

Article

Kartvelian and the Issue of Glottalization in Nostratic

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Abstract: The article deals with the issue of glottalization in Nostratic with a special focus on Kartvelian. Several hypotheses of sound correspondences are tested between Kartvelian and Proto-Indo-European. It is concluded that Kartvelian glottalization is not inherited but is probably a feature originally of prosodic nature. Pre-Proto-Kartvelian only had a distinction between voiced and voiceless phonemes.

Keywords: Nostratic, Kartvelian, Glottalization.

1. *The consonants of Proto-Kartvelian*

The Proto-Kartvelian phonological system may be reconstructed as follows (Cf. Gamkrelidze 1967: 709; Gamkrelidze—Mačavariani 1982: 25—61; Schmidt 1962: 60; Bomhard 2008: 142):

	p	t	c	č	k	q	
Obstruents	pʔ	tʔ	cʔ	čʔ	kʔ	qʔ	
	b	d	dz	dž	g	(G)	
			s	š	x		h
			z	ž	γ		
Resonants	m	n	l	r	y/i	w/u	
Vowels			o, ȯ	a, ā	e, ē		

Table1: The proto-phonemes of Kartvelian

It can be noted that (1) The voiceless stops and affricates were aspirated (*p^h, *t^h, *c^h, *č^h, *k^h, *q^h). The aspiration is usually considered phonemically non-distinctive as glottalization is supposed to be the “real” phonemic feature, (2) The reconstruction of a voiced postvelar stop *G in Proto-Kartvelian is controversial. In Georgian, the glottalized postvelar *qʔ was preserved, while the voiceless (aspirated) and voiced postvelar stops merged with x and γ respectively.

2. *The issue of glottalization in Nostratic*

Two main approaches of the glottalized feature can be distinguished: the “American” school, most prominently represented by Bomhard, and the “Moscovite” school, historically initiated by Illič-Svityč and Dolgopolsky. Both Kartvelian and PIE have a three-way opposition between stops. The phonetic nature of Kartvelian features is coherent with the set that the Glottalic Theory of PIE proposes: voiced, voiceless and glottalized. For that matter Bomhard (2008) who adheres to the Glottalic Theory of PIE compares directly Kartvelian t d tʔ with PIE t d^h d (=tʔ). The sound correspondences according to Bomhard (2008) are therefore as follows:

Kartvelian	Traditional PIE	Glottalic Theory
*t	*t	*t
*tʔ	*d	*tʔ
*d	*dh	*d

Table2: Sound correspondences in the Glottalic Theory of PIE

Dolgopolsky (2008: 8) and the “Moscovite” school had a different approach:

The emphatic stops are represented in K[artvelian] as glottalized, in H[amito-]S[emitic] as glottalized or plain voiceless (the distribution being probably due to prosodic factors), in U[ralic] (in the intervocalic position) as geminated voiceless stops, in A[Itaic] as fortes, in IE (in its traditional interpretation) as voiceless. The common denominator of their K, HS, U and A reflexes is an additional effort (if compared to the reflexes of N[ostratic] plain voiceless stops). One cannot determine the original phonetic realization of this additional effort (glottalization, aspiration, fortis articulation?). I prefer to denote them as "emphatic" and to use the traditional Orientalistic underdot as their symbol.

Kartvelian	Traditional PIE	Nostratic Dolgopolsky	Afrasian Dolgopolsky
*tʔ	*t	*tʔ	*tʔ
*t	*d	*t	*t
*d	*dh	*d	*d

Table3: Sound correspondences in the “Moscovite” approach

The “Moscovite” approach has been criticized by the promoters of the Glottalic Theory for several reasons, as in Bomhard (2008: 23):

The mistake that Illič-Svityč and Dolgopolsky made was in trying to equate the glottalized stops of Proto-Kartvelian and Proto-Afrasian with the traditional plain voiceless stops of Proto-Indo-European. [...] Illič-Svityč and Dolgopolsky posit glottalics for Proto-Nostratic on the basis of a small number of seemingly solid examples in which glottalics in Proto-Afrasian and/or Proto-Kartvelian appear to correspond to traditional plain voiceless stops in Proto-Indo-European. On the basis of these examples, they assume that, whenever there is a voiceless stop in the Proto-Indo-European examples they cite, a glottalic is to be reconstructed for Proto-Nostratic, even when there are no glottalics in the corresponding Kartvelian and Afrasian forms! This means that the Proto-Nostratic glottalics have the same frequency distribution as the Proto-Indo-European plain voiceless stops. Clearly, this cannot be correct.

The conclusion reached by Bomhard (2008: 23) is that the system of sound correspondences proposed by the “Moscovite” school cannot be correct and should be entirely dismissed. The gist of the argument is that the voiceless phonemes traditional PIE are the most frequent and least marked and they should only correspond with phonemes displaying the lowest level of markedness in the other languages. It can also be noted that in the Glottalic framework the simultaneous existence of a three-way contrast in PIE, Kartvelian and Afrasian is considered to be a kind of implicit “proof” that this three-way contrast should be ascribed to their common ancestor but in my opinion there are serious reasons to doubt that this three-way contrast is very ancient in any of these sub-families.

