Exploration of Residual Tocharian Reduplication

I – Introduction

Reduplication in Tocharian is fairly rare, and is typically associated with its preterite participles, though there are remnants of formerly productive reduplication. Firstly, we will briefly cover the types of reduplication remaining in Tocharian B ("TB"), along with comparative and etymological remarks for Tocharian A ("TA") and Proto-Tocharian ("PT") where necessary. Secondly, we will concisely cover the discussion in the literature about the disappearance of Class II (causative) preterite reduplication in TA. We will then explore possible solutions for some of the surprises others have encountered in this field, such as why the reduplicating vowel for the participles is *e*, which reflects Proto-Indo-European ("PIE") **o*, the etymology of various fossilized traces of reduplication, and curious case of dereduplication in TB. This brief paper is not meant to exhaustively list all instances of reduplication.

II – Overview of reduplication types in Tocharian

i. Reduplication in types of preterite participles

More on the basis of TB paradigms, which show more distinctions here than those of TA, we have traditionally classified Tocharian preterite participles into four groups, classes, or types (cf. Krause & Thomas 1960:156-7, and Adams 1981; Peyrot 2013 prefers the term "class" while Weiss prefers "types"). Reduplication is regularly found only in certain preterite participles in both TA and TB, but they match only asymmetrically.

Unlike in other IE varieties, reduplication follows one formal pattern – a syllable beginning with the same initial as the root, succeeded by a single vowel which is prefixed to the root. As in a similar pattern in Western Armenian or Turkish emphatic reduplication[1], the reduplicant is a root onset with an identical single consonant. Rarely, in cases where there are two consonants in the root onset (three consonant initials are not attested in either variant), TA will always copy the first consonant, and TB will do this most of the time, but not always. All preterite participle to preterite II palatalize the reduplicant- and root-initial consonant, if possible, such as *täla-* 'carry' makes the causative paradigm present IXb *taläskau* 'lift up', preterite II *cālawa* gives the participle *ceclu* /cecəlu/ (Weiss 2019).

Initial *w-* and *y-* roots are slightly unpredictable, as they may have *yai-* as the surface reduplicant, e.g *yät-* 'to decorate' *yaitu* and the causative paradigm of *wätk-* 'to decide' has *yaitku*. which are regular developments of earlier **yeyət-* and **ẃewẃətk-* (Weiss 2019), yet oddly, *yam-* makes unreduplicated *yāmu* and *wäs-* 'to dwell, to pass time' makes *auṣu* and *wäs-* 'to wear clothes' makes *ausu* (Ringe 1989). Peyrot (2013:97) further notes that a complication with initial *w-*, since it is lost before the reduplication vowel *e* in the context of wewə, but is preserved in the participle preterite *wewinaṣṣu** to *wəynask-* 'honor' and the preterite participle *weweñu-* 'to say', and in all forms with *a*-reduplication, such as in participle preterite *wawlāwau* to *wlaw(a)-* 'to

1 Also known as partial reduplication with quasi-fixed segmentism, used in Western Armenian as an intensifier or emphatic form (by which a portion of the base is prefixed to the base with a different consonant than that of the base consonant, such as in *garmir* 'red' → *gas-garmir* 'extremely red', *šidag* 'straight' → *šip-šidag* 'completely straight'), which is likely a morphological phenomenon induced by contact with (Ottoman) Turkish, c.f. *dop* 'full' → *dopdolu* 'chock-full', *beyaz* 'white' → *bembeyaz* 'thoroughly white', *yuvarlak* 'round' → *yusyuvarlak* 'very round', *çıplak* 'naked' → *çırçıplak* or *çırılçıplak* 'stark naked' (Godel 1945, Demir 2018).

control oneself (medio-passive)', from PT **wlāw-* and perhaps hearkening back to PIE **wl-eh$_a$-w*.

