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The Sanskrit Source
of the Tocharian 4×25-Syllable Meter

DIETER GUNKEL

1   Tocharian meter as an indigenous tradition

Were Tocharian meters influenced by Indic meters, and if so, to what extent? Since the outset of Tocharian studies, the prevalent opinion has been that the Tocharian metrical tradition, which is shared by both Tocharian languages, is independent of the Indian tradition. In Sieg and Siegling's original formulation, "Die tocharische Metrik scheint selbständig dazustehen und nicht der indischen entlehnt zu sein" (1921:x).[1] The supposed independence of the metrical form of Tocharian poetry may seem surprising given that the poetic texts are translations and adaptations of Buddhist Sanskrit originals. Furthermore, the Tocharian Buddhists did adopt the form of narration known as *campū*, in which prose and verse alternate.[2] However, Tibetan shows that it is possible to retain and modify indigenous meters for the translation/adaptation of Sanskrit texts.

   Two distinctive differences between Sanskrit and Tocharian meter are taken to advocate the latter's independence. First, Tocharian meter does not seem to regulate syllable weight. Second, Tocharian verse-internal cola, i.e. the metrical units delimited by caesurae, are only 3–6 syllables long, which is shorter on average than Sanskrit cola, to judge from the traditional metrical treatises. For example, four of the five most common Tocharian meters are matched with respect to verse length in syllables by eight relatively common Sanskrit meters.[3] The average Tocharian colon length is

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   [1] See also Watkins 1999:614 ("There is no obvious external contact source for Tocharian meter, the system of isosyllabic verse lines rigorously divided into even or uneven cola, and organized into four-line stanzas") and Pinault 2000:153 ("Le système de versification, en dépit des termes d'origine indienne, est totalement étranger à celui de la métrique du sanskrit").

   [2] On the Tocharian adoption of *campū*, see Pinault 2008:407.

   [3] "Relatively common" is here defined as belonging both to Velankar's (1949b) "list of metres used for continued narration" and Hahn's (2014) list of "the 25 most frequently used Sanskrit meters." For the cola of the Tocharian meters, which have strophes of 4 verses of 12 syllables ("4×12"), 4×14, 4×15, and 4×17, see Pinault 2008:399; Bross, Gunkel, and Ryan 2014; and Peyrot forthcoming. Velankar (1949a) gives the cola of the Sanskrit comparanda, i.e. the 4×12-syllable *Drutavilambita*, *Pramitākṣarā*, and *Vaṃśastha*, the 4×14 *Vasantatilaka*, the 4×15 *Mālinī*, and the 4×17 *Narkuṭaka*, *Mandākrāntā*, and *Hariṇī*.

4.4 syllables versus 8.9 in Sanskrit.[4] The second difference has emerged more clearly as further caesurae have been identified in various Tocharian meters. Let me briefly illustrate this and introduce the Tocharian 4×25.

2   The Tocharian 4×25

Sieg and Siegling (1921:x–xi) first described the Tocharian meter whose stanza consists of four metrically identical 25-syllable verses/pādas, which they dubbed the "4×25." It is one of the best-attested meters in both Tocharian A and B. In a sample of 3,102 pādas of Tocharian B poetry drawn from *CEToM*, it is the best-attested meter by syllable, making up 17.8% of the sample.[5] Sieg and Siegling identified caesurae ($^|$) after the 5th, 10th, and 18th syllables (σ) of the verse/pāda:

$$\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma$$

According to their description, the pāda consisted of four cola of various lengths, which we can represent shorthand as $5^|5^|8^|7$. Stumpf (1971:71–2) identified two further caesurae after syllables 14 and 22. These are sometimes considered to be "minor" or "secondary" caesurae ($_|$) that divide cola into subcola (e.g. Pinault 2008:398–9), though the diagnostics for their minor status are partly problematic (see below):

$$\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,{}_|\,\sigma\,\sigma\,\sigma\,\sigma\,{}^|\,\sigma\,\sigma\,\sigma\,\sigma\,{}_|\,\sigma\,\sigma\,\sigma = 5^|5^|4_|4^|4_|3$$

Stanza 15 of the story of the nun Sundarī (THT 15 a7–8 + THT 17 a8–b2), from the eighth book (the *Vācavarga*) of the Tocharian B *Udānālaṅkāra*, recently edited with translation and commentary in Hackstein, Habata, and Bross 2014, exemplifies the meter. Pādas are printed on two lines for typographical reasons, caesurae and junctures involving clitics (-, +) are marked, and restorations and emendations are in parentheses and square brackets, respectively. The pāda-final punctuation and the stanza-final numeral are original, in accordance with the Tocharian scribes' usual practice, which facilitates the·identification of the meter in more fragmentary contexts.

