Vina Diem Celebrent

Studies in Linguistics and Philology
in Honor of

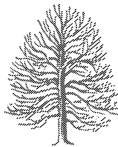# **Brent Vine**

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Palatable Thorns*

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"Thorn clusters"—the sequences set up by the Neogrammarians to account for cor-respondences of the type Ved. *ŕ̥kṣa-* = Gk. *ἄρκτος* 'bear' (supposedly < PIE *-*k̂þ*-) and Ved. *kṣā́m* = Gk. *χθών* 'earth' (supposedly < PIE *ĝʰðʰ- or *ĝʰþ-)[1]—need no introduc-tion here. Already Brugmann had misgivings about the status of the alleged interden-tal fricative PIE *þ, which was confined to the position after dorsals and invariably merged with *s or *t/*dʰ* in the daughter languages. The problem was fundamentally transformed by the discovery of Hittite and Tocharian. In these languages thorn clus-ters were represented not by sequences of the form *KT*, *Ks*, or *Kþ*, but by *TK* (cf. Hitt. *ḫartagga-* 'bear', *tēkan*, gen. *taknāš* 'earth'; Toch. A *tkaṃ* 'earth'), showing that the dorsal + coronal clusters of the "classical" IE languages had been metathesized from earlier sequences of coronal + dorsal. But reconstructing *TK* merely meant replacing one set of unknowns with another.[2] Cluster reduction sometimes occurred instead of the usual metathesis in the classical languages (cf. Gk. *χαμαί* 'on the ground' beside *χθών*), and metathesis was resisted at least some of the time in Hittite and Tocharian. In the twentieth century the question shifted from "What was thorn?" to "What was metathesized to what, and when and how many times did it happen?"

Our honorand will remember, as do I, Joki Schindler's illuminating lectures on the thorn problem at Harvard in the 1970s. Schindler's article on thorn from that period (Schindler 1977), though not the last word on the subject, was a milestone in the history of the problem and will be a convenient point of departure for resuming the topic here. Schindler's review of the material led him to the following conclusions:[3]

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*Many colleagues and students have helped me to a clearer understanding of the phonetic issues touched on in this paper. It is a pleasure here to thank Gašper Beguš, Claire Bowern, Joe Eska, Zachary Rothstein-Dowden, Kevin Ryan, and Michael Weiss. Errors, of course, are mine alone.

[1] Since *þ and *ðʰ would have been in complementary distribution under the Neogrammarian conception of thorn, I henceforth write *þ even after voiced aspirates.

[2] Here and below, I omit the asterisk in the formulas *TK*, *TsK*, etc.

[3] Schindler's list breaks the forms into four groups according to the position of the cluster in the root: 1) root-initial: **k̂þei-* 'siedeln', **k̂þeh₁(i)-* 'erwerben', **k̂þen-* 'verletzen', **gʷʰþei-* 'hinschwinden', **gʷʰþen-* 'verklei-nern', **gʷʰþer-* 'rinnen'; 2) possibly or certainly not root-initial: **ĝʰþem-* 'Erde', **ĝʰþuH-* 'Fisch', **k̂þi(e)h₂ino-* 'großer Raubvogel', *ĝʰþies 'gestern'; 3) root-final: **tek̂þ-* 'zimmern', **h₁rek̂þ-* 'zerren'; 4) elsewhere word-internally: **h₃ek̂ʷþ-* 'Auge', **h₂r̥k̂þo-* 'Bär', **ik̂þr̥-* 'near'(?).

1) A rule of PIE date ("THORN") converted *TK* clusters and (NB!) *KT* clusters into "*Kþ*" (not phonetically specified) under certain phonological conditions;

2) THORN did not apply to sequences of the type #*TKR̥*-, where the *T* was instead lost (cf. **ḱm̥tóm* '100' < **dḱm̥tóm*; *χαμαί* < **dʰǵʰm̥-h₂éi*);

3) THORN likewise failed to apply in sequences of the type #*TKR̥*-, where a "schwa secundum" broke up the cluster instead (cf. **dʰₑǵʰm̥-* in Hitt. *taknā́š*);

4) Otherwise, THORN applied when the cluster was tautosyllabic, but not when the *T* and *K* were in separate syllables (cf. Ved. *ŕ̥kṣa-*, reflecting contamination with an ablaut variant **h₂er.tko-*, vs. Hitt. *ḫart(a)ggga-* < **h₂r̥t.ko-*; **ǵʰþþies* 'yesterday' < **ǵʰ-dies*, etc.).

