṚ > *VR$ and $*V:̣ > *V:$, but preservation of the constriction under the stress and in the first posttonic syllable,
- (6) rise of distinctive Low tone on initial syllables of “unstressed” word forms versus High tone under the stress,
- (7) loss of the remaining constrictions in posttonic syllables with shortening of a long vowel but preservation of the timbre distinctions between old and new short vowels: $*V:̣ > *V$, also pretonic $*V: > *V$ and stressed $*V:̣ > *V$, but earlier $*V(R) > *v(R)$ and $*VṚ > *vR$, where $*v$ represents an original short vowel,
- (8) rise of new long vowels $*v:$ and $*V:$ in stressed and posttonic syllables and $*V:$ in pretonic syllables,
- (9) loss of the glottal constriction (in stressed syllables), yielding a short rising (=High) tone: $*Ṿ > *V'$, usually written $*V$ in the Slavic tradition,
- (10) leftward spread of the rising (=High) tone and lowering of an initial rising (=High) tone so as to merge with the initial falling (=Low) tone in Serbian and Croatian versus rightward spread of the falling (=High–Low) tone and lowering of the rising (=Low–High) tone in Slovene (cf. Kortlandt 2009), giving rise to a recent example of tone reversal. The developments (1)–(2) were dialectal Indo–European, (3)–(4) were Balto–Slavic, and (5)–(9) were Proto–Slavic.

It appears that most of these developments have striking parallels in Athabaskan, for which the following reconstructions have been proposed (cf. Rice & Hargus 2005: 9 and Kingston 2005: 146; here I write K for stops, X for fricatives, $V:$ for long vowels, V for short full vowels, v for reduced vowels, and an acute accent for marked tone, which is High in some languages, e.g. Chipewyan, and Low in others, e.g. Navajo, cf. Krauss 2005: 69):

	Early Proto–A.	Late Proto–A.	non–tonal lgs.	tonal lgs.
(a)	$*V:$	$*V$	V	V
(b)	$*Vʔ$	$*Vʔ$	$Vʔ$	$V'(ʔ)$
(c)	$*VR$	$*vR$	vR	vR
(d)	$*VṚ$	$*vṚ$	$vṚ$	$vR'(ʔ)$

(e)	*V:R	*VR	VR	VR
(f)	*V:Ṛ	*VṚ	VṚ	VṚ ⁽²⁾
(g)	*VK	*vK	vK	vK
(h)	*VḲ	*vḲ	vḲ	ṿḲ
(i1)	*V:K	*VK	VK	VK
(i2)	*V:K	*VX	VX	VX
(j1)	*V:Ḳ	*VḲ	VḲ	VḲ
(j2)	*V:Ḳ	*ṾX̣	VX̣	ṾX̣
(k1)	*V?K	*VK	VK	ṾK
(k2)	*V?K	*ṾX̣	VX̣	ṾX̣
(l1)	*V?Ḳ	*VḲ	VḲ	ṾḲ
(l2)	*V?Ḳ	*ṾX̣	VX̣	ṾX̣

The principal difference between Early and Late Proto-Athabaskan originated from the shortening of long vowels *V: > *V and the reduction of anteconsonantal short vowels *V > *v which corresponds to stage (7) of my Slavic chronology. As in Slavic (and Baltic), constricted vowels have the same timbre as original long vowels whereas short vowels before constricted resonants (d) are reduced. The spirantization of stops to fricatives *K > *X word-finally and before an obstruent suffix has no parallel in Balto-Slavic, where the glottalic stops were implosives, as they still are in Sindhi (cf. Kortlandt 1985: 193), not ejectives, as they are in Athabaskan. The rise of constricted vowels before glottalic stops (j2) has a perfect analogue in Balto-Slavic (3), which is known as “Winter’s law”. The later rise of a High tone from glottal constriction in a part of the Athabaskan languages, e.g. Chipewyan, also has a clear parallel in Slavic (9). The rise of a High tone on unconstricted vowels before glottalic consonants (d, f, h) has an imperfect parallel in North Slavic *vṚ > *(v)Rṿ > *(v)Ṛṿ, e.g. Proto-Slavic *koṛwa > Russian koróva, Polish krowa, Upper Sorbian kruwa ‘cow’. No modern Slavic dialect has preserved the glottalic articulation of the Balto-Slavic acute (but cf. Greenberg 2007), unlike the East Baltic languages (Latvian and Lithuanian), where glottal constriction has been preserved and is known as the “broken” tone (e.g. Kortlandt 1977).