> sū temeñ sraukaṃ $^|$ nraine tänmastär $^|$
>> māka lykwarwa $_|$ māka cmela $^|$ māka lkāṣṣäṃ $_|$ läklenta :
> māka pudñäkti $^|$ tsaṅkaṃ śaiṣṣene $^|$
>> ṣärpsentär-ne $_|$ ālyauce+ka $^|$ nraiṣṣe wnolme $_|$ tallāntä :
> spelke sompastär $^|$ krentats sū wnolmets $^|$
>> nāki welñe $_|$ preresa ceu $^|$ aunaṣṣän-me $_|$ arañcne :

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[4]If we disregard "minor" caesurae (§2), the Tocharian average is 5.75.

[5]The ten best attested meters by syllable in the TB sample are 4×25 (17.8%), 4×14 (11.9%), 4×12 with 5+4+3-syllable cola (11.8%), 4×15 (10.9%), 4×17 (9.6%), 4×18 (9.2%), 21/21/18/13 (6.6%), 13/13/13/21 (5.1%), 4×12 with 4+4+4-syllable cola (3.6%), and 14/11/11/11 (3.1%).

aiśamñe spaktā(ṃ) | ślek+ompalskoññe |

cowai ram+no | tärkana[ṃ-m]e | pälskoṣṣana | krentauna 15

[Richtet jemand gegen einen solchen Tadel und Verleumdung, die gegen-standslos ist,] und stirbt dieser deswegen, so wird er in der Hölle wiederge-boren, viele Male, und erlebt viele Wiedergeburten und Leiden. Erheben sich viele Buddhas auf der Welt, so weisen sie einander auf dieses unglückliche Höl-lenwesen hin. Den Eifer raubt ein solcher den guten Wesen. Mit diesem Pfeil des Tadelaussprechens trifft er sie (die Guten) ins Herz. Wissen, religiösen Dienst sowie die Fähigkeit zur geistigen Versenkung (Meditation) raubt er ih-nen gleichsam, und somit die geistigen Güter. (Hackstein, Habata, and Bross 2014:53)

The caesurae are quite strict, as can be seen from Figure 1, which plots the incidence of verse-internal word boundaries in the 4×25. The TB data are based on a corpus of 217 partly fragmentary pādas drawn from seventeen texts.[6] The TA data are based on a smaller corpus of forty non-fragmentary pādas drawn from fifteen texts.[7] Junctures preceding enclitics and following proclitics are not counted as boundaries.[8] The inci-dence of boundaries is predictably similar: a Spearman's rank-order correlation yields a strong, positive correlation (ρ = .89), which is statistically significant (p < .0001).[9] The overlapping error bars also give a sense of how insignificant the differences be-tween the two data sets are.[10] The high incidence of word boundary after syllables 5, 10, 14, 18, and 22 reflect the caesurae.

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[6]PK AS 6E (13 pādas), 7D (3), 7E (24), 7F (23), 7G (25), 7H (6), THT 8 (6), 16 (12), 17 (27), 18 (15), 19 (20), 20 (2), 73 (6), 74 (2), 108 (8), 128 (2), 496 (5).

[7]A 20 (2), 63 (2), 66 (2), 217 (5), 218 (2), 244 (2), 247 (2), 248 (4), 249 (3), 253 (6), 254 (3), 259 (4), 312, 315+316 (3).

[8]Following Bross, Gunkel, and Ryan 2014:6 n. 8 and Koller 2015, I treat the following forms as clitic. Enclitic in TA: *aci* '(starting) from'; the modal particle *aśśi*; the emphatic particles *ats, atsaṃ, atsek*; the comparative particle *oki* 'like'; the negative polarity item *ontaṃ*; the ablative and allative pronouns *anäs* and *anac*; the conjunctions *ṣkam* 'and, also' and *nu* 'and, but'; the disjunction *pat* 'or'; the focus particles *pe* and *penu*; and the relative particle *ne*. Proclitic in TA: the prepositions *ṣla* 'with' and *sne* 'without'. Enclitic in TB: the emphatic particles *ka, nai, nta, pi, ra, tsa*; the comparative particle *ram(t)*; the indefinite pronouns *kca, ksa*; the conjunctions *no* 'and, but', *ṣpä/ṣäp/ṣp/ṣ* 'and, also', *wat* 'or', and *wa* 'therefore'; *ñke* 'now', *tne* 'here(upon)'; and the forms of 'to be' *ṣai/ṣey* and *ste*. Proclitic in TB: the prepositions *ṣle* 'with' and *snai* 'without'.

[9]Running this on the number of boundaries as opposed to the percentages is slightly problematic: the TB data contains fragmentary verses, so the total number of boundaries per metrical position ranges from 149 (most lacunae) to 165 (least lacunae). Nevertheless, this yields similar values (ρ = .89, p < .0001).

[10]These are 95%-confidence Clopper-Pearson intervals for proportions (Clopper and Pearson 1934).

