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Preface

This volume contains the revised versions of twenty-nine of the thirty-eight papers presented at the Workshop on Linguistic Change and Reconstruction Methodology held at Stanford University, July 28—August 1 1987. This five-day long workshop, which was sponsored entirely by the U.S. National Science Foundation (Grant #86-17435), was scheduled during the now biennial Summer Institute of the Linguistic Society of America (LSA). The pleasant setting and intellectually rich atmosphere of the Stanford LSA Institute provided a special attraction to the scholars who participated in this workshop; during the Institute more than four hundred linguists and students of linguistics were in residence at Stanford, providing a stimulating concordance of language study, theory, and description that is unavailable in any other setting.

Bringing together thirty-eight scholars from around the world for a successful conference and a follow-up publication requires a blend of good organization, good planning, and good luck. From the beginning, this project has been blessed with all three. The good organization owes much to the staff of the Summer LSA Institute, who were as cooperative and helpful a group of individuals as I have ever worked with. Overall thanks are due to Ivan Sag, the Institute Director, who ran what is in retrospect one of the most successful LSA Institutes ever. More specific acknowledgement is due to Kathryn Henniss, Sag's tireless and eternally cheery assistant; Gina Wein, the administrative aide of the Department of Linguistics, and Michelle Collette and Sonya Oliva, the marvelously cooperative and efficient pillars of the Department. The fine facilities and stimulating atmosphere of the Stanford LSA provided a guarantee that the details of housing, space, food, entertainment and a rich intellectual spirit would be satisfactorily met. And they were.

The good planning which made the Workshop such a success, and has helped to bring this rather complicated volume to life, is due directly to the efforts of my secretary, Mrs. Connie Moore. She handled the complexities of travel, scheduling, and advance planning with professionalism and good cheer. It is no exaggeration to say that without her efforts, this undertaking could never have gone so smoothly, if at all.

The good luck is a bit harder to pin down, but it does have a general outline. There was the good luck to have had such a helpful

A survey of the comparative phonology of the so-called "Nostratic" languages

Allan R. Bomhard

1. Introduction

This paper is based on the analysis of lexical material I have been gathering for a projected dictionary of the so-called "Nostratic" languages. The main body of this proposed work will be a revised and greatly expanded version of the cognate sets proposed in my 1984 book *Toward Proto-Nostratic*. The scope of that book was confined to a comparison of the Indo-European languages with the Afroasiatic languages. New material has now been added from Kartvelian, Uralic-Yukaghir, Elamo-Dravidian, Altaic, and Sumerian. (At some future date, I would also like to explore Chukchi-Kamchatkan [Paleosiberian], Eskimo-Aleut, Etruscan, and Gilyak for possible parallels with these other languages.) Addition of this new material has an important advantage in that it greatly strengthens many of the etymologies that I previously proposed on the basis of a comparison of Indo-European and Afroasiatic alone. To date, I have gathered material for approximately 500 possible Nostratic etymologies.

On the basis of the lexical parallels I have uncovered so far, as well as upon the important work of other scholars, most notably Vladislav M. Illič-Svityč, Aharon Dolgopolskij, and Joseph H. Greenberg (though I do not necessarily agree with all of their proposals [see below, section 3]), I believe that there is sufficient evidence, both in quantity and quality, to conclude that the Indo-European, Kartvelian, Afroasiatic, Uralic-Yukaghir, Elamo-Dravidian, and Altaic language families and possibly Sumerian as well are genetically related.

This paper will focus on the comparative phonology of those Nostratic languages I have investigated to date.

2. Methodology

The approach to language comparison that I have followed in attempting to establish linguistic parallels among the various Nostratic languages is derived from that advocated by Joseph H. Green-

berg in the chapter entitled "Genetic Relationship among Languages" in his 1957 book *Essays in Linguistics.* The principles established by Greenberg bear repeating.

Greenberg notes that the only way to establish hypotheses about genetic relationship is by comparing languages. However, the problem is in knowing which languages to compare and in knowing what to compare since not all aspects of language are equally relevant to comparison. To be meaningful, comparison must strive to eliminate chance resemblances and to separate borrowings from native elements. This is often easier said than done; however, Greenberg lays out two main techniques for detecting borrowed lexical items. First, he notes that borrowing is commonly confined to certain semantic spheres (for example, cultural items) and certain grammatical categories (nouns far more often than verbs). Second, borrowed words can be distinguished from native vocabulary by expanding the range of comparison to include additional languages.

The simplest way to establish genetic relationship is by identifying a large number of similar morphs (or allomorphs) – especially irregularities – in similar environments in the languages being considered. Another significant indicator of probable genetic relationship is the presence of similar rules of combinability. Unfortunately, historical processes over the passage of time bring about the gradual transformation and eventual elimination of such similarities. The longer the period of separation, the lesser the chances will be that similarities of morphological forms and rules of combinability will be found.

Fortunately, there remain other factors that can be helpful in determining possible genetic relationship. One significant factor is the semantic resemblance of lexical forms. Here, it is important to be able to establish recurrent sound–meaning correspondences for a reasonably large sample of lexical material. Lexical forms with identical or similar meanings have the greatest value. Next in value come forms that, though divergent in meaning, can convincingly be derived, through widely-attested semantic shifts, from earlier forms of identical or similar meaning. The chances that lexical resemblances indicate genetic relationship increase dramatically when additional languages are brought into the comparison and when these new languages also exhibit a very large number of recurrent sound–meaning correspondences. Greenberg has termed this method "mass comparison". He considers the comparison of basic

vocabulary from a large number of languages from a specific, wide geographic area to be the quickest and the most certain method to determine possible genetic relationship. To Greenberg, lexical data are of paramount importance in attempting to establish genetic relationship among languages, especially in the initial stages of comparison. An excellent summary of Greenberg's methodology is also contained in Merritt Ruhlen's (1987: 9–14) recent book on language classification and again by Greenberg in his new book *Language in the Americas* (1987).

In attempting to determine whether or not particular lexical items from the various languages families might be related, I have made extensive use of Buck (1949) as a control for the semantic development of the proposed lexical parallels. It may be noted that, in examining the lexicons of Kartvelian, Afroasiatic, Uralic-Yukaghir, Elamo-Dravidian, Altaic, and Sumerian, I have observed that semantic shifts similar to those described by Buck for the Indo-European languages are found over and over again in these other language families as well.

3. Critique of Soviet views on Nostratic

Let me begin by stating unequivocally that I have the highest admiration for what Soviet scholarship (especially V. M. Illič-Svityč and A. B. Dolgopolskij) on Nostratic has achieved. Their research has opened up new and exciting possibilities and given Nostratic studies new respectability. However, this does not mean that I agree with everything they say. I regard their work as a pioneering effort and, as such, subject to modification in the light of advances in linguistic theory, of new data from the Nostratic daughter languages, and of findings from typological studies that give us a better understanding of the kind of patterning that is found in natural languages as well as a better understanding of what is characteristic of language in general, including language change. I agree with Illič-Svityč that, at a minimum, the following language families are likely to belong to Nostratic: Kartvelian, Afroasiatic, Indo-European, Uralic-Yukaghir, Elamo-Dravidian, and Altaic.

Let us now look at phonology. In 1972 and 1973, the Soviet scholars T. V. Gamkrelidze and V. V. Ivanov proposed a radical

reinterpretation of the Proto-Indo-European stop system. According to their reinterpretation, the Proto-Indo-European stop system was characterized by the three-way contrast glottalized – voiceless (aspirated) – voiced (aspirated). In this revised interpretation, aspiration is viewed as a redundant feature, and the phonemes in question could also be realized as allophonic variants without aspiration. A similar proposal was made by Paul Hopper at about the same time.

This new interpretation opens new possibilities for comparing Proto-Indo-European with the other Nostratic daughter languages, especially Proto-Kartvelian and Proto-Afroasiatic, each of which had a similar three-way contrast. The most natural assumption would be that the glottalized stops posited by Gamkrelidze and Ivanov for Proto-Indo-European would correspond to glottalized stops in Proto-Kartvelian and Proto-Afroasiatic, while the voiceless stops would correspond to voiceless stops and voiced stops to voiced stops. This, however, is quite different from the correspondences proposed by Illič-Svityč (1971). He sees the glottalized stops of Proto-Kartvelian and Proto-Afroasiatic as corresponding to the traditional plain voiceless stops of Proto-Indo-European, while the voiceless stops in the former two branches are seen as corresponding to the traditional plain voiced stops of Proto-Indo-European, and, finally, the voiced stops to the traditional voiced aspirates of Proto-Indo-European. Illič-Svityč then reconstructs Proto-Nostratic on the model of Kartvelian and Afroasiatic with the three-way contrast glottalized – voiceless – voiced.

