

# Towards a Better Definition of the Term ‘Proto-Celtic’: Examining the Relative Chronology of Celtic Sound Changes

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## Abstract

There have been various studies that reconstruct Proto-Celtic (PC) and uncover the genetic relationship of the Celtic languages, and yet there has been little consensus regarding the language classification within the Celtic language group. In Nakano (2022), the author argued that this is partly due to the lack of research that attempts to reconstruct PC with relative chronology in mind and the fact that the term ‘Proto-Celtic’ is poorly defined. Continuing the research of Nakano (2022), this paper will attempt to establish a rough relative chronology of Celtic sound changes and to propose a better-defined terminology for the reconstructed layers of Celtic languages.

## 1. Introduction

This research is a continuation of Nakano (2022), which addressed the opinions of various researchers on the reconstruction of Proto-Celtic (PC) diphthongs, long vowels, and, by extension, the genetic relationship of the Celtic languages. Nakano (2022) further describes the relative chronology of changes concerning said phonemes. The author also argues that the necessity to establish a firmer relative chronology arises from the fact that there has been virtually no research that attempts both the postulation of a relative chronology and a systematic reconstruction of PC at the same time, despite the two being intertwined. In this paper, within a slightly broader scope, the author will analyse Celtic sound changes pertinent to the remaining phonemes, describe their relative chronology using a table, and combine said relative chronology with the result of Nakano (*ibid.*).

## 2. Existing Studies on Relative Chronology of Celtic Sound Changes

Before mapping out the methodology of this research, it would be appropriate to briefly address existing studies on the topic:

- a. **Jackson (1953)** lists Celtic sound changes in the order of relative chronology. However, most of them are specific to Brittonic languages, and only a handful of the changes listed are pertinent to this research.
- b. **McCone (1996)** is perhaps the most comprehensive relative chronology of Celtic sound changes to date, although it does not provide a systematic reconstruction of PC according to the proposed chronology.
- c. **EDPC** is primarily a compendium of PC constructed forms and their cognates in attested Celtic languages, and it provides an ‘approximate’ relative chronology of the sound changes from PIE to PC and to the attested languages. This relative chronology is incomplete, but it serves as a good basis for the work ahead.
- d. **Nakano (2022)** is an attempt at a partial relative chronology centered around PIE diphthongs and long vowels.

### 3. Methodology

The core methodology of this research is to first list all Celtic sound changes (including those that the author did not include in Nakano (2022)), create a tentative chronological table of said changes, run the supposed PIE forms through the list of sound changes, check the resulting PC form, then finally revise the chronology according to the issues found during this process.

The data that is run through the chronological table is based on the original Swadesh list, as it is one of the most commonly used in similar research, and it consists of an adequate number of words to roughly measure the accuracy of the tentative chronology. The PIE forms and PC forms will be taken from the EDPC.

However, there are lexical items that are not present in the Swadesh list that hold cultural significance in Celtic societies, such as ‘cow’, ‘son’, etc. On the other hand, there are entries in the Swadesh list for which the Celtic data is missing, which reduces the number of entries usable for this research. For these reasons, the following entries have been added to the dataset:

- Numerals: ‘three, four, five, six, eight, nine, ten’
- Kinship terms: ‘mother, father, son, daughter’
- Animals: ‘animal, snake, worm, cow’
- Plants: ‘forest, stick, fruit, grass, rope’

The tentative relative chronology to be used as a starting point is roughly based on a combination of that of the EDPC and McCone (1996). We thus arrive at the tentative chronology as shown in Table 1.

### 4. Evaluation of the PC Reconstructed Forms in the EDPC

The tentative relative chronology and the EDPC present many challenges, but in fact most of the problems boil down to the issue of which stage of the chronology should be labeled as PC. If one were to construe PC strictly as the language from which all extant Celtic language spawned, then the reconstructed PC form should only reflect changes that affected all of those languages. In that case, different labels will be needed for different (later) stages of the evolution.

The following is an examination of some entries that are the most problematic or noteworthy.

**PIE \*trejes > \*trīs ‘three’**

Because there is no rule posited for \*-eje- > \*-ī-, the current end-result becomes \*\*trēes. Perhaps the change \*trejes > \*trees (where the semivowel \*j̥ is deleted) > \*trēs > \*trīs is possible, but this is mere speculation.