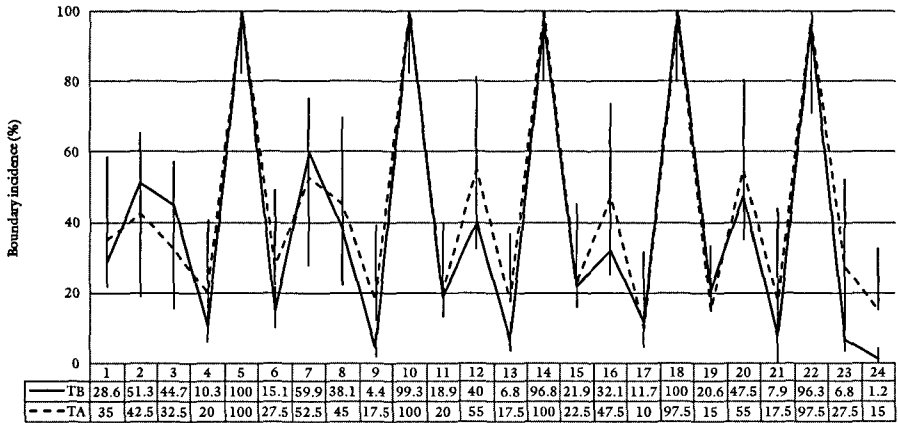|	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
—— TB	28.6	51.3	44.7	10.3	100	15.1	59.9	38.1	4.4	99.3	18.9	40	6.8	96.8	21.9	32.1	11.7	100	20.6	47.5	7.9	96.3	6.8	1.2
- - - TA	35	42.5	32.5	20	100	27.5	52.5	45	17.5	100	20	55	17.5	100	22.5	47.5	10	97.5	15	55	17.5	97.5	27.5	15

Figure 1. Boundary incidence in the Tocharian B and A 4×25.

A case can be made for the minor status of the caesurae after syllables 14 and 22. As discussed by Bross, Gunkel, and Ryan (2014:3–5), the violability of caesurae is currently the only reliable way to distinguish between major and minor caesurae.[11] While the poets realize the caesurae after syllables 14 and 22 at least 96% of the time in both TA and TB 4×25, they are nevertheless violated 6× as frequently as the other, major caesurae, and the difference is statistically significant (Fisher's Exact Test p = .0013).

	Respected	Violated	N
primary (after σ 5, 10, 18)	568 (99.6%)	2 (.4%)	570
secondary (after σ 14, 22)	386 (97%)	12 (3%)	398
		total caesurae = 968	

Caesura violability thus supports their minor status and points to some hierarchical structure (5)(5)(4₁4)(4₁3). In the four Tocharian meters that have been closely studied, all and only the caesurae between 4- and 3-syllable cola are minor as diagnosed by violability (Bross, Gunkel, and Ryan 2014:3–5). The 4×25 provides a further case of (4₁3) and supports the existence of the (4₁4) cola described, for example, in Pinault 2008 and Peyrot forthcoming:

$$4×12: \quad 5 \mid 4_{\mid}3$$
$$4×14: \quad 4_{\mid}3 \mid 4_{\mid}3$$
$$4×15: \quad 4_{\mid}3 \mid 3 \mid 5$$
$$4×18: \quad 4_{\mid}3 \mid 4_{\mid}3 \mid 4$$
$$4×25: \quad 5 \mid 5 \mid 4_{\mid}4 \mid 4_{\mid}3$$

---

[11] Studies of the alignment of syntax and meter are an obvious desideratum.

Comparing prose constituents with the verse cola of the first four meters listed above, Bross, Gunkel, and Ryan (2014) find that there are fewer boundaries than expected in colon- and some verse-penultimate positions, apparently reflecting the avoidance of constituent-final monosyllables. In the more robust TB data plotted in Figure 1, the two points with the lowest boundary incidence are after the 9th (4.4%) and 24th (1.2%) syllables, which may indicate half-verse (h) and verse (v). If so, the constituency of the 4×25 would be

$$(((\sigma\sigma\sigma\sigma) (\sigma\sigma\sigma\sigma))_h (((\sigma\sigma\sigma) (\sigma\sigma\sigma)) ((\sigma\sigma\sigma) (\sigma\sigma)))_h)_v .$$

The motivation for the organization of the cola is not immediately clear.[12] I will argue below that the caesurae are carried over from the *Krauñcapadā*, where their location is clearly motivated.

3   Tocharian meter as influenced by Sanskrit

Having provided the 4×25 with a fuller description, let us return to the scholarship regarding the relationship between Sanskrit and Tocharian meter. Widmer (2006) challenged the independent status of Tocharian meter, pointing out that aside from the non-regulation of weight, most Tocharian meters are structurally like the Sanskrit *samavṛttas*, whose stanzas consist of four metrically identical, isosyllabic verses/pādas (*catuṣpadī*) that are often further articulated by caesurae. Widmer compared the structure of four Sanskrit *samavṛttas* with four Tocharian meters, claiming that they correspond both in syllable count and in the location of the caesurae, which I refer to as the "colometry." Since then, it has become clear that two of the comparisons cannot be upheld, since they are based on a frequently cited but empirically unfounded analysis of the Tocharian 4×15 (Bross, Gunkel, and Ryan 2015). The remaining comparisons are between the Tocharian 4×15 and the Sanskrit *Candrāvartā*, which I cannot discuss here, and the Tocharian 4×25 and the Sanskrit *Krauñcapadā*; note that Widmer cites the colometry of the latter pair as "5|5|8|7," i.e. without reference to Stumpf's (minor) caesurae.