Another argument for the Glottalic Theory of PIE is that it proposes an apparently “natural” explanation for the gaps in the distribution of phonemes in Proto-Indo-European. This is for example the point of view in Bomhard (2008:55-56):

For the first time, the root structure constraint laws can be credibly explained. These constraints turn out to be a simple voicing agreement rule with the corollary that two glottalics cannot cooccur in a root. Hopper (1973:160) cites Hausa, Yucatec Mayan, and Quechua as examples of natural languages exhibiting a similar constraint against the cooccurrence of two glottalics. Akkadian may be added to this list as well if we take Geers’ Law to be a manifestation of such a constraint.

The conclusions described above seem compelling at first sight. But there are a number of hidden premises in the reasoning. One is that the three-way opposition is inherited, another is that the glottalized phonemes of Kartvelian are inherited as well. The conclusion is valid only if these additional premises are accepted. If the glottalized phonemes of Kartvelian were originally plain voiceless then the correspondence between PIE *t and Kartvelian *tʔ is possible.

The article is dedicated to an assessment of these two premises:

1. How much certainty is there that the three-way opposition is really inherited?
2. Should Kartvelian glottalized be compared with PIE traditional voiceless (as Dolgopolsky or Illič-Svityč proposed) or with voiced phonemes (as Hopper, Gamkrelidze, Bomhard proposed)?

3. Critical assessment

As regards the three-way opposition a number of variants suggest that Kartvelian glottalization is acquired and that Kartvelian voiceless and glottalized both correspond with PIE voiceless:

- K. *ceck-* / *cick-* ‘to break, tear’ ~ PIE 929 *sek-* ‘to cut’
- K. *čkep̣-* ‘to cut into small pieces’ ~ PIE 931 *skep-* ‘to cut’
- K. *čečəḳ-* ‘to cut in little pieces’ ~ PIE 929 *sek-* ‘to cut’

- K. *čkal-* ‘to tear apart’ ~ PIE 895 *sek-*, *sker-* ‘to cut’
- K. *č[ḳ]ar-* ‘to cut’ ~ PIE 923 *skel-* ‘to cut’
- K. *kreč-* / *krič-* ‘to shear, cut off’ ~ PIE 923 *skel-* ‘to cut’

- K. *kwec-* / *kuc-* ‘to cut’ ~ PIE 586 *kes-* ‘to cut’
- K. *kwec-* ‘to cut, cut off’ ~ PIE 586 *kes-* ‘to cut’

- K. *cal-/cel-/cil-* ‘to tear away, peel’, *cel-* ‘to scythe’ ~ PIE 911 *ser-p-* ‘sickle, to cut off’
- K. *çičil-* ‘snake’ ~ PIE 912 *serp-* ‘to crawl, creep’

- K. *kap-* ‘to lop, chop’ ~ PIE 931 *s-kep-* ‘to scrape, cut’
- K. *kep̣-* ‘to cut in little pieces’ ~ PIE 931 *s-kep-* ‘to scrape, cut’

- K. *par-* / *par-* / *partx-* ‘to fly’ ~ PIE 835 *pleuk-* ‘to fly’
- K. *perpel-* ‘butterfly’ ~ Latin *papilio* ‘butterfly’

These items undermine the diachronic status of the contrast between voiceless and glottalized phonemes in Proto-Kartvelian. More examples will be listed below. It can also be noted that Kartvelian accepts roots with two (or more) glottalized phonemes: **čkep̣-* ‘to cut into small pieces’, **čečəḳ-* ‘to cut in little pieces’, **kreč-* / **krič-* ‘to shear, cut off’, **kep̣-* ‘to cut in little pieces’, **čkenṭ* / **čkinṭil-* ‘(bird) faeces’, **čump̣-* ‘to get wet’, **čkwerṭ-* ‘to roll up’, **kuć-* ‘to crush; small’, **p̣rṭq̣el-* ‘flat’, **kaḳ* ‘to bend, hook’, etc. Kartvelian, which somehow acts as an intellectual substrate for the Glottalic Theory, supports neither the impossibility or rarity of **p̣* nor the impossibility of two (or more!) glottalized phonemes occurring in a row in the same root.

4. Testing different patterns of sound correspondences for Kartvelian lexical data

As regards the second premise it is possible to compare and test the lexical yield of two hypotheses: in the first case Kartvelian *tʰ* is equated with PIE (trad.) *t*, in the other case Kartvelian *tʰ* is equated with PIE (trad.) *d*. Which works best with Kartvelian lexical data? The following examples are based on my own survey of Kartvelian as compared to PIE (as reconstructed in Klimov 1998).

