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The colometry of Tocharian 4×15-syllable verse[1]

Abstract

We identify the basic colometry of Tocharian 4×15-syllable verse as 4+3+3+5 (traditionally 7+8), but we find no support for the putative alternative colometries of 4×15 often cited in the literature (viz. 6+4+5 and 8+7). In rare cases in which the medial caesura is violated, a word boundary after syllable 6 or 8 is highly probable by chance alone, as we confirm through corpus statistics. If the colometry is indeed invariable, one major argument for the influence of Indic on Tocharian meter is undermined. We further reinforce that the medial caesura after syllable 7 is no stronger than the final one after syllable 10, despite their putative statuses as major vs. minor caesurae, respectively. The more complex picture of the metrical practice of the poets demands that we call into question certain proposed restorations.

1. Metrical preliminaries

Tocharian poems are composed of stanzas that can be classified according to how many verses they contain and whether or not those verses are isosyllabic. Most stanzas consist of four verses. Most of those consist of four isosyllabic verses, e.g. 4×12 syllables, 4×14, 4×15, and 4×18. Anisosyllabic four-verse stanzas are not uncommon, e.g. 21/21/18/13, 14/11/11/11, and 20/22/10/15. There is one five-verse stanza, which is anisosyllabic, 13/13/13/13/21, and one fragmentary poem apparently composed in two-verse stanzas, 2×14 (THT 133). The scribes often mark verse-end with a colon (**:**) or a raised dot (**·**), and they number the stanzas.[2]

Caesurae articulate verses into cola. Longer cola are generally assumed to be subdivided into minor cola (e.g. Winter 1959; Malzahn 2012a: 34, 2012b: 154; Adams 2013: 3). For example, there is general agreement that the 4×14 verse, which is usually composed of 4+3+4+3 syllables – we will refer to that as the "basic colometry" – contains two seven-syllable major cola (M), each of which contains two minor cola (m) of four and three syllables (σ):

[1] We wish to thank Hannes Fellner, Olav Hackstein, Bruce Hayes, Theresa Illés, Melanie Malzahn, Angelo Mercado, Peter-Arnold Mumm, and Brent Vine for reading and commenting on this article.

[2] The pioneering discussion of Tocharian versification is Sieg and Siegling (1921: x–xi). For an overview of Tocharian versification and an inventory of stanzas and meters, cf. Stumpf (1971: 71–72), Thomas (1983: 272–276), and Pinault (2008: 399).

(((σσσσ)$_{m}$ (σσσ)$_{m}$)$_{M}$ ((σσσσ)$_{m}$ (σσσ)$_{m}$)$_{M}$)$_{VERSE}$

We will refer to this structure shorthand as [7||7] or [4|3||4|3], marking caesurae between putative major cola (major caesurae) with "||", caesurae between putative minor cola (minor caesurae) with "|", indicating violations of caesurae with a superscript "$^{!}$", and vowel sandhi with "≠", as in the following 4×14 stanza from the *Udānālaṅkāra* (THT 5 a4–6).

[68a] *wñā-neś (po)yśi* | *karuntsa* || *mā tañ ñyātstse* | *śolantse* **:**
[68b] *mā r≠ asānmeṃ* | *laitalñe* || *ceṃ sklok ptārka* | *pälskomeṃ* **:**
[68c] *kos tne ñakta* | *pelaikni* || *(po) śaiṣṣents≠ ā*$^{!}$*naiwacci* **:**
[68d] *tary≠ akṣā-ne* | *pudñäkte* || *teki ktsaitsñe* | *srukalñe 68*
'The omniscient one spoke to him with compassion: "Your life is not in danger,
nor (will you) fall from the throne. Let this doubt go from your mind,
o master, as unpleasant laws hold here for all the world."
The Buddha proclaimed three to him: sickness; old age; and death.'

There is less agreement concerning the colometry of 4×15, despite the fact that it is one of the best-attested verse types in Tocharian. In this contribution, we re-examine its colometry, focusing especially on whether it has built-in colometrical alternatives, and whether there are distinctions between major and minor caesurae in the meter.

