Reviewers' comments

Reviewer no 1

This article is exemplarily clear and well written and also well disposed. It manages to include copious bibliographical references without seeming pedantic.

However, I do have an objection to Šefčík's treatment of the Vedic data. Šefčík postulates that forms in which *$\acute{k}$ is continued as Vedic *k* are archaic *vis-à-vis* forms displaying other reflexes. I.e. *dṛk* is more archaic than *viṭ*. However, the only argument in favour of this analysis is that this is what the theory claims - but shouldn't a theory be supported by other facts?

An important argument against neutralization of palatovelars in PIE is the following. I believe that *$h_2i\acute{g}t\acute{o}$- > *iṣṭá-* can only have developed via (1) voicing assimilation of *ǵ* (not *g!*) > *ḱ: iǵtó > icta*; (2) assibilation: *icta > iśta-* (3) ruki-effect triggered by *ś: iśta > iśṭa*; (4) generalization of retroflexivity *iśṭa > iṣṭa*. All of these changes (referred to in abstract terms at the end of section 4?) seem natural within the Vedic phonological system if we accept that the word had a palatal, not a velar, in PIE.

In Šefčík's account, it would appear that *iṣṭa* has replaced archaic *ikta* due to analogical influence from a regular form like *dviṣṭa*. But it gets a bit messy when we consider that even *s* can yield *k* as well as *d*. Doesn't this suggest that there was a tendency to dissimilate the cluster *ṭṣ > kṣ*, regardless of the origin of *ṭ* in either *ḱ* or *ṣ*? As far as I can see, all the *k*-reflexes could be explained this way, and with less effort.

That being said, I still found the article a stimulating read: Trubetzkoy's theory is worthy of being taken up again, and I had no qualms with any other part of the article. I learnt a lot from reading it and recommend its publication.

Reviewer no 2

This is a wonderfully clear and well written paper. It might have been interesting to see what the conclusions would be if – as the present reviewer believes - it is actually true that some IE languages have traces of all three series, but within the chosen framework, the argumentation is impeccable. I recommend publication without hesitation.

Reviewer no. 3

I can only agree with the previous two reviewers that this article is clear and consistent in its argumentation as well as in its wording, and it definitely deserves to be published in the proceedings of the *Etymology and the European Lexicon* conference.

My main objection – which is not of great importance, I must stress – is that I do not fully understand the author's use of the term "functional relation". In other words, I do not understand in what regards the series framework (basic, related, secondary) is *functionally* conditioned.

Notes on the function of the Indo-European velar series

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This article focuses on two main issues. Firstly, a supposed exclusive relation between a marked velar series and a plain velar series will be demonstrated by means of examples from Latin, a centum language, and Old Indo-Aryan, a satem language. Secondly, it will be shown that a language can be found which has two marked velar series, both of which are dependent on one plain velar series.

This article aims to demonstrate that the relation between the plain velar series on the one hand and the marked velar series (either palatovelars or labiovelars) on the other hand was originally loaded with a hierarchy of marked oppositions, forming a functional subsystem, and that traces of this functional subsystem can be found even in those languages where this hierarchy itself was later lost.

In the appendix it is shown that two marked velar series may be assigned to one plain velar series, for there is at least one Indo-European language in which a triadic system of velar series can be found, although this triadic system is not the original Indo-European one.

1   The system of IE velar series as a system of related series

Although the supposed phonetic values and the diachronic development of the Indo-European reconstructed velars have often been described in detail, the nature of the **functional relation** between the reconstructed velar series has generally been neglected.

Contrary to this common practice, I believe that the relation between the different velar series in Indo-European languages is worth a closer, more detailed examination. In this article, I intend to show that this relation can and should be described by means of the term **related series**, first introduced into phonology by N. S. Trubetzkoy.[1]

2 Basic vs. related series

Trubetzkoy[2] distinguishes three types of localization series:

1. **basic series** (*Grundreihen*) are series in heterogeneous multilateral equipollent opposition (e.g. series which have a similar relation to each other as the plain velars, labials and dentals in Old Greek, Latin, Lithuanian, etc.) (Trubetzkoy 1939a: 115-117; Trubetzkoy 1969: 123-125),

2. **related series** (*Schwesterreihen*) which are always in exclusive relation to one of the basic series (Trubetzkoy mentioned

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[1]   Since the present paper is written in English, I will work with the English translation of Trubetzkoy 1939a, i.e. with Trubetzkoy 1969, in order to maintain his terminology, although I will quote the original text as well.