**PIE \*sueks > \*suexs ‘six’**

As the change C > x / \_{[+stop], s} does not happen until rule 31 in the tables, which is later than the branching off of Celtib., it is questionable whether the form \*swexs, instead of \*sweks, can be deemed as PC. The same argument applies to the PC forms given by the EDPC such as \*oxtū ‘eight’, \*fextu- ‘breasts’, etc.

**PIE \*(h<sub>1</sub>)neun > \*noyan ‘nine’**

Through regular changes, the PC form should be \*\*noyn, which subsequently changed to \*\*nōn via monophthongisation.

**15. PIE \*b<sup>h</sup>eg-ko-? > \*bekko- ‘small’**

This entry calls for an assimilatory change from \*-g-k- > \*-kk-.

**PIE \*ph<sub>2</sub>tēr > \*fatīr ‘father’**

The change \*p > \*f seems to be later than the divergence of Celtib., so for the same reason as for the point raised in the discussion of \*sueks > \*suexs, the PC form should arguably be \*patēr or \*fatīr.

**PIE \*k<sup>w</sup>rmi- > \*k<sup>w</sup>rimi- ‘worm’**

The EDPC (pp. 7–8) states that the \*i-insertion \*CLC[+stop] > \*CLiC[+stop] also happened before \*m, so this entry is not problematic.

**35. PIE \*guosd<sup>h</sup>o- > \*buzdo- ‘tail, penis’**

The initial consonant might have to be \*g<sup>w</sup>- instead of the sequence \*gu-, considering \*g<sup>w</sup>- is supposed to change into \*b in PC. Alternatively, one could posit a merger of \*gū- > \*g<sup>w</sup>-, which would have to happen before the change \*g<sup>w</sup> > \*b. The assimilatory change \*-sd- > \*-zd- is irregular; the subsequent change into geminates of *Tau Gallicum*<sup>1</sup> \*-đđ- is yet to be explained.

**42. PIE \*h<sub>1</sub>oh<sub>1</sub>s > \*ās- ‘mouth’**

There are no changes listed in the EDPC, McCone (1996), or Nakano (2022) that would account for the change \*h<sub>1</sub>oh<sub>1</sub> > \*ā. However, other examples such as \*dwoh<sub>1</sub> > \*dwāw ‘two’, \*moh<sub>1</sub>-ro- > \*māro- ‘great’, \*h<sub>1</sub>en-h<sub>1</sub>oh<sub>1</sub>tro- > \*enātro- ‘entrails’ (EDPC: 115), \*groh<sub>1</sub>weh<sub>2</sub> > \*grāwā (EDPC: 167) may provide enough

<sup>1</sup> *Tau Gallicum* is a phoneme found in Gaulish derived from a sequence of \*-st-, though its actual phonetic value is unknown. It is written in the Gaulish orthography with a symbol that resembles a D with a horizontal line (like <math>\langle \text{D} \rangle</math>), and is transliterated with a symbol such as *đ* or *ō*.

grounds to propose \*oh<sub>1</sub> > \*ā as a regular change. Counterevidence to this includes \*h<sub>3</sub>ékto<sub>h</sub> > \*oxtū, where \*oh<sub>1</sub> > \*ū occurs.

**44. PIE \*dn̥<sup>h</sup>uh<sub>2</sub>- > \*tang<sup>w</sup>āt ‘tongue’**

Devoicing of initial \*d > \*t is not explained through regular changes, and the EDPC accounts for this as an assimilatory change from \*d...t to \*t...t.

The change PIE \*uh<sub>2</sub> > PC \*ā is not in the tentative list of changes, but arguably a similar change is attested in \*duh<sub>2</sub> ‘far, long distance’ > \*duā̃io ‘slow’ (EDPC 110). This may be explained by postulating that the Celtic forms derived from the e-grade PIE forms, \*dn̥<sup>h</sup>ueh<sub>2</sub> and \*dueh<sub>2</sub> respectively. These forms would regularly produce \*danguā and \*duā.

**60. PIE \*s̥uopno- > \*souno- ‘sleep’**

The deletion of the approximant \*u is unexplained: following the regular changes, \*s̥uopno- should produce \*\*s̥ouno. On page 351 of the EDPC, the PIE form is reconstructed as \*s̥uopno-, but on page 9 it is written as \*supno-, the latter being arguably less problematic.