2. The corpora

Our corpora of 4×15 are derived from *A Comprehensive Edition of Tocharian Manuscripts* (CEToM). Verses were required to be exactly 15 syllables long. There were no other selectional criteria.[3] Data from fragmentary verses were taken only from non-fragmentary portions of the line. The corpus of 4×15 consists of 242 verses in Tocharian B, and 48 verses in Tocharian A, taken from the following texts.

[3] There are different types of metrical texts in the Tocharian languages: longer, purely metrical texts (*Lehrgedichte*, cf. Winter 1999: 74); short isolated poems; and dramatic texts that alternate between prose and short metrical passages (*campū* genre, cf. Pinault 2008: 407). Although Adams (2003: 9) has suggested otherwise, we assume that there are no significant metrical differences between these types; our findings in section 3 are consistent with this assumption. Likewise, we do not take the "names of tunes" (^{B}*kene*/^{A}*kaṃ*) into account since they apparently don't refer to the meter, but to some aspect of the performance (Winter 1955: 33). All Tocharian B texts in the corpus are classified by CEToM as Classical except for THT 291.a, which is Archaic.

Tocharian B		Tocharian A	
Text	Verses	Text	Verses
PK AS 6A	22	A 56	4
PK AS 6B	24	A 75	4
PK AS 6C	26	A 91	9
PK AS 7H	27	A 92	11
PK AS 7I	36	A 109	4
PK AS 7J	14	A 115	1
THT 28	18	A 315/316	9
THT 29	29	YQ I.6	6
THT 30	39		
THT 291.a	7		

Table 1: Verse corpora.

Studies such as Malzahn (2012b) exemplify how important it is to rule out potential confounds from syntax and other areas of the grammar when studying meter. Malzahn argues convincingly that the distribution of sentential enclitics in metrical texts, which Winter (1959) had attributed to a metrical factor, should be ascribed in the main to the syntax of second position clitics in Tocharian B: of the 205 sentential clitics in her verse corpus, 93% follow the first phonological word in their syntactic clause, just as they do in prose. Since poetic and prose texts in Tocharian B are roughly contemporary and compatible in genre, prose provides an excellent baseline for comparison.[4]

For the comparisons that we conduct in section 3.2, we assembled a 2,107-word corpus consisting of the non-metrical, non-fragmentary passages from the following texts: THT 88, 107, 108, 192, 560; IOL Toch 4, 178, 247–248; PK AS 17 A–D, H–K, 16.2–3. The tests require us to identify intonational constituents (ICs) in the prose corpus. We assume that the following clause- and phrase-level syntactic constituents were mapped to Intonational Phrases (cf. Nespor and Vogel 2007; Selkirk 2011); punctuation after these constituents was apparently optional, but provides some support for their reality.

	Constituents	Examples of punctuation
Clause-level	Statements	THT 88 a1; IOL Toch 247 a5
	Commands	IOL Toch 248 b6
	Questions	THT 88 b3
	Correlative clauses	IOL Toch 4 a5
	Conditional protases	IOL Toch 247 b1
	Temporal and causal clauses	IOL Toch 247 a3

[4] For the use of prose as a baseline for comparison with verse, cf. Watkins (1999). For the method more generally, cf. Ryan (2011) and Hayes (2013) with further references.

	Absolut(iv)e constructions	IOL Toch 178 b8
	Relative protases	IOL Toch 248 a6–b1
	Circumstantial participial clauses	——
	Complement infinitive clauses	——
Phrase-level	Noun phrases in lists	PK AS 16.3 b2–3; THT 108 b4
	Utterance-initial vocatives	THT 107 b1
	Utterance-initial interjections	IOL Toch 247 a5–6

Table 2: ICs in prose.

The following passage (THT 88 a4–5) illustrates our identification of ICs in the prose corpus. Note that the brackets indicate ICs, not restorations.

(tu lyelyakormeṃ) (vṛkṣavāsike ñakte śle māṃtsalyñe śanoś
this see:ABS tree.dwelling god with sorrow wife:ALL
weṣṣäṃ) (lariya) (pālka nai mā-ṣekaṃñe wäntarwats
say:3SG.PRS dea see:SG.IPV PTC impermanence thing:GEN.PL
sparkālye āke)
disappearance end
'Having seen this, the tree-dwelling god says to his wife with sadness:
"Darling, look at the impermanence of things and their ultimate disappearance!"'