Another general oddity as noted by Weiss (2019) is that initial *st-* reduplicates as a unit (*staukka-* 'to swell' → *stastaukkau*, with palatalization *stäm-* 'to stand' → *śceścamu* ~ *śeśśamu*), but *sp-* reduplicates as *p-*, e.g. *spartta-* (*sparttāṃtsa*, etc.)'to turn' → *paspārttau*. A possible explanation here may lie in extrametricality – TB speakers may have considered a sibilant before a labial plosive to be extrametrical, therefore unavailable for other phonological processes such as reduplication – moreover crosslinguistically, *sp-* clusters seem to be quite challenging to acquire (see Figure 3 of Yavaş & Altan (2016) for a comparison of #sC- cluster acquisition, where *sp-* has been experimentally shown to produce the longest-duration epenthetic schwas in L2 English/L1 Turkish speakers compared to other similar sibilant clusters).

1) Type 1

Type 1 is, as mentioned by Weiss (2019), quite uncommon. It is attested for *anaṭ* (ending in a phoneme other than *-a*) roots with internal *ä* – (*+ä* | *–a*) as per Peyrot (2013:120ss)'s notation. These preterite participles do not interest us here as they have no reduplication, just a nominative singular in accented *-u*, and an oblique stem in *-úweṣ(o)*, such as in *lä-n-t-* 'go out', preterite VI *lac*, we get *ltu*[2], *ltuweṣ* 'gone out'. There are a few preterite III which also have preterite participles of this type, e.g. *täṅku* 'hindered', *putku* 'shut' (Melchert 2013), as well as the irregular preterite participle of *i-* 'go', *yku*, *ykuweṣ* which follows this type (Weiss 2019).

2 Noteworthy here is that Kim (2007) points out that the corresponding TA participle shows the variants *lalntu*, *laltu*, and *lantu*, for which he proposes that PT **lət-ə́wə* was remodeled with reduplication as **la-lät-äwä* > *laltu*; this was further remade or influenced with the pres./subj. stem *länt-* as *lalntu* and the consonant cluster was simplified in *lantu*. However, Winter (1994:299, 303) has a different view.

The aforementioned *i-* root shows in *iyā-* ‘to go, to travel, to cause to go’, where TA has *yā-* and TB has *iyā-*, which likely reflects PT **(y)iyā-* (Adams 1999), a reduplicated athematic present like the subjunctive (relegated present) *tättā-* ‘to set, to place’. What is interesting is that the loss of reduplication in TA for both *yā-* and *tā-* is morphologically regular. Adams’s dictionary also suggests an alternative explanation for PT **(y)iyā-* from PIE **yiyeha-* a derivative of **yeha-* ‘to go, to travel’, cognate with Sanskrit *yāti* ‘goes, travels,’ Lithuanian *jóju* (infinitive *jóti*) ‘to ride,’ *jódyti* ‘to ride about,’ and Old Church Slavonic *jadǫ* (*jachati*) ‘to travel’.

2) Type 2

Type 2 is associated with *sāṭ* (ending in final *-a*) roots with internal *ä* (*+ä |+a*). This type is only found with preterite I. It has no reduplication, a nominative singular in *-au -ow(o)* and an oblique in *-oṣ(o)*, and it i*s* accented is on the suffix. It is unclear if this type had any remnants of reduplication during or before the PT era. This is similar to roots with an initial vowel which also show no reduplication; for example, *aks-* ‘announce’, which has the preterite *ākṣa* makes the preterite participle *ākṣu*, *ākṣoṣ*.

However, there is a subclass of Type 2 preterite participles with the reduplication syllable **Cë-* and the stress on the root vowel in the second syllable, such as in the four verbs illustrated in the table below:

Gen	Case	Num	TB	TA	PT	pre-PT
m.	nom.	sg.	yāmu	yāmu	*yám-əwə	*yám-əwə[3]
m.	nom.	pl.	yāmoṣ	yāmuṣ	*yám-oṣə	*yám-əwëṣə
f.	nom.	sg.	yāmusa	yāmus	*yám-əwsa	*yám-əwsa
m.	nom.	sg.	kekamu	kakmu	*kwë-kwəm-əwə	*kwë-kwəm-əwə
m.	nom.	pl.	kekamoṣ	kakmuṣ	*kwë-kwəm-oṣə	*kwë-kwəm-əwëṣë
f.	nom.	sg.	kekamusa	kakmus	*kwë-kwəm-əwsa	*kwë-kwəm-əwsa
m.	nom.	sg.	tetemu	tatmu	*të-tëm-əwə	*të-tëm-əwə
m.	nom.	pl.	tetemoṣ	tatmuṣ	*të-tëm-oṣə	*të-tëm-əwëṣə
f.	nom.	sg.	tetemusa	tatmus	*të-tëm-əwsa	*të-tëm-əwsa
m.	nom.	sg.	nanāku	nānku	*na-nak-əwə	*në-nak-əwə
m.	nom.	pl.	nanākoṣ	nānkuṣ	*na-nak-oṣə	*në-nak-əwëṣə
f.	nom.	sg.	nanākusa	nānkus	*na-nak-əwsa	*në-nak-əwsa