**73. PIE \*leug- > \*ligrā- ‘moon’**

Regular changes would produce \*leug- > \*loug- > \*lōg.

**76. PIE \*uelk- > \*uolko- ‘rain’, PIE \*pel- > \*fales- ‘stone’**

These entries involve irregular changes of short vowels.

**80. PIE \*d<sup>h</sup>euh<sub>2</sub>- > \*duñot- ‘smoke’**

Regular changes would produce \*d<sup>h</sup>euh<sub>2</sub>- > \*deuh<sub>2</sub>- > \*deu > \*dou > \*\*dō.

**84. \*deh<sub>2</sub>u- > dau-jo- ‘burn’**

This is the only entry in the table that clearly involves a long diphthong. \*deh<sub>2</sub>u- would regularly produce \*dāu-, but according to the EDPC this is shortened to \*dau-(jo-).

**5. Conclusion**

After the various considerations in the previous section, the relative chronology is to be modified in the following ways:

- Addition, ordered: \*oh<sub>1</sub> > \*ā, concurrent with No.1–6 in Table 1
- Addition, ordered: \*eje > \*ē, prior to No. 25
- Addition, ordered: \*gu > \*g<sup>w</sup>, posterior to No. 16
- Addition, unordered: \*-g-k- > \*-k-k-
- Addition, unordered: \*V<sub>1</sub>[+long]V<sub>2</sub> > \*V<sub>1</sub>[-long]V<sub>2</sub>

This research does not yet completely render the relative chronology of Celtic sound changes. However, what can be learned from the current results is that it is necessary to (re)define the term 'Proto-Celtic' because currently it can refer to many different stages in the evolution of Celtic languages and is confusing at best. If PC is to be defined purely as the parent language of all Celtic languages, then ideally the PC forms indicated by the EDPC should already be present in the row labeled 'Formation of Proto-Celtic?' in Table 2. However, not only do the PC forms indicated by the EDPC always appear in that row, but they also appear at different points in the chronology. Therefore, if PC is narrowly defined as described above, most of the word forms that the EDPC indicates as 'PC' would actually be from a later stage than PC, and word forms from disparate periods would turn out to be lumped together as PC.

Therefore, to conclude this paper, the author proposes that one should subdivide what has been referred to as 'PC' in the past. For example, subdivision such as 'Early Proto-Celtic' (pre-Celtiberian split), 'Middle Proto-Celtic' (post-Celtiberian split), and 'Late Proto-Celtic' (post-Cisalpine Celtic split) may work well for this purpose. This would result in the tree diagram below (Diagram 1).

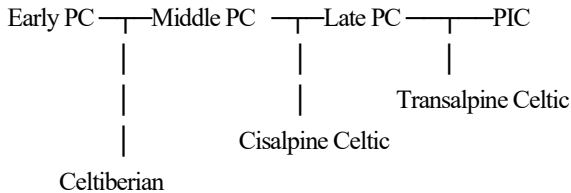


Diagram 1: The genetic relationship of the Celtic languages

This will help avoid ad-hoc terminology such as 'Common Celtic', which some scholars have adopted (as for how the notion of Common Celtic can be problematic, see Nakano (2022)). Having established a rough relative chronology, this iterative process between ordering rules and re-evaluating reconstructed forms must be continued until a thorough and systematic reconstruction and relative chronology is established, those two notions being two sides of the same coin.