While Widmer's study has had some resonance (cf. Pinault 2008:400–1), the comparisons above have apparently not convinced scholars that the Tocharian meters in question were borrowed/adopted from Sanskrit. I suspect this is because the following two questions have not yet been addressed. First, were the Tocharians familiar with meters like the *Krauñcapadā*, which are described in metrical treatises but rarely or never attested in Sanskrit poetry? Velankar (1949b) gives a sense of just how rare the *Krauñcapadā* is. The author compared the meters listed in ten metrical treatises

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[12]It is possible that the shorter 3-syllable subcolon in the (4,3) units may have a clausular function, marking verse-end in the 4×25 and 4×12, and both half-verse- and verse-end in the 4×14 (cf. the concept of "saliency" in Hayes and MacEachern 1998; Kiparsky 2006; Ollett 2012), but it is not clear whether an analysis along these lines could be extended to the 4×15 and 4×18, let alone the other twenty-five or so Tocharian meters.

with the actual poetic practice in twenty-eight Mahākavis of the ancient and medieval periods and found that of the 600 *samavṛttas* of the *catuṣpadī* (4×*n*) type listed in the treatises, the poets only used only 28 frequently, and another 103 "for a change and ornamentation" (51). The *Krauñcapadā* is not among those 128. And second, why does the 4×25 have two more caesurae than the *Krauñcapadā*? Let us take a closer look at the attestation and structure of the *Krauñcapadā*.

4 The *Krauñcapadā*

The Sanskrit metrical treatises describe the *Krauñcapadā* as a 4×25-syllable meter with a 5|5|8|7 colometry and the following rhythm, beginning with Piṅgala's *Chandaḥśāstra* (7.30):[13]

$$ - \cup \cup - - | - \cup \cup - - | \cup \cup \cup \cup \cup \cup \cup | \cup \cup \cup \cup \cup - $$

Outside the metrical treatises, the *Krauñcapadā* is to my knowledge only attested once, namely in five surviving stanzas of a buddhastotra discovered in the "Rotkuppel-raum" of the Kizil caves (*CEToM*'s "Qizil Miṇ-Öy") during the third German Turfan expedition (1905–7).[14] The stanzas, numbered 6–10 in the manuscript, were edited and translated in 1955 by Schlingloff, who dubbed the stotra *Preis der Bekehrungen Buddhas*.

After the Buddha achieves release (*vimokṣa*) and brings tranquility (*upaśama*) to the good (stanza 6), the poet dedicates a stanza to each of four miraculous conversions, that of the demon Āḍavaka (7), the snake king Apalāla (8), the elephant lord Nālāgiri (9), and the finger-collecting serial killer Aṅgulimāla (10). The conversion of Nālāgiri, depicted here as a rampaging bull elephant in musth, should give a sense of the meter and the quality of the poem. Schlingloff's conjectures and emendations are given in parentheses and square brackets, respectively. I have marked caesurae, clitic-host junctures (+), and compound boundaries (-), which the poet treats as (or much like) word boundaries with respect to caesurae (§5):

> roṣa-vivṛtta-|vyākula-dṛṣṭiḥ |
>   pravisṛta-mada-kaṭa-|viluḍita-vadanaḥ
> śonita-digdh[o] | bhrānta-karāgro |
>   hata-nara-śirasi-ja-|parigata-daśanaḥ |
> yena vinīto | rāja-gṛhe 'sau |
>   mimathiṣur arir+iva | gaja-patir aśivas
> tasya maharṣeḥ | śāsana[m a]gry[am] |
>   vina(yatu) mama mati(m | iha) mati-manasaḥ || 9 ||

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[13]*krauñcapadā bhmau sbhau nau nau ga bhūtendriyavasvṛṣayaḥ.*
[14]On the expeditions, see Fellner 2007.

His eyes were confused and rolled with rage, his face was besmirched by musth-secretion that flowed down from the temples, he was blood-smeared, the tip of his trunk swayed unpredictably, his tusks were garlanded by the hair of dead men—the one who tamed that baleful lord of elephants in Rājagṛha as he was seeking to crush (everything) like an enemy, let the prime teaching of that great sage, whose mind is thoughtful, tame my thinking here.

Regarding the style of the poem, Schlingloff wrote (1955:14):

Obwohl die chronologische Bestimmung unbekannter Werke allein nach stilistischen Gesichtspunkten sehr zweifelhaft ist, wird man doch mit einigem Vorbehalt sagen können, daß die Dichter unserer Hymnen von dem Dichterkreis um Aśvaghoṣa [2nd c. CE] und Mātṛceṭa [pre-4th c. CE] zeitlich nicht sehr entfernt sind.