Since the way that the poets realize caesurae suggests that they treated sequences of a lexical word followed by a monosyllabic enclitic as a single phonological constituent, we did so as well in all three corpora.[5]

3. The colometry of 4×15

3.1 Word boundary distribution in Tocharian B

The distribution of word boundaries in our Tocharian B 4×15 corpus is given in Figure 1. The numbers along the x-axis of the plot represent verse-internal word-boundaries. The peaks in the plot clearly reflect caesurae after the 4th, 7th, and 10th syllables, and a basic colometry of 4+3+3+5. This is at least partly consistent with the standard analysis [7||8]. As noted by Stumpf (1971: 72 with fn. 10), the number of caesura violations decreases numerically towards verse end. There is a break after 4 in 70.7% of verses, after 7 in 94.2%, and after 10 in 96.8%. The fact that the error bars at 7 and 10 overlap suggests that that difference could be attributed to chance; we return to this in section 3.3.

[5] We took the following clitics into account: *(k)ka*, *kca*, *ksa*, *ñke*, *tne*, *nai*, *no*, *nta*, *pi*, *ra*/*rā*, *ram(t)*, *wa*, *wat*, *ṣpä*/*ṣäp*, *ṣai*/*ṣey*, *(s)ste*, *tsa*.

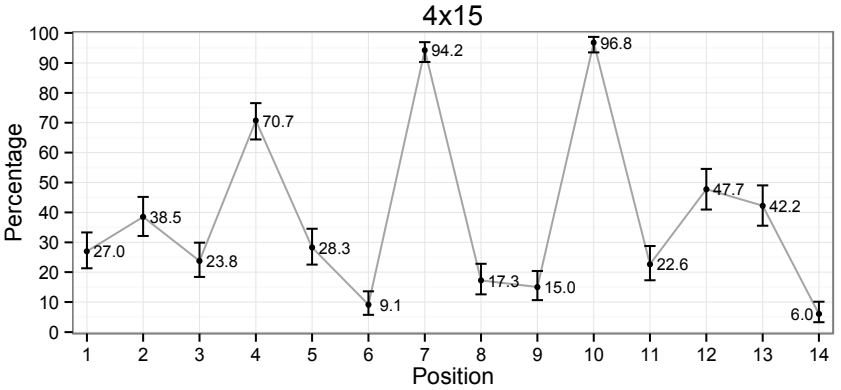

Figure 1: Percentage of verse-internal word boundaries in Tocharian B 4×15. Error bars are 95%-confidence Clopper-Pearson (1934) intervals for proportions.

Stanza 23 of THT 30 (a2–3) is representative of 4×15 meter in Tocharian B. The caesura after 4 is violated once in verse 23c, and the other caesurae are respected. Host-enclitic groups are joined with "-". We discuss the atypical word boundary distribution in stanza 24 (a3–4) in the following section.

[23a] *cets ce$_u$ silñe* | *pälskontse* || *lakle-ṣpä* | *wīkässi poyśi* :
[23b] *toṃ ślokanma* | *wertsyaine* || *ākṣa cets* | *palsko tsārwässiś* ·
[23c] *eṃṣketse ā'ratsiśco* || *yātatsiś* | *astarñeś ṣeko* :
[23d] *serke cmelñe* | *srukalñents=* || *eṃṣketse* | *nautalñe yāmtsi 23*
[24a] *snai keś cmela* | *karsatsiś'co-ṣpä-tne* | *ytārye sā śpālmeṃ* :
[24b] *śaiṣṣe kär(s)au'caisa a'pākärtse* | *yāmusa klyomña* :
[24c] *gaṅkne kekmu* | *mäkte yai'ku nāki* | *ṣesa reṣṣäṃ war* ·
[24d] *samudrämpa* | *taiknesa* || *ytārye sā* | *oktats=* *ākṣusa 24*

'To dispel this mental depression and sorrow of theirs, the omniscient one proclaimed these stanzas in the assembly to comfort their mind:
"For permanent cessation, for continual capacity for purity,
for permanent dispersion of the cycle of birth and death,
and for recognizing the births without number, this superb path
was made manifest by the one who knows the world as the noble one.
Just as water, having reached the Ganges, flows flawlessly together
with the sea, so this eightfold path just proclaimed [leads to immortality]."'