Table 1 (data adapted from Kim 2007)

3) Type 3

Type 3 is associated with *anaṭ* roots with any root internal vowel (X| – *a* in Peyrot 2013's notation). They have reduplication and a nominative singular *-u* and an oblique singular in *-oṣ(o)*, and they are accented on the root syllable. For example *pask-* 'protect' makes *papāṣṣu*, *papāṣṣoṣ* and *klyaus-* 'listen' makes *keklyauṣu*, *keklyauṣoṣ*. This is the shorthand namesake of the preterite I "*klyauṣa* 'heard'-type", which Weiss (2019) defines as bearing palatalization of the root final consonant before *-a*, and preterite I of the "*lyāka* 'saw' type", which has persistent palatalizing *ā* in the root (*ibid*.).

Other common verbs of this type are *pälwa-* 'to complain, to lament' (preterite I *plyāwa*, absolutive perlative *pepälyworsa*, of very uncertain etymology going by Adams (1999) and

3 As explained by Adams (1981:19), the final schwa disappears without a trace if the stress is antepenultimate. However, Peyrot (2008:70) says that since the schwa of the suffix was unaccented in the oblique, it was syncopated, so he reconstructs **kekə́moṣ* > **kekə́mweṣ*; and at this stage, an interconsonantal *we* became *o* in closed syllables, i.e. **CweCC* > *CoCC* or **CweC#* > *CoC#*, thus making **kekə́mweṣ* into *kekə́moṣ*.

Schmidt (1982)), *lu-* ‘rub’ (preterite I *lyawāne*, abs. *lelyuwormeṃ*), *läka-* ‘see’ (preterite I *lyāka*, nominative *lyelyku*, absolutive *lyelyakormeṃ*); *śuwa-* ‘eat’ (preterite I *śāwa*) has nominative *śeśu* but normally and oblique with *-eṣ* (with an absolutive *śeśuwermeṃ*) – *śeśwormeṃ* is a hapax). It is the only form for preterite II and is regular for preterite III, IV, V and VII (Weiss 2019).

Kim (2007) remarks that for TA, the classification is not as neat, given that TA preterite participles may (synchronically) be divided into two groups, those with uniform stem vowel *-u-* and those with uniform *-o-*; the former corresponds to Krause and Thomas’s Classes II and IV, the latter to Class III. Kim later states that even though we do not know much about TA accentuation, it appears plausible that stress position played a role in this bifurcation

4) Type 4

Type 4 is associated with *sāṭ* roots in internal *a* (*+a|+a*) which form preterite I. These participles are reduplicated and have a nominative singular in *-au* and an oblique singular in *-aṣ*. e.g., *tatākau*, *tatākaṣ* ‘been’. Kim (2007) mentions that Classes I and II are associated with consonant-final verb roots, i.e. TB /*-a-*/, TA *-ā*/-a- (< PT *-a-) and that a few Class II participles occur only in TB, mostly to roots of the shape PT **Cəw-*: *śeśu* ‘(having) eaten’ to /śəw(a)-/ ‘eat’, and unreduplicated *ltu* ‘having gone out’ to /lət-/ ‘go out’. Other examples given by Kim (2007) include **keku* ‘(having) poured’, **reru* ‘having roared’ (absolutive *kekuwer*, rerūwer-meṃ) to /kəw-/ ‘pour’, /rəw-/ ‘to roar’, and *plätku* ‘arisen, overflowing’ to /plətk-/ ‘to arise, to overflow’.