Since there is no other evidence for the existence of this text, it is impossible to say anything certain about its provenance. It may have been composed in India as early as the 2nd c. CE, transmitted along the Silk Road to Central Asia, and preserved in Kizil. It is not out of the question, however, that a Central Asian Buddhist who studied Sanskrit grammar, meter, and early Buddhist *kāvya* poetry composed the text.[15] The birchbark fragments known as the Turfan *Chandoviciti* (Schlingloff 1958), which contain a collection of Sanskrit verses exemplifying various meters, demonstrate that Buddhists in East Turkestan were studying Sanskrit meter as early as the 4th/5th c. CE.[16] Given the find spot and the fact that the manuscript exhibits the occasional confusion of vowel length and voicing among stops that is typical of Sanskrit texts from the region, e.g. *adavakaṃ* for *āḍavakaṃ* 'Āḷavaka' (7c) and *pannakarājaṃ* for *pannagarājaṃ* 'king of snakes' (8c), it is reasonably likely that the copyist spoke Tocharian, which had neither phonological contrast.[17]

The location of the caesurae in the *Krauñcapadā* is clearly motivated. The caesura after the tenth syllable, which marks the palpable rhythmic transition from the two adonics to the extended stretch of light syllables, divides the pāda into balanced sixteen-mora half-lines. The other two caesurae divide the half-lines into eight-mora quarter-lines. The symmetry suggests the following hierarchical organization:

$$(\, (\, ((- \smile \smile - -)_{8\mu} \, (- \smile \smile - -)_{8\mu})_{16\mu} \, (\, (\smile \smile \smile \smile \smile \smile \smile)_{8\mu} \, (\smile \smile \smile \smile \smile -)_{8\mu})_{16\mu})_{32\mu}$$
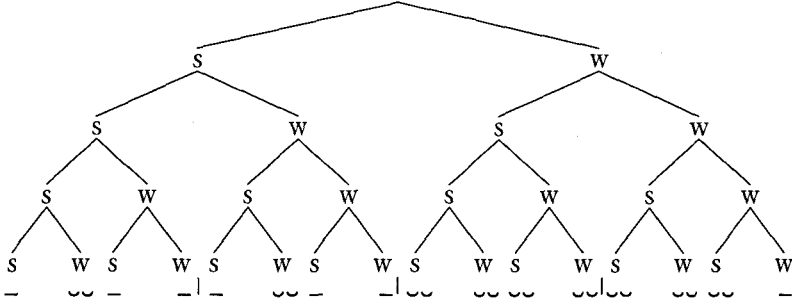
The identity of the first half-line with the *Rukmavatī* meter and the second with the

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[15]On the question of the provenance of stotras attested only in Central Asian manuscripts, see Hartmann 1997:286 n. 9.

[16]For a recent discussion of the nature and dating of the fragments, see Chen 2013.

[17]Wolfgang Krause already suggested to Schlingloff that the confusion among stops could be attributed to a Tocharian scribe (Schlingloff 1955:17 n. 2), and he surely would have suggested the same for the vowels had he thought, as we do now, that Tocharian lacked phonemic vowel length.

Maṇiguṇanikara invites further analysis of the *Krauñcapadā*, along the lines of Deo 2007, as a syzygy of two trochaic tetrameters. The meter is binary and trochaic (i.e. rhythmically Strong-Weak) at every level: each position is bimoraic, each foot contains two such positions, each dipody (=quarter-line) contains two feet, etc.:

```
                        ┌───────────────────────────┐
                        S                           W
                  ┌─────┴─────┐             ┌────────┴────────┐
                  S           W             S                 W
               ┌──┴──┐     ┌──┴──┐       ┌──┴──┐         ┌────┴────┐
               S     W     S     W       S     W         S         W
              / \   / \   / \   / \     / \   / \       / \       / \
             S   W S   W S   W S   W   S   W S   W     S   W     S   W
             ─   ∪∪ ─   _│_ ∪∪ ─   _│∪∪ ∪∪ ∪∪  ∪∪│∪∪  ∪∪ ∪∪      ─
```

If the *Krauñcapadā*, like the 4×25, had caesurae after the 14th and 22nd syllables, they would divide the last two dipodies (quarter-lines) into their constituent feet (eighth-lines).