Examples which work in both hypotheses: *b ~ bh*

- K. *bad* ‘net’, *band-* ‘to tie, plait’ ~ PIE 127 *bhendh-* ‘to bind’
- K. *bal* ‘merry tree, birch tree’ ~ PIE 139 *bherHk-* ‘birch tree’
- K. *barž-* ‘prop, stake’ ~ PIE 123 *bhel-g/k-* ‘plank, beam’
- K. *ber-* ‘to blow’ ~ PIE 120 *bhel-* ‘to blow’
- K. *betk-* ‘to beat, hit’ ~ PIE 112 *bhau-d/t-* ‘to strike’, Latin *battuere*

- K. *bex-* ‘to beat, strike’ ~ PIE 160 *bhlīg-* ‘to strike’ (with -l- infix and suffix -g-)
 K. *bez-* ‘to give a good beating’ ~ PIE 170 *bhreus-* ‘to break, pound’ (with -r-)
 K. *bežy-* ‘to get angry, to scream, to scold’ ~ PIE 115 *bheH₂-* ‘to speak’
 K. *bir-* ‘to sing’ ~ PIE 123 *bhel-* ‘to shout’
 K. *blanc* ‘fern’ ~ PIE 108 *bhar-s* ‘bristle, projection’
 K. *brdywen-* ‘to growl’ ~ PIE 160 *bhlē-* ‘to howl’
 K. *dag-* ‘to brand’ ~ PIE 240 *dhegwh-* ‘to burn’
 K. *dagr-* ‘to die’ ~ PIE 487 *ghdhei-* ‘to perish, die away’
 K. *ded* ‘mother’, *dedal* ‘female, hen’ ~ PIE 241 *dhē-* ‘to breast-feed’
 K. *deg-/dg-* ‘to stand, put’, *dew-/dw* ‘to lie, lay’ ~ PIE 235 *dhē-* ‘to set, put’
 K. *diyom-* (< *digom ?)¹ ‘humus’, *gim* ‘earth’ ~ PIE 414 *dhǵhem-* ‘ground’
 K. *dn-* ‘to flow; to disappear’ ~ PIE 249 *dhen-* ‘to flow’, 261 *dhwen* ‘to disappear’
 K. *duy-* (< *dug ?) ‘to boil, cook’ ~ PIE 240 *dhegwh-* ‘to burn’
 K. *dum-* ‘to be silent’, *dura* ‘deaf’ ~ PIE *dheu-* > *dumb*
 K. *g-* ‘this’ ~ PIE 417 *ghe-*, *ghi-* ‘this’
 K. *gargal-* ‘to speak; to make noise’ ~ PIE 428 *ghel-* ‘to call’
 K. *glas-* ‘to smear’ ~ PIE 457 *gher-*, *ghrēi* ‘to rub, smear’
 K. *gog-* ‘to proceed (solemnly)’ ~ PIE 456 *ghredh* ‘to walk’
 K. *gz(a)-* ‘road, to go’ ~ PIE 418 *ǵhē* ‘to release, let go’
 K. *yob-* ‘to plait’, *xwe(w)-* ‘to entwine, wrap’ ~ PIE 1114 *webh* ‘to weave’
 K. *yor-* ‘to deceive’ ~ PIE 1140 *wel-* ‘to deceive’
 K. *yreḱ-/yriḱ-* ‘to bend, twist’ ~ PIE 1140 *wel-* ‘to turn, roll’
 K. *yryad* ‘goose’ ~ PIE 30 *al-bho* ‘white’
 K. *yul-* ‘bent, crooked’ ~ PIE 1152 *wer* ‘to turn, bend’
 K. *yun-* ‘to bend’ ~ PIE 1148 *wen* ‘to bend, curve’
 K. *y(w)-* ‘to have, carry’ ~ PIE 75 *aw* > Germanic *audaz* ‘property’
 K. *ywed-* ‘strap’ ~ PIE 1116 *wedh* ‘to bind, attach’
 K. *ywer-* ‘to pour, drip, soak’ ~ PIE 1145 *wel-k* ‘wet’
 K. *mgel-* ‘wolf’ ~ PIE 493 *ǵhwer* ‘wild beast’
 K. *txow-* ‘to ask’ (with assimilation) ~ PIE *dheH₁* ‘to say’
 K. *wed-* ‘to wish, ask for’ ~ PIE 1109 *wadh-* ‘pledge’
 K. *wed-/wid-* ‘to go’ ~ PIE 1109 *wādhd-* ‘to go’