3.2 Supposed alternative colometries

The first three verses of stanza 24 exhibit three violations of the caesura after 7. On the basis of rare verses like these – the caesura after 7 is violated in only 13 verses (5.8%) in our corpus – scholars have supposed that poets composing in 4×15 could choose between two or more alternative colometries. Analyses of 4×15 often cite 8+7 and occasionally also 6+4+5 as alternatives to the 4+3+3+5 colometry.[6] Given how rarely the poets violate the caesura after 7, it is *prima facie* unlikely that either 8+7 or 6+4+5 represented a real compositional alternative for the poets. It is, however, true that where that caesura is violated in our corpus, there is a word boundary in either the preceding position (as in 24b and c) or the following one (as in 24c) in 12 of the 13 cases (92.3%). The question is how likely it is that a word boundary would occur after 6 or 8 by chance alone in those verses.

We can approximate that probability by assembling 15-syllable units from the intonational constituents (ICs) in our prose corpus and excluding cases where there is a word boundary after the 7th syllable. Since enjambment is rare in Tocharian B poetry, or to be more specific, since the poets usually align the beginnings and ends of verses with the beginnings and ends of the units that we identify as ICs in the prose corpus, we require the prose-based units to do the same. The boundary data plotted in Figure 2 are based on a corpus of 100,000 such units that are randomly assembled from prose ICs.[7] The break incidence after 6 and 8 is 54.5% and 51.3%, and there is a boundary in either the preceding or the following position in 84.7% of the lines. This 84.7% is nowhere near significantly different from the 92.3% observed in poetry. A χ^2 goodness of fit test against the estimated 84.7% rate gives $p = .45$. In other words, a difference at least this great would have arisen by chance 45% of the time. We would consider $p < .05$ to be significant.

[6] Cf. e.g. Thomas (1983: 274–275), Widmer (2006: 526), Pinault (2008: 399), and Malzahn (2012b: 154).

[7] This is a Monte Carlo method for gauging probability (Metropolis and Ulam 1949, Robert and Casella 2004, Rubinstein and Kroese 2007).

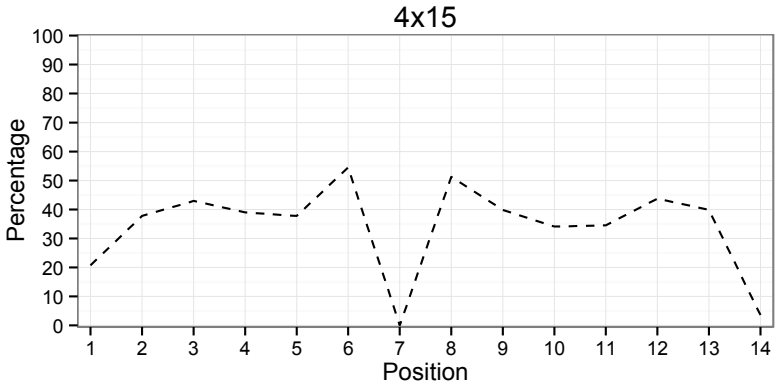

Figure 2: 15-syllable prose units without boundaries after 7.

In order to model the behavior of poets composing 4×15 verses with violations of the caesura after 7 even more closely, we can additionally require the 15-syllable prose-based units to match the word boundary incidence of the verse corpus at the other caesurae, i.e. after the 4th (70.7%) and 10th (96.8%) syllables. These data, plotted in Figure 3, show a word break incidence at 6 and 8 of 57.9% and 51.3%. There is a boundary in either the preceding or the following position in 88.4% of the lines, which again is nowhere near significantly different from the 92.3% observed in poetry: a χ^2 goodness of fit test against the estimated 88.4% rate gives $p = .66$.