The mistake that Illič-Svityč made was in trying to equate the glottalized stops of Proto-Kartvelian and Proto-Afroasiatic with the traditional plain voiceless stops of Proto-Indo-European. His reconstruction would make the glottalized stops the least marked members of the Proto-Nostratic stop system. Illič-Svityč's reconstruction is thus in contradiction to typological evidence, according to which glottalized stops are uniformly the most highly marked members of a hierarchy.

One of the consequences of Illič-Svityč's mistaken equation of the glottalized stops of Proto-Kartvelian and Proto-Afroasiatic with the traditional plain voiceless stops of Proto-Indo-European is that he is led to posit forms for Proto-Nostratic on the basis of theoretical considerations but for which there is absolutely no evidence in the Nostratic daughter languages. Now, what about those examples

adduced by Illič-Svityč which appear to support his proposed correspondences? Some of these examples admit to alternative explanations, while others are questionable from a semantic point of view and should be abandoned. Once these examples are removed, there is an extremely small number (no more than a handful) left over that appear to support his position. However, compared to the massive counter-evidence in which glottalized stops in Kartvelian and Afroasiatic correspond to similar sounds (the traditional plain voiced stops) in Indo-European, even these residual examples become suspect.

4. Current views on Proto-Indo-European phonology

The Neogrammarian reconstruction of the Proto-Indo-European phonological system, which was arrived at through strict adherence to the doctrine that sound laws admit no exceptions, was notable for its large inventory of stops and its extremely small inventory of fricatives. The stop system was based upon the example of Old Indo-Aryan and consisted of a four-way contrast of 1) plain voiceless stops, 2) voiceless aspirates, 3) plain voiced stops, and 4) voiced aspirates (cf. Brugmann 1904: 52), thus:

	1	2	3	4
Labial	*p*	*ph*	*b*	*bh*
Dental	*t*	*th*	*d*	*dh*
Palatal	*ḱ*	*ḱh*	*ǵ*	*ǵh*
Velar	*q*	*qh*	*g*	*gh*
Labiovelar	*q̬u̯*	*q̬u̯h*	*g̬u̯*	*g̬u̯h*

The Neogrammarians also reconstructed five short vowels and five long vowels plus a reduced vowel, the so-called "schwa primum", which alternated with so-called "original" long vowels. A full set of diphthongs was posited as well. Finally, the system contained the semivowels **y* and **w*, a series of nasals, and the liquids **l* and **r*. The nasals and liquids could function as syllabics as well as non-syllabics, depending upon their environment.

The Proto-Indo-European vowels were subject to various alternations that were partially correlated with the positioning of the

accent within a word. These vowel alternations served to indicate different types of grammatical formations. The most common alternation was the interchange between the vowels **e* and **o* in a given syllable. There was also an alternation among lengthened-grade vowels, normal-grade vowels, and reduced- and/or zero-grade vowels.

The Neogrammarians posited voiceless aspirates for Proto-Indo-European on the basis of an extremely small, and somewhat controversial, set of correspondences from Indo-Iranian, Armenian, and Greek. In the other daughter languages, the voiceless aspirates and plain voiceless stops have the same treatment, except that **kh* became *x* in Slavic. In this century, a great many linguists have concluded that voiceless aspirates should not be reconstructed for the Indo-European parent language but rather should be considered as being secondarily derived in the daughter languages. In particular, it has been shown that many examples of voiceless aspirates in the daughter languages can be convincingly derived from earlier clusters of plain voiceless stop plus a following laryngeal. The removal of the voiceless aspirates has resulted in a stop system characterized by a three-way contrast of 1) plain voiceless stops, 2) plain voiced stops, and 3) voiced aspirates. Such a reconstruction creates a problem from a typological point of view, since data collected from the study of a great number of the world's languages have failed to turn up any systems in which voiced aspirates are added to the pair "plain voiceless stop" / "plain voiced stop" unless there are also corresponding voiceless aspirates in the system.

There are a number of other disturbing problems with the traditional reconstruction: First, most of the standard handbooks comment on the fact that there are extremely few, if any, unambiguous examples of the voiced bilabial stop **b* that can be reconstructed for Proto-Indo-European. The statistically low frequency of occurrence (perhaps even total absence) of this sound cannot be satisfactorily explained within the traditional framework. Another problem concerns the fact that the traditional plain voiced stops are rarely found in inflectional affixes or in pronouns. The final problem concerns the unexplained constraint against the cooccurrence of two plain voiced stops in a root.

It was in trying to find a solution for these problems in particular that Thomas V. Gamkrelidze, Paul J. Hopper, and Vjačeslav V. Ivanov were led in the early 1970's to consider the possibility that the traditional plain voiced stops might have been glottalics. Basing their arguments on typological considerations, they observed that the patterning of the plain voiced stops exhibited many of the typological characteristics of glottalics. In addition, Gamkrelidze and Ivanov (1984) suggested that the traditional plain voiceless stops be reinterpreted as voiceless aspirates. They made no changes to the traditional voiced aspirates, however. In this revised interpretation, aspiration is viewed as a redundant feature, and the phonemes in question could also be realized as allophonic variants without aspiration. These revisions provide typologically natural explanations for the problems mentioned above, specifically: 1) by reinterpreting the traditional plain voiceless stops as voiceless aspirates, there is no longer a conflict with typological evidence; 2) reinterpretation of the traditional plain voiced stops as glottalics easily accounts for the statistically low frequency of occurrence of the traditional plain voiced bilabial stop (which becomes a bilabial ejective in the revised system) since the bilabial member is always characterized by a low frequency of occurrence (there quite often being a total absence at this point of articulation) in attested languages having ejectives; 3) in such languages, it is common for ejectives to be excluded from inflectional affixes and pronouns; and 4) many languages with ejectives have a constraint against the cooccurrence of two ejectives in a root. Moreover, the revisions proposed by Gamkrelidze, Hopper, and Ivanov provide new insights into the underlying principles governing Grassmann's Law and Bartholomae's Law. It may be noted that the changes proposed by Gamkrelidze, Hopper, and Ivanov have gained widespread support among Indo-Europeanists.

In 1878, the young Ferdinand de Saussure attempted to show that so-called "original" long vowels were to be derived from earlier sequences of short vowel plus a following "coefficient sonantique". In 1927, Jerzy Kuryłowicz and Albert Cuny independently demonstrated that reflexes of the Saussure's "coefficients sonantiques" were preserved in Hittite. On this basis, a series of consonantal phonemes, commonly called "laryngeals", was then posited for Proto-Indo-European. Kuryłowicz, in particular, set up four laryngeals, and it is his version of the "Laryngeal Theory" that is followed in this paper. The laryngeals may be assigned the following phonetic values:

H_1 = Glottal stop
H_2 = Voiceless and voiced multiply-articulated pharyngeal/laryngeal fricatives

H_3 = Voiceless and voiced velar fricatives
H_4 = Voiceless glottal fricative

On the basis of the preceding discussion, the Proto-Indo-European phonological system may be reconstructed as follows:

Obstruents

p^h/p	t^h/t	k^h/k	k^{wh}/k^w
b^h/b	d^h/d	g^h/g	g^{wh}/g^w
(p')	t'	k'	k'^w
	s		

Laryngeals

H_1	H_2	H_3	H_4

Nasals and liquids

$m/\underset{\circ}{m}$	$n/\underset{\circ}{n}$	$l/\underset{\circ}{l}$	$r/\underset{\circ}{r}$

Glides

y	w

Vowels

e	o	a	i	u	e
$\bar{e}$	$\bar{o}$	$\bar{a}$	$\bar{\imath}$	$\bar{u}$	

5. Proto-Kartvelian phonological system

Proto-Kartvelian had a rich system of stops, affricates, and fricatives. Each stop and affricate series was characterized by the three-way contrast 1) voiceless aspirated, 2) voiced, and 3) glottalized. Thomas Gamkrelidze and Giri Mačavariani (1982) reconstruct three separate series of affricates and fricatives, namely, a front series, a mid series, and a back series, but Karl Horst Schmidt (1962) reconstructs only two. It is Gamkrelidze and Mačavariani's views that are followed in this paper. Klimov (1964) also follows Gamkrelidze and Mačavariani.

Proto-Kartvelian also has a series of resonants, which could function as syllabics as well as nonsyllabics, depending upon their environment. The patterning is strikingly similar to what is assumed to have existed in Proto-Indo-European.