Examples where K. glottalized “correspond” with PIE (trad.) voiceless

- K. *anḱes* ~ PIE 2, 45 *ank-* ‘fishing pole, hook’
 K. *bač* ‘rope’ ~ PIE 111 *bhas-ko* ‘band, bundle’
 K. *berčq-* ‘to glitter’ ~ PIE 120 *bhel-*, *blisk-* ‘to shine’
 K. *buḱ* ‘inflorescence, leaf’ ~ PIE 146 *bheu-t-* ‘to be; to grow (plant)’
 K. *čxap-* ‘to splash’ ~ PIE 992 *s-phereg-* ‘to scatter’, 993 *s-per* ‘to strew’
 K. *ć(a)n-* ‘to plait’ ~ PIE 973 *snē-* ‘to spin, sew’
 K. *čar* ‘sour, salty’ ~ PIE 1039 *sūro* ‘sour’
 K. *çičil* ‘snake’ ~ PIE 912 *serp-* ‘to crawl, creep’
 K. *čip* ‘birch’ ~ PIE 55 *apsā* ‘aspen’
 K. *čkar-/čkr-* ‘to ring, make noise’ ~ PIE 548 *kel-* ‘to shout’
 K. *čkent/čkinṭil, kund* ‘(bird) faeces’ ~ PIE 947 *sker-* (Gen. *sknt-*) ‘excrement’
 K. *čkep-* ‘to cut into small pieces’ ~ PIE 931 *skep-* ‘to cut’
 K. *čkwar-/čkur-* ‘to close the eyes, wink’ ~ PIE 928 *skel-* ‘to blink, wink’ (-w- !)
 K. *čkwert-* ‘to roll up’ ~ PIE 639 *kwel-* ‘to revolve’
 K. *čob-/čow-/čuč* ‘to suck’ ~ PIE 912 *seu-* ‘to drink’
 K. *čq-/čqar-* ‘to annoy, ache’ ~ PIE 912 *skēth-* ‘to injure’
 K. *čqal-/čql-* ‘to wound’ ~ PIE 912 *skēth-* ‘to injure’
 K. *čq(ew)-* ‘to curse’ ~ PIE 897 *sekw-* ‘to speak, to say’

¹ Possibly because of the back vowel -o-, *g > ḡ. Cf. *duy*.

- K. *ćqrta* ‘elbow’ ~ PIE 928 *skel-* ‘crooked, leg, limb’
 K. *ćqwed-* / **ćqwid-* / **ćqwd-* ‘to tear’ ~ PIE 918 *skhed-* ‘to split’ (-w- !)
 K. *čump-* ‘to get wet’ ~ PIE 1052 *swomb(h)o-* ‘spongy ; swamp’, 1046 *swem*
 K. *čurbel* ‘leech’ ~ PIE 1045 *swel-* ‘to eat, drink’
 K. *čuž-* ‘male child’ ~ PIE 913 *seu-* ‘to give birth, son’
 K. *čw* ‘to burn, roast, make fire’ ~ PIE 68 *as-* ‘to burn’, 506 *yes-* ‘to boil’
 K. *čwer-* ‘to stump (wood)’ ~ PIE 1050 *swer-* ‘to cut, pierce’
 K. *čwet-* ‘(water) drop’ ~ PIE 1050 *sweid-* ‘to sweat’
 K. *č[k]jar-* ‘to grasp, hold’ ~ PIE 888 *seǵh-* ‘to hold’
 K. *č[k]jar-* ‘to cut’ ~ PIE 923 *skel-* ‘to cut’
 K. *čečķ-* ‘to cut in little pieces’ ~ PIE 929 *sek-* ‘to cut’
 K. *č[k]jir-* ‘to need, have a need’ ~ PIE 927 *skel-* ‘to be under an obligation’
 K. *yać-* ‘cheek’, *yač* ‘jaw’ ~ PIE 784 *ous, aus* ‘mouth’ (-w- !)
 K. *hweķ* ‘sharp end, thorn’ ~ PIE 18 *aķ* ‘sharp’ (-w- !)
 K. *kać-* ‘to cut, chop’ ~ PIE 586 *ķes* ‘to cut’
 K. *kal-* / *kl-* ‘not to suffice, short’ ~ PIE 938 *s-ker* ‘to cut, short’
 K. *kalmax* ‘fish’ ~ PIE 958 *s-kwalos* ‘big fish’ (wanderwort ?)
 K. *kap-* ‘to lop, chop’ ~ PIE 931 *s-kep* ‘to scrape, cut’
 K. *kar-* / *kr-* ‘to hit, beat’ ~ PIE 545 *kel-* ‘to strike, cut’
 K. *kep* ‘back of the head, skull’ ~ PIE 529 *kap-ut* ‘head’
 K. *kep-* ‘to cut in little pieces’ ~ PIE 931 *s-kep* ‘to scrape, cut’
 K. *ker* ‘fireplace’ ~ PIE 551 *kel* ‘warm’
 K. *ket-* ‘to mix in’ ~ PIE 632 *kwet-* ‘to shake, paste’
 K. *kiw-* / *kiw-* / *rki-*, *krčx-* ‘to shout’ ~ PIE 548 *kel-* ‘to shout’
 K. *ķmin-*, *ķum-* ‘to moan (quietly), howl’ ~ PIE 556 *kem-* ‘to hum’
 K. *ko-* ‘to wish’ ~ PIE 515 *kā-* ‘to like, desire’
 K. *kon-* ‘to bind’ ~ PIE 565 *kenk-* ‘to gird, bind’
 K. *krab-* / *krap-* ‘to collect, gather’ ~ PIE 938 *kerp-* ‘to pluck’
 K. *kreč-* / *krič-* ‘to shear, cut off’ ~ PIE 923 *skel-* ‘to cut’
 K. *krķ-* ‘to twist, coil, ring’ ~ PIE 639 *kwel-* ‘to revolve’ (-w- !)
 K. *krrox-* ‘to cackle, brood-hen’ ~ PIE 548 *kel-ə-* ‘to shout’
 K. *kuć-* ‘to crush; small’ ~ PIE 586 *ķes-* ‘to cut’ (-w- !)
 K. *kurčx-* / *ķwarčx* ‘leg’ ~ PIE 928 *skel-* ‘crooked, leg, limb’ (-w- !)
 K. *kwad-* / *kud-* ‘tail’ ~ Latin *cauda* ‘tail’
 K. *kwam-/ķwm-* ‘to smoke’ ~ PIE 595 *kēu-* ‘to burn’
 K. *kwart-* ‘clothes’ ~ PIE 951 *s-keu-* ‘to cover’
 K. *kwax-* ‘unripe, sour’ ~ PIE 627 *kwath-* ‘to ferment, be sour’
 K. *kwec-* ‘to cut, cut off’ ~ PIE 586 *ķes-* ‘to cut’ (-w- !)
 K. *kwer* ‘round, scone’ ~ PIE 639 *kwel-* ‘to revolve’
 K. *kwerčx-* ‘to split’ ~ PIE 923 *skel-* ‘to cut’ (-w- !)
 K. *kwir-* ‘to look, wonder at’ ~ PIE 775 *okw-* ‘eye’
 K. *mčax-* ‘very sour’ ~ PIE 1039 *sūro* ‘sour’
 K. *perčķ* ‘to split, crack’ ~ PIE 988 *s-pel-* ‘to split’
 K. *perpel* ‘butterfly’ ~ Latin *papilio* ‘butterfly’
 K. *pox-* ‘fat’ ~ PIE 793 *peya* ‘fat’
 K. *prīqel-* ‘flat’ ~ PIE 805 *pelə-*, 833 *plat* ‘flat’
 K. *pu-* ‘to cut, hack’ ~ PIE 827 *peuə-* ‘to cut, strike, prune’
 K. *puť-wn-* ‘to pluck (fowl)’ ~ PIE 827 *peuə-* ‘to purify, cleanse’
 K. *tqub* ‘twins’ ~ PIE 642 *kwetwer* ‘four’
 K. *tqw-* ‘to talk’ ~ PIE 1088 *tolkw-* ‘to speak’ (with -l-)
 K. *zap-* ‘to speak’ ~ PIE 996 *sp(r)eg-* ‘to speak’
 K. *zep-*, *žez-* ‘to pound’ ~ PIE 985 *spel-* ‘to split, break off’