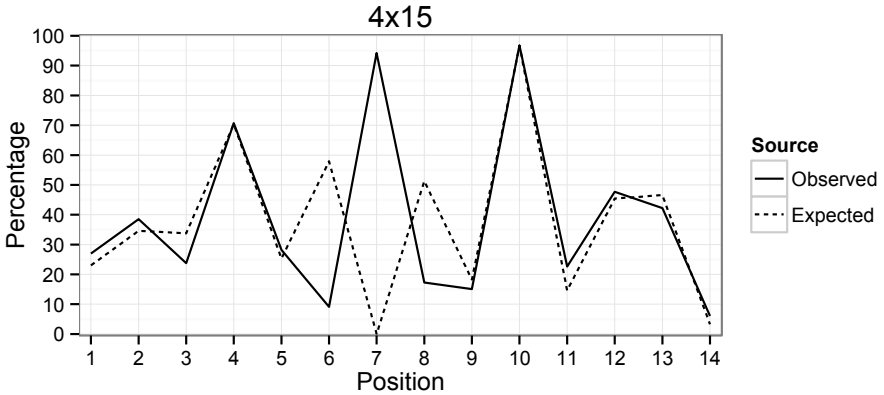

Figure 3: 4×15 vs. 15-syllable prose units without boundaries after 7, matching boundaries after 4 and 10.

In sum, considered in isolation, stanza 24 might seem to be composed in a meter with colometrical alternatives, especially to a scholar familiar with Rigvedic trimeter verse or

the dactylic hexameter.[8] However, upon consideration of a larger corpus of 4×15, there is no support that the meter encoded such alternatives. Consequently, 8+7 and 6+4+5 should no longer be cited as colometrical alternatives for 4×15 in Tocharian B.

3.3 Major vs. minor cola

We now return to the question whether the boundary data in Figure 1, which reflect a 4+3+3+5 colometry, are consistent with the standard analysis [7||8], which would imply [4|3||3|5]. As mentioned above, there is a general consensus that there is a distinction between major and minor cola in Tocharian meter. Von Gabain and Winter (1958: 33–34) and Winter (1959) were the first to propose the distinction. According to them, the minor caesurae are more violable than major ones:

> Wir dürften damit berechtigt sein, neben festen Hauptzäsuren auch Nebenzäsuren anzunehmen, d. h. fakultativ aufhebbare Grenzen zwischen Unterabschnitten innerhalb der Kolen (von Gabain and Winter 1958: 34).

Accepting Malzahn's (2012b) analysis of clitic distribution in verse, caesura violability is to our knowledge the only remaining diagnostic proposed for the distinction between major and minor cola. Assuming a [4|3||3|5] colometry for 4×15, this predicts that the poets violate the putative minor caesurae after 4 and 10 significantly more frequently than the putative major caesura after 7 (cf. Table 3). From the standpoint of violability, the caesura after 10 is clearly not a minor caesura – it is the most strictly respected – but the caesura after 4 seems to be, to judge from the fact that their error bars in Figure 1 do not overlap.

	Violated	Not violated
Caesura after 4	67	162
Caesura after 7	13	212
Caesura after 10	7	211

Table 3: Violations of caesurae after 4, 7, and 10 in Tocharian B 4×15.

We can test the statistical significance of the difference between the caesura after 4 and that after 7 with Fisher's Exact Test of Independence. Those two caesurae are violated a total of 80 times in our corpus, and 67 of those violations occur after 4. Assuming the null hypothesis that the poets treat the caesurae equally, Fisher's Exact Test tells us what the probability is that the violations would be at least this unevenly distributed. The

[8] 15-syllable verses in 20/22/10/15 have the basic colometry 4+4+4+3. This may have contributed to the assumption of an 8+7 alternative for 4×15. However, isosyllabic verses can have different colometries in different meters, e.g. the different 12-syllable verses in the two different 4×12 meters (5+4+3 and 4+4+4) and the different 13- and 21-syllable verses in 13/13/13/13/21 and 21/21/18/13 (Stumpf 1971: 71–72).

probability (p) is less than .0000001, meaning that a difference at least this great would have arisen by chance less than .00001% of the time; the difference is highly significant. The difference between the violability of the caesurae after 7 and 10, however, is not significant. A discrepancy at least as great would have arisen by chance 25% of the time (p = .25). In sum, taking caesura violability to be a diagnostic of the major vs. minor distinction, the colometry of 4×15 is [4|3||3||5].

3.4 Word boundary distribution in Tocharian A

The distribution of word boundaries in our Tocharian A 4×15 corpus is given in Figure 4. The relatively long error bars are due to the smaller and more fragmentary corpus. Nevertheless, the same basic 4+3+3+5 colometry holds in A. The numerical differences between the three caesurae in the two languages can all be attributed to chance (*p* = .39, .37, and 1). As in B, the caesura after 4 is violated more frequently than that after 7 and 10, but the differences are not significant (*p* = .025 and .1) in the smaller A corpus. Given that there is a word boundary after 7 100% of the time, there is no support for alternative colometries in Tocharian A either. This is consistent with, but does not necessitate, Peyrot's recent proposal that "TA has elaborated the TB metrical tradition, but TB is the source" (Peyrot 2013: 6).