[2]   Surprisingly Trubetzkoy, in spite of training in Indo-European linguistics, did not apply his newly coined term "related series" to reconstructed Indo-European. Trubetzkoy studied Indo-European comparative grammar in Leipzig, so he was well versed in the field. However, his best known work on an IE theme was the famous article Trubetzkoy 1939b (widely rejected by scholars).

especially Čukča, Gilyak, Tigre) (Trubetzkoy 1939a: 117-122; Trubetzkoy 1969: 125-129) and finally

3. **secondary series** (*Nebenreihen*) which form a parallel system to the basic series, to each one of the basic series, in a privative opposition (e.g. the correlation of palatalization in Russian where each basic series is mirrored by its palatalized counterpart) (Trubetzkoy 1939a: 122-131; Trubetzkoy 1969: 129-38).

Of these three types of velar series, the related series and their relation to the basic series are of chief importance for the purpose of this article.

Speaking of the mutual relation of both basic and related series in general, the related series are considered to be *marked*, i.e. with some added value in contrast to the basic series.

If the related series is marked, then the basic series is an invariant of opposition between the two series or, to put it differently, the basic series equals the basis of the opposition and the related series is represented by this basis (i.e. the basic series) together with a complement of the opposition (i.e. the marker itself) (Marcus 1967: 9-10).

This can be demonstrated in Fig. 1 where K represents all phonemes of a basic series and $\underline{K}$ does the same for phonemes of a related series. The arrow points to the marked member of the opposition:

Fig. 1 Relation of marked and unmarked series

$$K \longrightarrow \underline{K}$$
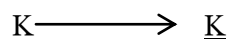
K = base of the opposition = basic series

<u>K</u> = base of the opposition + complement of the opposition = marked se-
   ries

If this model of related series is applied to the classic triadic model of the
velar subsystem of Indo-European, then it holds true that in centum lan-
guages this relation is realized between a plain velar (unmarked) and a
labiovelar (marked). Accordingly, in satem languages it is between a
plain velar (unmarked member of the opposition) and a palatovelar
(marked member of the opposition).

   As it is known, the plain velars in given groups of IE languages
do not fully represent sound segments of the same origin, since palatove-
lars and plain velars are not distinguished in centum languages (both of
them together form an unmarked member of the opposition), and labiove-
lars and plain velars are not distinguished in satem languages (hence they
form together an unmarked member of the opposition).

Note 1: The classic model of three velar series was first introduced by Bezzen-
berger (Bezzenberger 1890), named by von Bradke (von Bradke 1890) and
accepted by Brugmann (1897). Since that time, this model has been used by
many authors, for example Szemerényi (1990: 71-72). Some of these authors
tried to prove that there are traces of a preserved system of three velar series
in Albanian (cf. Ölberg 1976; Kortlandt 1980), Phrygian (Woodhouse 2005)
or Armenian (cf. Stempel 1994; Kortlandt 1980), but such ideas have never
been widely accepted. Melchert (1987) also argued that some traces of this
system were preserved in Anatolian languages, but some years later (2012)
he himself rejected the idea. See further Solta 1965; Steensland 1973; Shields
1981; Tischler 1990; Woodhouse 1998; Cavoto 2001; Salmons & Smith
2005, Kümmel 2007, 318-27 for various perspectives on this matter. On ty-
pology cf. especially Allen 1978; Sihler 1995: 152-153; Lipp 2009 1: 31. The
authors dealing with the two-series model are Meillet 1934: 91-95; Čekman
1974; Kortlandt 1978; Sihler 1995: 151-157 and Schmitt-Brandt 1998: 88-90.

Fig. 2 Mutual relations between the velars series

Palatovelar: K´   satem languages

Plain velar: K

Labiovelar: K$^\text{u}$ centum languages
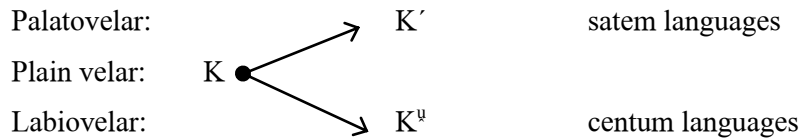
A typical characteristic of related series is a neutralization of the marked member (i.e. of the related series) to the unmarked member (i.e. to the basic series) in a given context. Because such neutralization occurs, one can conclude that the opposition between both series is not equipollent, as Trubetzkoy stated, but rather privative. As we have seen, the result of neutralization equals a basis of an opposition and this is typical for privative oppositions (cf. Trubetzkoy 1939a: 67; Trubetzkoy 1969: 75; Marcus 1967, 4-5).