Three short and three long vowels are usually reconstructed for Proto-Kartvelian. As in Proto-Indo-European, the vowels underwent various ablaut changes. These alternations served to indicate different types of grammatical formations. The most common alternation was the interchange between the vowels **e* and **a* in a given syllable. There was also an alternation among lengthened-grade vowels, normal-grade vowels, and reduced- and/or zero-grade vowels.

The Proto-Kartvelian phonological system may be reconstructed as follows:

Obstruents

p^h	t^h	c^h	$c^h{}_l$	$\check{c}^h$	k^h	q^h	
b	d	$ʒ$	$ʒ_l$	$\check{ʒ}$	g	G	
p'	t'	c'	$c'{}_l$	$\check{c}'$	k'	q'	
		s	s_l	$\check{s}$	x		h
		z	z_l	$(\check{z})$	γ		

Resonants

$m/\underset{\circ}{m}$	$n/\underset{\circ}{n}$	$l/\underset{\circ}{l}$	$r/\underset{\circ}{r}$	y/i	w/u

Vowels

$e, \bar{e}$	$o, \bar{o}$	$a, \bar{a}$

6. Proto-Afroasiatic phonological system

There are still many uncertainties regarding the reconstruction of the Proto-Afroasiatic phonological system. In general, I have followed the views of Martinet (1975 [1953]: 248–261), Cohen (1968: 1299–1306), and Diakonoff (1984: 1–10), though I have made minor adjustments to their proposals on the basis of my own research.

One of the most notable characteristics of Afroasiatic consonantism is the system of triads found in the stops and affricates – each series (except the lateralized affricates) consists of the three-way contrast 1) voiceless aspirated, 2) voiced, and 3) glottalized (that is, ejective). The lateralized affricate series probably lacked a voiced member. Another significant characteristic is the presence of a glottal stop, a voiceless glottal fricative, and voiced and voiceless pharyngeal fricatives. Proto-Afroasiatic may also have had a series of postvelars.

According to Diakonoff (1975: 134–136), Proto-Afroasiatic had a vertical vowel system of **ə* and **a* as well as a series of syllabic

resonants. In my opinion, the evidence from the non-Semitic branches of Afroasiatic does not appear to support the reconstruction of syllabic resonants for Proto-Afroasiatic. Proto-Afroasiatic seems not to have had long vowels.

The Proto-Afroasiatic phonological system may tentatively be reconstructed as follows:

Obstruents

p^h	t^h	c^h	t^{yh}	tl^h	k^{yh}	k^h		k^{wh}	
b	d	$ʒ$	d^y		g^y	g		g^w	
p'	t'	c'	t'^y	tl'	k'^y	k'		k'^w	$ʔ$
f		s	$š$				$ħ$		h
							$ʕ$		

Glides, nasals, and liquids

w	y	m	n	r	l

Vowels

$ə$	a

7. Root structure patterning in Afroasiatic

It is necessary to be quite clear concerning my assumptions regarding root structure patterning in Proto-Afroasiatic, because the assumptions I have made here are critical to the viability of the lexical comparisons I have made between Afroasiatic and the other language families considered in this paper.

Let me begin by quoting in full Diakonoff's (1984: 1–2) comments on Afroasiatic root structure patterning in his letter written to the Third International Hamito-Semitic Congress and published in the proceedings edited by James Bynon:

> The latest argument which has recently been advanced in favour of retaining the term 'Hamitic' was, as far as I know, the supposed fact that the Hamitic roots are mainly biconsonantal while those of Semitic are triconsonantal. Our work on the Comparative Historical Vocabulary of Afrasian (CHVA) has shown without a shadow of a doubt that this is wrong. The Common Afrasian roots were in principle biconsonantal; most of them have been extended to a triconsonantal status either by reduplicating the second consonant of the root, or by adding a real or fictitious

> 'weak' consonant (forming either *mediae infirmae* or *tertiae infirmae* roots); the choice between the formation of a *secundae geminatae*, a *mediae infirmae* or a *tertiae infirmae* secondary stem is virtually non-predictable (i.e. these types of the root are allomorphic at the Proto-Afrasian level). An additional method of forming secondary roots is the one well known from Proto-Indo-European, viz., the adding of a suffixed (very rarely a prefixed) consonant 'complement' to the root. In about 90% of the cases (at least in that part of the vocabulary which we have worked through) the so-called 'three-consonantal roots' can with a great certainty be derived from a well attested biconsonantal root plus a complement which is used to modify the main semantics of the biconsonantal root. Note that the 'biconsonantal cum complement' roots are well attested not only in Semitic but also in Cushitic, Berber and Egyptian, and though they are somewhat more rare in the Chadic and some of the Cushitic languages, the reason for this phenomenon is: (1) the loss of external inflection which later also caused losses in the final stem consonants and (2) the loss of a number of Proto-Semitic phonemes in Late Stage languages.

I agree totally with Diakonoff's comments.

It is thus now certain beyond any reasonable doubt that the third consonantal element of the Proto-Semitic root, be it infix or suffix, was simply not a part of the root, in the overwhelming majority of cases, at the Proto-Afroasiatic level and that the underlying root structure patterning did not differ in any appreciable aspect from that found in Proto-Indo-European.

8. Proto-Uralic phonological system

There is broad agreement among scholars about Proto-Uralic consonantism. Word initially, Proto-Uralic had the following sounds: **p-*, **t-*, **k-*, **č-*, **c^y-*, **s-*, **s^y-*, **š-*, **š^y*, **δ^y-*, **y-*, **w-*, **l-*, **l^y*, **r-*, **n^y-*, **n-*, **m-*. Medially between vowels, the following sounds were found: **-p-*, **-t-*, **-k-*, **-č-*, **-c^y-*, **-s-*, **-s^y-*, **-š-*, **-γ-*, **-δ-*, **-δ^y-*, **-y-*, **-w-*, **-l-*, **-l^y-*, **-r-*, **-ŋ-*, **-nk-*, **-ŋt-*, **-n-*, **-nt-*, **n^y-*, **-m-*, **-mt-*, **-mp-*. Cf. Austerlitz (1968: 1375–1377).

There are still many uncertainties regarding the reconstruction of the Proto-Uralic vowels. The system followed in this paper reflects that adopted by Károly Rédei in the new Uralic etymological dictionary currently in the course of publication.

The Proto-Uralic consonant system may be reconstructed as follows:

p	*t*		*č*	c^y	*k*
	δ			δ^y	*γ*
	s	s^y	*š*	$š^y$	
m	*n*			n^y	*ŋ*
	r	*l*		l^y	
w				*y*	

9. Proto-Dravidian phonological system

Word initially, there were only voiceless stops in Proto-Dravidian. This is still the situation found in Tamil. On the basis of the reflexes found in South Dravidian languages and Telugu, a series of alveolars distinct from dentals and retroflexes has been reconstructed for Proto-Dravidian. A notable feature of Proto-Dravidian consonantism is the absence of sibilants. Medially, Proto-Dravidian had a contrast between geminate (including the clusters of nasal plus consonant) and non-geminate consonants. Initially and medially in combination with other stops, **p*, **t*, **k*, and **c* were voiceless; between vowels and before nasals, they were voiced. The geminates were voiceless.

Proto-Dravidian had five short and long vowels plus the sequences **ay* and **av*.

The reconstruction shown below is close to that set up by Kamil Zvelebil (1970: 77) for Proto-Dravidian; however, I have followed Thomas Burrow and Murray B. Emeneau (1984: xii–xiii) in their representation of the alveolar as **r̲* instead of **t̲*, even though the evidence from the Dravidian daughter languages points to underlying /*t̲*/ at the Proto-Dravidian level. The reason for my decision to represent the Proto-Dravidian phoneme as **r̲* instead of **t̲* is based on the observation that this phoneme corresponds to /*r*/ in the closely-related Elamite (though there is some room for interpretation here) as well as in the other Nostratic languages.

p-	*t-*			*c-*	*k-*
-p-	*-t-*	*-r̲-*	*-ṭ-*	*-c-*	*-k-*
-pp-	*-tt-*	*-r̲r̲-*	*-ṭṭ-*	*-cc-*	*-kk-*
-mp-	*-nt-*	*-nr̲-*	*-nṭ-*	*-ñc-*	*-ṅk-*
-p(u)	*-t(u)*	*-r̲(u)*	*-ṭ(u)*	*-c(u)*	*-k(u)*
m	*n*		*ṇ*	*ñ*	
-mm-	*-nn-*		*-ṇṇ-*	*-ññ-*	
v-	*-r*	*-l*	*-ṛ*	*y*	
-v-	*-r-*	*-l-*	*-ṛ-*	*-y-*	
			-ḷ		
			-ḷ-		
-vv-		*-ll-*	*-ḷḷ-*	*-yy-*	
(-v)					

e	*o*	*a*	*i*	*u*
ē	*ō*	*ā*	*ī*	*ū*

10. Proto-Altaic phonological system

As noted by Merritt Ruhlen (1987: 128): "The study of the Altaic family has had a long and stormy history, and even today there is considerable disagreement among specialists over exactly which languages belong to the family." I would include the following groups within the Altaic language family: (Chuvash-)Turkic, Mongolian, and (Manchu-)Tungus (but not Korean, Ainu, and Japanese-Ryukyuan, which I believe must be treated separately).

