

PROBLEMS OF NOSTRATIC COMPARATIVE PHONOLOGY

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Nostratic consonant system
according to Illič-Svitšč
("Opit sravneniya nostratičeskix yazykov")

p'	p	b		m		w		
ṭ	t	d		n	l	r		
ç	c	ʒ	s	z				
č̣	č	č̣	š	ž??	ń	í	f	j
č̣	č̣	č̣	ṣ̌	ẓ̌	ñ	î		
			ṣ̌	ẓ̌				
ķ	k	g						
q	q	ɣ						
			ħ	ʕ				
ʔ			h					

Nostratic consonant system
at the present state of research
(A. Dolgopolsky)

p̣	p	b		m		w		
ṭ	t	d		n	l	r		
ç̣	c	ʒ	s	z				
č̣	č	č̣	ṣ̌	ẓ̌	ń	í	f	y
č̣	č̣	č̣	ṣ̌	ẓ̌	ŋ	ɭ		
č̣	č̣	č̣	ṣ̌	ẓ̌				
ķ	k	g		ŋ				
q	q	ɣ	x	ɣ				
			ħ					ʕ
ʔ			h					

Symbols: Illič-Svitšč: under-dot (ṭ, ç, ķ) - glottalized consonants (ejectives); ħ - voiceless pharyngeal fricative; ʕ - voiced pharyngeal; ń, î - cacuminal n, l; ṣ̌, ẓ̌ - voiceless and voiced lateral fricatives; q, q, ɣ - postalveolar stops; ʒ, č̣, č̣ - voiced affricates.

Dolgopolsky: under-dot - glottalized consonants; ŋ, ɭ - postalveolar (cacuminal, retroflex?) n, l; circumflex (č̣, č̣, č̣, ṣ̌, ẓ̌) denotes lateral obstruents; ʒ, č̣, č̣, č̣ - voiced affricates; q, q, ɣ - uvular stops; x, ɣ - uvular fricatives (= Arabic ح, ع); ħ - voiceless epiglottal (pharyngeal) fricative (Arabic ح); ʕ - epiglottal (pharyngeal) approximant (Arabic ع).

Vladislav Illič-Svitšč (1932 - 1966) was the first scholar to discover regular phoneme correspondences between the daughter-languages of the Nostratic macrofamily and to reconstruct the underlying proto-Nostratic phonemes, as well as some 600 Nostratic roots.

Since Illič-Svitšč's death 22 years ago there have been many important achievements in Hamito-Semitic (especially Chadic, Cushitic, Semitic and Berber), Uralic, Indo-European and Dravidian comparative linguistics, in Kartvelian lexicography, in Tungusian and Turkic etymology, etc. In the light of these achievements and a remarkable increase in the stock of reconstructed Nostratic stems Illič-Svitšč's phonological reconstructions may be verified and, wherever necessary, modified or revised.

The most essential parts of Illič-Svitšč's system of reconstructions have been corroborated by a large number of recently discovered Nostratic roots. This is true of his theory of the Nostratic stops and their reflexes (IE mediae = Kartvelian and Hamito-Semitic voiceless = Uralic intervocalic short stops, etc: IE mediae aspiratae = Kartv. and HS voiced stops = Uralic intervocalic voiced fricatives, etc.; IE tenues = Kartv. and HS ejectives and [deglottalized] voiceless stops = Uralic intervocalic long stops, etc.)¹, as well as of his theory of the IE labialization and palatalization of the gutturals and of the [Kartvelian] and HS labialization as reflecting the following p[roto]-N[ostratic] vowel. Other parts of his hypothesis (correspondences of the resonants and a large part of his theory of laryngeals) have been corroborated as well.

¹ No wonder that a recent attempt to establish a different set of IE-Semitic correspondences of stops (made by a scholar not acquainted with the Nostratic studies of Illič-Svitšč and his school) has proved to be unsuccessful.

What needs ~~to be~~ revision, in my opinion, are some parts of his theory of sibilants and especially affricates.

To my mind, four points are to be reconsidered:

A. The least important change is a different phonetic interpretation of some phonemes reconstructed by V. Illič-Svitič: his *š, *č and *ç are to be reinterpreted as plain (not palatalized) sibilants *s, *c and *ç, while IS's *s, *c, *ç and *ʒ should be understood as palatal sibilants *š, *č, *ç and *ʒ. Actually my interpretation is more or less identical to that found in an earlier paper by V. Illič-Svitič, namely his article "Material k sravneniyu nostratičeskix yazikov" (written in 1965 and published in 1967).