In Fig. 3, we can express such neutralization as follows:

Fig. 3 Neutralization of the marker of the related series

$$\underline{K} \quad \Rightarrow \quad K$$

If no neutralization process can be found between the two series, both of the series are considered to be basic series. However, it should not be forgotten that the relation between the two series may change in the course of the diachronic development of the respective language (see below).

Some archaic Indo-European languages demonstrate this particular alternation between both series. The alternation is triggered by a context, especially when the marked member is positioned before an obstru-

ent (most often *t* or *s*) or a diaereme (#).[3] In this case the mark of the related series, i.e. the added localization beside the basic one, is neutralized:

Fig. 4 Marker neutralization of the marked velar series in context

MARKEDVELAR + OBSTRUENT/# ➡ PLAINVELAR + (OBSTRUENT/ #)

For the plain velars, the system shows a zero alternation in the same context, since if there is no marker to neutralize, the process does not manifest itself. However, this zero alternation is still an alternation *sui generis* given by context.

One can assume that the old system of related series is preserved in at least two languages, both in the two major areal groupings of the Indo-European language family: Latin for the centum languages and Old Indo-Aryan[4] (Vedic) for the satem languages.

3 Centum example of related series: Latin labiovelars and plain velars

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[3]   This term is preferred to *juncture* in this article. It was first introduced by the Moscow School (Panov 1961). In functional terms, it can be defined as a sum of phonological features whose function is to mark boundaries between phonological forms (usually phonological forms of words). Phonetic correlates of diaereme are pauses, irregular phonation or a glottal stop (in languages such as Czech), tonal falls, etc. (cf. Bičan 2008). It should be noted that diaereme shares some phonemic properties with obstruents, which is more than can be expected of "juncture".

[4]   In this paper, the term Old Indo-Aryan (OIA) and Vedic are considered to be synonyms, as I use only Vedic data here.

Latin preserves the original Indo-European labiovelars relatively intact, especially the voiceless stop *k^u* and to some extent even the voiced *g^u*. However, the aspirated stop *g^{uh}* was, like all original aspirated stops, subject to various processes, especially fricativization (cf. Sihler 1995: 136-144, 151-164; Meiser 1998: 97-105; Baldi 1999: 277-283; Weiss 2009: 78-79).

In Latin, both an opposition and neutralization are present between the old labiovelar series and the plain velar series. Table 1 gives examples of alternation before *t-* (supines in *-tum* or derivatives in *-tor)*, *s-* (especially in the sigmatic perfect) and before a diaereme (#). Voiced and aspirated labiovelar stops never occur in the position before #; examples of the assimilation of final voiceless labiovelar stop *-k^u* are the two words originally ending in *-que* (*neque* and *atque)*.

Note 2: All Latin data below are drawn from Lewis, Short 1879 and compared with Walde 1910 and LIV.

Table 1 Neutralization of marker of the marked velar series in Latin

-C	+ C-		CC	
k^u *<qu>*	+ t		kt *<ct>*	√*kok^u-: kok-tum <coctum>*; cf. *kok^u-ō <coquō>* √*sek^u-: sek-tor <sector>*; cf. *sek^u-ō <sequor>*
	+ s		ks *<x>*	√*kok^u-: kok-sī <coxī>*; cf. *kok^u-ō <coquō>*
	#		k *<c>*	*nek <nec>*; cf. *nek^ue <neque> atk <ac>*; cf. *atk^ue <atque>*
g^u *<gu> <u>*	+ t		kt *<ct>*	√*$sting^u$-: stīnk-tum <-stīnctum>*; cf. *- $sting^u$-ō <ex-stinguō>* √*ung^u-: ūnk-tum <ūnctum>*; cf. *ung^u-ō <unguō>*

	+ C-	CC	
	+ s	ks <x>	$\sqrt{sting^{u}}$-: -stīnk-sī <-stīnxī> ; cf. -sting^{u}-ō <ex-stinguō> ung^{u}-: ūnk-sī <ūnxī>; cf. ung^{u}-ō <unguō>
		(k)	−
g^{uh} <f> <v> <gu>	+ t	kt <ct>	$\sqrt{nig^{uh}}$- 1.: nik-tō <nictō>; cf. -nig^{uh}-e-ō <cō-nīveō> $\sqrt{nig^{uh}}$- 2.: Umb. nink-tu <ninctu>; cf. Lat. ning^{uh}-i-t <ninguit, nīuit>>
	+ s	ks <x>	$\sqrt{nig^{uh}}$- 1.: nīk-sī <-nīxī >; cf. -nig^{uh}-e-ō <cō-nīveō> $\sqrt{nig^{uh}}$- 2.: nink-sit <ninxit>; cf. ning^{uh}-i-t, nig^{uh}-i-t <ninguit, nīuit>
	#	(k)	−