5 Boundaries in the *Preis der Bekehrungen Buddhas*

Since the metrical treatises do not necessarily reflect the poets' treatment of caesurae exactly,[18] and since the Tocharians may well have learned the *Krauñcapadā* from actual poetic texts such as the *Preis der Bekehrungen Buddhas* (*PdBB*), we should examine the word boundary distribution in that stotra. As noted above, a number of the caesurae coincide with compound boundaries. I have counted compound boundaries between inflectable stems as word boundaries. This conforms to poetic practice and to the prescriptions of the metricians.[19] Note that the use of Schlingloff's emendations and conjectures for the word-boundary distribution is less problematic than it may seem at first glance. For example, in 9b

      śonitadigdh[o] ¦ bhrānta-karāgro

the manuscript reads °*digdhoḥ*. Schlingloff entertains the emendation printed as well as a single compound *śonitadigdha-*¦*bhrānta-karāgro*. With respect to boundaries, the

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[18] Cf. Steiner 1997:244 for regular caesurae in *Anuṣṭubh Vipulās* that are nowhere noted in the treatises.

[19] Steiner (1997:243–7) provides a clear, concise discussion of Halāyudha's definition of caesura (*yati*) in the *Yatyupadeśopaniṣad* as well as a study of what appear to be regular exceptions to that definition in Harṣadeva's poetic practice, e.g. caesura between prefix and stem, explicitly forbidden by Halāyudha. Since the exceptions appear to be less metrically felicitous and may require particular pragmatic motivation in some cases (245), I have not counted them here. I also consider the realization of caesurae before and after vowels fused across compound boundaries to be less felicitious, so I have treated *bhrāntakarāgro* as *bhrānta-karāgro*, as opposed to *bhrānta-karā-gro*, *bhrānta-kar-āgro*, or *bhrānta-kar-ā-gro*. The same holds for *prasphuritauṣṭham* (spanning syllables 6–10 in 7a) and °*mukhāgnim* (8–10 in 8a).

two options are equivalent. In 9d, one may take issue with Schlingloff's conjecture of the akṣaras *miha* and the supposed compound *mati-manasaḥ* 'einsichtig':

> vina(yatu) mama mati(m ¦ iha) mati-manasaḥ

In my view, the parsing of *matiCVCVmatimanasaḥ* as *mati-CVCVmati-manasaḥ* or *matiC VCVmati-manasaḥ* is extremely likely, and the more difficult choice between the printed text and, for example, *mati-CVCVm ati-manasaḥ* makes no difference for the tally. Figure 2 plots the boundary incidence in the TB 4×25 and the *Krauñcapadā*. As above, host-clitic junctures do not count as boundaries.[20]

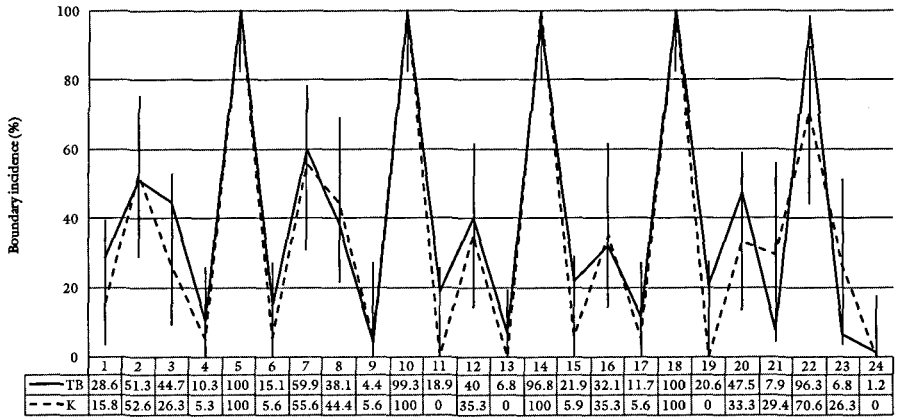|	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
—— TB	28.6	51.3	44.7	10.3	100	15.1	59.9	38.1	4.4	99.3	18.9	40	6.8	96.8	21.9	32.1	11.7	100	20.6	47.5	7.9	96.3	6.8	1.2
- - - K	15.8	52.6	26.3	5.3	100	5.6	55.6	44.4	5.6	100	0	35.3	0	100	5.9	35.3	5.6	100	0	33.3	29.4	70.6	26.3	0

Figure 2. Boundary incidence in the TB 4×25 and the *Krauñcapadā*.

Strikingly, the correlation between the two is virtually as strong as the correlation between the TB and TA data: Spearman's $\rho = .86$, $p < .0001$.[21] The most important fact reflected in the plot is the high boundary incidence after the 14th (100%) and 22nd (70.6%) syllables, which correspond to Stumpf's (minor) caesurae. Thus while the metrical treatises do not prescribe caesurae in those positions, the actual poetic practice of the *PdBB* provides the basis for all five Tocharian caesurae and points to borrowing.

The high boundary incidence after syllables 14 and 22 does not necessarily reflect caesurae in the *Krauñcapadā*. The peaks in the plot there could be "caesurals," by which I mean byproducts of the other caesurae, the rhythm required in that stretch of the meter, the shape of Sanskrit lexical items, and other aspects of the grammar. In order to address the question and by extension the accuracy of the treatises, we would require more poetry composed in *Krauñcapadā* as well as Sanskrit prose passages that

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[20] In practice, these are *aham=iti* 6b, *imam=hi* 6c, *prāpya=ca*, *bhiṣag=iva* 6d, *aham=iha* 7d, *(gha)na[m]=iva* 8a, *tarum=iva* 8b, *yo=hy* 8c, *arir=iva* 9c, *°pa(tir=iva)* 10b, *gaja=iva* 10c, and *nabhasi=ca* 10d.