Examples where K. glottalized “correspond” with PIE (trad.) voiced

- K. *beḱ-* ‘to trample’ ~ PIE 116 *bhegw-* ‘to run away’
- K. *berḱen* ‘wild pear’ ~ PIE 173 *bhrūg* ‘fruit’
- K. *buḱwn-* ‘to gobble up’ ~ PIE 170 *bhaḱ-* > Greek *phagein* ‘to eat’
- K. *ḱitx-* ‘to ask, read, recite’, *ḱwet* ‘to promise’ ~ PIE 480 *gwet-* ‘to say, speak’
- K. *kr-* ‘to glitter’ ~ PIE 366 *ḡel-* ‘bright’
- K. *ḱrḱo-* ‘acorn’ ~ PIE 472 *gwel-* ‘acorn’ (-w- !)
- K. *ḱwed-/ḱwd-* ‘to die’ ~ PIE 466 *gwedh-* ‘to push, injure’

Examples where K. voiceless “correspond” with PIE (trad.) voiced

- K. *ati* ~ (?) PIE 191 *deḱm* ‘ten’
- K. *karb* ‘belly’ ~ PIE 1145 *gwelbh* ‘womb’
- K. *kmār* ‘husband’ ~ PIE 369 *ḡemā-* ‘to marry’
- K. *kwēr-* ‘to cool down’ ~ PIE 365 *gel* ‘cold’ (-w- !)
- K. *te* ‘light’ ~ PIE 183 *dei(w)*
- K. *titi, ḱit* (?) ‘finger’ ~ PIE 188 *deiḱ, deiḡ*
- K. *tx-* ‘to flow’ (with assimilation) ~ PIE 175 *deH₂*

