

# Diachronic development from Indo-Aegean to Indo-European

Author: Glen Gordon (<http://paleoglot.blogspot.com/>)

Email: glengordon01@yahoo.com

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The purpose of this pdf is to attempt to outline what grammatical changes, sound changes, and prehistoric events took place to shape the eventual language known to linguists as Proto-Indo-European (PIE) which has been dated to approximately 4000 BCE and was probably centered in the region of modernday Ukraine. I do *not* consider this a final theory or the only possible answer to the question of Pre-PIE stages. However, my desire here is to inform and inspire others to look at this intriguing problem for themselves as well. Linguistics lags behind another, comparatively more “tangible” science dealing with the past, namely archaeology. By contributing online and by encouraging hundreds of other busy minds to share their knowledge and ideas as well, I believe that much progress can be made to finally piece together the linguistic past further back than a mere 6000 years or so.

## The Indo-Aegean Language Family Proposal

I start with the premise that Indo-European language family is a close sister group to the Aegean language family to which I believe Etruscan, Lemnian, Rhaetic, Eteo-Cypriot, Eteo-Cretan and Minoan belong. In particular, I believe that a parent language dated to about 7000 BCE at the latest which we may name *Proto-Indo-Aegean* may be reconstructed in the finalmost stage with pronouns (\**məi*/\**mə*/\**mənə* 'I/me/my', \**tau*/\**tʷə*/\**tʷənə* 'thou/thee/thy', \**ʔəi*/\**ʔə*/\**ʔənə* 'he/him/his', \**wəi*/\**məs* 'we/our', \**təi*/\**təs* 'you/yours'), demonstratives (\**ka* 'this', \**ta* 'that (near you)', \**ha* 'that (yonder)'), case & number markers (\**-(a)m* [acc.], \**-(a)se* [gen.], \**-(a)la* [dat.], \**-(a)t'a* [abl.], \**-əi* [loc.], \**-(a)i*/\**-əs* [pl.], \**-aʔ* [dl.]), numerals (\**t'əu*/\**t'ə* 'one', \**t'wəi*/\**t'wə* 'two', \**kʷatʷə* 'four', \**nəu-* 'nine', \**t'ə-kam* 'ten', \**kaməs* '20') and original vocabulary (\**kahʷanə* 'dog'). From there, Pre-Proto-Indo-European would have slowly evolved away from the core and settled in the area of the Danube and Balkans, developing its own idiosyncracies for the next 3000 years.

## A Revised Transcription of Proto-Indo-European

In this document, all Proto-Indo-European forms cited are converted to a revised transcription such that palatalized stops are shown as plain stops (\**k̑* → \**k*), plain stops are shown as uvular stops (\**k* → \**q*), unaspirated voiced stops are shown as creaky-voiced stops (\**g̊* → \**ḡ*), aspirated voiced stops are shown simply as voiced stops (\**gʰ* → \**g*), and laryngeals are shown with their phonetic values that I believe to be the most probable (\**h₁* → \**ʔ*/\**-h-*, \**h₂* → \**χ*, \**h₃* → \**hʷ*).

## A Summary of Pre-IE Changes in Chronological Order

As of the date above, I currently believe that the following changes have taken place in the stages prior to commonly reconstructed Proto-Indo-European:

### Indo-Aegean (9000 BCE – 7000 BCE)

#### Centralization

Due to influence of neighbouring Pre-Proto-Abkhaz-Adyghe to the east, the original 4-vowel system of \**a*, \**ə*, \**i* and \**u* collapsed into a centralized system of only \**a* and \**ə*. In open stressed syllables \**i* and \**u* were diphthongized to \**əi* and \**əu* respectively while in closed syllables and medifinal positions, they became \**ə* and \**a* respectively. Note that at this

stage, while **\*i** and **\*u** may have continued to exist on the phonetic level as allophones of diphthongs **\*əi** and **\*au**, they were now only variants of **\*y** and **\*w** on the phonemic level.

#### Labialization

With Centralization came concomitant labialization of tautosyllabic stop and sibilant onsets containing **\*u**. Labialization however did not occur in the coda of a syllable.