Length blocked the rise of constriction in vowels before glottalic stops in Athabaskan (j1, cf. Krauss 2005: 77). This development has a parallel in the dialectal Indo-European loss of glottalization after long vowels (2). Moreover, a glottalic full vowel *V? did not occur as a nucleus in stems ending in resonants (Kingston 2005: 147), which has a parallel in the dialectal Indo-European loss of glottalization with lengthening of the vowel before final nasals (2). There is no contrast between *V?R and *V:Ṛ, nor between *V?Ṛ and *V:Ṛ (f, Kingston 2005: 146), though there is between *V:Ḳ, *V?K and *V?Ḳ (j, k, l). This has an analogue in the Balto-Slavic merger of the syllable-medial and syllable-final glottal stops into a syllable-final feature of constriction (4). The loss of constriction in non-tonal languages (j2, k, l) has an imperfect parallel in the Slavic loss of constriction in pretonic and post-posttonic syllables (5). The rise of new long “reduced” vowels *ṿ, e.g. in Navajo -c̣i:n ‘bone’ and -c̣i:n ‘stick, base’ (Krauss 2005: 90), also has a parallel in Slavic (8). As far as I can see,

there is no Athabaskan development corresponding to the rise of distinctive tone from pre-accentuation in Slavic (6), e.g. Serbian and Croatian acc.sg. *vòdu* LL 'water' < Proto-Slavic **wodŏ* LL from Early Slavic **wadŏ* HL on the analogy of **nā wadŏ* HLL 'onto the water', later **na wodŏ* LLL > S and Cr. *nā vodu* LLL (cf. Kortlandt 2005: 119), which is strongly reminiscent of the loss of High tone in pre-accented vocatives and finite verb forms in main clauses in Vedic Sanskrit.

The rise of distinctive tone in Baltic is quite different from that in Slavic. In West Baltic (Prussian), glottalization yielded a rising tone on long vowels and diphthongs while the absence of glottalization is reflected by a falling tone. In East Baltic (Latvian and Lithuanian), distinctive tone arose from a retraction of the stress which may be compared with the rise of the independent svarita in Vedic Sanskrit, e.g. in *vīryām* < *vīriām* 'manliness', where the grave accent mark indicates a falling (=High–Low) tone. As a result of the loss of antevocalic **i*, a High tone (i.e. stress) on this vowel was retracted to the preceding syllable in East Baltic, yielding a rising (=Low–High) tone. The stress was similarly retracted from final **-a*. When the newly stressed syllabic nucleus was constricted, the glottalization was lost in Lithuanian, but not in Latvian, where it was weakened and developed into creaky voice quality, resulting in a falling (=High–Low) tone (cf. Kingston 2005: 154). This is the origin of the tone reversal under “*métatonie douce*”, which yielded a rising tone in Lithuanian but a falling tone in Latvian (cf. Derksen 1996). When the newly stressed syllable was unconstricted, the rising tone was preserved in Latvian but developed into a “middle” (level) tone in Lithuanian (cf. Kortlandt 1977: 325). The latter was evidently less prominent than the rising tone on earlier constricted syllables, which points to a raising effect of the constriction. In Latvian and in the Žemaitian (northwestern) dialects of Lithuanian, originally stressed unconstricted syllables received a falling tone in opposition to the metatonical rising tones. The fourfold tonal distinction between rising tone, middle tone, falling tone and “broken” tone (constriction) has been preserved in a limited dialectal area, where it was strengthened by further retractions of the stress (cf. Aleksandravičius 1957, Zinkevičius 1966: 40). In the Aukštaitian dialects of Lithuanian, on which the standard language is based, the glottalization of originally stressed constricted syllables was weakened and developed into creaky voice quality, resulting in a falling tone and merging with the metatonical middle tone, which had become falling in this area. Originally stressed unconstricted syllables developed a rising tone which merged with the metatonical rising tone in opposition to these falling tones. As a result, the standard language has lost glottal constriction as a distinctive feature. In Latvian, the loss of glottalization in originally stressed constricted syllables eventually yielded a “stretched” (long High) tone which merged with the metatonical rising tone. The retraction of the stress to the initial syllable in this language gave rise to a threefold opposition between stretched tone, falling tone and broken tone because distinctive constriction had been preserved in unstressed syllables. The threefold opposition was eventually lost by the merger of the stretched with the falling tone in East Latvian and the merger of

the falling with the broken tone in West Latvian but preserved in the central dialects on which the standard language is based.