Examples where K. voiceless “correspond” with PIE (trad.) voiceless

- K. *ca* ‘sky’ ~ (?) PIE 48 *ansu* ‘god’
- K. *cal-/cel-/cil-* ‘to tear away, peel’, *cel-* ‘to scythe’ ~ PIE 911 *ser-p-* ‘sickle, to cut off’
- K. *car-* / *cr-* (?), *cxir* ‘to sift’ ~ PIE 889 *sē-* ‘to sift’
- K. *cc-* ‘to laugh’ (Georgian *si-c-il-*) ~ PIE 1040 *sward-* ‘to laugh’
- K. *ceck-* / *cick-* ‘to break, tear’ ~ PIE 929 *sek-* ‘to cut’
- K. *cem-* ‘to smear’ ~ PIE 970 *smeru-* ‘grease, to smear’
- K. *ćx* ‘heat’ ~ PIE 68 *as-* ‘to burn’, 506 *yes-* ‘to boil’
- K. *ćxi(n)ḱ-* ‘to sneeze’ ~ PIE 971 *snē* ‘imitative words involving the nose’
- K. *ćkal-* ‘to tear apart’ ~ PIE 895 *sek-, sk-* ‘to cut’
- K. *ćkep-* ‘to flow’ ~ PIE 893 *seikw-* ‘to flow’
- K. *ćwem* ‘we, us’, *ćem* ‘me’ ~ PIE 1114 *we* ‘we, us’, 702 *me* ‘me’
- K. *ešw* ‘boar, pig’ ~ PIE 1038 *sū* ‘pig’
- K. *kas-* ‘to sweep, clean up’ ~ PIE 585 *kes-* ‘to scrape’
- K. *ker* ‘scale, dandruf’, *kurč* ‘bark, husk’ ~ PIE 923 *s-ke-* > Germanic *skal-* ‘shell, scale, husk, etc.’
- K. *keš-* ‘to suffocate’ ~ PIE 931 *kwes-* ‘to pant, wheeze’
- K. *kor* ‘house’ ~ PIE 639 *kwel* > Latin *col-* ‘to inhabit’
- K. *kwab* ‘cave’ ~ PIE 592 *kew* ‘hole, cave’
- K. *papar-* ‘mane’ ~ PIE 803 *pel* ‘skin, hide’, Latin *pilus*, 838 *pleus* ‘feather, fleece’
- K. *par-* / *ḡar-* / *partx-* ‘to fly’ ~ PIE 835 *pleuk* ‘to fly’
- K. *per-* ‘gray’ ~ PIE 804 *pel* ‘pale’
- K. *pertx-* ‘to shake’ ~ PIE 801 *pel* ‘to thrust, strike’
- K. *pir(š)ḱw-* ‘lungs’ ~ PIE 835 *pleu* ‘lung’
- K. *pol-* ‘big hoof, foot’ ~ PIE 823 *per-sna* ‘heel’
- K. *po(š)tel-* ‘leaf of plant’ ~ PIE 824 *pet-* ‘to spread’
- K. *pr-* ‘many’ ~ PIE 798 *pel-* ‘full, a lot’
- K. *preç-* / *priç-* ‘to tear’ ~ PIE 835 *plēḱ-* ‘to tear’
- K. *ps-* ‘to urinate’ ~ Latin *pissāre* ‘id.’
- K. *pšw-en-* / *pšwn-* ‘to mince, crumble’ ~ PIE 796 *peis-* ‘to crush, pestle’
- K. *pu-* ‘to expand, to rise’, *pupul* ‘boil’ ~ PIE 847 *pu-* ‘to swell’
- K. *puc-* ‘(a) little’ ~ PIE 842 *pou-* ‘little, few’
- K. *px-* ‘warm’ ~ PIE 828 *pūr-* ‘fire’
- K. *zećx* ‘fire’ ~ PIE 68 *as-* ‘to burn’, 506 *yes-* ‘to boil’

K. *zeša* ‘firewood’ ~ PIE 68 *as-* ‘to burn’, 506 *yes-* ‘to boil’

Contradictory examples

- K. *yrč-* / *krč-* ‘to gnash the teeth’ (onomatopoeic ?) ~ PIE 26 *al-* ‘to feed’
- K. *kaḱ* ‘to bend, hook’ ~ PIE 537 *keg* ‘hook’
- K. *kaḡ* ‘stick, cane’ ~ PIE 409 *ghabhlo* ‘branch’
- K. *kaḡ* ‘jaw, chin’ ~ PIE 423 *ghebhel* ‘head’
- K. *keḡ* ‘roof’ ~ PIE 423 *ghebhel* ‘head; roof’
- K. *kit, titi* ‘finger’ ~ PIE 188 *deik, deiḡ* ‘finger’
- K. *mṭḱaw* ‘five fingers’ ~ PIE 188 *deik, deiḡ* ‘finger’
- K. *zalw-* ‘fetters, trap’ ~ PIE 911 *ser-* ‘to line up, to attach’
- K. *zywar-* ‘limit, yard’, *zyw-ed-* / *zyw-d-* ‘to limit, fence’ ~ PIE 898 *swel-* ‘post, doorsill’
- K. *zirt-* ‘to glide’ ~ PIE 901 *selk-* ‘to drag, pull; seal’
- K. *zisxl-* ‘blood’ ~ PIE 343 *es-* ‘blood’
- K. *ziz-* ‘to (over)fill’, *zey-* ‘to be satiated’ ~ PIE 876 *sā* ‘to be satisfied, satiated’
- K. *zoḡw* ‘sea’ ~ PIE 878 *sal-* ‘salt’
- K. *zrk-el-* ‘fat’ ~ PIE 901 *selp-* ‘fat, butter’
- K. *z-* ‘to lie, to be’ ~ PIE 340 *es-* ‘to be, to sit’