- 1) **\*kui** > **\*k<sup>w</sup>əi** “who?”
- 2) **\*tu** > **\*t<sup>w</sup>ə** “you”
- 3) **\*kahuni** > **\*kah<sup>w</sup>anə** “dog”

#### Case Agglutination

Through agglutination, the case system was first formed from pre-existing postpositions with the vowel **\*a** intervening between noun stems ending in a consonant (other than a resonant) and consonant-initial case suffixes. Some postpositions such as **\*bi** “by” and **\*di** “in” nonetheless remained outside of the resultant case system. This rule must postdate *Centralization* as evidenced by the diphthong in the locative case ending that would have become **\*\*i** > **\*\*ə** if it had preceded it.

- 1) **\*si** > **\*(a)si** [genitive]
- 2) **\*la** > **\*(a)la** [dative]
- 3) **\*t'a** > **\*(a)t'a** [ablative]
- 4) **\*ʔəi** > **\*əi** [locative]

#### Uvular Allophony (**\*k** beside **\*ə** = /k/; **\*k** beside **\*a** = /q/)

#### Word-final Velar Debuccalization (**\*-k** > **\*-ʔ**)

This is caused by the process of lenition.

- 1) **\*-ak** [dual] > **\*-aʔ**

#### Word-final Dental Sibilantization (**\*-t** > **\*-s**)

This is caused by the process of lenition and is a sound change common to many other languages around the world. Word-final **\*-s** is subsequently retained in Proto-IE while rhotacizing to **\*-r** in Proto-Aegean.

- 1) **\*-ət** [plural] > **\*-əs**
- 2) **\*-ət** [2ps.trans.] > **\*-əs**
- 3) **\*-at** [stative noun] > **\*-as/\*-at-** (in oblique case forms)

#### Sigmatic Heteroclisy

Due to the lenition of word-final **\*-t** to **\*-s** and since related wordforms with word-medial **\*-t-** retained the original phoneme, heteroclisy was produced in the declension of affected noun stems.

- 1) **\*kaməs** “ten” vs. **\*kamət-asə** “of ten”
- 2) **\*-as** [stative noun] vs. **\*-at-** (in oblique cases)

8500

#### Vowel Harmony

A brief period of Vowel Harmony, an isogloss shared with Pre-Proto-Altaiic to the southeast, may be warranted to explain the source of qualitative ablaut of **\*ə** and **\*a** between active and stative conjugations. Presumably, the transitive conjugation which used personal endings exclusively with **\*ə**-vocalism (i.e. 1ps **\*-əm**, 2ps **\*-əs** and 3ps **\*-ə**) and the intransitive conjugation which used personal endings exclusively with **\*a**-vocalism (i.e. 1ps **\*-ax**, 2ps **\*-**

**at**, 3ps **\*-a**) acquired their distinctive vocalisms in the stem by way of regressive vowel harmony emanating from their contrastive personal endings. This innovation must postdate *Centralization* since if it had preceded it, we would expect to see verb stem alternations between labialized phonemes and their non-labialized counterparts.

#### Transitive-Subjective Shift

The verbal paradigm of old shifted gradually from a system marking transitivity to a system marking focus between the subject and object (if any) of an action. The pronoun of the 3ps object, **\*ə**, was therefore agglutinated to all personal endings of the former intransitive conjugation to transitivize the verb and in this way derive a new subjective form (e.g. **\*-ax** [1ps.intr.] → **\*-ax-ə** [1ps.subj.]). The former transitive became the objective form without change in form. So in all, three basic verb forms now coexisted: **\*t'əh<sup>w</sup>-əm** “I give (it)” [obj.] / **\*t'ah<sup>w</sup>-ax** “I give” [intr.] / **\*t'ah<sup>w</sup>-ax-ə** “I give (something)” [subj.]. This system is parallel to the French contrast of “je le donne”, “je donne” and “j'en donne”.

### Old IE (7000 BCE – 6000 BCE)

#### Penultimate Accent Shift (PAS)

Accent shifts such that the former accent fixed on the initial syllable is placed instead on the penultimate (second-to-last) syllable of all words.