The reduplicating syllable, when present, has the shape *Ce*-, unless it has undergone *a*-umlaut when the root syllable has *a*-vocalism in which case the reduplicating syllable surfaces as *Ca*-, as in e.g. *tatākau*. Exceptional is *sosoyu, soyäṣṣasta, soyäṣṣa*, etc. 'satiated' from *soy*- 'to satisfy oneself, to be satisfied'.

ii. Fossilized relics

As for nouns that have fossilized remains of reduplicated stems, they seem to be rare – at least compared to other Indo-European languages, there are not many nouns that have maintained traces of reduplication. We have *kokale* 'cart, wagon, chariot' along with all its derivatives from PIE *$k^{w}ek^{w}ló$, already a reduplicated derivative of *$k^{w}el$-; *ckācko* 'leg, shin, calf, (perhaps) thigh' is suggested by van Windekens to have a reduplicated formation as seen in *pyāpyo* 'flower'[4], though Adams (1999) takes this assumption to be semantically excellent but phonologically "both surprising and *ad hoc*".

The most obvious example is perhaps *säsuwa* 'sons', which has irregular cases (*soy*, *seyi*, *soy*/*saiwi*? in the singular and *säsuwa*, *säsuwaṃts*, *säsuwa* in the plural). The TA *se* suggests that the PT form should be **soy*, but TA *seyo* (genitive) suggests that the PT form should be **seyew*; ignoring the -*i* (TB)/-*o* (TA) endings. But more importantly here is how TB ended up with a reduplicated form as the standard expression – van Windekens (1976) attributes this to a Prakrit borrowing *sisu*/*susu* 'lad, young one, boy', but Adams (1999) believes Winter (1985)'s proposal far more that *säsuwa,* along with its derivatives *säsuwerṣṣe* 'pertaining to children' and

4 Here, we have TA *pyāpi* and TB *pyāpyo* reflecting PT **pyāpyā(-iän)*- (where **-iän*-, according to Adams (1999), reflects the PIE "definitizing" suffix *-h_1*en*-) which probably reflects a (reduplicated) PIE **p(e)yeha*.

säsuwerśke ‘dear son’, reflect an old reduplicating preterite participle from *$seuh_x$- ‘to give birth’ (a bonus for this explanation is that the neuter singular *$susuh_xus$ could also explain *$säsū$ + (pl.)$ā$ for free).

The noun piśpik ‘(woman’s) breast, nipple’, of unclear etymology, may be a good candidate for a reduplicated formation based on a putative PIE *$peikipeiki$-, the simple form of which may be found in Latin *spīca*/*spīcus* ‘ear of grain,’ Old English *spīc* ‘pointed piece of land’ and *spāca* ‘spoke, ray,’ and Old Norse *spīkr* ‘nail’ from which we ultimately get English *spike*. Adams (1999) posits that if this etymology is true, TB *ṣpikīye* ‘crutch’ may share the same root.

The word *ykāssäññe* ‘sexual pleasure, concupiscence’ (and its variant which has conflated abstract verbal -*lñe* in *ykässälñe*), according to Adams (1999) must be based on an older (perhaps defunct but reconstructible) adjective *$ykässe$, possible ‘concupiscent’ or ‘shameful’ (Pinault, 1988), itself built upon a still older (PT-era or older?) noun */$yäkā$-/ or */$īkā$-/ (cf. *ymassu*/*īme* or *ykenta*/*īke*), which in turn would mean that the PT word should derive from a deverbative PIE noun, *$h_xih_xiǵ^h$-eha-, from a reduplicated *$h_xih_xiǵ^h$-e/o- (cf. Sanskrit *īhate*), probably from PIE *$h_xiǵ^h$-l (Avestan *iziieiti* ‘to desire’, Classical Armenian *ilj* ‘desire, wish’ by metathesis)

Perhaps the strangest instance of reduplication is a TB derivative, an expressive reduplication, *ktakät* ‘finger gesture, spreading of the fingers’, likely stemming from PIE *$k^wetu̯ór$ ‘four’ (Blažek 2001), perhaps later meaning ‘span’ or ‘stretched fingers’ based on the Lithuanian verbs *kėsti* ‘to expand, to stretch’ and *kėtoti* ‘to place apart, to deploy, to expand the hand’. One last “expressive reduplication” is suggested by Melchert (by personal correspondence

to Adams, 1999) for *perpette* ‘burden, load’, which may have been **per-per-te* with subsequent assimilation of **-rt-* to **-tt-*.