For comparison, in Table 2 there are examples of the zero alternation of the plain velars. This alternation is zero, for there is no alternation of location, since plain velars do not alternate in location in a given context. This proves that plain velars are the unmarked member of the opposition which exists between them and labiovelars, for labiovelars are neutralized to plain velars, but plain velars are not a subject of the contextually triggered alternation of location. Again, no voiced or aspirated velar stops are attested before a diaereme (#):

Table 2 The zero alternation of the plain velar series in Latin

-C	+ C-	CC	
	+ t	kt <ct>	$\sqrt{dīk}$-: dik-tum <dictum>; cf. dīk-ō <dīcō > > $\sqrt{spek}$-: spek-tum <spectum>; cf. spek-i-ō <speciō >
k <c>	+ s	ks <x>	$\sqrt{dīk}$-: dīk-sī <dīxī>; cf. dīk-ō <dīcō > $\sqrt{spek}$-: spek-sī <spexī>; cf. spek-i-ō <speciō>

	#	*k* <*c*>	*hik* = <*hic*>; cf. *kedo* <*cedo*>
g <*g*>	+ *t*	*kt* <*ct*>	√*ling-: līnk-tum <līnctum>; cf. *ling-ō* <*lingō*> √*fig-: fik-tum <fictum>; cf. *fing-ō* <*fingō*>
	+ *s*	*ks* <*x*>	√*ling-: link-sī <līnxī>*; cf. *ling-ō* <*lingō*> √*fig-: fīnk-sī <fīnxī>*; cf. *fing-ō* <*fingō*>
	#	*(k)*	
g^h <*h*>	+ *t*	*kt* <*ct*>	√*veg^h-: vek-tum <vectum>; cf. *veh-ō* <*vehō*> √*trag^h-: trak-tum <tractum>; cf. *trah-ō* <*trahō*>
	+ *s*	*ks* <*x*>	√*veg^h-: vek-sī <vēxī>*; cf. *veh-ō* <*vehō*> √*trag^h-: trak-sī <traxī>*; cf. *trah-ō* <*trahō*>
	#	*(k)*	

The examples listed above clearly show that the old IE system of neutralization between the related series and the basic series survived quite well into Latin despite its partial erosion due to analogy and phonological development. Therefore, it corresponds perfectly to the supposed state described above in section 2.

4 Satem example of related series: Old Indo-Aryan

In Vedic, the system of velar series is again formed around a basic series of plain velars which represents the unmarked members of the opposition and the related palatovelar series consisting of the marked members of the opposition. The original palatovelars are usually the case in satem languages realized as fricatives/affricates, but it seems that in OIA were still preserved as true palatal stops (for details cf. Wackernagel 1896 1:

137-167; Allen 1953: 52; Burrow 1955: 72-73, 77-79; Kobayashi 2004: 53-54).

The opposition is again neutralized before any obstruent (most often before *t, dh, bh, s*) or a diaereme (). The old palatovelars are realized as follows: $*\acute{k}$ = OIA *ś*, $*\acute{g}$ = OIA j_1, $*\acute{g}^h$ = OIA h_1.[5]

Note 3: All Old Indo-Aryan data below are drawn from Grassmann 1873; Wackernagel 1896; MacDonell 1910; MacDonell 1916; Whitney 2000a and Whitney 2000b.

Table 3 Alternation of the palatovelars series in Vedic

-C	+C-	CC	
ś	+ t	ṣṭ	*dṛś-: dṛṣṭá-*; cf. *ádarśi*
			aṁś-: aṣṭá-; cf. *aśnóti*
	+ dh	(ḍ)ḍh	*diś-: dididḍhi*; cf. *diśátu*
	+ bh	ḍbh	*viś-: viḍbhíḥ*; cf. *viśam*
		gbh	*diś-: digbhyáḥ* cf. *diśam*
	+ s	kṣ	*dṛś-: dṛkṣam* ; cf. *ádarśi*
			diś-: dekṣyáti; cf. *diśátu*
	#	s	*viś-: víṭ*; cf. *viśam*
		k	*dṛś-: -dṛk*; cf. *ádarśi*
j_1	+ t	ṣṭ	*yaj-: iṣṭá-*; cf. *yájati*
	+ dh	ḍḍh	*yaj-: yaḍḍhvam*; cf. *yájati*
			mṛj-: mṛḍḍhvam; cf. *mṛjánti*
	+ bh	ḍbh	*rāj-: rāḍbhyaḥ*; cf. *rajam*
	+ s	ss	*rāj-: rātsu*; cf. *rajam*
		kṣ	*yaj-: yákṣat*; cf. *yájati*
	#	s	*rāj-: rā́ṭ*; cf. *rajam*