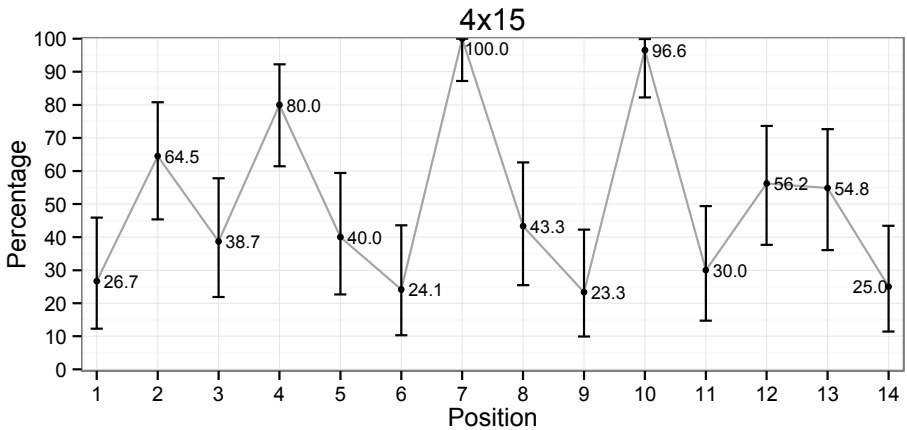

Figure 4: Percentage of verse-internal word boundaries in Tocharian A 4×15.

4. Implications

4.1 Textual restorations

Our findings have obvious implications for the edition of the texts, especially regarding textual restorations. These must respect the metrical practice of the poets, which was far more constrained than the standard analyses of 4×15 suggest. For example, the restorations bolded below are not impossible, but they are highly unlikely from a metrical standpoint, given that the Tocharian B poets violate the caesura after 7 in 4×15 in only 5.8% of the verses in our corpus, and the caesura after 10 in only 3.2% of them.

PK AS 6A b1–2 (restoration proposed by the CEToM editors)

[12c] *a(saṃ)khyai k(a)lˈp(an)masa* || *lalyyau ñ(ä)ś* | *rṣ(ā)käñ= (eṃ)twecc(ek* **:)**
[12d] *(kär)ts(au)ñ(e)nta* | *kraupamar* || ***mā(ka spänˈtaitse)*** *nervānne 12*

PK AS 7J a2–3 (restoration proposed by Sieg 1938: 44–45)

[19a] *śak pärkāwänˈta wässi* || *aiṣṣeñca* | *kälpāṣṣäṃ wnolme* **:**
[19b] *takärṣkäññe* | *erṣeñca* || *mäsketrä* | *kärtse lkātsine* **:**
[19c] *takälñene* ˈ *ṣpä wlaiśke* || *yetse* ***(mäsˈketrä cmelane :)***
[19d] *(ṣmare) yetse* | *täṅwaññe* || *wnolmentse* | *ṣek cpī mäsketrä 19*

THT 30 b1–2 (restoration proposed by Sieg and Siegling 1949: II, 50 fn. 8)[9]

[28d] *keṣe aiksnar* | *wä****(ntoṣ rupˈne swāñcainˈtsa ye)t(se)*** *ysāṣṣe 28*

4.2 Possible influence of Sanskrit meter on Tocharian meter

The absence of evidence for colometrical alternatives also bears on the ongoing discussion of the degree of influence that Indic meter may have had on Tocharian meter. From the advent of Tocharian studies until quite recently, the opinio communis held that Tocharian meter "est totalement étranger à celui de la métrique du sanskrit" (Pinault 2000: 153).[10] Recently, Widmer (2006) called this into question – quite plausibly – on the general grounds that the majority of Tocharian metrical texts are translations and adaptations of Sanskrit originals and "profondément ancré dans l'état d'esprit du monde indien" (ibid: 523).[11] Part of Widmer's specific evidence for Sanskrit influence is based on the following four putative correspondences between Sanskrit and Tocharian meters, which he suggests should not be attributed to chance (ibid: 525–526).