#### Schwa Fronting (**\*ó** > **\*é**)

#### Unstressed Vowel Merger (**\*a** & **\*ə** > **\*a** /ə/)

- 1) **\*kəh<sup>w</sup>ánə** “dog” > **\*kəh<sup>w</sup>ána** (PIE **\*kwon-**)
- 2) **\*-ásə** [gen.] > **\*-ása** (PIE **\*-ós**)

#### Phonemicization of Uvulars (**\*χ**, **\*q**, **\*ǧ**, **\*ǧ**)

### Mid IE (6000 BCE – 5000 BCE)

#### Quasi-Penultimate Accent Rule (QAR)

After deictics were agglutinated to nominal and pronominal stems, the rules of accent automatically expanded to allow the occasional accent positioned on the antepenultimate syllable.

- 1) **\*kah<sup>w</sup>ána (sa)** “the dog (nom.sg.)” > **\*kah<sup>w</sup>ánasa** (> PIE **\*kwōn**)
- 2) **\*béra (ta)** “he carried” > **\*bérata** (> PIE **\*bērt**)

#### Word-final Rhotacization (**\*-n#** > **\*-r#**)

- 1) **\*wát'an** > **\*wát'ar** (> PIE **\*wódr** “water”)

#### Postnasal Exception

Rhotacization is resisted after **\*m**.

#### Rhotic Heteroclisy

Rhotacization produced a new type of heteroclisy in the case system such that word-final **\*-r** alternated with medial **\*-n-** in the stem of oblique cases, parallel to the **\*s/\*t** alternation of Sigmatic Heteroclisy.

- 1) **\*wát'ar** “water” vs. **\*wat'énsa** “of the water”

#### Mediofinal Lenition of Glottal Stop (**\*ʔ** > **\*h**)

#### Ejective Voicing (**\*k'/\*t'** > **\*ǧ/\*ǧ**)

5800

#### First Contact with Proto-Semitic

Contact with Proto-Semitic may have been quite profound judging by the many basic words loaned into Indo-European during this period of the Neolithic due to expanding economic

trade between Eastern Europe and Western Asia via the Bosphorus.

- 1) PSem **\*yiθ** “there is” → MIE **\*ʔes** (> PIE **\*ʔes-** “to be”)
- 2) PSem **\*θalāθi** “of three (f.)” → MIE **\*taréisa** (> PIE **\*treis**)
- 3) PSem **\*šidθu** “six (f.)” → MIE **\*s<sup>w</sup>éksa** (> PIE **\*sweks**)
- 4) PSem **\*sábʔatum** “seven (def.m.)” → MIE **\*séptam** (> PIE **\*septn̥j**)
- 5) PSem **\*ša** “him, himself” → MIE **\*s<sup>w</sup>a** (> PIE **\*swe** “oneself”)
- 6) PSem **\*muḥáddiwu** “rejoiceful” → MIE **\*maxéda** (> PIE **\*māḍ-** “to be drunk”)
- 7) PSem **\*ḥāniṭu** “ripening” → MIE **\*xénda** (> PIE **\*χend-** “to blossom”)
- 8) PSem **\*bāwiʔu** “coming” → MIE **\*béuha** (> PIE **\*beuh-** “to appear, become”)
- 9) PSem **\*malāʔu** “to fill” → MIE **\*maléha** (> PIE **\*plēh-** “to fill”)
- 10) PSem **\*wādiʔu** “knowing” → MIE **\*wéiða** (> PIE **\*weid-** “to know”)
- 11) PSem **\*māsiʔu** “to wash” → MIE **\*mésça** (> PIE **\*mesǵ-** “to wash”)

### Heavy Stress Accent

The language at this stage shifted from a light tonal accent to a heavy stress accent, perhaps popularized in the Pre-IE speech area by contact with Proto-Semitic.