Elsewhere I have argued that there was a series of preglottalized stops in Proto-Germanic and that all obstruents were voiceless here in recent prehistoric times (e.g. 2003a, 2003b, 2007b). Preglottalization has been preserved in British English (e.g. in the word for 'water') and in the western dialects of Danish (the so-called *vestjysk stød*) and is reflected as preaspiration in Icelandic and Faroese (as well as in northern Scandinavian dialects) and under certain conditions as gemination (and sometimes affrication) in all North and West Germanic languages. The *vestjysk stød* has nothing to do with the standard Danish *stød*, which developed from the falling Scandinavian accent 1 in the same way as the secondary broken tone in West Latvian developed from the falling tone of the standard language. On the southern Danish island of Als, the *vestjysk stød* coexists with the Scandinavian pitch accents 1 and 2 (cf. Hansson 2001: 166), which leaves no doubt about their independent origins. The Scandinavian accents 1 and 2 reflect the mono- or polysyllabic origin of a word and became distinctive when monosyllables adopted a definite article or svarabhakti vowel yielding a second syllable with a low tone (e.g. Haugen 1976: 283f.). Since the epenthetic vowel was at first subphonemic, the rise of distinctive tone was essentially brought about by a syntactic development, as it was in Slavic.

“In various Low German dialects, a length distinction on old and new long vowels arose in disyllables, depending on the phonation of the intervocalic consonant. [...] An example of this is the minimal pair *ik riet* /rit/ 'I tear' versus *ik ried* /ri:t/ 'I ride'. [...] It is furthermore assumed that this length distinction is sometimes realized as an intonational opposition” (de Vaan 1999: 38). This development is reminiscent of Slavic $*V > *v$ and $*V? > *V$ versus $*V$: with preserved length. The distinction between “long” and “overlong” vowels may have arisen from the loss of glottalization which shortened the preceding long vowel with preservation of the timbre distinctions between old and new short vowels. There is no reason to assume that voicedness played an independent role here. In Central Franconian, there is a distinctive opposition between a falling tone 1 and a stretched tone 2 that seems to be reversed in a strip of land along the southeastern border, which is formed by the “thick bundle of isoglosses separating Central Franconian from Rhine Franconian, the most characteristic one being the isogloss between the pronoun *dat* 'that' to the northwest and *das* to the southeast” (de Vaan 1999: 41). Phonetically, the Franconian tones strongly resemble the Latvian falling and stretched tones and the Lithuanian falling and rising tones, respectively. The distribution of the tone accents in the larger northwestern (A) and the smaller southeastern (B) parts of the Central Franconian area is as follows (cf. de Vaan 1999: 26f. and Kortlandt 2007a: 2):

- I. Non-high long vowels and diphthongs are falling in A and stretched in B.

- II. High long vowels and diphthongs, lengthened short vowels, and short vowels with tautosyllabic resonants are stretched in A and falling in B when they are followed by an original final consonant or non-final preglottalized stop.
- III. Elsewhere these vowels and sequences are falling in A and stretched in B, except lengthened short vowels, which are falling in both A and B.