In pN three orders² of sibilants (including affricates) are to be distinguished: a *s-order, a *š-order and a *ž-order (leaving apart for the moment the lateral *š-order). The distinction of *s, *š and *ž:

Proto-Nostratic			
IS's interpretation ("Opit sravneniya")	IS's earlier notation and my notation	Kartvelian	Uralic
*s	*š	*s	*š
*š	*s	*š (Klimov's *s ₁)	*s
*ž	*ž	*ž	*ž

Cp. the distinction between plain and palatal consonants among the resonants:

*n	*n	*n	*n
*ñ	*ñ	*n	*ñ
*l	*l	*l	*l
*l̃	*l̃	*l ₂ , *r/l	*l̃

As we can see from the history of the resonants, it was Uralic and not Kartvelian that preserved the Nostratic distinctive feature of palatality. If U *ñ and *l̃ go back to pN *ñ and *l̃, it is reasonable to suggest that the pN sibilant underlying U *š is to be interpreted as *š. As to Kartvelian, in its prehistory there was a sibilant shift:

pN *š, *č, *ç, *ʒ > pKartv. *s, *c, *ç, *ʒ

pN *s, *c, *ç, *ʒ > pKartv. *š, *č, *ç, *ʒ (= Klimov's *s₁, *c₁, *ç₁, *ʒ₁).

The phonetic nature of the K *š-order is hard to determine. What we know is that it has yielded hissing sibilants (s, c, ç, ʒ) in Georgian and hushing sibilants (š, č, ç, ʒ) in Megrelian, Laz and Svan (and therefore it is called "hissing-hushing sibilants" by Klimov) and that it differs both from the *s-order and the *ž-order. It is my guess that the difference between the *š-sibilants and the *š-sibilants in K may resemble that between two series of hushing sibilants in Abkhaz (a West Caucasian language connected by Sprachbund ties with Kartvelian): the lamino-post-alveolar š, š̃, č, č̃, ʒ, ʒ̃ (ш̃, ж̃ etc. of the practical Cyrillic orthography) and the apico-palatal š̂, š̂̃, č̂, č̂̃, ʒ̂, ʒ̂̃ (ш̂, ж̂, etc. of the Cyrillic orthography). I hope that it will be possible to cast some etymological light on the question by studying loan-words in Kartvelian and Abkhazo-Circassian.

B. In "Opit sravneniya" (vol. I, p. 148) we find a correspondence: pN *ʒ > Hamito-Semitic *d̂, Kartvelian *ʒ₁, IE *-sd- (?), Dravidian *c-, Altaic *ʒ̃-. This sound correspondence and this reconstruction are to be flatly rejected. Here the HS data have been misinterpreted due to a misleading Semitological traditional notation of the Semitic lateral ejective *č̂ (or *č̂̂) as "d̂". The alleged sound correspondence is based on three etymologies only:

(1) N *ʃvʃv 'branch' > HS "d̂": Sem. "d̂" (i.e. *ʃiʃ-) 'tree', Eg. ʒʃʃ 'branch', Berb.: Shilh aḡḡa 'trunk, log', as well as some words of Cushitic and Chadic languages meaning 'tree' and bearing

² "Order" (articulatory type) in the sense of A. Martinet's phonological theory (A. Martinet, *Éléments de linguistique générale*).

some phonetic resemblance to S *ʃiʃ-: Beja hindi/e, Saho haḷā, Afar haḷā, Iraqw xa'teno, Burungi ḥāda 'stick', Chad "*Hḡ" 'tree' > Hausa íṭāḷē, Bolewa oče, Mandara hāzā (i.e. há:zā) 'tree', etc. || IE *H(o)sd-o- 'branch' (Illič-Svitšič, *Opět-sravnění nostratičeskix jazıkov*, I, p. 276-7).

(2) N *ʃ(a)ṇv 'foetus, pregnancy, posterity' > HS "*ḡn-" 'to get pregnant, posterity; brother, sister': Sem. "*ḡn-" (i.e. *ḡn-) > Arab. ḡanw-, ḡinw- 'small children', ḡan'- 'posterity', Geez "ḡns" (i.e. ḡns) 'to get pregnant' | Cush. 'brother': Beja san, Bilin dan, pl. šán, Kemant, Quara zän, Hamir zin, etc.; Kambatta hizo, etc. | Chad. *(ḡ)ṇ- > Mandara bzāt-(allegedly from *mzṇ) 'child, sun', Kanakuru, Hina, Tera žina, Gabin šēna 'step-siblings', etc. | ? Eg. šn 'brother' || K *ʃ,ma id. || Drav. *caṇ-ay 'foetus, pregnancy' (Il.-Sv., *Opět sravnění...*, II, pp. 111-2).

The third etymology is found (with a query!) in the preliminary publication "Material k slovarju nostratičeskix jazıkov" only:

(3) ? N *ʃvγv 'to grasp' (= *ʃvγv in the notation of *Opět sravnění...*) > Kartv. *m3,iγ- or *m3,iχ- 'fist' (reconstructed by Illič-Svitšič on the arbitrary assumption that Georg. m3iγ- 'fist, handful' is a loan-word from a Zan language, i.e. from Megrelian or Laz) || Sem. "*ḡṣṣ" 'to grasp' > Soqotri "ḡṣṣ" (today we know that the root in question is *ʃγθ 'to grip' > Jibbali √ʃγθ, Mehri √zγθ, Soqotri √zṣṣ) (Il.-Sv., "Material k slovarju nostratičeskix jazıkov", *Ėtimologiya* 1965, p. 371).