There are only a handful of reduplicated adjectives – most partially, one fully. The adjective *päp* (*päpaṃ,* etc.) ~ *pup-* (*pupañ, pupaṃ,* etc.), ‘foul, evil-smelling’, of unclear etymology, is suggested by Winter (mentioned by Adams (1999), “Winter (1976:396)” citation likely a typo) to be a reduplication of PIE **peu(hx)-* ‘foul, stink’, the simplex of which is antonymous ‘pure, to be clean’. We also have *yulyke* ‘clever, crafty, cunning’, which Isebaert (1980) suggests a PIE preform **we-wl-eko-*, a reduplicated derivative of **wel-* ‘to turn, to twist’, which sounds plausible.

The TB first person singular pronoun *ñaś* (TA has a very unusual feature given that it distinguishes a masculine and feminine first person singular pronoun, as *näṣ* (m.) and *ñuk* (f.) (Fortson 2011)) likely had a circuitous journey through time – if we take pre-PT *mene-*, we can say that this should have derived from the reduplicated PIE accusative **méme* (from **me* or **mé*, Cogwill 1965:170). Though we see evidence of the fully reduplicated form only in Indic (Sanskrit *máma*), we can still see a dissimilated form in Avestan *mana* and a dissimilatory loss in both Latin *meus* and Greek ἐμός (gen.) and ἐμή (acc.). For Tocharian, we can posit **méme* > loss of the unstressed vowel **mne* > **m(ä)ñä* > **mñä* > **ñä*, with the final *ś* being a remnant of the genitive ending *-i* (< PIE **-eis*) by applying the Tocharian-Greek-Germanic equation by Schmidt (1978), an idea which goes back at least as far as Kronasser (1956).

Lastly, for adverbs, we have *ololyesa* ‘even more’, which may be related (by reduplication) to *olya* ‘more’ according to Adams (1999), and Weiss (2019) also posits the adverb *preke* ‘at all times’, as a distributive reduplication (there may a similar phenomenon in Hittite, c.f. Dempsey 2015). The fully reduplicated adverb and undeclinable adjective *pälyca-pälyc* ‘fleeting(ly) is again of uncertain etymology; van Windekens (1944:136-7) proposes a connection with *plutk-* ‘to rise up’, which originally meant ‘to fly’, and Adams (1999) prefers a more direct connection to just the root *plu-* ‘fly’.

III – Disappearance of Causative Preterite Reduplication in TB

Class II (causative) preterites are reduplicated in TA, commonly known as the regular way of creating “causative” preterites (whereas TB uses preterites with just a palatalizing internal *a* to make them, TA has a reduplicated form in its corresponding Class II, such as TA *cacäl* vs. TB *cāla* ‘lifted’ ← *täla-* ‘to lift’; *käl-* ‘to endure’ shows preterite *kakäl*, TA *wawik*:, TB *yaika* ‘removed’ ← *wik-* ‘to disappear’ (Weiss 2019)), but TB has eliminated reduplication even here. Exactly how this happened is still very much under discussion – the origins[5] of this class of causatives is still under some level of debate in TA[6], with some saying that this is possibly reflecting the PIE reduplicated aorist. Kim (2007) also notes that **äw* = *[u], which seems to cause weakening in two important categories of forms, preterite participles in *-u* and verbal

5 Weiss (2019) mentions that under the fixed accent characteristic of this type, surfaces as ā; also regarding its origin as “is one of the most controversial questions about the Tocharian verbal system. The corresponding formation in Tocharian A is reduplicated and for this reason scholars since Wilhelm Schulze have tried to explain the Tocharian B preterite II as continuing in some fashion an original reduplicated form, but this is not the only solution” (p. 183).

6 For TB, Krause & Slocum (2020) suggests that PIE long *ē* found its way into TB (possibly from the long vowel as found in Latin *lēgi*, *fēci*, etc.).

nouns in *-une* (thus in TA reduplicated preterite participles to verbal roots in *ā* (< pre-TA **ā* < PT **a*) or *a* (< pre-TA **a* < PT **ë, *e, *o*), the root vowel in the second syllable is always *-Ø- ~ -ä-*.