### Dephonicization of Labialized Dentals (**\*s<sup>w</sup>/\*t<sup>w</sup>/\*ḍ<sup>w</sup>/\*d<sup>w</sup>** > **\*s<sup>w</sup>/\*t<sup>w</sup>/\*ḍ<sup>w</sup>/\*d<sup>w</sup>**)

- 1) **\*s<sup>w</sup>éksa** > **\*swéksa** (> PIE **\*sweks** “six”)
- 2) **\*k<sup>w</sup>atwáχa** > **\*katwáχa** (> PIE **\*ʔoktóu** “eight”)

### Schwa Reduction (unaccented **\*a** /ə/ > **\*ə** by default)

Aside from certain exceptions, most schwas were reduced to supershort schwa at the very least. In longer words, phonotactic restructuring also deleted any supershort schwas that did not create a core syllable of the shape **\*C<sup>ə</sup>C** preceded by any number of open semisyllables exclusively of the shape **\*C<sup>ə</sup>**.

- 1) **\*ḍaxénaw** > **\*ḍ<sup>ə</sup>xen<sup>ə</sup>w** (> PIE **\*dānu** “river”)
- 2) **\*xawayána** > **\*x<sup>ə</sup>wyan<sup>ə</sup>** (> PIE **\*ʔoχuyóm** “egg”)
- 3) **\*h<sup>w</sup>amaigása** > **\*h<sup>w</sup>am<sup>ə</sup>igás<sup>ə</sup>** (> PIE **\*moigos** “urine”)

### Suffix Resistance Exception (**\*ə** remains)

### Paradigmatic Resistance Exception (**\*ə** remains)

### Schwa-Triggered Lengthening (**\*VC<sup>ə</sup>** > **\*VC:<sup>ə</sup>/\*V:C<sup>ə</sup>**)

If the supershort schwa is word-medial, it lengthens an accented vowel in an immediately preceding open syllable, otherwise all supershort schwas geminate the immediately preceding consonant instead. Word-final supershort schwas never cause vowel lengthening in a preceding accented syllable.

- 1) **\*[k<sup>ə</sup>h<sup>w</sup>án<sup>ə</sup>s<sup>ə</sup>]** > **\*[k<sup>ə</sup>h<sup>w</sup>a:n<sup>ə</sup>s:<sup>ə</sup>]** “dog (nom.sg.)” (> PIE **\*kwōn**)
- 2) **\*[ber<sup>ə</sup>t<sup>ə</sup>]** > **\*[be:r<sup>ə</sup>t:<sup>ə</sup>]** “she/he carried” (> PIE **\*bērt**)
- 3) **\*[k<sup>w</sup>əjt<sup>ə</sup>]** > **\*[k<sup>w</sup>əjt:<sup>ə</sup>]** “what?” (> PIE **\*k<sup>w</sup>id**)
- 4) **\*[h<sup>w</sup>am<sup>ə</sup>j'gas<sup>ə</sup>]** “urine” > **\*[h<sup>w</sup>am<sup>ə</sup>j'gas:<sup>ə</sup>]** (> PIE **\*móigos**)

### Phonemicization of Vocalic Length (**\*ē, \*ā**)

The phonemicization of vocalic length was by Schwa-Triggered Lengthening and helps to explain the origin of Narten presents as well as the curious vocalic lengthening seen in nominative singulars.

### Delaryngealization

Creaky stops acquire plain phonation when neighbouring a laryngeal.

- 1) \***ǵ**<sup>ə</sup>xen<sup>ə</sup>w > \***d**<sup>ə</sup>xen<sup>ə</sup>w (> PIE \***dánu** “river”)

### Laryngeal Deletion

The optional regressive shift of accent is due to the development of rising tone caused by voiceless syllable-coda laryngeals which we may presume eventually steals the primary accent away from the original syllable. Following this change in tone, voicing and omission of the laryngeal occurs.

- a) \***CVCH.CV-** > \***CVCH.CV-** > \***CVC.CV-**  
 1) [\***pár**x<sup>ə</sup>**nàs**<sup>ə</sup>] > [\***pár**x<sup>ə</sup>**nas**<sup>ə</sup>] > [\***pà**r<sup>ə</sup>**nas**<sup>ə</sup>] “prostitute”  
 b) \***#HCC** > \***#CC**  
 1) \***h**<sup>wə</sup>**m**<sup>ə</sup>**igás**<sup>ə</sup> > \***m**<sup>ə</sup>**igás**<sup>ə</sup> (> PIE \***moigos** “urine”)

### Metathesis

To remain faithful to sonority hierarchy, illegal clusters in verb stems that would result from impending *Syncope* are avoided by metathesizing the offending consonants.