In the light of new information and new achievements in comparative linguistics etymology (1) is to be rejected (since IE *H(o)sd-o- 'branch' can be better explained as belonging together with Sem. *ḡass- 'leafed branch' and Mong. aca(n) 'bifurcated branch' < N *qačṣv), the K stem *ʃma- and Central Cush. *ʃan- 'brother' are to be removed from etymology (2), and in etymology (3) the K root contains *ʃ- rather than *ḡ-. It means that the correspondence HS "*ḡ" (i.e. *ḡ) : K *ʃ has no factual basis. Neither is there any basis for postulating a correspondence between HS "*ḡ" and Alt. *ʃ (since Altaic data do not appear in any of the etymologies). Hence there is no reason to assume that HS "*ḡ" corresponds to voiced consonants in other Nostratic languages. On the origin of HS *ḡ see below (D, etymological entries (35)-(51)).

In my reconstruction I have a Nostratic phoneme labelled *ʃ, but it has nothing to do with what Illič-Svitšič denoted by this symbol.

C. V. Illič-Svitšič was quite right in supposing that there must be voiced counterparts to the voiceless sibilants in Nostratic (a *z as a counterpart for *s, etc.), but he could not find more than two etymologies for such *z-phonemes: one for an alleged *z (reinterpreted by me as an affricate *ʃ), and one for *ž (with "uncertainty brackets" for the phoneme in question).

Today we can be more positive in this respect. There are sound correspondences which I prefer to interpret as evidence for pN *z, *ž and possibly *ʃ:

N	IE	Sem.	Eg.	Chadic	Kartv.	Uralic	Turkic	Mong.	Tung.	Drav.
*z	*H	*z	z	*s (JS s ₁)	*z	*s		s	*s	*c
*ž ?	*H	*z			*z	*š	*s- ?			
*ʃ	*H	*š	z ?		*z	*š			*s,?*-ʃ-	*c.

For the sake of differentiation cp. the phonologically nearest phonemes: the voiceless sibilants and the voiced affricates:

N	IE	Sem.	Eg.	Chadic	Kartv.	Uralic	Turkic	Mong.	Tung.	Drav.
*s	*s	*š	s ("š")	*s ₁	*š	*s	*s	s	*s	*c
*š	*s	*š	s	*s ₂	*s	*š	*s	s	*s	*c
*š	*s	*š	s	*s ₃	*š	*š	*s	s	*s	*c
*ʒ ³	*s	*z			*ʒ, *z	*s	*j-	ʒ	*ʒ	*c
*ʒ	*s	*z	z ("s")		*ʒ, *z	*š-?	*j-	ʒ	*ʒ	
*ʒ	*s	*š			*ʒ		*-š-	ʒ	*ʒ	

Examples of N roots (originally words) with voiced sibilants:

* z :

(4) *z(e)rdV 'to feed, rear', 'to grow' (> 'to be fed, reared') > K *zrd- (or *žrd-) 'to feed, bring up' || S *vzrd (or *vrd) 'shoots, sprouts' || IE *Hordhō- 'erect', 'growth', *Hordh- 'to grow, rise' || ? U *serā (or *sērā) 'old (of age), grown up' || D *ceř- 'to thrive, grow'.

(5) *toXUZV 'to plait, wattle' > K *tXaz- 'to plait (together)' || HS: Chad. (according to Jung-raithmayr and Shimizu) *tkw_s: (> Ngizim ták^ws_s 'to tie', Glavda ták^was, etc.) || IE *deH(y)- > *dē-/ *dē-, *dēi-/ *dī- 'to bind' || FU *tosV 'a vessel, basket' (+ *'a wicker basket' + *'a wattled object') || ?? Mong. tagsi 'a cup'.

* ž :

(6) *žE(š)XqV 'blood' > K *zisz- 'blood' || HS: ? Eg. zXn 'flesh (sp.)' || IE *hesx-ř / *hsx-n- 'blood' || ? FU (in Ob-Ugr. only) *čoškV or *čokšV (by assimilation from **šoškV) 'blood' || Tung. *sā:ksā (< *sā:s-ksā) 'blood' (*-ksa/*-ksā is a suffix of uncountable nouns).

(7) *žom(V)rV 'dream' > K (derived words) *(s)i-zmar- 'a dream', *zman- (< **zmar-n-) 'to dream' || HS: ? WChad. *saim- 'to sleep, dream' | S *šmr 'to be/keep awake in the night' (+ *'to doze, be half asleep') || IE *Hon(e)ro- or *Hwen(e)ro- > Late IE *oner- 'dream' (*-nr- < *-mr- by assimilation) || U (FPerm. only) *šomprV 'to dream, to day-dream' (*-mpr- < *-mr-).

(8) *žUr(i) 'to watch, spy' > K *zwer- (or *žwer-) 'to spy, peep' | S *šūr- (or *ōūr-) 'to behold; to watch stealthily, lie in wait' || IE *(H)wer- 'to look, look after, pay attention', *(H)woró- 'attentive', *(H)wor-ah 'attention' || ?? Mong. sori- 'to examine, try out, test'.