For TA, however it ultimately came about, Peyrot (2013) explains that despite co-occurring with initial palatalization, reduplication nevertheless carried a heavy functional load, "since the corresponding non-causative, unreduplicated preterite may have initial palatalization too" (p. 91), which meant that there were a good number of minimal pairs such as *śaśärs* to *śärs* 'to let know', *lyalymā-ṃ* to *läm* vs. *lymā-ṃ* 'to cause to place'.

Though there have been synchronic empirical/statistical studies attempting to quantify the concept of functional load in a language's phonology (for instance, see Surendran & Nigoyi 2003) as this is a very active subfield of study experimentally, it remains difficult to quantify such a concept for a dead language – nevertheless, it would be sound to claim that an element with a heavier functional load in the grammatical structure might persist, while those with a lighter functional load disappeared or became optional (Dorian 1977). This seems to be at play here, and may be our best explanation for the motivation behind this loss in TB.

IV – Surprises

i – Reduplicating participle vowel e *reflects PIE* *o

For TA, in the context of explaining that one can predict which reduplication vowel (/a/ or /ā/) will surface based on the underlying root vowel, Peyrot (2013) only mentions in passing

in a footnote (FN 110) that "except for some roots with *ā*-reduplication and a root vowel *e* or *o*, and some roots beginning with a vowel or one of the glides *y* and *w*". Yet this does not explain the bigger mystery here for TB – why is the reduplicating vowel for the participles *e*, which reflects PIE **o*? Willi (2018) says that a true "PIE *o*-reduplication would be unheard of", yet the distribution found in TB points to a reduplication vowel of PT **æ*, which is the regular descendant of PIE **-o*[7]- or **-ē-*.

Willi (2018, FN67) also points that that Ringe (1990:223-6) uses **-ë-* for the PT descendant of PIE **-o-* but **-e-* for PIE **-ē-*, and though he seems to accept this, he notes that others do not accept Ringe's line of reasoning that **-ë-* and **-e-* behave differently in labial environments, and that for this reason other authors note (e.g. Kümmel 2009) both as PT **-æ-*.

A plausible explanation for an apparent *o*-reduplication, according to Willi (2018:99), is that this could (or should) have arisen in PT by assimilation to an identical vowel in the proceeding syllable, and he gives Latin *memordī* 'bit' → *momordī* as a possible parallel development. If this were true, only a reduplicated formation with *o*-vocalism in the root could be the correct trigger, though Willi gets around this barrier by suggesting that if *o*-reduplication had become established during the PT (or perhaps pre-PT) era, there may have been a generalization from there to any other reduplicated formation (e.g. the reduplicated aorist), and secondly, that perhaps the TA causative preterite reduplicated vowel need not be identical to that

7 PIE short *o, including *h_3e > *o, results in PT *æ; Krause [not the famous old timer Krause] & Slocum (2020) give as an example PIE **so* > PT **sæ* > TA *sa-* TB *se*, but note that in TB, PIE **mózgo-* 'knot' becomes PT **mæskæ* > TB *meske* 'joint'; but the development in TA shows an example of the insertion of epenthetic *-ä-* to break up a cluster: PT **mæskæ* > pre-TA **mask(a)* > TA *masäk*. In some instances PIE **o* remains PT **o*, but this generally results from assimilation of the normal result PT **æ* to a following PT **u* or **o* < PIE **ō* or **ā* (umlaut), for example, PIE **(d)oru* > PT **æru* > PT **or(u)* > TA & TB *or* 'wood'.

of the preterite participles in TA/TB. For such a scenario, he proposes as a possibility that the reduplication pattern here could have been *$(h_1)Ce$-h_1C- > *$C\bar{e}C$- and that PT *-*æ*- < PIE *-*ē*- could have replaced PT *-*ä*- (< PIE *-e-) afterwards in other contexts because of the phonetic similarity with PT *-*æ*- < *-o- in the participial reduplication.