For Proto-Altaic phonology, I follow the reconstructions proposed by Nicholas Poppe (1960). Proto-Altaic is assumed to have had a voicing contrast in stops and affricates, but, as noted by Poppe (1960: 9–10), there is a possibility that the contrast could have been between voiceless aspirated and voiceless unaspirated stops and affricates instead. An entirely different approach is taken by Illič-Svityč (1971, I: 147–156), who reconstructs the three-way contrast of 1) voiceless aspirated, 2) plain voiceless, and 3) plain voiced. Neither the liquids nor the velar nasal were used word-initially. Proto-Altaic had a rich system of long and short vowels.

The Proto-Altaic phonological system may be reconstructed as follows:

p		*t*		*č*	*k*			
b		*d*		*ǯ*	*g*			
		s						
m		*n*		n^y	*-ŋ-*			
	-l-		*-r-*					
	$-l^y-$		$-r^y$					
				y				
a	*o*	*u*	*i*	*e*	*ė*	*ö*	*ü*	*ï*
ā	*ō*	*ū*	*ī*	*ē*	*ė̄*	*ȫ*	*ǖ*	*ï̄*

11. Sumerian phonology

In a series of recent, privately-circulated papers, Claude Boisson has been exploring lexical parallels between Sumerian and other languages, especially the Nilo-Saharan languages and the so-called "Nostratic" languages. Boisson has been very careful not to draw wild conclusions from the data he has amassed about possible relationship of Sumerian to other languages or language families. Yet, the lexical parallels he has uncovered between Sumerian and the Nostratic languages, especially Dravidian, though not numerous, look very promising and permit one to establish tentative phonological correspondences between Sumerian and the rest of Nostratic.

The Sumerian cuneiform syllabary distinguished the vowels *a, e, i, u* and the consonants *b, d, dr, g, g̃* (probably a velar nasal), *h, k, l, m, n, p, r, s, š, t, z.* There may have been corresponding long vowels as well. There were no initial consonant clusters, while final consonants, especially *t, d, k, g, m, n, r,* were often omitted in the writing, and this often makes it difficult to ascertain the form of the word. Internally, there was a tendency for consonants to assimilate. Lastly, the traditional transliteration shows a voicing contrast in stops. The actual contrast, however, may have been between voiceless aspirated and voiceless unaspirated stops. For details on Sumerian phonology, cf. Thomsen (1984: 37–47).

The Sumerian root was generally monosyllabic: CV, VC, and, most often, CVC. There was no distinction between verbal roots and nominal roots: thus, *dùg* could mean either 'good' or 'to be good'.

12. Proto-Nostratic phonological system

Proto-Nostratic had a rich system of stops and affricates. Each stop and affricate series was characterized by the three-way contrast 1) voiceless aspirated, 2) voiced, and 3) glottalized.

Three short vowels may be reconstructed for Proto-Nostratic: **i, *a, *u,* and this, along with the addition of the vowel *e,* is the situation reflected in Sumerian, which is particularly conservative in regards to vocalism. These vowels were probably subject to considerable subphonemic variation in Proto-Nostratic. The high front and back vowels may be assumed to have had lowered variants, while the central low vowel may be assumed to have had higher variants. It was the reanalysis, phonemicization, and exploitation of this subphonemic variation that gave rise to the ablaut and vowel-harmony patterning found in the majority of the Nostratic daughter languages. In Afroasiatic, on the other hand, the high allophones merged into **ə,* and the low allophones merged into **a.* It is unclear whether phonemic long vowels existed in Proto-Nostratic as well, though the evidence seems to indicate that they did not.

The Proto-Nostratic phonological system may tentatively be reconstructed as follows:

Obstruents

p^h	t^h	c^h	t^{yh}	tl^h	k^{yh}	k^h		k^{wh}	q^h	
b	*d*	*ʒ*	d^y		g^y	*g*		g^w	*G*	
p'	t'	c'	t'^y	tl'	k'^y	k'		k'^w	q'	q'^w
									ʔ	
		s	s^y				*ħ*		*h*	
							ʕ			

Glides, nasals, and liquids

w	*y*	*m*	*n*	*r*	*l*
			n^y	r^y	l^y

Vowels

i/e	*a/e*	*u/o*

The palatalized velars are reconstructed solely on the basis of the reflexes found in Afroasiatic, and their reconstruction at the Proto-Nostratic level is, therefore, highly uncertain. I would like to be able to propose that the Afroasiatic reflexes are due to an innovation in which plain velars were palatalized before front vowels, but the evidence that I have gathered to date is simply too contradictory to allow me to be able make such a statement with even a modicum of certainty.

13. Selected examples

The following abbreviations will be used: PN = Proto-Nostratic; PK = Proto-Kartvelian; PAA = Proto-Afroasiatic; PIE = Proto-Indo-European; PU = Proto-Uralic; PFU = Proto-Finno-Ugrian; PD = Proto-Dravidian; PED = Proto-Elamo-Dravidian; PA = Proto-Altaic; S = Sumerian. The symbol ɜ in the examples below is used to represent a vowel of unknown quality.

1. PN **bur-/*bor-* 'to bore, to pierce': PAA **bər-/*bar-* 'to bore, to pierce'; PIE **b^{h}or-/*b^{h}ɾ̥-* 'to bore, to pierce'; PU **pura* 'borer, auger'; PD **pur-* 'gimlet, borer; to bore, to perforate'; PA **bur-* 'to bore a hole'; S *bùr* 'to bore through, to pierce'.

2. PN **buw-/*bow-* 'to become, to arise, to come into being, to grow': PAA **bəw-/*baw-* 'to grow'; PIE **b^{h}ewH-/*b^{h}owH-/*b^{h}uH-* 'to become, to arise, to come into being, to grow'; PU **puwe* 'tree'; PD **pū-* 'to blossom, to flower'.

3. PN **p^{h}il^y-/*p^{h}el^y-* 'to split, to cleave': PAA **p^{h}əl-/*p^{h}al-* 'to split, to cleave'; PIE **(s)p^{h}el-* 'to split, to cleave'; PU **pil^{y}ɜ-* 'to split, to cleave'; PD **piḷ-* 'to split, to cleave, to burst'.

4. PN **p^{h}ar-/*p^{h}er-* 'to fly, to flee': PK **p^{h}r-in-* 'to fly': PAA **p^{h}ər-/*p^{h}ar-* 'to fly, to flee'; PIE **p^{h}er-/*p^{h}or-/*p^{h}ɾ̥-* 'to fly, to flee'; PD **paṟ-* 'to fly, to flee'.

5. PN **dan-/*den-* 'to run, to flow': PK **den-/*din-* 'to run, to flow', **dṉ-* 'to melt'; PIE **d^{h}en-/*d^{h}on-* 'to run, to flow'.

6. PN **dun^y-/*don^y-* 'to cut, to cut off, to cleave, to split': PAA **dən-/*dan-* 'to cut, to cut off, to cleave'; PIE **d^{h}en-/*d^{h}on-/*d^{h}ṉ-* 'to cut, to cut off, to cleave'; PD **tuṉ-* 'to cut, to sever, to sunder; to be cut, severed, sundered'; S *dun* 'to dig (with a hoe)'.

7. PN **t^{h}ar^y-/*t^{h}er^y-* 'to rub, to wear down; worn out, weak, frail': PAA **t^{h}ər-/*t^{h}ar-* 'weak, frail, delicate'; PIE **t^{h}er-/*t^{h}or-/*t^{h}ɾ̥-* 'to rub, to wear down; weak, frail, delicate'; PD **taṟ-* 'to be worn out, rubbed; to rub down, to grind, to wear away'.

8. PN **t^{h}i-/*t^{h}e-* 'thou, thee': PAA **t^{h}ə/*t^{h}a* 'thou, thee'; PIE **t^{h}ŭ, *t^{h}e-* 'thou, thee'; PU **tinä/*tüna* 'thou, thee'; PA **ti* 'thou, thee'; S *za.e* 'thou'; Gilyak *t^{h}i* 'thou'.