[21] Running this on the number of boundaries (see the caveat above, n. 9) again yields similar values ($\rho = .85$, $p < .0001$).

happen to have comparable stretches of light syllables. The issue has no consequences for the borrowing scenario: if the Tocharians learned the *Krauñcapadā* from the *PdBB* and/or comparable texts, they had access to the surface form of the meter (boundary distribution), not to its grammar (caesurae).

6   Tune or meter names (*kenes*)

Tocharian metrical passages are preceded by a term in the locative or perlative singular, which is usually set off by double daṇḍas. For example, on the wooden tablet from the Kizil caves recently published by Ogihara (2015), || *apratitulyemne* || precedes TB verses in the 4×25 praising a local monastery. Sieg and Siegling (1921) referred to the terms as meter names. The majority are of Sanskrit origin, but so far, only one of the ca. 150 terms (B *hariṇaplutne*, A *hariṇaplutaṃ*) has been identified with a Sanskrit meter name (Malzahn 2013). Since Winter 1959, the prevalent opinion holds that they do not refer (only) to the meter, but (also) to an aspect of the performance of the poetry, perhaps the tune.[22] Winter's reasons for this were that (1) the same meter is often associated with a number of different terms and (2) occasionally the same term is associated with more than one meter. Furthermore, in archaic texts, the term is occasionally followed by *kene*, the locative singular of TB *kene* (: A *kaṃ*), which may be cognate with Latin *canō* 'sing', Old Irish *canu*, the Hesychius gloss ἠικανός· ὁ ἀλεκτρυών ('dawn-singer', i.e. the cock), etc. and mean 'tune, melody' (Winter 1959, Watkins 1999). To borrow a TB example from Watkins' admirably clear discussion of the *kenes* (1999:602–4), THT 515b4 preserves *niṣkramaṃ kenene*, which Watkins translates "in *niṣkramant-* [Skt. 'departing'] melody" (603).

   Several experts have recently been working on the *kenes* (Malzahn 2013, Peyrot forthcoming), and the results will no doubt elucidate the phenomenon. Here I wish to make one observation. The 4×25 is associated with at least three *kenes* that are common to both TB and TA: TB *apratitulyemne* (: A *apratitulyenaṃ*), *bahudantākne* (: A *bahudantākaṃ*), and *bahuprahārne* (: A *bahuprakāraṃ*), as well as three further *kenes* attested only in TA, *ārśi-lāñcinaṃ*, *watañi-lāntaṃ*, and *ṣeraśi-niṣkramāntaṃ*. I find it striking that the *kene* derived from Sanskrit *apratitulya-*, which apparently means 'not to be compared, incomparable' (cf. *SWTF* s.v.), scans – ᴗ ᴗ – × and thus fits the beginning of the *Krauñcapadā* pāda, as do many Sanskrit meter names including *Krauñcapadā* itself. (The beginning of a popular verse was used as a mnemonic and eventually as the name of the meter.) While the scansion of *apratitulya-* may be accidental, I cannot help but wonder whether a popular *Krauñcapadā* verse that began *apratituly°* was the source of the *kene*. To be sure, this is not the only source of *kenes*. For example, *ārśi-lāñcinaṃ* means either 'in the (tune) of Tocharian A kings' or 'in the Tocharian A (tune) of kings' (Watkins 1999, Peyrot forthcoming). Whether it is one of the sources should be easier to gauge with the results of the studies noted above.

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[22] For a different view, see Widmer 2000:527 n. 20.

7 The borrowing

I would like to suggest the following borrowing scenario with all due caution. An erudite Tocharian Buddhist who studied Sanskrit grammar and meter and had a taste for Buddhist *kāvya* poetry adopted the *Krauñcapadā* for his or her Tocharian compositions.[23] Given the general popularity of buddhastotras in Central Asia, the fact that particular stotras enjoyed local popularity (Hartmann 1997:286–7), and the rarity of the *Krauñcapadā*, the *PdBB* may have been one of the source texts. While the 4×25 is used for buddhastotras, e.g. to translate and adapt Mātṛceta's *Varṇārhavarṇastotra* into TA,[24] the meter is by no means restricted to the genre, nor is it rare. I must assume that (1) the Sanskrit source texts belonged to multiple genres and/or (2) the genre-specificity of the meter was lost as it gained popularity in the Tocharian tradition.