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[9] Thomas (1983: 197) suggests a metrically regular restoration: *keṣe aiksnar wä(ntoṣo swañcaintsa cwi ye)t(se) ysāṣṣe 28*.

[10] Cf. Sieg and Siegling (1921: x) and Watkins (1999: 614).

[11] Note the positive reception of Widmer (2006) in Pinault (2008: 400–401).

Stanza structure	Tocharian verse	Sanskrit verse	Sanskrit meter name
4×25	5+5+8+7	5+5+8+7	*krauñcapadā*
4×15	7+8	7+8	*candrāvartā*
4×15	†8+7	8+7	*maṇiguṇanikarā*
4×15	†8+7	8+7	*mālinī*

It is important to note that the last two correspondences assume the unsupported 8+7 colometrical alternative for Tocharian 4×15 and may thus be discarded. Furthermore, the fact that syllable weight is regulated in Sanskrit verse but not in Tocharian (which apparently had no binary distinction between heavy and light syllables) is not, as Widmer suggests (ibid: 526), the only formal difference between the two metrical systems. In the Tocharian system, word boundary distribution is far more strictly regulated, and the number of cola per verse is higher. Thus, 7+8 should be represented as 4+3+3+5 or [4|3||3||5], and 5+5+8+7 as 5+5+4+4+4+3 (cf. Stumpf 1971: 71). This does not invalidate the general thrust of Widmer's contribution; the topic deserves further investigation.

5. Summary

It emerges from a quantitative corpus-based study of Tocharian 4×15-syllable verse that the basic colometry of the verse is 4+3+3+5. There is no evidence for the alternative colometries 8+7 and 6+4+5 cited in the literature. In Tocharian B, the poets violate the caesura after the 4th syllable significantly more frequently than the caesurae after the 7th and 10th syllables; the numerical difference between the last two can be attributed to chance. Assuming that caesura violability indicates a difference between major (M) and minor (m) cola, the colometry of 4×15 is [4|3||3||5] or

$$(((\sigma\sigma\sigma\sigma)_{m} (\sigma\sigma\sigma)_{m})_{M} (\sigma\sigma\sigma)_{M} (\sigma\sigma\sigma\sigma\sigma)_{M})_{VERSE}.$$

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TOCHARIAN TEXTS IN CONTEXT

INTERNATIONAL CONFERENCE ON TOCHARIAN MANUSCRIPTS AND SILK ROAD CULTURE

held June 26–28, 2013 in Vienna

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Preface

When at the end of the 19th century the ancient Silk Road began to open again, it initiated the rediscovery of forgotten civilizations for the scholarly world. Among the manuscripts that were unearthed in Central Asia, the ones written in the two Tocharian languages led to the foundation of the new field of Tocharian studies and provided linguistics with a new branch of Indo-European. In the same way that the ancient Silk Road cultures were internationally orientated, mutually cooperative, and multilingual, Silk Road Studies and Tocharian Studies have to be interdisciplinary and collaborative.

In order to make Tocharian texts more accessible to the scholarly community and to promote interdisciplinary research, the University of Vienna has been hosting an online edition project of Tocharian manuscripts, which is funded by the Austrian Science Fund (Y 492-G20), since 2011. From June 26 to 28, 2013, the same institutions generously sponsored the International Conference on Tocharian Manuscripts and Silk Road Culture: Tocharian Texts in Context, and they also made the publication of the present volume possible.

This volume collects twenty three conference papers ranging from Tocharian philology and linguistics to studies on Sanskrit, Uyghur, Middle Iranian, historical and archeological research on the region where Tocharian was spoken, and the history of Silk Road Studies and thus exemplifies the wide range of approaches in the field. In view of the diverse disciplines and scholarly traditions represented in the collection, we have not imposed a standardized model of transliteration or style on the papers.

It was in a spirit of international cooperation and mutual understanding, vivid in first millennium Turkestan societies, that Tocharian texts were written down at all, and it was due to the re-establishment of ancient ties that Tocharian texts were rediscovered; so we hope that connecting scholars and ideas in the present volume will lead to a better understanding of the lost Silk Road cultures.

Vienna, June 2015 The editors