9. PN **t^{h}ak'-/*t^{h}ek'-* 'to touch, to push, to strike': PAA **t^{h}ək'-/*t^{h}ak'-* 'to touch, to push, to strike'; PIE **t^{h}ak'-* 'to touch, to strike, to push, to stroke'; PD **tak-* 'to touch, to come into contact with, to hit': S *tag* 'to touch'.

10. PN **t'ar-/*t'er-* 'to tear, to rend, to cut, to sever': PIE **t'er-/*t'or-/*t'ɾ̥-* 'to tear, to rend, to flay'; PD **taṟ-* 'to cut, to cut off, to lop off, to strip off', **teṟ-* 'to burst asunder, to split, to cut, to cut off'; S *dar* 'to split'.

11. PN *t'aħ-/*t'eħ-* 'to split': PK **t'ex-* 'to break'; PAA **t'əħ-/*t'aħ-* 'to break, to shatter'; PIE **t'eA-* 'to cleave asunder, to divide'.

12. PN **t'ay-/*t'ey-* 'to shine, to gleam, to be bright, to glitter, to glow': PAA **t'əy-/*t'ay-* 'to be good, pleasant, agreeable, glad, happy, desirable, beautiful, lovely'; PIE **t'ey-/*t'oy-/*t'i-* 'to shine, to be bright'; PD **tī(y)-* 'to be burnt, charred, singed'.

13. PN **d^{y}ar-/*d^{y}er-* 'to hold firmly': PAA **d^{y}ər-/*d^{y}ar-* 'to hold firmly; hand, arm'; PIE **d^{h}er-/*d^{h}or-/*d^{h}ɾ̥-* 'to hold firmly in the hand, to support'.

14. PN **d^{y}i-/*d^{y}e-* demonstrative stem: PAA **d^{y}ə-/*d^{y}a-* demonstrative stem; PIE **-d^{h}e* suffixed particle; PU **c^{y}e, *c^{y}i* demonstrative stem.

15. PN **t^{yh}um-/*t^{yh}om-* 'to strike, to hit, to stun, to stupefy': PAA **t^{yh}əm-/*t^{yh}am-* 'to strike, to hit, to stun, to stupefy'; PIE **t^{h}em-/*t^{h}om-* 'to strike, to hit, to stun, to stupefy'; PD **cōm-* 'to

droop; to fade; to get intoxicated, bewildered, stupefied'; (?) S *šum* 'to slaughter'.

16. PN **t'ʸar-/*t'ʸer-* 'to cut, to split': PK **č'er-/*č'ar-/*č'r-* 'to cut'; PAA **t'ʸər-/*t'ʸar-* 'to cut, to split'; PFU **cʸärke-* 'to split open, to rend'; PD **car-* 'to tear, to rend, to split'.

17. PN **t'ʸul-/*t'ʸol-* 'to overshadow, to cover over, to make dark': PAA **t'ʸəl-/*t'ʸal-* 'to overshadow, to cover over, to make dark'; PIE **t'el-/*t'ol-* 'to cover over, to stretch over'; S *dul* 'to cover'.

18. PN **ʒam-/*ʒem-* 'to blow, to play (a wind instrument)': PAA **ʒəm-/*ʒam-* 'to blow, to play (a wind instrument)'; PIE **dʰem-/*dʰom-/*dʰm̥-* 'to blow, to play (a wind instrument)'.

19. PN **ʒim-/*ʒem-* 'to be sour, bitter, pungent, sharp': PK **ʒɪm-* 'salt', **ʒɪm-ar-* 'vinegar'; PFU **čemɜ* 'sour; to become sour'.

20. PN **cʰukʰ-/*cʰokʰ-* 'to bend, to turn, to wind, to twist; to close, to shut; to cover': PAA **cʰəkʰ-/*cʰakʰ-* 'to bend, to turn, to wind, to twist; to close, to shut; to cover'; PIE **tʰokʰ-* 'to bend, to turn, to wind, to twist'; PU **čukka-* 'to bend, to twist, to turn; to close, to shut'.

21. PN **c'il-/*c'el-* 'to stretch out, to extend, to exceed; to be wealthy, to prosper': PAA **c'əl-/*c'al-* 'to stretch out, to extend, to exceed; to be wealthy, to prosper'; PD **cel-* 'wealth, prosperity'.

22. PN **tlʰunkʰ-/*tlʰonkʰ-* 'to hook up, to hang; hanging, dangling; peg, hook': PAA **tlʰənkʰ-/*tlʰankʰ-* 'to hook up, to hang; peg, hook'; PIE **kʰonkʰ-* 'to hook up, to hang; peg, hook'; PD **cuṅk-* 'piece hanging out or dangling'.

23. PN **tlʰilʸ-/*tlʰelʸ-* 'to see': PK **xel-/*xil-* 'to open the eyes, to see'; PU **šʸilʸmä* 'eye'.

24. PN **tl'im-/*tl'em-* 'to join, bind, or unite together': PAA **tl'əm-/*tl'am-* 'to join together'; PIE **k'em-/*k'om-/*k'm̥-* 'to join together, to unite'; PU **δʸimä (*δʸümä)* 'glue'.

25. PN **gub-/*gob-* 'highest point, summit, top': PAA **gəb-/*gab-* 'highest point, pinnacle'; PIE **gʰebʰ-* 'gable, head, pinnacle'; PD **kop-* 'top, summit, crest'; (?) S *gub* 'to stand, to erect'.

26. PN **gat'-/*get'-* 'to take (with the hand), to grasp': PAA **gət'-/*gat'- 'to take'; PIE *gʰet'-/*gʰot'-*, (with nasal infix) **gʰe-n-t'-* 'to take (with the hand)': PFU **käte* 'hand'; PD **kat-* 'to seize, to grasp', **ketkā, *kay* 'hand'.

27. PN **kʰapʰ-* 'to take, to seize; hand'; PAA **kʰəpʰ-/*kʰapʰ-* 'to take, to seize; hand'; PIE **kʰapʰ-* 'to take, to seize'; PFU **kappɜ-* 'to seize, to grasp'; PD **kap-* 'to feel, to touch'; PA **kapa-* 'to seize, to snatch'.

28. PN **kʰul-/*kʰol-* 'to hear': PIE **kʰl-ew-/*kʰl-ow-/*kʰl-u-* 'to hear'; PU **kule-* 'to hear'; PD **kēḷ-* 'to hear, to listen'.

29. PN **kʰur-/*kʰor-* 'blood': PIE **kʰr-ew-H-/*kʰr-u-H-* 'bloody, raw'; PD **kuruti* 'blood'; S *guru$_{II}$-un, kurin* 'blood'.

30. PN **k'an-/*k'en-* 'to get, to acquire, to possess, to create': PAA **k'ən-/*k'an-* 'to get, to acquire, to possess, to create'; PIE **k'en-/*k'on-/*k'n̥-* 'to beget'; PD **kan-* 'to beget, to bear, to bring forth; child, young animal'; S *gan* 'to bear, to bring forth, to give birth to'.

31. PN **k'alw-/*k'elw-* 'female in-law': PIE **k'(ₒ)lowV-, *k'(e)lōC-* 'husband's sister'; PFU **käle-wɜ* 'sister-in-law'; PD **kal-* 'female in-law'; PA **kälin* 'female in-law'.

32. PN **k'il-/*k'el-* 'to decrease, to diminish': PK **k'el-/*k'l-* 'to decrease, to diminish'; PAA **k'əl-/*k'al-* 'to decrease, to diminish; to be or become little, small, few'; PD **kil-* 'small, little'.

33. PN **gʸil-/*gʸel-* 'to glide, to slip, to slide': PAA **gʸəl-/*gʸal-* 'to glide, to slip, to slide'; PIE **gʰl-ey-/*gʰl-oy-/*gʰl-i-* 'to glide, to slip, to slide'; PFU **kilɜ* (**külɜ*) 'smooth, slippery'.

34. PN **wigʸ-/*wegʸ-* 'to carry, to convey': PAA **wəgʸ-/*wagʸ-* 'to carry, to weigh'; PIE **wegʰ-/*wogʰ-* 'to carry, to convey, to weigh'; PFU **weγe-* or **wiγe-* 'to bring, to carry, to convey'.

35. PN **kʸʰilʸ-/*kʸʰelʸ-* 'to rise, to ascend, to raise up': PAA **kʸʰəl-/*kʸʰal-* 'to lift, to raise, to ascend'; PIE **kʰel-/*kʰol-/*kʰḷ-* 'to lift, to raise, to elevate'; PD **kiḷar* 'to rise, to ascend, to raise up'.