Table 1: The Tentative Relative Chronology of Celtic Sound Changes

No.	Label	Before	After	Environment
<b>PIE RECONSTRUCTED FORMS</b>				
1		h1e	e	
2		h2e	a	
3		h3e	o	
4		eh1	ē	
5		eh2	ā	
6		eh3	ō	
7	Deletion of initial laryngeals before consonants	H	∅	#_C
8	Deletion of laryngeals between consonants	H	∅	C_C
9	Epenthesis in non-initial syllables	H	a	σ1.C_C
10	Dental assimilation	TT	ss	
11	Pre-laryngeal treatment of syllabic consonants	∅	a	CR_HC
12	Compensatory lengthening of *a	aH	ā	
13	Dybo's law	H	∅	V_C.σ[+str]
14		H	a	R_C
15	Centum depalatalisation	[+pal]	[-pal]	
16		g <sup>w</sup>	b	
17	Deaspiration of aspirated stops	[+asp]	[-asp]	
18		∅	i	CL_[+stop]
19	Joseph's rule	e	a	_Ra
20		∅	a	C_RC
21		H	∅	[-syl]
22	P to K <sup>w</sup> assimilation	p	k <sup>w</sup>	_\$0k <sup>w</sup>
<b>FORMATION OF PROTO-CELTIC?</b>				
23		e <sub>u</sub>	o <sub>u</sub>	
24		u <sub>u</sub>	o <sub>u</sub>	_C
25		ē	ī	
<b>DEFINITIVE END OF PROTO-CELTIC, CELTIBERIAN BRANCHES OFF</b>				
26		V[-long]n	V[+long]	_s
27	raising before nasal	V	V[+high]	_N
28	shortening before final nasal	V[+long]	[-long]	_N#
29		ō	ū	_(C)(C)#
30		ō	ā	
31	Osthoff-type shortening	V[+long]	[-long]	_RC
32		C	x	_[{+stop}, s]
33		p	b	_ [+liq]
34		p	w	_ [+nas]
35		p	f	
36	formation of Tau Gallicum	st	đ	
<b>CISALPINE CELTIC BRANCHES OFF</b>				
37		f	∅	
38		e <sub>i</sub>	ē	
<b>TRANSALPINE CELTIC BRANCHES OFF</b>				
39		o <sub>u</sub>	ō	
<b>TO INSULAR CELTIC NODE</b>				

(Cont'd) Table 1: The Tentative Relative Chronology of Celtic Sound Changes

Cat. of sound	Cat. of change	Jck	MC 64	EDPC	Nkn	Main sources
cons, vowel				A1a	1	MC1996: 51
cons, vowel				A1b	1	
cons, vowel				A1c	1	
cons, vowel	lengthening, compensatory			A2a	1	
cons, vowel	lengthening, compensatory			A2b	1	
cons, vowel	lengthening, compensatory			A2c	1	
cons	deletion					MC1996: 51
cons	deletion			A3		
cons	epenthesis/vocalism			A4		MC1996: 51
cons	assimilation	1		A5		
cons	epenthesis/vocalism			A6		
cons, vowel	lengthening, compensatory					
cons	deletion			A7		
cons	vocalism			A8		
cons	merger			A9	1	
cons	shift			B1		
cons	deaspiration			B2		
vowel	epenthesis/vocalism			B3		
vowel	assimilation			B4		
vowel	epenthesis/vocalism			B5		
cons	deletion			B6		
cons	assimilation			B7		
diph	merger	8		C7	2	
diph	merger	8		C8	2	
vowel	shift		a	B8	2	
vowel	lengthening, compensatory				3	MC1996: 51
vowel	raising				4	MC1996: 51
vowel	shortening				5	MC1996: 51
vowel	shift		e	B9	6	
vowel	shift		e	C5	6	
vowel	shortening		f	B10	7	
cons	lenition			C1		
cons	voicing			C2		
cons	lenition			C3		
cons	lenition			C4		
cons	Tau Gallicum					unnumbered
cons	deletion				8	
diph	monophthongisation			C6	9	
		8				

(Cont'd) Table 1: The Tentative Relative Chronology of Celtic Sound Changes

UNORDERED:			
Liquid assimilation	p	r	_r
Liquid assimilation	p	l	_l
Liquid assimilation	s	r	r_
Liquid assimilation	s	∅	r_t
	m	w	_w
	V[-long]	V[+long]	_xs[+liq]
Liquid metathesis	ar	ra	[LAB]_[DENT][DENT]
Liquid metathesis	al	la	[LAB]_[DENT][DENT]
	H	∅	Vy_C



(Cont'd) Table 1: The Tentative Relative Chronology of Celtic Sound Changes

cons	assimilation			D1a		
cons	assimilation			D1b		
cons	assimilation		g	D1c		
cons	assimilation			D1d		
cons	assimilation			D2		
vowel	lengthening			D3		
cons, vowel	metathesis			D4a		
cons, vowel	metathesis			D4b		
cons	deletion			D5		