(9) *baže 'to ripen, be cooked (gar werden)', 'to cook' > K *baz- (or *baž-) 'to ripen' || HS: S *bšī 'to ripen, be cooked' || IE *bheH-/ *boH- 'to warm, to steam, ? to roast' || ? Mong. bažaga- 'to prepare, to get or have ready' || FU (in FPerm. only) *paše 'to fry, bake, roast'.

* ž :

(10) *(žä)rga 'to ram, strike' > K *zerg- (or *žerg-) 'feststampfen, festtreten (z.B., Erde)' || S *vzrg > Arab. vřř 'frapper avec le fer du bout inférieur de la lance' || IE *Kerg^h- (act. voice) 'to shake', (medium) 'to jump, dance' || ? FU *šärkV (or *s-) 'to break, to fell' || ? Turkic > OTurk. särk 'earthenware and broken pieces of it'.

(11) *žogvrju(i) (or *žorgv(i)) 'line/boundary/strip of land between geographical objects/areas' > K *žywar 'border, boundary' || IE *(H)worw(o)-, *(H)wrw(o)- 'boundary, boundary-ditch, moat', *(H)werw- 'furrow, grove, line' || FU *šorV 'small area between geographical objects, strip of land'.

³ My former hypothesis on the reflexes of pN *ʒ ('O nostratičeskoj sisteme affrikat i sibilyantov: korni s fonemoy *š', *Ėtimologiya* 1972, Moskva, 1974, pp. 163-175) is to be revised in the light of new evidence.

In etymology (10) the exact identity of the initial voiced sibilant depends on the semantically dubious FU reflex. It means that we have only one unambiguous example of the phoneme *ʒ (etymology (11)), which is not enough for any positive conclusions. Hence this phoneme, although theoretically expectable, remains questionable.

Uralic is the only daughter-language distinguishing all three voiced sibilants. Semitic does not distinguish *z from *ʒ, but keeps both of them separate from *ʒ. Hence in a root with a voiced sibilant without Uralic and Semitic representation we cannot distinguish among *z, *ʒ and *ʒ, which is symbolized as *Z (unspecified voiced sibilant). Wherever we have no reflexes in Uralic, but do have them in Semitic, *z is not distinguished from *ʒ. This latter case will be symbolized as *ʒ.

(12) *ʒ|ʒorV 'to be foreign, hostile' > K *zar- (or *ʒar-) 'to hate, detest' || S *zar- 'foreign, foreigner, enemy', whence a denominative verb */z?r ~ */zwr 'to be foreign, hostile' || IE *Her- 'to be angry, hostile' || Tung. *sori- 'to fight', *sori-n 'fight, battle'.

(13) *Zig(o)dV 'stake, peg', (+) 'paling, fence' > K *zyude 'fence, wall' || IE *Hod^h-/*Hed^h- 'Zaunstecken, Zaun aus Pfählen' || Tung. *sigdi- 'peg' || D *ci(:)t- 'bamboo pin'.

(14) *ZVrV (= *ZürV < *ZirU?) 'to fear, frighten' > K *zar- (or *ʒar-) 'to frighten; horror' || Mong. süre- 'to awe, inspire horror' || D *cūr- 'to frighten'.

D. Illič-Svitčič reconstructed two lateral obstruents in proto-Nostratic: a voiceless fricative *ʃ (labelled by him as *š) and a voiced lateral fricative *ʒ (labelled as *đ), but he could find only few roots containing pN *ʃ and very little reliable evidence for *đ.⁴

Now, in the light of new information available today, we are in a position to reconstruct a complete set of lateral obstruents: fricatives *ʃ and *ʒ and affricates *tʃ, *tʃ and *tʃ:

N	IE	S	B	Eg.	Cush.	Chadic	Kartv.	Uralic	Turkic	Mong.	Tung.	Drav.
*ʃ	*s	*ʃ	*s	š	*ʃ		*š	*ʃ	*s	s	*s, *-l-	*c
*ʒ	*l	*ʒ	š	š	*ʒ	WCh.*ʒ-	*l(?)	*-ʒ-, *l-		-l-	*-l-	*n-, *-t-
*tʃ		*tʃ			*tʃ		*tʃ	*tʃ, *ʃ			*tʃ-	*c-, ? *-tʃ-
*tʃ	*ks-?	*ʒ	š-			WCh.*ʃ	*tʃ	*ʒ-	*tʃ?	s-??	*tʃ-	*c-
*tʃ	*l, *s- ₅	*ʒ			*ʒ	Ch.*ʃ	*tʃ	*ʒ ?		ʒ-	ʒ-	

Cp. the reflexes of pN *-lʃ- (which resemble partially those of *ʒ):

*lʃ	*l	*lʃ	ʃʃ, nʃ	Bj.lʃ	*l ?	*-ʒ-	*-l-	-l-	*-l-	*-t-
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Nostratic roots with lateral obstruents:

*ʃ :

(15) *ʃah(a)ra 'moon, moonlight', (+) 'bright, pale (as moon)' > HS *ʃVhVr > S *ʃahar- 'moon', */ʃhr 'bright as moon, pale' | Cush. (according to Ehret) *ʃeh- 'moon' || ? U *ʃʃarV- 'to be bright' (+ 'to dawn'), 'white' || Mong. *ʃara 'moon'. Cp. otherwise Illič-Svitčič MS 363 s.v. *čohra 'bright'.