36. PN **k'ʸal-* 'bald; head': PAA **k'ʸal-* 'to be bald; bald; head'; PIE **k'al-* 'bald; head'.

37. PN **g^{w}an-/*g^{w}en-* 'to harm, to injure': PAA **g^{w}ən-/*g^{w}an-* 'to harm, to injure'; PIE **g^{wh}en-/*g^{wh}on-/*g^{wh}n̥-* 'to strike, to slay, to kill, to wound, to hurt'.

38. PN **k^{wh}a-/*k^{wh}e-* interrogative pronoun stem, **k^{wh}i-/*k^{wh}e-* relative pronoun stem: PAA **k^{wh}ə-/*k^{wh}a-* interrogative stem; PIE **k^{wh}e-/*k^{wh}o-, *k^{wh}i-* interrogative and relative pronoun stem; PU **ke-/*ki-* relative pronoun stem, **ku-/*ko-* interrogative pronoun stem; PA **ka-, *ki-* interrogative pronoun stem.

39. PN **k'^{w}ir-/*k'^{w}er-* 'highest point, top, peak': PAA **k'^{w}ar-* 'highest point, top, peak, summit, hill, mountain, horn'; PIE **k'^{w}er-/*k'^{w}or-/*k'^{w}r̥-* 'hill, mountain, peak'; PA **kira* 'mountain crest'.

40. PN **k'^{w}at'-/*k'^{w}et'-* 'to cut': PK (**k'wet'y-/*k'wat'y-* >) **k'wety-/*k'waty-* 'to cut, to cut off, to cut down'; PAA **k'^{w}ət'-/*k'^{w}at'-* 'to cut'; PIE (**k'^{w}et'-/*k'^{w}ot'-* > [regressive deglottalization]) **k^{wh}et'-/*k^{wh}ot'-* 'to whet, to sharpen'; PD **katti* 'knife, cutting instrument, razor, sword', **katk-* 'to cut'.

41. PN **Gul-/*Gol-* 'bend, corner, edge, valley, ravine, gully': PK **Gele* 'ravine, gorge, gully'; PIE **g^{h}el-/*g^{h}ol-/*g^{h}l̥-* 'edge, valley'; PFU **kolɜ* 'hollow, hole; crack, fissure, crevice, rift'; PD **kolli* 'bend, valley, corner'.

42. PN **q'al-/*q'el-* 'neck, throat': PK **q'eli* 'neck, throat'; PIE **k'el-/*k'ol-/*k'l̥-* 'neck, throat; to swallow'.

43. PN **q'^{w}ul-/*q'^{w}ol-* 'to strike, to hurt, to wound, to slay, to kill': PK **q'wel-/*q'wal-/*q'wl-* 'to slay, to kill'; PAA **q'^{w}əl-/*q'^{w}al-* 'to kill, to slaughter'; PIE **k'^{w}el-/*k'^{w}ol-/*k'^{w}l̥-* 'to strike, to kill'; PU **kole-* 'to die'; PED **kol-* 'to kill, to murder'.

44. PN **q'^{w}ur-/*q'^{w}or-* 'to swallow; neck, throat': PK **q'orq'-* 'pharynx, throat, gullet'; PIE **k'^{w}er-/*k'^{w}or-/*k'^{w}r̥-* 'to swallow; neck, throat'; PD **kural* 'neck, throat, windpipe'.

45. PN **sam-/*sem-* 'to resemble, to be like': PAA **səm-/*sam-* 'to resemble, to be like'; PIE **sem-/*som-/*sm̥-* 'like, same, similar'.

46. PN **sun-/*son-* 'sinew, tendon': PIE **senHw-/*sneHw/u-* 'sinew, tendon'; PU **sōne* 'sinew, tendon'.

47. PN **nas^{y}-/*nes^{y}-* 'to breathe, to blow': PAA **nəš-/*naš-* 'to breathe, to blow'; PIE **nas-* 'nose'.

48. PN **ʕal-/*ʕel-* 'to be high, elevated; to rise high, to ascend; on, upon, on top of, over, above, beyond': PAA **ʕəl-/*ʕal-* 'to be high, elevated; to rise high; to ascend; on, upon, on top of, over, above, beyond'; PIE **H$_2$el-* 'over, above, beyond'; PU **älɜ-* 'to lift, to raise'.

49. PN **ʕanħ-/*ʕenħ-* 'to breathe, to respire, to live': PAA **ʕənh^{-}-/*ʕanħ-* 'to breathe, to respire, to live'; PIE **H$_2$enH$_2$-* 'to breathe, to respire, to live'.

50. PN **ħang-/*ħeng-* 'to press or squeeze together; to make narrow or constricted; to strangle; narrow, constricted; throat': PAA **ħəng-/*ħang-* 'to be narrow, constricted; throat'; PIE **H$_2$eng^{h}-* 'to be narrow; to choke, to strangle'; PD **aṇaṅk-, *aṉaṅk-* 'to cause pain, to make to suffer', to press into a narrower compass, to humble', **aṅkaḷ-* 'palate'.

51. PN **ħant^{h}-/*ħent^{h}-* 'front, front part': PAA **ħənt^{h}-/*ħant^{h}-* 'front, front part'; PIE **H$_2$ent^{h}-s* 'front, front part', **H$_2$ent^{h}-i* 'in front of, before'.

52. PN **ħar-/*ħer-* 'falcon, eagle, hawk': PAA **ħər-/*ħar-* 'falcon, hawk'; PIE **H$_3$er-/*H$_3$or-* 'eagle'; PD **eruva* 'eagle, kite'.

53. PN **ʔam(m)-/*ʔem(m)-* 'mother': PAA **ʔəm(m)-/*ʔam(m)-* 'mother'; PIE **H$_1$am(m)-* 'mother'; PU **emä* 'mother'; PD **am(m)a* 'mother'; S *ama* 'mother'.

54. PN **ʔarg-/*ʔerg-* 'to climb on, to mount': PAA **ʔərg-/*ʔarg-* 'to climb on, to mount; one who mounts'; PIE **H$_1$erg^{h}-/*H$_1$org^{h}-/*H$_1$r̥g^{h}-* 'to climb on, to mount'; PD **ark-* 'to climb on, to mount'.

55. PN **haw-/*hew-* 'to long for, to desire': PAA **həw-/*haw-* 'to long for, to desire'; PIE **H$_4$ew-* 'to long for, to desire'; PD **āv-* 'to long for, to desire'.

56. PN **ʔay-, *ʔya-* interrogative and relative pronoun stem: PAA **ʔay(y)-* interrogative pronoun stem; PIE **H$_1$yo-* relative pronoun stem; PFU **yo-* 'who, which'; PD **yā-* interrogative stem; PA **yā-* 'who, which, what'.

57. PN **wad-/*wed-* 'to cut, to strike, to slay': PAA **wəd-/*wad-* 'to kill, to destroy'; PIE **wed^{h}-/*wod^{h}-* 'to cut, to strike, to slay'; PD **veṭṭ-* 'to cut (as with sword or ax), to injure, to destroy; blow, strike, cut, wound'.

58. PN **wat'-/*wet'-* 'to moisten, to wet; water': PIE **wet'-/*wot'-/ut'-* to moisten, to wet; water'; PU **wete* 'water'.

59. PN **wal^{y}-/*wel^{y}-* 'to turn, to roll, to revolve': PAA **wəl-/*wal-* 'to turn, to turn around, to revolve'; PIE **wel-/*wol-/*w̥l-* 'to turn, to roll, to revolve'; PD **vaḷ-* 'to circle around'.

60. PN **man-/*men-* 'to stay, to remain': PAA **mən-/*man-* 'to stay, to remain'; PIE **men-/*mon-* 'to stay, to remain'; PD **man-* 'to stay, to remain'.

61. PN **mi-/*me-* interrogative pronoun stem: PK **mi-n-* interrogative pronoun stem; PAA **mə-/*ma-* interrogative pronoun stem; PIE **me-/*mo-* interrogative stem; PU **mi* interrogative and relative stem; PA **mi* interrogative stem; S *me-* interrogative stem.

62. PN **mal-/*mel-* 'to fill, to be or become full, to increase': PAA **məl-/*mal-* 'to fill, to be or become full'; PIE **mel-/*mol-/*mḷ-* 'much, many'; PD **mal-* 'to abound, to be full, to swell, to expand, to increase'.

63. PN **mi-/*me-* 'I, me': PK **me* 'I'; PAA **mə-/*ma-* (only in Chadic) 1st person personal pronoun stem; PIE **me-* 1st person personal pronoun stem; PU **minä/*müna* 'I, me', **me* 'we, us'; PA **mi-, *ma-* 1st person personal pronoun stem; S (Emesal) *me-* 1st person personal pronoun stem.