Today, after the passage of forty years, points (2) and (3), specifying the conditions under which initial **TK*- was simplified or broken up, have become more or less standard doctrine (*pace* Kloekhorst 2014).[4] Points (1) and (4), however, have not fared so well. The view that some version of THORN applied at the IE level, prior to the separation of Anatolian and Tocharian from the rest of the family,[5] is not well supported; the only possible evidence for a treatment other than *tk* in either branch is the uncertain Luvian form *inzagān*, on which more will be said below. Mayrhofer, who rarely differed from Schindler on major issues, broke with him on this point and exempted Anatolian from THORN in his canonical presentation of PIE phonology (1986:150–8, building on Mayrhofer 1982). Also disputed was Schindler's claim that *KT* as well as *TK* clusters were subject to THORN. The best apparent example of a thorn cluster coming from *KT* was the word for 'yesterday', supposedly from an immediate preform **ǵʰþies*. But, as pointed out by Melchert (2003:153), no thorn stage is actually needed to explain the development of the cluster **ǵʰ-di-* to Ved. *hy-* (*hyáḥ*), Gk. *χθ-* (*χθés*), or Lat. *h-* (*heri*). The inclusion of *KT* in the domain of THORN was the main reason for Schindler's awkward syllable boundary condition in (4), without which thorn clusters would have been generated at morpheme boundaries before dental suffixes like **-to-* (***dr̥ḱ-þó-* for correct **dr̥ḱ-tó-* 'seen'), **-t(e)i-* (***dr̥ḱ-þi-* for correct **dr̥ḱ-ti-* 'sight'), etc.[6]

Given the current state of the discussion, a phonetic approach may offer the best way forward. The view that the sound ancestral to the sibilant of Ved. *ŕ̥kṣa-* (and Lat. *ursus* < **orcsos*) and the *-t-* of Gk. *ἄρκτος* (and OIr. *art*) was actually an interdental fricative is no longer widely held. Since about 1990 the idea has gained ground that PIE *TK* clusters first became *TsK* by an extension of the rule that took *TT* to *TsT*

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[4]Much of Kloekhorst's article is devoted to defending a glottalic interpretation of the behavior of **d* in thorn clusters. The discussion does not, in my opinion, represent an advance over Schindler's treatment.

[5]It is here assumed, in agreement with a growing number of researchers, that Tocharian was, after Anatolian, the second branch to leave the family.

[6]Schindler's need to invoke the syllable boundary condition for the 'bear' word (see above) is a consequence of his assumption—more easily taken for granted then than now—that THORN was operative in Anatolian. If THORN was post-Anatolian, no syllable-based special pleading would be needed to explain the intact *-tk-* of Hitt. *ḫart(a)ggga-*.

(cf. Hitt. 2 pl. *ez(at)teni* < *h_2ed-te-*, etc.), and that the sigmatized cluster *TsK* then underwent metathesis to *KTs*, giving the attested thorn treatments. This approach, which I will call the "*TsK* theory," goes back to Merlingen (1957:51); it has since been independently advocated by Melchert, Schindler, and others.[7] It is easy to see why it has been popular. No controversial segments figure in the *TsK* scenario, and the final step is an appealingly simple rule of cluster reduction (*KTs* > *KT*, *Ks*). Above all, the theory connects the puzzling thorn phenomenon with the other, better understood process affecting dental stops in PIE, the familiar dental + dental rule (*TT* > *TsT*). Compared with the alternatives,[8] the *TsK* approach looks like an excellent option.