(16) *ʃülʃä 'heart', (?) 'breast' > HS */ʃlʃ > Eg. šnʃ 'chest' | ? S *(ʃ)u(ʃ)l- or *(ʃ)ul(ʃ)-

⁴ In a paper published in 1972 ("Nostratičeskie korni s sočtanem lateral'nogo i zvonkogo laringala", *Ėtimologiya* 1970, pp. 356-369) I found that in some roots Uralic *ʒ goes back to a pN cluster *lʃ or *lʃ. From this observation (which is still valid today) I drew the conclusion that there was no basis for postulating a pN *ʒ. But recently I have found roots which do require a reconstruction of a Nostratic *ʒ.

⁵ The regular IE reflex is *l, while *s- appears in the presence of a stem-medial *-r- (a law of *l - *r-incompatibility).

> Akkad. šūlu 'ein Totengeist (?)' | Cush. *š^hʷl- (assimilation from *šʷl-) > ECush. *saz- (< *sa2-) 'heart' || U *šū2š(me) 'heart' || Mong. sülde 'soul, protecting genius' || Tung. *sʷlāmā 'heart'. An alternative pN reconstruction is *šū2šā, but it does not account for Eg. n in šn 'breast' and for S *l in Akk. šūlu.

(17) *n^haqiš(a) 'nose' > S *n^hš (derived noun) 'bone of the nose' || IE *neHs-/*nHos- 'nose' || Tung. *n^haksa ~ *n^haksa 'nose'.

(18) *š^hiīV(-mV) 'to look, examine' > U *š^hiīmā 'eye' || Mong. sili- 'to choose' || Tung. *silma- 'to examine, choose'.

(19) *šā(V)XU. 'to cut asunder' > K *š^hχ(a)l-/*š^hχwl- 'beschneiden' || S *š^hlχ 'to cut asunder' || FU *šā(V) 'to cut' || D *cal- 'to split, cut asunder'.

(20) *KūššV 'to fell, fall' > K *gušš- 'to fell, bring down' || S *k^hšš 'jeter quelqu'un par terre de manière qu'il tombe la face contre la terre' |? Chad. (Jungr.-Shimizu) *(N)gž 'to fall' || Tung. *(x)ul- 'to crumble, come down, collapse'.

(21) *bo(š)šV 'breath' (+ 'odor'; 'steam, smoke') > S *bšš 'to be/become disagreeable in the odor of the mouth' || FU *poše 'breath, smoke' || T *būs 'mist, fog, steam' || Tung. *bol- 'to blow (wind)' (in Tung. *-l- < *-2š- by assimilation from *-šš-).

(22) *š(ū)lšV or *š(ū)2V 'dew' > FU *šu2a 'hoar-frost, frozen dew' || Tung. *silā-(ksā) 'dew'.

(23) *šā(V) 'to split, cut asunder' > ? K *š^hkd- 'bersten, platzen, absplittern' || S *š^hkk 'to split' || IE *sek- 'to cut' || FU (in Ob-Ugr. only) *šāKrV- 'to chop, cut' || T *sök 'to tear apart, break through an obstacle' || D *cākk- 'to chip'.

*č :

(24) *čV(?,N) 'to recognize, know (connaître)', (?) 'to see' > K *čan-/*čn- 'to recognize' || S *š^hʷn 'to know (connaître)', *š^hny 'to see' || U *šunV (or *šunV) 'to see', (der. stem) FU *š^hčunšV > pVogul *šunš- 'to look at, glance'. Contrary to Illič-Svitšič's opinion (OS I 201-2), K *čan-/*čn- cannot be compared to Demotic Eg. swn 'to know', Hausa sáni, Margi sēni 'to know' (and related words in other Chadic languages), since these words represent HS *s₁-, which does not correspond to K *č-. For this HS root I have a different etymology (N *sun^hV 'to feel').

(25) *čāyUrV 'hair' > S *š^hi'šar-, *š^hašar- 'hair', *š^hašar-at- 'a hair' | Cush.: CCush. *cəg^wər 'hair', Lowland East Cush. *dōgər 'hair'; my proto-Cush. reconstruction (1973) was *čag^wər | Chad.: WCh. *šVHv (Stolbova's *čVHv) 'hair' || FU (Ugr. only) *šāg(u)rV 'hair' || ? Mong.: Script Mong. soir 'coarse long hair' || D *cōra 'a hair'.

(26) *če(p)V 'heel, foot, part of leg' > S *šap- (or *šāp- ?) 'foot, trace' | Cush.: Central Cush. *cāp- 'heel, sandals' || U *ššewča 'part of leg' (sp.) || Tung. *čā(p)ā 'heel (?)'.