Potential loanwords and look-alikes

- K. *breg-* ‘to knock, hammer’ (irregular -g-) ~ PIE 165 *bhreḡ-* ‘to break’²
- K. *cag* ‘thorn’, *žegw* ‘thorny bush’ ~ Latin *sagitta* ‘arrow’
- K. *čartw* ‘magpie’, *žižy, zašw* ‘blackbird’ ~ PIE 1096 *trozd* ‘thrush’ (onomatopoeic ?)
- K. *ekšw* ‘six’ (a loanword ?) ~ PIE 1044 *s(w)eks* ‘six’
- K. *kwel-* ‘to hide, conceal’ (a loanword ?) ~ PIE 553 *kel-* ‘to hide, cover’ (-w- !)
- K. *kwer-* / *qwer* ‘crow’ ~ PIE 383 *ger-*, 567 *ker-* ‘to cry hoarsely (bird)’ (onomatopoeic)
- K. *qel* ‘neck’ (irregular -l-) ~ PIE 639 *kwel-* ‘to turn; neck’
- K. *lag-* ‘to put’ (irregular -l-) ~ PIE 660 *leg-* ‘to lie, lay’
- K. *leqw-* / *lqw-* ‘to melt’ (irregular -l-) ~ PIE 669 *leikw-* ‘liquid’
- K. *loḱ-* ‘to lick’ (irregular -l-) ~ PIE 668 *leiḡh-* ‘to lick’
- K. *ma(n)g-* ‘strong, sturdy’ (irregular -g-) ~ PIE 708 *meg-* ‘great’
- K. *mḱerd-* ‘breast’ (irregular -r- and -d-) ~ PIE 579 *kerd-* ‘heart’
- K. *žel-* ‘tree’ ~ PIE 879 *salik* ‘willow’

5. Results of the tests

The results can be summarized in the following table:

	PIE trad. voiced	PIE trad. voiceless	PIE trad. voiced aspirate
K. voiceless	7	33 (21%)	
K. glottalized	7	70 (44%)	
K. voiced		8	38 (22%)

Table4: Quantitative “yield” of the different “correspondences”

The conclusion is that an overwhelming majority of Kartvelian glottalized phonemes correspond with PIE voiceless - as the “Moscovite” school proposed - and not with PIE voiced. The number of cases where Kartvelian glottalized corresponds with PIE voiced probably reflects the potential for chance coincidence. It is therefore unsurprising that Bomhard (2008) contains very few instances of the (erroneous) correspondence: PIE (trad.) *voiced* ~ Kartvelian *glottalized*. In fact the correct conclusion is that Kartvelian glottalized cannot correspond with PIE plain voiceless *and*

² Note the infixal paradigm: PIE 115 *bheg-*, 165 *bhreḡ-*, 154 *bhlag-* ‘to strike, to break’.

Afrasian emphatics *at the same time*. There is little doubt that PIE voiceless corresponds with *both* Kartvelian glottalized *and* voiceless.

This situation leads to the following scenario: Proto-Kartvelian and Pre-PIE had only two series, voiceless and voiced.

Kartvelian	Traditional PIE
*tʔ = *t ^h	*t = *d
*d	*dh

Table5: Modified Sound correspondences

This means that the comparanda for the specific relationship between PIE and Kartvelian in Dolgopolsky are probably better than those in Bomhard (2008) on the whole, as the glottalized phonemes of Kartvelian do *not* come from originally glottalized phonemes. In this approach the gaps in PIE roots are the trace of a phonological split.

6. Kartvelian glottalization and accent

In the analysis which I propose here Kartvelian first lost glottalization then reacquired glottalization and aspiration as described below:

- Kartvelian *d
- Kartvelian *t > secondary split into *t^h (unaccented) and *tʔ (accented)

It is probable that the glottal split of *C > Cʔ / C^h in Kartvelian has a relationship with the position of accent in Proto-Kartvelian or in a deeper stage. This would explain why Kartvelian generally admits only one glottalized per root as there is only one accented syllable, even though it has already been noted that there are numerous instances of glottalized sequences.

An interesting example is K. *zap- ‘to speak’. The Indo-European comparanda are: (1) *sprek-: Welsh *ffreg* ‘talk, chatter’ (with final *-k), (2) *spreg-: Albanese *shpreh* ‘I speak out’ (< *spreg-sk-), OE *sprecan*, OHG *sprehhan* ‘to speak’, OE *spraec*, OHG *sprāhha* ‘language’, (3) *speg-: OHG *spehhan*, OE *specan* ‘to speak’, OE *spaec* ‘speech’, English *to speak*, *speech*, MHG *spaht* ‘chatter, loud song’, *spehhen* ‘to chatter’. The Indo-European comparanda show that neither -r- nor the final -g / -k can be part of the root, which is therefore the unaccented zero grade of √z_p. A similar example is K. *zep- ‘to pound’ ~ PIE 985 *spel-* ‘to split, break off’, which is listed as having s-mobile but nearly all comparanda do have s-. Cf. PIE 1000 *splei* ‘to splice, split’, which is also coherent with an unaccented root √z_p > *sp-. Another case, which may be a borrowing, is K. *ankes ~ PIE 2, 45 *ank- ‘fishing pole, hook’: Indic *ankāh*, Greek and Germanic < *ankón are coherent with an unaccented root. One more example is K. *čq(ew)- ‘to curse’ ~ PIE 897 *sekw- ‘to speak, to say’: Greek and Germanic indicate that this word was not accented on the root.