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[5]   OIA j_1 and h_1 mark those *j* and *h* sounds which developed from IE palatovelars and not as a result of palatalization of velars (i.e. j_2 and h_2). Cf. Hübschmann's (1877) attitude to this issue, see also Wackernagel (1896 1, 137-167); MacDonell (1910, 25, 31-34, 46, 50-51) and Burrow (1955, 77).

		k	*yaj-: (ṛtv-)ík*; cf. *yájati*
	+ t	ḍh	*vah-: ūḍhá-, ūḍhvam*; cf. *váhati*[6]
	+ dh	ḍh	*vah-: voḍham*; cf. *váhati*
	+ bh	ḍbh	*sah-: ṣaḍbhyáḥ* cf. *sáhate*
h₁	+ s	Kṣ	*vah-: ávākṣīt*; cf. *váhati*
		ṭs	*sah-: ṣaṭsú*; cf. *sáhate*
	#	s	*vah-: vāṭ*; cf. *váhati*
			sah-: ṣāṭ; cf. *sáhate*

Again, these findings are compared with the results of a zero alternation of the plain velars in the same context. It can be observed that in some contexts the anticipated combinations are not attested by any data. These 'artificial' examples are given in brackets and their forms are based purely on analogy.[7]

Table 4 Zero alternation of plain velars in OIA

-C	+C-	CC	
	+ t	kt	*śak-: śaktam*; cf. *śaknóti*
			tak-: takti; cf. *tákvan-*
k	+ dh	gdh	*śak-: śagdhí*; cf. *śaknóti*
	+ bh	(gbh)	−
	+ s	kṣ	*śak-: śakṣyati*; cf. *śaknóti*
	#	(k)	−
	+ t	(kt)	−
	+ dh	(gdh)	−
g	+ bh	(gbh)	−
	+ s	(kṣ)	−
	#	(k)	−

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6   Note the compensatory lengthening.

7   Erhart (1980: 45) presented a list of combinations of phonemes similar to the one given here, but he did not demonstrate any examples of zero alternations. This list was created on the basis of Erhart's, but it differs in that all of the examples presented are attested in OIA.

	+ t	gdh	*dagh-: dhaktam*; cf. *daghma*
	+ dh	(gdh)	−
gh	+ bh	(gbh)	−
	+ s	kṣ	*mi(g)h-: amikṣat*; cf. *meghá-*
	#	k	*dagh-: dhak*; cf. *daghma*

On the basis of the examples above, it can be seen that the results of assimilation of the old IE palatovelars before obstruents and diaereme only partially correspond to the results of zero alternation of plain velars in the same context.

This is probably a result of subsequent developments caused by analogy with other sibilants (cf. Martinet 1951: 91-95), i.e. to *s* and especially *ṣ* (as a result of the *ruki* rule). For comparison, clusters consisting of sibilant + obstruent/diaereme are presented in Table 5.

Table 5 Alternation of sibilants in OIA[8]

-C	+ C-	CC	
	+ t	ṣṭ	*viṣ-: viṣṭá-* ; cf. *víveṣaḥ*
			dviṣ-: dviṣṭá-; cf. *dvéṣat*
	+ dh	ḍḍh	*viṣ-: viviḍḍhi* ; cf. *víveṣaḥ*
			dviṣ-: dviḍḍhve; cf. *dvéṣat*
ṣ	+ bh	ḍbh	*dviṣ-: dviḍbhíḥ*; cf. *dvéṣat*
		rbh	*śoc-iṣ-: śocirbhíḥ*; cf. *śociṣam*
	+ s	kṣ	*dviṣ-: dvikṣát*; cf. *dvéṣat*
		ṭs	*dviṣ-: dviṭsu*; cf. *dvéṣat*
		ṣṣ	*śoc-iṣ-: śociṣṣu*; cf. *śociṣam*
	#	ṭ	*dviṣ-: dviṭ*; cf. *dvéṣat*