(27) *čVχV 'to burn' (tr.) > HS: Cush. (acc. to Ehret) *šah(aw)- 'to burn' > SCush. *šah-, etc.) || K *čχ- 'to be hot (hot weather, sun)', *čχe- 'heat, hot weather, fever'.

(28) *čōtV 'to exercise magic forces' (+ 'to curse', 'to bless') > K *č^hcodw- 'to sin', 'sin' || S *šw^ht (+ *šyt) 'to harm by magic' (+ 'to slander', 'to insult', 'to cause somebody's death'), *š^htn 'to bear ill-will, to be hostile' | Eg. štm 'to slander' || U *šot(a) '(magic) force' (+ 'to curse', 'to bless') || D *co^ht- 'defect, blame', (+) 'insinuation, disparaging remark'.

(29) *ka(č)U 'to scratch, to scrape off scales' > K *kač^hwr- (assimilation from *kačwr-?) 'to scratch' || S *kšš, *kšw 'to rub, wipe, bark', *kšr 'scales', 'to scrape off scales' | Omotic: Kaffa kučč- 'to scratch' | ?WCh. *q^wašsa (St.'s *q^wačsa) 'itch, scab', 'to scrape' || IE *kes- 'to scratch, scrape', *kseu- 'scaben, reiben' || D *kacc- 'itch', 'to scratch for relief'. Illič-Svitšič (OS I 343-4) compared the S, IE and D roots and reconstructed the N root as *kašV.

*šĉ (ambiguous cases in which we lack evidence to distinguish between N *š and *ĉ) :

(30) *rāsĉV 'to sprinkle', (+ ?) 'dew, moisture' > S */rās 'to besprinkle' || IE *rōs-, *ros-ā 'dew, moisture' || FU *rāsV 'to sprinkle', (+) 'to moisture' || ? Mong. nesi 'blood from an animal or a sword'.

(31) *šĉ(o)hyV or *šĉ(o)hi 'to wish' > S */shy/w ~ */swy 'to wish' || FU *šōyV (or *šōyV) 'to wish, to strive'.

? (32) *(w)okVšĉV 'a canine (sp.)' > S *kVš- 'wolf' or sim. | Berb. */w(š)k'n 'jackal' || FU (in Ob-Ugr. only) *(w)okšVrV 'fox'.

(33) *ĉšarV 'to be dry' > S */šrr 'to dry' | Eg. w-šr 'trocknen, verdorren', s-šr 'trocknen (tr.)' || IE *ksēro- 'dry', *ksēr-j- 'to dry' || FU *šarV 'to become dry' || ? D *car- 'rough of surface, coarse'.

(34) *šĉi||U 'to take (away, off, up)' > S */šlw ~ */šll 'to take, take away/off' || IE *sel(wo)- 'to take, grasp' || FU (in Ugr. only) *šilV 'to acquire' || D *cil'i 'to take off'.

(34a) *šĉopV 'to sew (leather), leather' > S */špyw 'to sew (leather)' | CCh. *švp- 'to sew' || FU *šopa 'cloth(es)' || Mong. sabkin 'leather' || Tung. *šōbgō 'fish-skin used as leather'.

*ĉ :
(35) *rEĉV, XV 'to wash' > S-*/rhĉ (metathesis from **/rĉh ?) 'to wash' || K *rĉx- id. (deglossalization of the expected *ĉ due to assimilation: *-ĉx- > *-ĉx-) || ? Mong. nisqa- 'to wash a corpse'.

(36) *ĉoyV, a' 'mud, clay, slush' (+ 'filth, dung', 'litter') > S */ĉp 'excrement, filth' | Cush.: SCush. *ĉūf- 'mud', ? ECush.: Saho qōbo 'mud' or ECush. *subf- ~ *sibf- 'mud' || U *šsoyva 'clay' || Turk. *ĉöp 'sediment, dregs' || ? D *cav- 'fuller's earth, sediment'.

(37) *ĉ(ü) (V, I) V 'little, small' > K *ĉul₂- (Klimov's *ĉ₁uz₁-) '(male) child, boy' || S */ĉ?l > Arab. √ĉ?l 'parvus, tenuis, vilis et macilentus fuit' || U *ĉ(e)lV 'a small thing' and possibly *ĉälV 'the small finger' || Mong. cölüi(d)- 'to diminish, be reduced' || D *cill- 'small'.

(38) *ĉVm (V, I) V 'to plait/tie together' > S *ĉmd (dissimilation from Prae-Sem. **/ĉm3?) 'to tie/bind together, to attach' || K *ĉmaš- 'to plait/braid together' || ? U (in Samoyedic only) *(s)im(s)a (assimilation from **šimsa?) 'zusammenwickeln, umwickeln' || ?? Mong. camcay 'shirt'.

(39) *weĉE?V 'to go out' > S */wĉ?, *-wĉi?- 'to go out' || IE *wesk-, (?) *west- 'to go (out, away)' || D *vecc- 'to take out'.