And yet, comparisons aside, I would contend that this account is in absolute terms not very attractive at all. Not one step in the purported development—the assibilation of *TK* to *TsK*, the metathesis of *TsK* to *KTs*, or the simplification of *KTs* to *KT* as well as *Ks*—is inherently likely on closer inspection, and the sequence of three marked changes in a row is highly improbable. Consider first the supposed generalization of the dental + dental rule to the case of dentals before dorsals. The two rules are actually very different. The dental + dental rule applies only at morpheme boundaries, while dental + dorsal clusters are only morpheme-internal. The change of *TT* to *TsT* has an obvious phonetic explanation: the *-s-* was an effect of the audible release of the first dental before the second—a result of the two identical segments being uttered in succession.[9] The acoustic turbulence of the release, misparsed as assibilation, was reinterpreted as an inserted *-s-*; "*s*-insertion" then spread as a sound change, favored by the fact that it enhanced morphogical transparency. It is not obvious how this process could or would have been transferred to morpheme-internal *TK* sequences. The unaltered *-t-* of Hitt. *ḫart(a) g̑ga-* (not **ḫarz(a)g̑ga-*) very nearly proves that the putative change of *TK* to *TsK* had not yet taken place when Anatolian separated from the rest of the family (cf. n. 6);[10] there must therefore have been a period after the first branching in the IE *Stammbaum* when underlying *TT* sequences at morpheme boundaries were realized as *TsT*, while morpheme-internal *TK* clusters were still intact. I cannot think of a reason, under these circumstances, why speakers would have been motivated to "generalize" the *-s-* from the first case to the second. It is significant that there was no *s*-insertion in the more obviously parallel case of dental + labial clusters at morpheme boundaries, as shown by the formation of the

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[7]The idea does not appear in Schindler's 1977 article, but was in the air in the late eighties and early nineties. Ringe (2009:9) reports having first heard it informally from Schindler at a conference in 1991; I myself overheard it being expounded by another scholar at around the same time. For further discussion see Melchert 2003:154–5, esp. n. 29.

[8]Among which, in addition to Kloekhorst 2014 and the sources critiqued by Melchert (ibid.), mention may be made of Lipp 2009, arguing at great length, but not to my mind convincingly, against metathesis in Indo-Iranian.

[9]That there would have been such a release, of course, can be inferred from the general IE prohibition against geminates.

[10]A conclusion in no way falsified by Luv. *inzagān*; see below. Tocharian, where the only credible word with a thorn cluster is A *tkaṃ* (= B *keṃ* < **tk-*), adds nothing to the discussion, since a hypothetical **tsk-* would have gone to *tk-* in any case in this branch of the family.

bʰ-cases of dental stems (cf. OAv. instr. pl. *drəguuō.dəbīš̌*, dat. pl. *drəguuō.dəbiiō*, YAv. *druuaṭbiiō*, etc.).[11]

Even supposing that *TK* clusters *did* develop to schematic *TsK*, how likely is it that a sequence of this structure would have metathesized to *KTs*? Clusters consisting of a sibilant and a single stop are crosslinguistically susceptible to metathesis in both directions, as will be familiar to anyone acquainted with the history of the English words *ask* and *wasp*.[12] It is well known, however, that certain directions of metathesis are more favored than others in certain positions. Thus, as pointed out in a discussion of metathesis by Steriade (2001:233–5), sibilant + stop sequences do not usually shift to stop + sibilant in word-initial position, and stop + sibilant sequences rarely if ever shift to sibilant + stop word-finally. The more general principle is that "the common types of s//T metathesis seem to have the consequence of providing the stop with the best transitional cues locally available," i.e., putting it in contact with a vowel. The only case mentioned by Steriade in which a sibilant interacts with *two* stops is the East Baltic rule by which *sk*, *šk* and *zg*, *žg* metathesize before a consonant; cf. e.g. Lith. *drėksti* 'scratch' < **drėsk-ti*; *sumegztas* < **-zg-t-* 'braided'; Latv. dial. *tūkst* 'swell' < **tūsk-t(i)*; etc. (cf. Stang 1966:110–1). Here too the effect is to increase the exposure of one of the stops, the velar, to a vowel. Pending a more systematic collection of typological data, our default assumption must be that a cluster of the type *TsK* could easily have switched to *KsT*, but not to *TKs* or *KTs*.[13]