		ḥ	*śociṣ-: śocíḥ*; cf. *śociṣam*
	+ *t*	st	*as-: ásti*; cf. *ásmi*
			vas-: váste; cf. *vásati*
	+ *dh*	ddh	*vas-: vaddhvam*; cf.
		dh	*ās-: ādhve*; cf. *ā́sāte*
s	+ *bh*	dbh	*mas-: madbhíḥ*; cf. *masam*
		bh	*apas-: apóbhyaḥ*; cf. *apásam*
	+ *s*	ts	*vas-: ávātsīḥ*; cf. *vásati*
		ss	*apas-: apássu*; cf. *apásam*
		s	*as-: ási*; cf. *ásmi*
	#	ḥ	*apas-: apā́ḥ*; cf. *apásam*

To sum up: although the alternation is still present in the Vedic system, the original exclusive relation to the basic series of velars has already been weakened. There are two reasons for this: firstly, the original pala-tovelars were partially rephonemized as new sibilants and secondly, a completely new alternation to the newly formed retroflex series emerged (originally a result of processes caused by the *ruki* rule). The tendency for neutralizing the location before obstruents/diaereme of the original pala-tovelar series is preserved, but it was generally changed in favour of the alternation of sibilants. This means that OIA preserves the alternation but in a modified form. Modifications like these are considered by the author of the present lines to be a second stage in the development of related series.

## 5 The stability of systems of related series in IE

The original exclusivity of related series is valid for the system of labio-velars and plain velars in Latin, as is demonstrated above, for this alternation of related series is still almost fully preserved.

This relation between related series and basic series in Latin can then be expressed as in Fig. 5. This model is considered to be the general model of IE (if the relation with two velar series is taken into account):

Note 4: In the following figures, only relations between related and basic series are marked, either as synchronic state alternations (designated by a single arrow) or a diachronic development (merging; designated by a double arrow). Any marked series (either palatovelar or labiovelar) are designated by $\underline{K}$. *P* represents any labial stop and *T* any dental stop.

Note 5: For a short overview of a further development of related series in certain branches of IE languages, see either Brugmann 1897 1: 542-622; Szemerényi 1990: 63-64; or Adrados Bernabé Mendoza 2010: 122-128).

Fig. 5 Related and basic series (as in Latin)

<div align="center">

RELATED SERIES   BASIC SERIES

$\underline{K}$ (i.e. K$^\mu$) $\rightarrow$ K

P

T

</div>
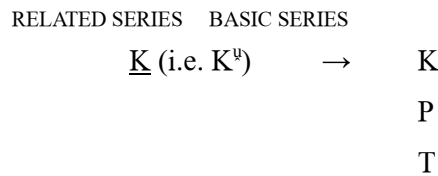
Generally speaking, the system of related series underwent various changes during the subsequent development of the Indo-European languages.

One way of changing the system is attested in Mycenaean Greek (cf. Myc. *ke-ni-qe-te-we* /*khernik*$^\mu$*tēwes*/ and *a₃-ti-jo-qo* /*Aithiok*$^\mu$*s/,* without neutralization; it is probably an innovation after which the former related series is considered to be the basic series.) and in Germanic where the original related series of labiovelars was first systematized as a new

basic series without any neutralization (cf. Fig. 6). The difference against the original state is that, while the number of series itself is preserved, the status of the marked velar series has been changed.

Fig. 6 The system of only basic series (as in Mycenaean or Germanic)

RELATED SERIES   BASIC SERIES

$(\underline{K,} \text{ i.e. } K^{u}) \quad \Rightarrow \quad \underline{K} \text{ (i.e. } K^{u})$

K

P

T

Note 6: There are traces of a former alternation of related series in Gothic similar to those in Latin, cf. Goth. *ni-h* (< **niƕi* = Lat. *neque, nec*), Goth. *leihts* (< **leik^{u}-*). However, elsewhere in Gothic, the labiovelars remain unchanged in their original alternation position, cf. Goth. *saƕ, laiƕ.*

Another way of systematizing the marked velar series as the basic series is that found in P-Celtic where the old labiovelars merged with the labial series (cf. Fig. 7)[9], and in Q-Celtic where the labiovelars merged with the plain velar series (cf. Fig. 8). A similar situation may be observed in Old Greek, where the labiovelars merged with all three basic series (cf. Fig. 9; cf. Gr. ὀπίζομαι ~ ὄψις, ἔλιπον ~ λείψω without any alternation of *k^{u}-). All of these three ways share the following common features: no new series was added to the original basic series of labials, velars and dentals and the resulting number of series is smaller than the original one.

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[9]   As well-known, this merger could not have taken place until PIE *p had been eliminated in Celtic.