These examples tend to show that Kartvelian glottalization is correlated with PIE accent: inherited voiceless phonemes became glottalized in (pre-)Proto-Kartvelian when they were followed by the accented vowel. Another indication that glottalization is linked with prosody is that voiceless phonemes are conspicuously rare in Kartvelian monoliteral verbs:

- K. *b- ‘to pour’ ~ (no **p-, no **p̥-)
- K. *č- ‘to give ; to beat’ ~ *č̥- ‘to reach, arrive’ ~ *ž- ‘to exceed’ ~ (no **š̥-, no **š̄)
- K. *č- ‘to dip’ ~ *z- ‘to press, squeeze’ ~ (no **s)
- K. (no **d-, no **t-, no **t̥-)
- K. *g- ‘to thread, string ; to acquire, win’ ~ (no **k-, no **k̥-)
- K. *i- ‘to arrive, reach’
- K. *l- ‘to decrease ; to wait’ ~ *m- ‘to carry, bring’ ~ *n- ‘to wish’ ~ *r- ‘to win ; to save’

- K. (no ****q-**, no ****q̥**)
- K. ***x-** ‘to touch’ ~ ***y(w)-** ‘to have, carry, possess’
- K. ***dž-** ‘to be (lying)’ ~ (no ****č-**)

Another set of verbs corresponding to the zero grade of ***C_w** involves many more voiceless phonemes and nearly no glottalized:

- K. ***pu(w)-** ‘to expand, to rise (dough)’
- K. ***č_w-** ‘to burn, roast’ ~ ***ž_w-** ‘old’ ~ ***čč_w-** ‘to soften, soft’ ~ ***č_w-** ‘to get used to’
- K. ***c_w-** ‘to put on, to string on’
- K. ***dew-/d(w)-** ‘to lie, lay’
- K. ***gu-** ‘to get used to’ ~ ***g_w-** ‘to feed ; to stop, hinder, be late’
- K. ***q_w-** ‘to select, to eliminate’
- K. ***zu-** ‘to buzz’ ~ ***s_w-** ‘to smear ; to have ; to insert’ ~ ***ś_w-** ‘to drink’
- K. ***š_w-** ‘to give birth ; to resemble ; to let go, leave’ ~ ***ž_w-** ‘to defecate’
- K. ***x_w-** ‘to meet’ ~ ***γ(w)-** ‘to have, carry, possess’

There is nearly a complete distributional symmetry between monoliteral verbs, where voiceless phonemes are incredibly rare, and **C_w**-type verbs, where voiceless phonemes are well represented and glottalized phonemes are rare.

ᵑ	ᵑ̥	ɛ	ɛ̥	ᵑ	ᵑ̥	
pʔ	ᵑ̥ʔ	cʔ	čʔ	ᵑ̥ʔ	ᵑ̥ʔ	
b	ᵑ̥	dz	dž	g	(ᵑ̥)	
		ᵑ̥	š	x		ᵑ̥
		z	ž	γ		
m	n	l	r	y	ᵑ̥	

Table6: Phonemes attested in monoliteral roots

p	ᵑ̥	c	č	ᵑ̥	q	
ᵑ̥ʔ	ᵑ̥ʔ	ɛ̥ʔ	čʔ	ᵑ̥ʔ	ᵑ̥ʔ	
b	d	ᵑ̥	dž	g	(ᵑ̥)	
		s	š	x		ᵑ̥
		z	ž	γ		
ᵑ̥	ᵑ̥	ᵑ̥	ᵑ̥	ᵑ̥	ᵑ̥	

Table7: Phonemes attested in **C_w**-type roots

In monoliteral verbs, where accent must have immediately followed the only consonant of the root, voiceless consonants are nearly absent. The rarity or near absence of the least marked phonemes in the class of monoliteral verbs is in all cases a typological oddity. It can also be noted that dental stops are quite unexpectedly very poorly attested in these two types of verbs.

6. Conclusion

The three-way opposition between voiceless, voiced and glottalized phonemes in Kartvelian does not appear to be inherited. Glottalization is an innovative and possibly recent feature of Kartvelian which was correlated with accentuation. Originally (Pre-)Proto-Kartvelian only had two series: voiced and voiceless.

Annexe: Sound correspondences of the comparanda

K	PIE	K	PIE	K	PIE	K	PIE	K	PIE	K	PIE	K	PIE		
p	p, b	t	t, d	c	s	č, ć	s	k	k, g	q	k, g				
pʷ		tʷ		cʷ		čʷ, ćʷ		kʷ		qʷ					
b	bh	d	dh	dz		dž		g	gh	(G)	/				
				s		š		x	H ₁				h	/	
				z		ž		γ	H ₂ , w						
m	m	n	n	l	r	r	l	y/i	y/i	w/u	w/u				

Table8: Sound correspondences

References

Bomhard, Allan R.

2008 *Reconstructing Proto-Nostratic, Comparative Phonology, Morphology, and Vocabulary*. Volumes 1 (xxi, 875pp) & 2 (976pp). Leiden, Boston: Brill.

Klimov, Georgij Andrejevich

1998 *Etymological dictionary of the Kartvelian languages*. Berlin, New York: Mouton de Gruyter.