- a) \***péh**<sup>w</sup>**y**<sup>ə</sup>**t**<sup>ə</sup>**i** > \***péih**<sup>wə</sup>**t**<sup>ə</sup>**i** “he feeds”  
 b) \***léik**<sup>wə</sup>**nt**<sup>ə</sup>**i** > \***léin**<sup>ə</sup>**k**<sup>w</sup>**t**<sup>ə</sup>**i** “he is leaving”  
 c) \***n**<sup>ə</sup>**péw**<sup>ə</sup>**t**<sup>ə</sup>**i** > \***p**<sup>ə</sup>**néw**<sup>ə</sup>**t**<sup>ə</sup>**i** “he is blowing”  
 d) \***r**<sup>ə</sup>**dém**<sup>ə</sup>**t**<sup>ə</sup>**i** > \***d**<sup>ə</sup>**rém**<sup>ə</sup>**t**<sup>ə</sup>**i** “he is sleeping”

### a-Epenthesis

A vowel \***a** is inserted in the first available interconsonantal position from the left which precedes the accent in order to avoid awkward word-initial clustering from *Syncope* and to optimize syllabicity. This rule only surfaces in the strong cases of substantival stems.

- a) \***CCCV-** > \***?aCCCV-**  
 1) \***k**<sup>wə</sup>**twáx**<sup>ə</sup> > \***?ak**<sup>wə</sup>**twáx**<sup>ə</sup> (> PIE \***?októu** “eight”)  
 2) \***xuyan**<sup>ə</sup> > \***?axuyán**<sup>ə</sup> (> PIE \***?oχuyóm** “egg”)  
 b) \***CCCV-** > \***CaCCV-**  
 1) \***p**<sup>ə</sup>**rx**<sup>ə</sup>**nás**<sup>ə</sup> > \***par**x<sup>ə</sup>**nás**<sup>ə</sup> (> PIE \***pórneχ** “prostitute”)  
 2) \***t**<sup>ə</sup>**rh**<sup>ə</sup>**más**<sup>ə</sup> > \***tar**h<sup>ə</sup>**más**<sup>ə</sup> (> PIE \***tórmos** “borehole”)  
 3) \***migás**<sup>ə</sup> > \***maigás**<sup>ə</sup> (> PIE \***moigos** “urine”)

### Laryngeal Vocalization

- 1) \***h(V)** > \***e**  
 \***-h** > \***-e** [dual] (> PIE \***-e**)  
 2) \***x(V)** > \***æ**  
 \***d**<sup>ə</sup>**xenu** > \***dænu** “river” (> PIE \***dánu**)  
 \***m**<sup>ə</sup>**xed-** > \***mæd-** “to be drunk” (> PIE \***mad-**)  
 \***n**<sup>ə</sup>**xes-** > \***næs-** “nose” (> PIE \***nas-**)  
 3) \***h<sup>w</sup>** > \***u** ~ \***w**  
 \***k**<sup>ə</sup>**h<sup>w</sup>an**<sup>ə</sup> > \***kwan**<sup>ə</sup> “dog” (> PIE \***kwon-**)  
 4) \***-{x, h<sup>w</sup>}(C)#** > \***-w(C)#**  
 \***ǵ**<sup>ə</sup>**lah**<sup>wə</sup> “sister-in-law” > \***ǵ**<sup>ə</sup>**lau-** (> PIE \***ǵlou-**)

### Laryngealization of Geminates (\*[s:] > \***z**, \*[t:] > \***ǵ**)

#### Phonemicization of \***z**

#### Syncope

Supershort schwas in all positions are deleted.

#### Clipping

This rule affects the suffix of the nominative singular **\*-sa** [-z<sup>ə</sup>] and the 3ps non-progressive **\*-ta** [-d<sup>ə</sup>] to **\*-z** and **\*-d** despite the *Suffix Resistance* exception of *Reduction*.