Table 2: Celtic Sound Changes from PIE to PIC

No.	Label	Before	After	Environment
<b>PIE RECONSTRUCTED FORMS</b>				
1		h1e	e	
2		h2e	a	
3		h3e	o	
4		eh1	ē	
5		eh2	ā	
6		eh3	ō	
7	Deletion of initial laryngeals before consonants	H	∅	#_C
8	Deletion of laryngeals between consonants	H	∅	C_C
9	Epenthesis in non-initial syllables	H	a	σ1.C_C
10	Dental assimilation	TT	ss	
11	Pre-laryngeal treatment of syllabic consonants	∅	a	CR_HC
12	Compensatory lengthening of *a			
13	Dybo's law	H	∅	V_C.σ[+str]
14		H	a	R_C
15	Centum depalatalisation	[+pal]	[-pal]	
16		g <sup>w</sup>	b	
17	Deaspiration of aspirated stops	[+asp]	[-asp]	
18		∅	i	CL_[+stop]
19	Joseph's rule	e	a	_Ra
20		∅	a	C_RC
21		H	∅	[-syl]
22	P to K <sup>w</sup> assimilation	p	k <sup>w</sup>	_\$0k <sup>w</sup>
<b>FORMATION OF PROTO-CELTIC?</b>				
23		e <sub>u</sub>	o <sub>u</sub>	
24		u <sub>u</sub>	o <sub>u</sub>	_C
25		ē	ī	
<b>DEFINITIVE END OF PROTO-CELTIC, CELTIBERIAN BRANCHES OFF</b>				
26		V[-long]n	V[+long]	_s
27	raising before nasal	V	V[+high]	_N
28	shortening before final nasal	V[+long]	[-long]	_N#
29		ō	ū	_(C)(C)#
30		ō	ā	
31	Osthoff-type shortning	V[+long]	[-long]	_RC
32		C	x	_ {[+stop], s}
33		p	b	_ [+liq]
34		p	w	_ [+nas]
35		p	f	
36	formation of Tau Gallicum	st	đ	
<b>CISALPINE CELTIC BRANCHES OFF</b>				
37		f	∅	
38		e <sub>i</sub>	ē	
<b>TRANSALPINE CELTIC BRANCHES OFF</b>				
39		o <sub>u</sub>	ō	
<b>TO INSULAR CELTIC NODE</b>				

































## List of Abbreviation

C	consonant
CC	Continental Celtic
Celtib.	Celtiberian, Hispano-Celtic
CmC	Common Celtic
Gaul.	Gaulish
H	laryngeal
IC	Insular Celtic
L	liquid
MCo.	Middle Cornish
MIr.	Middle Irish
MW	Middle Welsh
O	obstruent
OC	Old Cornish
OIr.	Old Irish
OW	Old Welsh
PBr.	Proto-Brythonic
PC	Proto-Celtic
PGoid.	Proto-Goidelic
PIC	Proto-Insular Celtic
PIE	Proto-Indo-European
R	resonant
V	vowel
//	phonemic transcription
[ ]	phonetic transcription
<>	orthography/transliteration
*	reconstructed form
**	incorrect reconstructed form
!	EDPC's reconstructed form that cannot be produced through changes in the tentative chronology

## List of Abbreviations in Table 1

EDPC	Matasović (2009)
Jck	Jackson (1953)
MC 64	McCone (1996: 64)
Nkn	Nakano (2022)

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# 「ケルト祖語」のよりよい定義を目指して

—ケルト語派の歴史的音変化の相対年代の考察—

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キーワード: ケルト祖語 相対年代 ケルト語の音変化 再構 比較言語学

## 要旨

ケルト祖語 (PC) の再構やケルト語の系統関係の解明に向けた研究はこれまで様々に行われてきたが、ケルト語派内部の言語の分類に関しては、コンセンサスが得られていないのが現状である。Nakano (2022) では、その一因として、相対的な年代を考慮した PC のシステマティックな再構を試みた研究がないこと、また「ケルト祖語」という用語の定義が曖昧であることが挙げられると主張した。本稿では、Nakano (2022) の研究に引き続き、ケルト語の音変化の大まかな相対年代を措定し、再構されたケルト語にかかわる用語の定義を行うことを試みる。

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