The boundary incidence in the 4×25, specifically the greater violability of the minor caesurae and the apparent bridges after the 9th and 24th syllables, suggest that (s)he not only borrowed the caesurae but also carried over the constituency of the meter, which was perfectly transparent in the weight-regulating *Krauñcapadā*, with its moraically balanced half- and quarter-verses. The fact that the constituency continued to be transmitted is somewhat surprising, since it became opaque when syllable-weight regulation was given up.

$$(\, (\, (- \smile - -)_{8\mu} \, (- \smile \, - -)_{8\mu})_{16\mu} \, (\, (\smile \smile \smile \smile | \smile \smile \smile \smile)_{8\mu} \, (\smile \smile \smile \smile | \smile \smile -)_{8\mu} \,)_{16\mu} \,)_{32\mu}$$
$$(\, (\, (\sigma \, \sigma \, \sigma \, \sigma \, \sigma)_{5\sigma} \, (\sigma \, \sigma \, \sigma \, \sigma \, \sigma)_{5\sigma} \,)_{10\sigma} \, (\, (\sigma\sigma\sigma\sigma | \sigma\sigma\sigma\sigma)_{8\sigma} \, (\sigma\sigma\sigma\sigma | \sigma\sigma\sigma)_{7\sigma} \,)_{15\sigma} \,)_{25\sigma}$$

It is possible that the manner of recitation of the Tocharian 4×25, which is presumably referred to by the *kenes*, facilitated the retention of the constituency.

The reason for giving up weight regulation should probably be sought in Tocharian phonology. While counterexamples exist,[25] Gordon (2006:207) cautiously observes that of the seventeen languages with weight-sensitive metrical traditions in his survey, sixteen have a phonemic distinction in vowel length, and all seventeen treat CVV(C) and CVC syllables as heavy in meter, as in Classical Sanskrit. Furthermore, stress tends to agree with the meter in treating those syllable types as heavy. In contrast to Sanskrit, neither Tocharian language has phonemic vowel length. The stress system of Tocharian A treats non-high vowels as heavy and high vowels as light (Nevins and Plaster 2008). Tocharian B stress is weight-insensitive, but stress assignment in

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[23] This Tocharian may also have considered rare, long, ornate meters to be particularly well-suited for praising the Buddha (cf. Hahn 1987:55). With the exception of the *PdBB*, Hahn's examples are later stotras.

[24] Cf. Hartmann 1987 and Pinault 2008:281–91, both with further references. The latter, together with the following chapter (293–311), provides an insightful exemplification and discussion of issues of Tocharian translation and adaptation of Sanskrit buddhastotras.

[25] The counterexample in Gordon's study is Berber. Paul Kiparsky informs me that Ottoman Turkish, which did not have contrastive vowel length, borrowed the Persian/Urdu quantitative tradition.

certain morphological categories (e.g. class I subjunctives of the type *tékäm-me* 'will touch') and individual lexical items (e.g. *pātär* 'father') point to a similar prehistoric distinction between non-high and high vowels (Malzahn 2010:6–7, 219–20; Jasanoff 2015). I suggest that Tocharian phonology did not make the kinds of distinctions that facilitate the development, borrowing, or retention of quantitative meters.[26]

8 Concluding remarks

Accepting that the *Krauñcapadā* is the source of the 4×25, we can draw several conclusions. First, it speaks for the utility and accuracy of the quantitative corpus-linguistic methods developed for the analysis of Tocharian meter in Bross, Gunkel, and Ryan 2014 and 2015 and applied to the 4×25 here. Second, it shows that even rare Sanskrit meters were candidates for borrowing into Tocharian. Third, the similarity between the 4×25 and other Tocharian meters suggests that the puzzling colometries of Tocharian meter, i.e. the seemingly unmotivated combinations of even and uneven cola, may have arisen via borrowing and the loss of syllable weight regulation.[27] Regarding the last point, however, I wish to stress that it remains possible that an indigenous system with those characteristics was already in place when the Tocharians borrowed the *Krauñcapadā*.

Abbreviations

CEToM = *A Comprehensive Edition of Tocharian Manuscripts*. Accessed 2013–16. http://www.univie.ac.at/tocharian/
SWTF = Bechert, Heinz (ed.). 1994. *Sanskritwörterbuch der buddhistischen Texte aus den Turfanfunden*. Vol. 1: *Vokale*. Göttingen: Vandenhoeck & Ruprecht.

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[26] I say "facilitate" because Old Javanese *kakawin* (9–12 c. CE) shows that poets of a language that probably lacked phonemic vowel length could borrow Sanskrit syllabo-quantitative and mora-counting meters as well as the Sanskrit-type distinction between light and heavy syllables. It is not clear to me whether Old Javanese had a contrast between heavy and light syllables prior to the borrowing, and if so, whether it was different from the Sanskrit-type distinction. I am grateful to Andrew Ollett for pointing this out to me and to Arlo Griffiths for answering a number of questions about Old Javanese. For some basic information about the tradition and its relationship to Sanskrit, see Pollock 2006:387–9.

[27] Mordvin meter, if cognate with Kalevala meter (Kiparsky 2014), provides the closest parallel I am aware of.

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