Thus, it appears that glottalization was lost after non-high long vowels and diphthongs at an early stage, after which the remaining instances of glottalization yielded a stretched tone in A, as in Latvian, and a falling tone in B, as in Lithuanian. The falling tone in A and the stretched tone in B were evidently the unconditioned (unmarked) reflexes before the lengthening of short vowels in open syllables and the apocope blurred the picture and rendered the distribution of the tones opaque. How did the bifurcation of glottalization into a stretched tone in the northwest and a falling tone in the southeast come about? It is important to understand the phonetic influence of glottalization on word melody. When the glottal closure is formed, the vocal cords are tightened so that the pitch of the sound goes up. The flow of air is then interrupted and subsequently continued at a lower pitch when the glottal closure is released. When a following voiceless consonant is short, the rise of the pitch may be more prominent than its fall, but when it is long, the fall of the pitch may be more prominent than its rise. As a result, we expect a falling tone near the Rhine Franconian area, where the glottal stop was oralized and lengthened the following fricative (as in High German *essen*), but a stretched tone in the northwest, where the rise of the pitch before the short interruption of the air flow prevented the pitch from falling below the level it would reach without the glottal closure (as in English *eating*). This is indeed what we find. Thus, the bifurcation of the glottalization into a stretched tone in A and a falling tone in B is explained by the relative prominence of the rise of pitch before and the fall of pitch after the glottal closure. The word melody was then transferred to the initial syllable, yielding a tonemic opposition on long nuclei. The transfer was clearly anterior to the apocope because original monosyllables ending in a consonant adopted the new, marked tone, as if followed by a word-initial glottal stop. It also preceded the lengthening of short vowels in open syllables in B because these never developed a stretched tone.

Elmar Ternes has argued that a large number of instances in both A and B dialects show a reversed distribution of the tones, yielding an inconsistent picture (2006: 100f.). Upon closer inspection it appears that his only real counter-example from the B dialect of Beuren is the word for *Schaf* 1 'sheep', which suggests that the glottalization was preserved after the low vowel **ā* here. The unexpected tonal reflexes in the A dialect of Trier, e.g. the plural forms *Birnen* 2 'pears' and *Augen* 2 'eyes', can easily be analogical. In the A dialect of Vianden, the falling tone 1 is "always realized with a glottal stop" in monosyllables, exemplifying the same development as in West Latvian and standard Danish, but not in disyllables, where it is widely replaced by the

stretched tone 2 (de Vaan 1999: 29, cf. Engelmann 1910). A larger amount of data from the Central Franconian area would be most welcome.

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Glotalizacija i geneza tona u athabaskanskom, baltoslavenskom i germanskom

Prema mojoj teoriji o slavenskoj akcentuaciji, baltoslavenski akut bio je grkljanski zatvorni suglasnik koji se razvio iz protoindoeuropskih laringala i grkljanskih konsonanata te je proizveo kratki uzlazni ton u kasnom protoslavenskom. Glotalizacija je postupno nestajala. Čini se da velik broj navedenih pojava ima vrlo izraženih sličnosti s athabaskanskim.

Nastanak distinktivnog tona u baltičkome podosta se razlikuje od onoga u slavenskome. U zapadnobaltičkome (pruskome) glotalizacija je proizvela uzlazni ton u dugim vokalima i diftonzima, a nepostojanje glotalizacije odražava se u silaznom tonu. U istočnobaltičkim jezicima (litavski i latvijski) distinktivni je ton nastao retrakcijom naglaska, što se može usporediti s nastankom samostalne svarite u vedskom sanskrtu.

Već sam pisao o nizu predgrkljanskih zatvornih suglasnika u protogermanskome te da su svi opstruenti ovdje bili bezvučni u nedavnim pretpovijesnim vremenima. Predglotalizacija je sačuvana u britanskome engleskome i u zapadnim dijalektima danskoga te se odražava kao predaspiracija u islandskome i farskome, a pod određenim uvjetima i kao geminacija u svim sjevernogermanskim i zapadnogermanskim jezicima.

U središnjem frankonskom postoji distinktivna opozicija između silaznog tona 1 i složenog tona 2, u kojoj je došlo do zamjene tonova u dijelu zemlje uz jugoistočnu granicu. Fonetski gledano, frankonski tonovi jako slične na latvijske silazne i složene tonove te na litavske silazne i uzlazne tonove. Poželjno je više podataka s područja središnjega frankonskoga.

Key words: glottal stop, glottalization, tonogenesis, Athabaskan languages, Balto-Slavic languages, Germanic languages

Ključne riječi: glotalni zatvor, glotalizacija, geneza tona, athabaskanski jezici, baltoslavenski jezici, germanski jezici