(40) *ĉVhW(i) 'to burn' (tr.), (+) 'to warm intensely, to be hot (of the sun)' > S */ĉhy 'heat of the sun' | SCush.: proto-Rift *ĉah- 'to warm (of the sun)' || K *ĉw- 'to burn' (tr., intr.), 'to be very hot' || ? Turk. *ĉabār 'kindling' (T *-b- < N *-w-).

(41) ? *ĉapV 'to grasp, take' > K *ĉap- 'to grasp, take, acquire' || S */ĉbt 'to take' || Tung. *ĉap- 'to grasp'. The root is ideophonic and hence dubious.

(42) *ñāĉV (qV) 'to moisten, be moistened' > S */nĉx 'to irrigate, sprinkle' || IE *yes- 'to seethe, ferment, stir' (+ 'to be moist' ?) || FU *ñāĉ(k)V 'moist'. In U, there is partial influence of the paronymic N root *ñāĉ(V)hA (> U *ñāĉā 'moist', ?? S */nĉh, cf. Illič-Svitāč MS 333), whence the blended root variants: U *ñāĉkV 'moist', S */nĉh 'to irrigate, sprinkle'. The K root represented by Svan nic 'moist' is likely to belong to one of these two roots.

(43) ?? *kU(y)mV(ĉ)V ≈ 'shin, thigh' > K *kwnĉVχq- > Megr. kwinĉixe 'thigh' || S *k(u)ymV(ĉ) 'shin, thigh, leg' | Cush. *k^wanĉ-/*kunĉ- 'buttocks' and Beja kemūs (Reinisch) id. A very questionable root.

(44) *γ(ā)ĉV 'to cut, cut asunder' > K *γeĉ- > Megr. γaĉ- 'scheren, schneiden' || S */ĉw 'to cut asunder, divide', *γiĉ- 'piece, portion' | Eg. γ3 'hacken' | Cush.: ? SCush. *haĉ- 'to be separated, divided up' || ?? U (in Samoyedic only) *(y) (i) (š) V (or 1 *ī-, 2 *-u-, 3 *-ššk-) 'to cut' (*-i- < *-ā- due to the influence of *y-) || D *ac- 'to cut'.

- (45) *čVH(V)mV 'daylight' > K *čam- 'morning' || HS: SCush. */čhm 'day, daylight' || ? Mong.: Script Mong. comur 'clear'.
- (46) *pV(č)U 'a hair, eyelash' > K *p(i)čw- 'eyelash' || HS: Chad. *m-PV(č)V > WChad. *m-PV(č)V 'hair' || ? D *počča 'eyebrow' or 'eyelash'.
- (47) *k(ü)čV or *kečU 'to tear, to skin' > ? K *kučč- 'zerhauen, zerstückeln' || HS: S *-kīč-/*-küč- 'to tear, to separate, to skin' || FU *küšV- ~ *kešV- 'to tear, to bark, to flay'.
- (48) *či|upV 'to be narrow, compressed' > HS: S */čpp ~ */čbb 'to be narrow, compressed' | Cush.: CCush. */cbb 'to be narrow, straitened' || FU *šsupV 'schmal, eng' || Tung. *čIp- (or *tIp- ?) 'to choke with smth.'.
- (49) *čanV 'to jump, skip' > S */čmd 'to jump' || FU *šanV 'to gallop, jump' || ?? Tung.: Nanay čangoar, čangoap 'quickly, suddenly' || D *caŋk- 'to jump, leap'.
- (50) *čabV?V 'war', 'warriors, army' > S *čb? 'to wage war', *čaba?- 'war, army', Eg. 3bi 'army' (l.-w. from Semitic?) || Tung. *čab(u)ka 'army, war'.
- (51) *čar?V 'nipple, teat', 'udder' (+ *'chest' +) 'front' > S *čar?- 'nipple, teat', 'udder' || FU *š(ä)rV 'front', (+ 'earlier') || ? Mong. cara- 'to prepare, advance, prevent' (+ *'to be ready earlier') || D *car- 'udder'.

* čč (ambiguous case):

- (52) *ččVHLV 'to be compassionate, have mercy' > K *ččal- id. || S */šhl (deglossalization from *čhl ?) 'to be gracious, have mercy, be compassionate'.

* ž :

- (53) *žEZEKU 'thorn, hook' (+ 'tooth') > S *šikk-(at-) 'thorn', 'pin, nail' | Cush. (after Ehret) *žiskw-, (to my opinion) *žiskw- 'tooth' > SCush. *žiskwa, ECush. *ilVkkw- id., CCush. *əRkw- id. || Tung. *žigō 'hook, 'fish-spear', 'bear's fang' || Mong. elgü-, ölgü- 'to hang (on), suspend', elgün qada- 'to nail onto (as pictures on the wall)'.

(54) *šüž(V)XV 'to glow, burn' > K *sx(u)l- or *cx(u)l- > Svan cxul- 'опалить, обжечь' | IE *swel- 'to glow, burn' || U *šüže 'embers, charcoal' || ? Mong. süü 'incense' || Tung. *sul(u)- 'flame' || D *cuž- 'to be hot, burn (intr.)', 'to roast, burn (tr.)'.