64. PN **mad-/*med-* 'honey, mead': PIE **med^{h}w/u-* 'honey, mead'; PFU **mete* 'honey': PD **maṭṭu* 'honey, sweet drink'.

65. PN **nik^{h}-/*nek^{h}-* 'to cause damage, to harm, to hurt, to injure': PAA **nək^{h}-/*nak^{h}-* 'to cause damage, to harm, to hurt, to injure'; PIE **nek^{h}-/*nok^{h}-* 'to cause damage, to harm, to hurt, to injure'; PFU **nikkä-* 'to push, to push against'; PD **nek-* 'to suffer'.

66. PN **na-/*ne-* 1st person personal pronoun stem: PAA **nə-/*na-* 1st person personal pronoun stem; PIE **ne-/*no-/*n̥-* 1st person personal pronoun stem (dual and plural); PD **năm(m)-* 1st person personal pronoun stem.

67. PN **na-/*ne-, *ni-/*ne, *nu-/*no-* negative particle: PK **nu* negative particle; PIE **ne, *n̥-, *ney* negative particle; PU **ne* negative particle; S *nu-* negative prefix.

68. PN **luk'-/*lok'-* 'to gather, to collect': PAA **lək'-/*lak'-* 'to gather, to collect'; PIE **lek'-/*lok'-* 'to pick, to gather, to collect'; PFU **luke-* 'to read, to count'.

69. PN **lag-/*leg-* 'to put, to place': PK **lag-* 'to put, to place'; PIE **leg^{h}-/*log^{h}-* 'to put, to place, to lay (down), to set; to lie (down)'.

70. PN **ħar-/*ħer-* 'to scratch, to scrape': PAA **ħər-/*ħar-* 'to scratch, to scrape, to plow'; PIE **H$_2$er-* 'to plow'; PD **ar-* 'a plow'; S *har (-har)* 'to scratch, to scrape'.

14. Correspondences

Proto-Nostratic	Proto-Kartvelian	Proto-Afroasiatic	Proto-Indo-European	Proto-Uralic	Proto-Dravidian	Proto-Altaic	Sumerian
b-	*b-*	*b-*	*b^{h}/b-*	*p-*	*p-*	*b-*	*b-*
-b-	*-b-*	*-b-*	*-b^{h}/b-*	*-w-*	*-pp-/-vv-*	*-b-*	*-b-*
p^{h}-	*p^{h}-*	*p^{h}-*	*p^{h}/p-*	*p-*	*p-*	*p-*	*p-*
-p^{h}-	*-p^{h}-*	*-p^{h}-*	*-p^{h}/p-*	*-p-*	*-pp-/-v-*	*-p-/-b-*	*-p-*
p'-	*p'-*	*p'-*	*(p'-)*	*p-*	*p-*	*p-*	*b-*
-p'-	*-p'-*	*-p'-*	*(-p'-)*	*-p-*	*-p(p)-*	*-b-*	*-b-*
d-	*d-*	*d-*	*d^{h}/d-*	*t-*	*t-*	*d-*	*d-*
-d-	*-d-*	*-d-*	*-d^{h}/d-*	*-δ-*	*-ṯ(t)-*	*-d-*	*-d-*
t^{h}-	*t^{h}-*	*t^{h}-*	*t^{h}/t-*	*t-*	*t-*	*t-*	*t-*
-t^{h}-	*-t^{h}-*	*-t^{h}-*	*-t^{h}/t-*	*-t(t)-*	*-t(t)-*	*-t-*	*-t-*
t'-	*t'-*	*t'-*	*t'-*	*t-*	*t-*	*t-*	*d-*
-t'-	*-t'-*	*-t'-*	*-t'-*	*-t-*	*-t(t)-*	*-d-*	*-d-*
d^{y}-	*ǯ-*	*d^{y}-*	*d^{h}/d-*	*c^{y}-*	*c-*	*ǯ-*	*d-*
-d^{y}-	*-ǯ-*	*-d^{y}-*	*-d^{h}/d-*	*-c^{y}-*	*-c(c)-*	*-ǯ-/-d-*	*-d-*
t^{yh}-	*č^{h}-*	*t^{yh}-*	*t^{h}/t-*	*c^{y}-*	*c-*	*č-*	*š-*
-t^{yh}-	*-č^{h}-*	*-t^{yh}-*	*-t^{h}/t-*	*-c^{y}-*	*-c(c)-*	*-č-*	*-š-*
t'^{y}-	*č'-*	*t'^{y}-*	*t'-*	*c^{y}-*	*c-*	*č-*	*d-*
-t'^{y}-	*-č'-*	*-t'^{y}-*	*-t'-*	*-c^{y}c^{y}-*	*-c(c)-*	*-ǯ-*	*-d-*

Proto-Nostratic	Proto-Kartvelian	Proto-Afroasiatic	Proto-Indo-European	Proto-Uralic	Proto-Dravidian	Proto-Altaic	Sumerian
s^{y}-	*š-*	*š-*	*s-*	*s^{y}-*	*c-*	*s-*	*š-*
-s^{y}-	*-š-*	*-š-*	*-s-*	*-s^{y}-*	*-c(c)-*	*-s-*	*-š-*
ʒ-	*ʒ$_{1}$-*	*ʒ-*	*d^{h}/d-*	*č-*	*c-*	*ǯ-*	
-ʒ-	*-ʒ$_{1}$-*	*-ʒ-*	*-d^{h}/d-*	*-č-*	*-c(c)-*	*-ǯ-/-d-*	
c^{h}-	*c^{h}$_{1}$-*	*c^{h}-*	*t^{h}/t-*	*č-*	*c-*	*č-*	
-c^{h}-	*-c^{h}$_{1}$-*	*-c^{h}-*	*-t^{h}/t-*	*-č-*	*-c(c)-*	*-č-*	
c'-	*c'$_{1}$-*	*c'-*	*t'-*	*č-*	*c-*	*č-*	
-c'-	*-c'$_{1}$-*	*-c'-*	*-t'-*	*-č-*	*-c(c)-*	*-ǯ-*	
s-	*s$_{1}$-*	*s-*	*s-*	*s-*	*c-*	*s-*	*s-*
-s-	*-s$_{1}$-*	*-s-*	*-s-*	*-s-*	*-c(c)-*	*-s-*	*-s-*
tl^{h}-	*x-*	*tl^{h}-*	*k^{h}/k-*	*š^{y}-*	*c-*		
-tl^{h}-	*-x-*	*-tl^{h}-*	*-k^{h}/k-*	*-š^{y}-*	*-c-*		
tl'-		*tl'-*	*k'-*	*δ^{y}-*	*t-*	*d-*	
-tl-		*-tl'-*	*-k'-*	*-δ^{y}-*	*-t(t)-*	*-d-*	
g-	*g-*	*g-*	*g^{h}/g-*	*k-*	*k-*	*g-*	*g-*
-g-	*-g-*	*-g-*	*-g^{h}/g-*	*-γ-*	*-k-*	*-g-*	*-g-*
k^{h}-	*k^{h}-*	*k^{h}-*	*k^{h}/k-*	*k-*	*k-*	*k-*	*k-*
-k^{h}-	*-k^{h}-*	*-k^{h}-*	*-k^{h}/k-*	*-k(k)-*	*-k(k)-*	*-k-/-g-*	*-k-*
k'-	*k'-*	*k'-*	*k'-*	*k-*	*k-*		*g-*
-k'-	*-k'-*	*-k'-*	*-k'-*	*-k-*	*-k(k)-*	*-g-*	*-g-*
g^{y}-	*g-*	*g^{y}-*	*g^{h}/g-*	*k-*	*k-*	*g-*	
-g^{y}-	*-g-*	*-g^{y}-*	*-g^{h}/g-*	*-γ-*	*-k-*	*-g-*	
k^{yh}-	*k^{h}-*	*k^{yh}-*	*k^{h}/k-*	*k-*	*k-*	*k-*	
-k^{yh}-	*-k^{h}-*	*-k^{yh}-*	*-k^{h}/k-*	*-k(k)-*	*-k(k)-*	*-k-/-g-*	
k'^{y}-	*k'-*	*k'^{y}-*	*k'-*	*k-*	*k-*	*k-*	
-k'^{y}-	*-k'-*	*-k'^{y}-*	*-k'-*	*-k-*	*-k(k)-*	*-g-*	
g^{w}-	*gw/u-*	*g^{w}-*	*g^{wh}/g^{w}-*	*k-*	*k-*	*g-*	*gu-*
-g^{w}-	*-gw/u-*	*-g^{w}-*	*-g^{wh}/g^{w}-*	*-γ-*	*-k-*	*-g-*	*-gu-*
k^{wh}-	*k^{h}w/u-*	*k^{wh}-*	*k^{wh}/k^{w}-*	*k-*	*k-*	*k-*	*ku-*
-k^{wh}-	*-k^{h}w/u-*	*-k^{wh}-*	*-k^{wh}/k^{w}-*	*-k(k)-*	*-k(k)-*	*-k-/-g-*	*-ku-*
k'^{w}-	*k'w/u-*	*k'^{w}-*	*k'^{w}-*	*k-*	*k-*	*k-*	*gu-*
-k'^{w}-	*-k'w/u-*	*-k'^{w}-*	*-k'^{w}-*	*-k-*	*-k(k)-*	*-g-*	*-gu-*
G-	*G-*	*G-*	*g^{h}/g-*	*k-*	*k-*		*g-*
-G-	*-G-*	*-G-*	*-g^{h}/g-*	*-γ-*	*-k-*		*-g-*
q^{h}-	*q^{h}-*	*q^{h}-*	*k^{h}/k-*	*k-*	*k-*	*k-*	*k-*
-q^{h}-	*-q^{h}-*	*-q^{h}-*	*-k^{h}/k-*	*-k(k)-*	*-k(k)-*	*-k-/-g-*	*-k-*