An additional positive outcome of this option is that, according to Willi, such a development could even help to explain the widespread palatalization in root-initial consonants (which, as we saw, are extant in both participles and causative preterites). In attempting to give a more detailed explanation of the fate of PIE *$\bar{e}$, Krause & Slocum (2020) explain that this vowel developed an onglide which results in initial *#*y*- or palatalization of the preceding consonant in PT, though depending on the vocalism of the underlying vowel, *-*ē*- gives PT *-*æ*-, which is the reflex of PIE *o > PT *æ; thus PIE *$\bar{e}$ and *o only distinguish themselves in PT by the presence or absence, respectively, of preceding palatalization.

ii – -pe-reduplication

Weiss (2019) gives us *pläṅka*- 'to sell', with its 2nd person imperfective *peplyaṅke* or past participle *peplyaṅku* and notes that the *pe*- is not the imperative particle here, rather verbs beginning with *p*- do not take the particle but take a reduplication.

Other verbs which follow this pattern of reduplicating their p-initial syllable is *prutk*- 'to be stopped, to be confined, to be shut out', which becomes *peprutku*; *pränk* 'to stay away, to restrain oneself' becomes *pepränko*, the middle (hybrid transitive-intranstive) verb *päk*- 'to

become ready for eating, to cook, to make ready for eating, etc.' becomes *pepäkṣu-/päpeku-/pepakṣormeṃ; pärk-* 'to ask, to question' (cognate with Armenian harcanel) becomes *pepärku/pepärkormeṃ; pälk-* 'to burn' becomes *pepälyku; pälw-* 'to complain, to bewail one's fate' becomes *pepälywu* from which we also have the noun for 'complaint' *pepälywor*, *pils-* 'to stretch, to strain (one's ears)' becomes *pepilso; putk-* 'to divide, to share, to separate' becomes *pepputku*, which shows an interesting case of plosive assimilation; and the verbal root *pyutk-* 'to establish, to bring into being, to create' becomes *pepyutko*.

iii – Dereduplication in TB

Weiss (2019) mentions but one case of dereduplication in his textbook – that of *tākow*, a dereduplicated or metrically shortened form of *tatākau/tatākow* (later spelling) 'has become'. We also see the curious case of TB *tättā/tattaṃ-* (Kim 2018) and dereduplicated TA *tā-* from PT **tättā-* (reflects a reduplicated present with a generalized zero-grade) from PIE **dhidh(e)h₁-*, where we also get Greek τίθημι 'to put, to place,' Sanskrit (with analogical vowel in reduplicated syllable) *dádhāti* 'puts, places,' which Adams (1999) thinks is probably the derived Hittite *tittiya-* 'to insert, to create a city,' *tittanu-* 'to adjust, to sit down, to insert' (as an aside, Adams comments that the *-tt-* in these two Hittite verbs is something of a problem as one would expect **-t-*), and the possibly reduplicated Lycian infinitive *ttãne* 'to put, to place', with the unreduplicated variant being *tãne-*. The Hittite and Lycian examples at least show that the possible fate of the original PIE reduplicated form.

The root *mi-* (from PIE **mei* 'exchange') 'to befool' may be a possible dereduplication candidate, from /memyā/. The TA athematic present of *säl-* 'to throw off, to let fall, to drop', also the same in TB, might be the equivalent (Adams, 1999) of the Sanskrit reduplicated athematic present with somewhat regular loss of reduplication

Malzahn (2010) agrees in essence with Kim (2003) in his heavily modified proposal of Schulze's take on preterite II verbs, in that we start with inherited PIE reduplicated stems with the shape **CeCe(R)C-* or **Ci-Ce(R)C-,* and contra Harðarson (1997), Kim claims that such structures could have resulted in preterite II forms by assuming that during the PT era, these reduplicated preterites first developed root allomorphs of the PT **-Cæ(R)C-* in the active plural forms, then became generalized to root-initial palatalization through the whole active paradigm, and finally generalized the root allomorph of the active plural forms. Thus Malzahn prefers this explanation by inter-paradigmatic analogy rather than intra-paradigmatic analogy.