Even the final step in the process—the simplification of *KTs* to *Ks* in Indo-Iranian and Italic and to *KT* in Greek and Celtic—is suspect. The supposed reduction of *KTs* to *Ks* would have been straightforward, since the sibilant in clusters of the form *KTs* would have been perceptually more salient than the *T* surrounded by obstruents. But *KTs* > *KT* does not look like so natural a change, and I know of no actual example that would support it in the IE domain. In Greek, for what it is worth, where the hypothetical *KTs* of thorn clusters is stipulated to have developed to *KT*, the *non*-hypothetical **-kts-* of the nom. sg. and dat. pl. of stems in *-kt-* gave *-ks-* (cf. nom. sg. *νύξ*, *(ϝ)άναξ*, etc. < **-kt-s*; dat. pl. *νυξί*, *(ϝ)άναξι*, etc. < **-kt-si*).[14]

If *TK* > *TsK* > *KTs* > *KT/Ks* is not a plausible trajectory, we must look for an alternative. Cross-linguistic evidence for the diachronic treatment of coronal + dorsal sequences is not easy to find, but a good deal can be ascertained about the synchronic phonetics of such clusters. Stop + stop clusters are in general characterized by signif-

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[11]Ved. *-adbhiḥ*, *-adbhyaḥ*, etc., of course, are of no value here, since **-s-* was lost between stops in Vedic (cf. aor. 3 sg. *abhakta* 'obtained' < **-k-s-ta*, etc.).

[12]*ask* and substandard *ax* have been variants throughout the history of English (OE *āscian*, *ācsian*; PGmc. **aiskōn-* < PIE **h₂eis-sk-*). *wasp* is found in Old English as *wæsp*, *wæps*, and *wæfs*; the original form is usually thought to have been a derivative of PIE **webʰ-* 'weave' (**wobʰ-sā*; cf. Balochi *gvabz*, with Bartholomae's Law).

[13]One might try to justify the *TsK* > *KTs* metathesis by analyzing the *Ts* sequence as an affricate, i.e., as an indivisible unitary phoneme. But since PIE otherwise lacked phonological affricates, this would be nothing more than a terminological maneuver. The putative *Ts* of thorn clusters would have been no likelier to be analyzed as a single phoneme than the final [ts] of Eng. *hats* or *writes*.

[14]I say "for what it is worth" because these are morphologically motivated forms, and hence not a certain predictor of how **-kts-* would have been treated in more opaque environments.

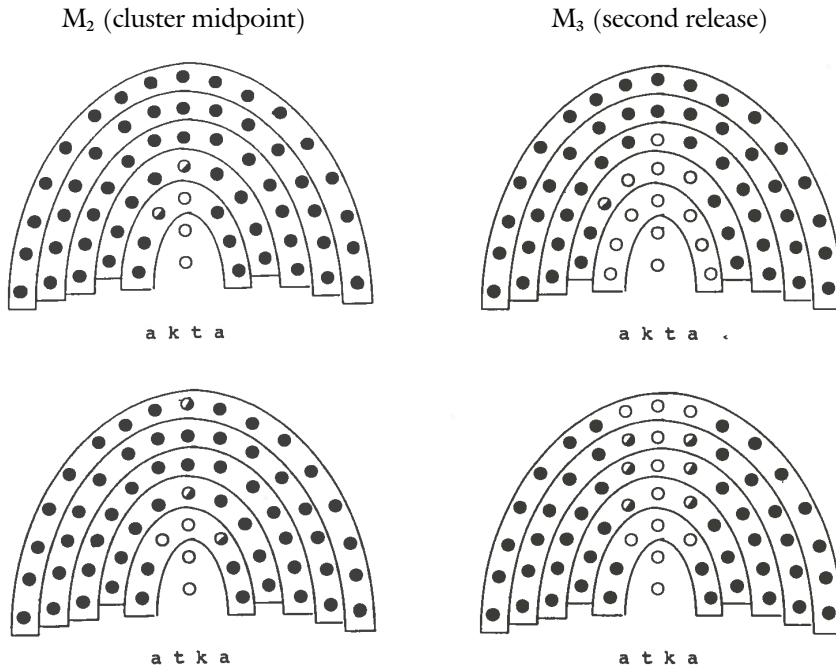M₂ (cluster midpoint)   M₃ (second release)