- 1) **\*[be:r<sup>ə</sup>d<sup>ə</sup>]** “he carried (3ps.)” > **\*bērd** (> PIE **\*bērt**)
- 2) **\*[g<sup>ə</sup>la:wz<sup>ə</sup>]** “sister-in-law (nom.sg.)” > **\*glāuz** (> PIE **\*glōus**)
- 3) **\*[k<sup>w</sup>iz<sup>ə</sup>]** “who?”/**\*[k<sup>w</sup>id<sup>ə</sup>]** “what?” > **\*k<sup>w</sup>iz/\*k<sup>w</sup>id** (> PIE **\*k<sup>w</sup>is/\*k<sup>w</sup>id**)

Uvularization of **\*x** to **\*χ** (Velar-Laryngeal Series Realignment)

## Late IE (5000 BCE – 4000 BCE)

4800 Last Contact with Proto-Semitic

The loanword **\*gāiǵə-** “goat” (> PIE **\*gáido-**) which obviously must derive from Proto-Semitic **\*gādyu** “young goat” suggests that the last of the cultural and linguistic contact occurred in the Late IE period since the attested vocalism of **\*a** in later PIE cannot be adequately explained by way of Mid IE phonology whereas early Late IE created a new vowel **\*æ** which was produced from an earlier loss of onset laryngeals and which directly became PIE **\*a**.

### Genitival Misanalysis

Animate substantive stems in genitive **\*-ás** and inanimate substantive stems in genitive **\*-ám** become misanalysed as accented thematic stems in either the animate nominative singular **\*-z** or a pseudo-marker **\*-m** segmented by analogy with the identical animate accusative singular ending. Since the final nasal stop is reinterpreted as an inanimate nominative-accusative marker, stem-final **\*m** is now omitted from the weak cases (i.e. **\*yucám-i** “with a yoke” > **\*yucá-i**).

### Development of Adjectival Case System

Upon misanalysis of genitival constructs as nominative formations, the new thematic adjectives begin to agree in case with the noun they modify.

### Acrostatic Regularization

Accentuation on the last syllable of animate thematic stems is retracted to the initial syllable and the accent is regularized throughout the declensional paradigm.

- 1) **\*maigá-s** “urine” > **\*máigə-z**

### Agglutination of New Thematic Genitive Marker

Due to the retraction of accent in some stems, the nominative and genitive singular becomes nearly homophonous. Therefore in order to avoid case merger, the endingless locative form of the relative pronoun stem **\*ya-** (> PIE **\*yo-**) is agglutinated to the pre-existing genitive form. Semantically, the basic meaning conveyed by this new construction is “with that of X” which is effectively a circumlocution for the more direct phrase “of X”, or to put it another way, a doubly marked genitive.

- 1) **\*ǵékwə-s** “of a horse” (versus **\*ǵékwə-z** “horse [nom.sg.]”) → **\*ǵékwə-s-ya**

### Thematicization

New animate suffixes are derived from inanimate ones by means of an infix schwa by analogy with the fact that animate stems are now mostly thematic while inanimate stems are mostly athematic. Thus:

- |   |   |
|---|---|
| 1) <b>*-mŋ</b> [agent/patient]                | → <b>*-mən-</b> [animate agent]                 |
| 2) <b>*-s</b> ( <b>*-t-</b> ) [stative]       | → <b>*-əs-</b> / <b>*-ət-</b> [animate stative] |
| 3) <b>*-r</b> ( <b>*-n-</b> ) [agent/patient] | → <b>*-ər-</b> [animate agent]                  |

- 4) **\*-tr̥** (**\*-tn-**) [agent/patient] → **\*-tər-** [animate agent]  
 5) **\*-l̥** (**\*-n-**) [agent/patient] → **\*-əl-** [animate agent]  
 6) **\*-χ** [collective] → **\*-əχ-** [animate collective] (> Post-IE **\*-eh₂** [feminine])

### Oxytonized substantives

A new derivational process is synthesized whereby new deadjectival substantives are automatically given oxytone accent by analogy with the now-standard adjectival accent on the ultimate syllable. This is the origin of thematicized suffix pairs in later PIE (such as **\*-tér-**/**\*-tor-**, **\*-mén-**/**\*-mon-** and **\*-és-**/**\*-os-**) differing only by accent placement and the vocalism of the full vowel.