Proto-Nostratic	Proto-Kartvelian	Proto-Afroasiatic	Proto-Indo-European	Proto-Uralic	Proto-Dravidian	Proto-Altaic	Sumerian
q'-	*q'-*	*q'-*	*k'-*	*k-*	*k-*	*k-*	*g-*
-q'-	*-q'-*	*-q'-*	*-k'-*	*-k(k)-*	*-k(k)-*	*-g-*	*-g-*
q'^{w}-	*q'w/u-*	*q'^{w}-*	*k'^{w}-*	*k-*	*k-*	*k-*	*gu-*
-q'^{w}-	*-q'w/u-*	*-q'^{w}-*	*-k'^{w}-*	*-k-*	*-k(k)-*	*-g-*	*-gu-*
l-	*l-*	*l-*	*l-*	*l-*	*l-*		*l-*
-l-	*-l-*	*-l-*	*-l-*	*-l-*	*-l-*	*-l-*	*-l-*
-ly-	*-l-*	*-l-*	*-l-*	*-l^{y}-*	*-l-*	*-l^{y}-*	*-l-*
r-	*r-*	*r-*	*r-*	*r-*			*r-*
-r-	*-r-*	*-r-*	*-r-*	*-r-*	*-r-/-r̲-*	*-r-*	*-r-*
-ry-	*-r-*	*-r-*	*-r-*	*-r-*	*-r̲-*	*-r^{y}*	
y-	*y-/O-*	*y-*	*y-*	*y-*	*y-/O-*	*y-*	
-y-		*-y-*	*-y-*	*-y-*	*-y-*	*-y-*	
w-	*w-*	*w-*	*w-*	*w-*	*v-/O-*		
-w-	*-w-*	*-w-*	*-w-*	*-w-*	*-v-*		
m-	*m-*	*m-*	*m-*	*m-*	*m-*	*m-*	*m-*
-m-	*-m-*	*-m-*	*-m-*	*-m-*	*-m-*	*-m-*	*-m-*
n-		*n-*	*n-*	*n-*	*n-*		*n-*
-n-	*-n-*	*-n-*	*-n-*	*-n-*	*-n-/-n̲-*	*-n-*	*-n-*
n^{y}-		*n-*	*n-*	*n^{y}-*		*n^{y}-*	
-n^{y}-		*-n-*	*-n-*	*-n^{y}-*	*-n̲-*	*-n^{y}-*	
ʔ-	*O-*	*ʔ-*	*H$_{1}$-*	*O-*	*O-*	*O-*	
-ʔ-	*-O-*	*-ʔ-*	*-H$_{1}$-*	*-O-*	*-O-*	*-O-*	
h-	*O-*	*h-*	*H$_{4}$-*	*O-*	*O-*	*O-*	
-h-	*-O-*	*-h-*	*-H$_{4}$-*	*-O-*	*-O-*	*-O-*	
ħ-	*x-*	*ħ-*	*H$_{2}$/H$_{3}$-*	*O-*	*O-*	*O-*	*h-*
-ħ-	*-x-*	*-ħ-*	*-H$_{2}$-/-H$_{3}$-*	*-O-*	*-O-*	*-O-*	*-h-*
ʕ-	*O-*	*ʕ-*	*H$_{2}$/H$_{3}$-*	*O-*	*O-*	*O-*	
-ʕ-	*-O-*	*-ʕ-*	*-H$_{2}$-/-H$_{3}$-*	*-O-*	*-O-*	*-O-*	

Proto-Nostratic	Proto-Kartvelian	Proto-Afroasiatic	Proto-Indo-European
i	*i*	*ə*	*i, e*
e (< *a*)	*e, i*	*ə*	*e, a,* $_{e}$
u	*u*	*ə*	*u, o*
e (< *i*)	*e*	*a*	*e*
a	*a, i*	*a*	*a, o,* $_{e}$
o (< *u*)	*o*	*a*	*o*

Proto-Nostratic		Proto-Kartvelian	Proto-Afroasiatic	Proto-Indo-European
iy		*iy*	*əy*	*iy, ī*
ey	*(< ay)*	*ey, i*	*əy*	*ey, ay, i*
uy		*uy*	*əy*	*uy, ū*
ey	*(< iy)*	*ey*	*ay*	*ey, ē*
ay		*ay, i*	*ay*	*ay, oy, i*
oy	*(< uy)*	*oy*	*ay*	*oy, ō*
iw		*iw*	*əw*	*iw, ī*
ew	*(< aw)*	*ew, u*	*əw*	*ew, aw, u*
uw		*uw*	*əw*	*uw, ū*
ew	*(< iw)*	*ew*	*aw*	*ew, ē*
aw		*aw, u*	*aw*	*aw, ow, u*
ow	*(< uw)*	*ow*	*aw*	*ow, ō*

Proto-Nostratic		Proto-Uralic	Proto-Dravidian	Proto-Altaic	Sumerian
i		*i, ü*	*i*	*i, ï*	*i*
e	*(< a)*	*e*	*e*	*e*	*e*
u		*u*	*u*	*u, ü*	*u*
e	*(< i)*	*e*	*e*	*e*	*e*
a		*a, ä*	*a*	*a*	*a*
o	*(< u)*	*o*	*o, a*	*o, ö*	*u*
iy		*iy, üy*	*iy, ī*	*ī, ῑ̈*	*i*
ey	*(< ay)*	*ey, ē*	*ey, ī*	*ē; i, ï*	*i*
uy		*uy*	*uy, ī*		
ey	*(< iy)*	*ey*	*ey, ē*	*ėy; ē̈*	
ay		*ay, äy*	*ay, ā*	*a; i, ï*	*a*
oy	*(< uy)*	*oy*	*oy, ō*		
iw		*iw, üw*	*iv, ū*		
ew	*(< aw)*	*ew*	*ev, ū*		
uw		*uw*	*uv, ū*	*u, ü*	*u*
ew	*(< iw)*	*ew*	*ev*		*u*
aw		*aw, äw*	*av, ā*	*ō, ō̈*	
ow	*(< uw)*	*ow, ō*	*ov, ō*	*ō, ō̈*	

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A few issues of contemporary Indo-European linguistics

William R. Schmalstieg

1. Orthography

Since much linguistic reconstruction is based on the interpretation of orthography, I should like to say a few words about this. I have suggested many times that the orthography of Old Prussian does not reflect very well the pronunciation of the native speakers of that language and I have written that a consistent spelling may just as well be an incorrect one. According to Levin (1982: 284),

> This statement can be meaningful only if we define a text as a phonemic, phonetic, or morphophonemic transcription. Since no serious student of textual practice, including Schmalstieg himself, can entertain such a notion (Schmalstieg suggests that others expect the orthography to be a phonetic transcription), his statement seems to be a reverse tautology — a logical impossibility. The only determiner of correct spelling is consistency, especially when the text we are studying is the first embodiment of the spelling conventions being analyzed.

I must confess to not being a "serious student of textual practice" since I surmise, on the basis of my experience with other languages written in the Latin alphabet, that the spelling is intended to reflect some kind of "phonemic, phonetic, or morphophonemic transcription". The Old Prussian texts seem to have been written for German pastors to read to their Old Prussian congregations. It seems highly unlikely that the authors of these texts intended to create some kind of consistent letter code unrelated to the spoken word.