Figure 1. (Reproduced from Recasens et al. 1993:346–7 by permission of Elsevier.)

icant gestural overlap; other things being equal, this is greater in the case of front-to-back sequences (e.g. *pt*, *pk*, *tk*) than back-to-front sequences (e.g. *kp*, *kt*, *tp*).[15] In an interesting article, Recasens et al. (1993) report on an electropalatographic study of stop clusters in English and Catalan. Shown above in Fig. 1 are their electropalatograms for the sequences [akta] and [atka] at two points in the production process—M₂, the cluster midpoint, and M₃, the moment of the release of the second stop. The figures are oriented with the prepalatal region upward; filled-in circles represent points of lingual-palatal contact, and partially filled-in circles represent points of partial contact. Note that at M₃ *tk* is predictably more *k*-like and *kt* is more *t*-like, but that the profiles of *tk* and *kt* are virtually identical at M₂. Recasens et al. interpret this as follows (347–8):

> During the production of [tk] and [kt], simultaneous raising of the tongue front for [t] and of the tongue dorsum for [k] causes the raising of the intermediate tongue surface portion. During a period of the cluster closure event (i.e., at M₂), the outcome of this process is blending

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[15]See, with special reference to the complicated clusters of Georgian, Chitoran, Goldstein, and Byrd 2002 and the discussion by Hayes (2002, esp. pp. 450–1). *TK* clusters (unlike e.g. *KT* clusters) are "harmonic" in Georgian, i.e., subject to cluster-wide voice/aspiration/glottalization constraints that reflect their close articulatory cohesion.

> between two lingual gestures into a single gesture involving an inter-
> mediate primary articulator, i.e., the predorsum. As expected, blending
> conveys a shift in place of articulation (i.e., prepalatal instead of alveolar
> or velopalatal) and an increase in degree of dorsopalatal contact (which
> is larger than for dorsal [k]).

What this means at the IE level is that both *TK* and *KT* clusters would have been diachronically prone to palatalization. For *KT* this tendency is well known; cases like Lat. *octō* 'eight' > Fr. *huit*, Sp. *ocho*, Port. *oito*, and Balto-Slavic **duktē* 'daughter' > Slavic **dъtji* (OCS **dъšti*, etc.) are familiar to every Indo-Europeanist. It is the treatment of *TK*, however, that is of interest here.

My proposal for the IE thorn problem is that the phonetic stage written *Kþ* by the Neogrammarians and *KTs̝* by more recent scholars should in fact be written *KT^j*, with a palatal or palatalized second element. This *KT^j*, I submit, was the product of an In-ner, or "Core," IE (i.e., post-Anatolian, post-Tocharian) metathesis. The input to the metathesis was either *T^jK^j* or some other point on the phonetic continuum delim-ited by *T^jK* (with more salient palatalization at the beginning of the cluster) and *TK^j* (with more salient palatalization at the end). The palatalization was "spontaneous" in the sense that it was triggered not by a consonant or vowel outside the *TK* sequence, but by the inherent articulatory and acoustic properties of dental + dorsal clusters. Since **t^j* and **d^hj* were not otherwise phonemic in Inner PIE, the post-metathesis sequences [kt^j], [gʷʰd^hj], etc., might have continued to be analyzed, at least for a time, as underlying sequences of dental + dorsal. But this would not have been a stable arrangement from either a phonetic or phonological point of view. Eventually the aberrant second element of the clusters was either assibilated (*KT^j > KTs̝ > Ks̝*) or reanalyzed as a normal dental stop (*KT^j > KT*). The former treatment is seen in Indo-Iranian (*ŕ̥kṣa-*) and Italic (*ursus < *orcsos*), the latter in Greek (*ἄρκτος*) and Celtic (*art*).