- 1) **\*d̥əh<sup>w</sup>tá-** “given” + **\*-ər-** → **\*d̥əh<sup>w</sup>tér-** “giver”  
 2) **\*h<sup>w</sup>epá-** “active” + **\*-əs-** → **\*h<sup>w</sup>epés-** “one who is active”  
 3) **\*bermá-** “carrying” + **\*-ən-** → **\*bermén-** “bearer”

4500 **Schwa Diffusion** (**\*ə** > **\*ə**/**\*ǝ**)

### Schwa Merger

(**\*ə** > **\*e**, **\*ǝ** > **\*a**)

### Start of Proto-Kartvelian Contact (?)

- 1) PKart **\*dqa** “she-goat” → LIE **\*diga-** (> PIE **\*digo-** “goat”)  
 2) PKart **\*m̥k'erd-** “breast, chest” → LIE **\*kērd** (> PIE **\*kēr**/**\*kerd-** “heart”)

### Tonal Accent

### Szemerényi's Law

Word-final voiced dentals **\*-z** and **\*-d** disappear after non-semivocalic resonants **\*l**, **\*m**, **\*n** and **\*r**.

- 1) **\*dgāmz** “earth” > **\*dgām**  
 2) **\*kwānz** “dog” > **\*kwān**  
 3) **\*d̥əh<sup>w</sup>tērz** “giver” > **\*d̥əh<sup>w</sup>tēr**  
 4) **\*kērd** “heart” > **\*kēr**

### Sibilant Merger

### Ips pron.nom. **\*mei** is replaced by **\*ʔéǵaχ** (> PIE **\*ʔéǵoχ**)

The new pronoun form, only ever used for emphasis and topical focus, literally meant “(as for) my being here” and is built on an old 1ps subjunctive reflexive of a fossilized verb

**\*ʔéǵ(e)-** “to be here” (< **\*ʔe** “here” plus **\*ǵe** [emphatic]).

### Vowel Shift

(**\*a** > **\*o**; **\*ā** > **\*ō**)

**Labial Dissimilation Exception**  
 The vowel **\*a** when neighbouring tautosyllabic bilabial consonants (**\*m**, **\*b**, **\*p**, **\*w**) or labialized consonants (**\*h<sup>w</sup>**, **\*k<sup>w</sup>**, **\*ǵ<sup>w</sup>**, **\*g<sup>w</sup>**) remains **\*a**. Examples of this preserved **\*a** include **\*wástu** “residence” (< **\*wes-** “to reside”) and **\*márkos** “horse”.

### Monophthongization

- 1) **\*mōuhs** “mouse” > **\*mūhs**  
 2) **\*tōu** “you” > **\*tū**

## Post-IE (after 4000 BCE)

### Phonation Shift of Voiced Stops

(**\*b**/**\*d**/**\*g** → **\*b**/**\*d**/**\*g** → **\*b<sup>h</sup>**/**\*d<sup>h</sup>**/**\*g<sup>h</sup>**)  
 Occurring in Hellenic and Indo-Iranian.

### Satemization

Palatalization of **\*k/\*g/\*g<sup>h</sup>** to **\*k/\*ǵ/\*ǵ<sup>h</sup>** and Deuvularization of **\*q/\*ǵ/\*ǵ<sup>h</sup>** to **\*k/\*g/\*g<sup>h</sup>** occurred in Baltic, Slavic, Indo-Iranian, Armenian and Albanian with varying conditions individual to each group. Southern Anatolian and Tocharian may have been affected by neighbouring satemized dialects if their independent palatalization of velar stops is indeed the product of contact. The wave of change likely emanated from northern areas and spread southward through the interior of the PIE group. It is possible that contact with Uralic or Uralic-like dialects was the ultimate trigger for this innovation.

### Delabialization of Labialized Velar Stops

Simplification of **\*k<sup>w</sup>** to **\*k** occurred with varying conditions individual to each group affected, mostly within the Satem subgroup.

### Development of Thematic Aorists (**\*wid-é-t** 'he knew')

Occurring in Hellenic and Indo-Iranian.