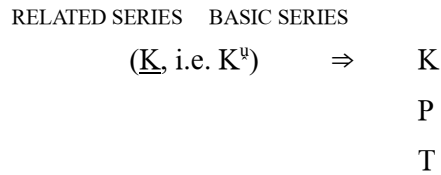*Fig. 7* The system of only basic series as in Q-Celtic

RELATED SERIES   BASIC SERIES

(<u>K</u>, i.e. K$^{\mathrm{u}}$) $\Rightarrow$ K

P

T

Fig. 8 The system of only basic series as in P-Celtic

RELATED SERIES   BASIC SERIES

K

(<u>K</u>, i.e. K$^{\mathrm{u}}$) $\Rightarrow$ P

T
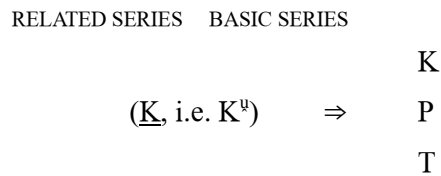
Fig. 9 The system of only basic series as in Classic Greek

RELATED SERIES   BASIC SERIES

(<u>K</u>, i.e. K$^{\mathrm{u}}$) $\Rightarrow$ K

$\Rightarrow$ P

$\Rightarrow$ T
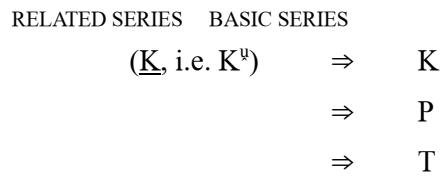
The Baltic languages at the same early stage of development reshaped the status of palatovelars to a new basic series (a sibilant series), similar to the state schematized in Fig. 6.

Fig. 10 The system of only basic series as in Baltic

RELATED SERIES   BASIC SERIES

(<u>K</u>, i.e. K´)   ⇒   Š

                                 K

                                 P

                                 T

The Vedic system represents an innovation similar to that in Fig. 5, but later on a new series of palatals arose (by split in the original velars due to palatalization) and two of the three phonemes in intervocalic position, namely j_1 and h_1, merged with these new palatals (i. e. with j_2 and h_2, respectively) while the third ($ś$) became a new sibilant, proportional to dental *s*. This state in Indo-Aryan then developed further in the MIA period, when the last remaining differences in preconsonantal allophones between both *j* and *h* were lost and *ś* merged with *s* (cf. Fig. 11).

Fig. 11 Final state of (Middle) Indo-Aryan[10] system of location series (retroflex series not included in the figure)

RELATED SERIES   BASIC SERIES

(<u>K</u>, i.e. K´)   ⇒   C

                                 K

                                 P

                                 T

Due to a similar process of palatalization in Slavic, the supposed development in this language corresponds roughly to that in Indo-Aryan, but

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[10]   For more details see Appendix.

the depalatalization of the original sibilants which developed from pala-
tovelars caused them to merge with the dental series.

Fig. 12 Final state of Slavic system of location series

	RELATED SERIES	BASIC SERIES
		C
		K
		P
	(K̲, i.e. K′) ⇒	T

6 Conclusion

Generally, the process of remodelling of a system of related series in IE
languages can be schematized as given in Table 6.

The main tendency remains the same: to redefine the related se-
ries as the basic series, either by redefining it as a new basic series, or by
merging it with the old basic series.

Table 6 Phases of remodelling of related series

PHASES	DESCRIPTION	EXAMPLE OF LAN-GUAGE
Phase 1	Basic vs. related series, alternations preserved	Latin
Modified phase 1	Basic vs. related series, system of alternations corrupted	Old Indo-Aryan
Phase 2	Basic series only (both old/new)	Balto-Slavic, P-Celtic, Q-Celtic, Mycenaean Greek, Germanic, etc.

It seems that only Latin preserves the old system of related series rela-
tively intact. Other languages show major or minor subsequent modifica-

tions. The state of related series, as it is preserved in Latin, is considered to be the first phase of the whole process, while the situation in Old Indo-Aryan is already slightly modified, as the old related series moves towards rephonemization as a part of the basic series. In Baltic, Slavic, Germanic, Greek and Celtic, the last phase of this process can be observed − the old related series is, in one way or another, fully integrated either as a new basic series or as a part of an older basic series.