A number of details now fall into place. The development of underlying **ĝʰ-di̯-* to an apparent thorn cluster in Gk. *χθές* (+ OIr. *in-dé*, Go. *gistra-dagis* 'id.') was in phonetic terms simply a merger of [ĝʰd^hj] with [ĝʰd^hj]. In Indo-Iranian, where the merger did not take place, the **dʰ* was lost instead, giving **ĝʰi̯* (> Ved. *hy-*; so too perhaps Lat. *heri*).[16] Occasional Greek forms with a sibilant, like Gortyn. *ψινοντος* = *φθίνοντος* and Att. *Φιλοσκετ[* (= *Φιλοκτήτης*, etc.), probably reflect sporadic or regional instances of the assibilation treatment (*KT^j > KTs̝*); in *Φιλοσκ-* the difficult cluster **-kts-* was replaced by the more familiar *-sk-*.

A potentially problematic form for this scenario is the twice-attested Luvian neuter noun *inzagān* (also *īnzagan-za*), taken by Melchert (2003) to mean 'things buried,

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[16]If the true metathesized thorn cluster **ĝʰd^hj-* (< **dʰĝʰ-*) gave Lat. *s-* (cf. *sitis* 'thirst' < **dʰgʷʰi-*), and if *homo* 'man', *humus* 'ground', etc., go back to preforms in **ĝʰm̥- < *dʰĝʰm̥-*, then *heri* is attractively taken from simplified **ĝʰd^hi-*. It is impossible to tell from Gk. *ἴκτινος* 'kite' and Ved. *śyena-* 'large bird of prey' whether the initial cluster of the latter form goes back to simplified **k̑i̯- < *k̑t̯i̯-* or to **k̑t̯i̯-*, i.e., a genuine metathesized thorn cluster followed by **-i̯-*.

inhumation' and derived by him from a hypostasis of the prepositional phrase **en dʰǵʰŏ̃m* 'into the earth'. The cuneiform spelling *in-za-ga-*, according to Melchert, points to a cluster [-ndzg-], with an underlying *TK* sequence realized as *TsK*. This analysis of the form has been disputed; Kloekhorst (2008:861–2) argues that *inzagān* means 'implements, tools'. But whatever the meaning and etymology of the word, the important point is that a Luvian cluster **-dzg-* is in no way inconsistent with the picture presented above. The essence of the "palatal" theory of thorn clusters is that at some point later than the separation of Anatolian and Tocharian from the rest of the family, but earlier than the breakup of the Inner IE languages, clusters of the type *TʲKʲ*, *TʲK*, or *TKʲ* were metathesized to *KTʲ*. Hitt. *ḫartagga-* and Toch. A *tkam* show that there was no metathesis in Anatolian or Tocharian. But phonetic palatalization was presumably earlier than metathesis, and there is no reason why it could not have been many centuries earlier. It is entirely possible, therefore, that underlying *TK* was already realized as *TʲKʲ* or *TʲK* at the moment of the separation of Anatolian from the other languages, and that the Hittite word for 'bear' was, or at one time was, not [ḫartka-], but [ḫartʲka-], with a *-t-* that was already palatal or palatalized. If so, the Pre-Luvian word for 'inhumation', assuming Melchert's etymology to be correct, might equally well have been [indʲgan], with a palatal or palatalized **-dʲ-* that became *-dz-* by a sound change specific to Luvian. A "palatal" explanation of the Luvian affricate would actually be preferable to a *TsK*-based account, as it would explain the *s*-less reflex of *TK* in Hittite.

Our proposed chronology, then, is the following:

1. Undivided PIE: /TK/ possibly realized as [TʲKʲ], [TʲK], or [TKʲ]
2. Pre-Proto-Inner ("Core") IE: /TK/ definitely realized as [TʲKʲ], [TʲK], or [TKʲ]
3. Proto-Inner ("Core") IE: former [TʲKʲ TʲK TKʲ] metathesized to [KTʲ]

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