(55) ?? *žomV 'heat' (+ 'sun') > S *šamaš- 'sun' | Eg. šm, šmm 'to be hot' | WChad. *žlVm- > Angas lem 'sun' || FU *lomV (or *lomV) 'warmth, flame, embers'. Semitic *šamaš- 'sun' is likely to go back to a word group *žamV mVžV 'hot/burning sun/fire', with the second component *mVžV represented in K *mže 'sun' and Berb. */ms 'fire', cf. below item (61).

(56) *žä(č)idV 'to move, go' > S */škd 'to give' (+ *'to move (tr.)') | Chad.: WChad. *žjakV(d)- (Stolbova's *šjakAd-) 'to move' || IE *leit-/*līt- 'to go' || FU *läkte- 'to go, go out' || D *naž- 'to walk, go, pass'.

(57) ? *žEñčV 'chest' > U *šü(ñ)čš 'breast', 'Inneres' || D *neč- 'chest, heart'. IE *leisd-, *loisd- 'Rand, Saum' might well belong here (from the point of view of regular sound correspondences), but the semantic change involved is complicated and therefore dubious.

* ž :

(58) *žapV 'lip', (+) 'edge, shore, riverbank' > HS: S *šap-at- 'lip', 'shore, riverbank' | Eg. sp.t (Erman-Grapow's sp.t) id. (loanword from Semitic?) | Cush.: ? SCush. *šuf- 'lip' | ? Chad.: Hausa lèbè:, Kirfi l5vòk 'lip' || IE *lab-yo-(m), *lab-uro-(m), *lab-s- 'lip' || Mong. žabaži 'corner of the mouth' || Tung. *žapka 'edge, shore, riverbank'.

(59) *ʒir(u) 'root' > K *ʒir- 'root, bottom' || S *ʒiraw- 'sinew, root' | Berb. */zwr (*zūr, *zwVr-) 'root, vein' | Central Cush. *zīr 'root' | pChad. */ʒarw 'root' (according to Jung-raithmayr and Shimizu) > WCh. *ʒarwa- ~ *ʒarya id., CCh.: proto-Mofa-Mada *ʒiray 'root', EChad.: Ndam sīrwé 'root', etc. || IE *ser(w)- 'vein, thread', (+) 'string', 'to join in a string' || D *cīr- 'root'.

(60) *ʒimV 'to put, to place' (+ 'to do') > K *ʒim- 'to do' || S *ʒim- 'to put, place, set' || Mong. ʒime ~ ʒeme 'conduct, manner of behavior, procedure' (+ *'doing, manner of doing').

(61) ? *mVʒV 'fire (especially as source of heat)' (+ 'sun') > K *mʒ-e 'sun' || HS: Berb. *-misī- 'fire' | ?? Central Chadic */gmʒ 'fire' (a composite root with the second element *-mʒ-?) || IE *molko- 'firewood, fuel' || ? D *mū-/*mut- 'to kindle a fire'. Cp. Illič-Svitič OS II 77-78 (*ma/ɛ/ʌ, i.e. *mV(ɛ)V 'bright, sun') and Dolgopolsky in *Voprosé yazékoznanīya* 1964: 2, p. 54, where K *mʒ-e was compared to the Semitic root (then erroneously reconstructed as *šmš and interpreted as reduplication).

(62) *ʒa|o|kV (~ *ʒa|kV) 'to push, throw' > K *ʒv|k 'to kick' || S */ʒk|k > Arab. /ʒqq 'to grow (tooth, plant)', 'to pass through (a thong)' | Chad.: ? WCh. *ʒik|q- 'to push' || IE *lak|k- (or *lag|g-) 'to kick' || FU *ʒok|kV 'to push, butt'.

Symbols: ɸ – glottalized consonants (ejectives ɸ, k, q, etc., injectives ɸ, ɸ); ɸ – uvularized consonants ("emphatic consonants" in Arabic and Berber); ɸ – postalveolar or cacuminal (retroflex) consonants (ɸ, ɸ, ɸ, ɸ); c, ʒ – hissing affricates (as z in German and Italian) and sibilant affricates without opposition of hissing and hushing consonants (in Dravidian, Mongolian and Central Cushitic); ǧ – Arabic ǧ (g > ǧ, ǧ); q, ɠ – uvular stops; x, ɣ – velar fricatives; χ, γ – uvular fricatives; ʕ, ʕ – epiglottal continuants (Arab. ʕ, ʕ); ɸ – lateral obstruents (ʒ, ʒ, ʒ); ə – central mid vowel; ä, ö – in Tungusian vowel harmony it is the higher grade ([ɛ], [o]) of the vowel alternation ä/a, ö/o; V – unspecified vowel; E – unspecified front vowel; U – unspecified rounded vowel; H – unspecified laryngeal consonant; K – unspecified velar stop.

Uncertainty symbols: *ab = "*a or *b", *(a) = "*a or sim."; *(a) = "*a or zero" (*'kar(a)n- = "'karan- or 'karn-").