Appendix: Plurality of related velar series

Whether any language could ever have a triadic system of velar series like the one that supposedly existed in Proto-Indo-European is often disputed. It has been the subject of numerous analyses and my aim here is not to support either the classic system of three velars (although it has been used here as a study model) or any other variation of the two-series models. However, it must be mentioned that, in Vedic, a new, secondarily developed subsystem of related series existed next to the old series of palatovelars which is described above. This new subsystem comprised newly developed palatals (at the time of Proto-Indo-Iranian) which emerged due to the palatalization of velars (cf. Wackernagel 1896 1: 137-167; MacDonell 1910: 26-28, 50-51; Burrow 1955: 76-79; on palatalization of velars in satem languages generally see Collinge 1985: 133-142 for further literature).

The secondary palatal series in OIA demonstrates similar neutralizations of location before obstruent/diaereme as the primary subsystem of related series of the palatovelars does. This process is carried out in the same linear environment as the neutralization of palatovelars was, but it

is far more regular and corresponds better with the zero alternation of the plain velars (see Table 4).

Note 7: Again, all Old Indo-Aryan data below are drawn from Grassmann 1873; MacDonell 1910; MacDonell 1916; Whitney 2000a and Whitney 2000b.

*Table 7* A secondary related series alternation in OIA

-C	+ C-	CC	
	+ *t*	*kt*	*vac-: vakti*; cf. *ávāci*
			pac-: paktá-; cf. *pácati*
	+ *dh*	*gdh*	*pṛc-: pipṛgdhí*; cf. *párcaḥ*
			śuc-: suśugdhí; cf. *śócati*
c	+ *bh*	*gbh*	*vac-: vāgbhíḥ*; cf. *ávāci*
			ṛc-: ṛgbhyáḥ; cf. *ṛcam*
	+ *s*	*kṣ*	*vac-: vakṣi*; cf. *ávāci*
			pac-: pakṣyáti; cf. *pácati*
	#	*k*	*vac-: vā̃k*; cf. *ávāci*
			tvac-: tvák; cf. *tvacam*
	+ *t*	*kt*	*yuj-: yuktá-*; cf. *yuyója*
			bhuj-: bhuṅkté; cf. *bubhujé*
	+ *dh*	*gdh*	*yuj-: áyugdhvam*; cf. *yuyója*
j₂	+ *bh*	*gbh*	*yuj-: -yúgbhiḥ*; cf. *yuyója*
	+ *s*	*kṣ*	*yuj-: áyukṣi*; cf. *yuyója*
	#	*k*	*yuj-: -yúk*; cf. *yuyója*
			vij-: vík; cf. *vijam*
	+ *t*	*gdh*	*dah-: dagdhá-*; cf. *dáhati*
			duh-: dugdhá-; cf. *duháte*
	+ *dh*	*gdh*	*dah-: dagdhi*; cf. *dáhati*
			duh-: dugdhi; cf. *duháte*
h₂	+ *bh*	*gbh*	*dah-: -dagbhiḥ*; cf. *dáhati*
	+ *s*	*kṣ*	*dah-: dhakṣyáti*; cf. *dáhati*
			duh-: dhukṣata; cf. *duháte*
	#	*k*	*dah-: ádhāk, -dhak*; cf. *dáhati*
			duh-: -dhúk; cf. *duháte*

That neutralization of palatals was carried out before obstruents and di-aereme is an undisputable fact, and therefore there is no other possibility than to consider the relation between palatals and plain velars to be a relation between related series as well, as described above.

The alternation of palatals is, without doubt, of later origin than the one of palatovelars, but it can serve as an example of a second related series attached to the same basic series. Hence, plain velars are the basic series for both the older palatovelar series and the newer palatal series, or in other words, besides the triad of the basic series of the plain velars, labials and dentals, there are two subsystems of related series, each of them relating to the plain velars.

In Fig. 13, the state after the development of a palatal series is demonstrated in which both series have not yet merged, as was the case in MIA and as shown in Fig. 11.

Fig. 13 Related series in Vedic

OLD RELATED SERIES		BASIC SERIES		NEW RELATED SERIES
Ś	→	K	←	C
		P		
		T		
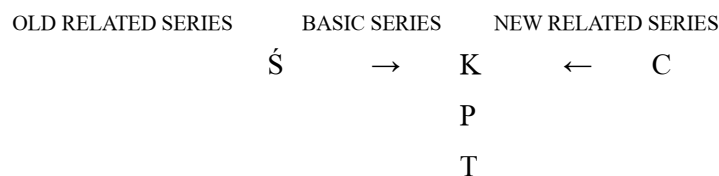
In any event, when one is searching for a typological parallel supporting the possibility of two related series associated with only one and same basic series, Vedic can serve as an example, though not as a proof, that such a system ever existed in the Indo-European languages, for the parallel confirms only the possibility of such a system and nothing more.

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