In a detailed article defending the bottom-up approach to Tocharian causatives (as opposed to the top-down approach of having derived from PIE reduplicated imperfects of the **(e)-ǵi-ǵenh₁-t*/**(e)-ǵi-ǵn̥h₁-ent*-type, which later became pre-PT **CiCe(R)C-*/**Ci-C(R̥)C-*), Malzahn (2016) states that reconstructing presents of this top-down approach for pre-PT seems at first glance to gain some support from other Tocharian material, namely:

> […] from some forms belonging to Tocharian morphological categories affiliated specifically with preterite Class II such as the TA/TB Imperative II and the TB Class IXb presents and subjunctives. Those imperatives (such as TB pitka, TA *putäk* < **pä-w'ätkā*

from *wätk(ā)*- ‘decide’, Kaus. ‘command’) and even some so-called privatives such as TB eṣpirtacce ‘un-turned’ from *spārtt(ā)*- ‘turn’ belonging with Class IXb formations made from this root such as *ṣparttaṣṣäṃ* (e.g. in THT 30 b8; see Malzahn 2010: 449 451), thereby presupposing a pre-TB subjunctive stem **ṣpärttā*- (see Malzahn 2010: 454–456) attest to (possibly dereduplicated) verbal stems of the PT shape **C_1’äC_2*-. (*ibid*., 392-93)

She then explains her “*tēzzi*” principle[8], which can neatly explain the present > subjunctive stem PT **śä-śärsā*- presupposed by Class IXb *śarsaṣṣäle*, with a new present stem **śärs-ā*- which was formed on the basis of a preterite stem PT **śärs-ā*-, which then underwent secondary reduplication by **C’ä*- (*ibid*., 397-98).

On the basis that at some stage of the development that “followed the analogical dereduplication of the Class III preterites that had started out as reduplicated perfect,” Malzahn (2010:313) asserts that all former present verbs that had been built from preterites via the *tēzzi* principle were still felt “to be based on synchronically unreduplicated preterites, acquired analogical reduplication,”(*ibid*.) to wit, on the model of the presents that later turned into the ablauting kind of Subjective I class, and which had been exactly based on former perfect paradigms, were still reduplicated and showing pre-PT **o*/zero ablaut.

8 However, Pooth (2015) disagrees with the premise and even existence of such a principle, and warns in a tripartite fashion that 1) “a “backformation” of Proto-Anatolian present forms from “PIE root aorist” contradicts the most plausible diachronic typological scenario; we would not be able to understand the existence of IE distinction of root aorists vs. root presents in the given form at all”; 2) “from a typological background this idea is quite implausible — iff [sic] the “primary endings” *-ti go back to locative-marked progressives (which is highly likely both for form and function)”; and, 3) “this idea should not be used as “a principle” any longer, because it is obviously just a by-product of a mistaken “Graeco-Aryan” backprojection”.

As for case involving a zero-grade preterite I ending in suffixal pre-PT *-*ā*, Kim (2003:225ss, FN75), the *tēzzi* principle is able to generate and explain present and subjunctive stems from such preterites based on the PT *$C_1äC_2\acute{a}$- → *$C_1äC_2\acute{a}$-*sk* pattern without any trace of a reduplicated syllable whatsoever.

There may be quite a few more cases of dereduplication, but proposing etymologies on this basis can be fraught with difficulty. To give one example outside of Tocharian, on the question of whether the imperfective Classical Armenian *dne-l* 'to place, to put' goes back to Proto-Armenian imperfective *$dē$-*ne*-, which replaced the PIE reduplicated stem *d^heh_1-, Kocharov (2019) speculates that in theory, one may reconstruct a more complicated scenario, according to which the PIE reduplicated stem first underwent dereduplication yielding the imperfective root stem and then was extended by the nasal suffix. Though as he points out, this scenario requires a stage when both imperfective and perfective stems were "non-characteri[z]ed" or indistinct. Occam's razor would lead one to support a more economy-minded view that the contrast between the imperfective and perfective stems of this verb had been continually maintained, and the loss of reduplication was repaired by means of a competing imperfective nasal stem.

V – Conclusion

To conclude, we hope that we have been able to sketch a rough typology of reduplication as both a productive process (at least in a limited way) in Tocharian and as an unproductive relic of a distant past, containing perhaps several layers in this proverbial time-slice, each with

additional (morpho-)phonological phenomena, the details of most of which are now lost to us, that wore out previously productive reduplicative processes save for one in TB. As for why reduplication in causatives survived in TA but did not in TB, psycholinguistic experiments on functional load may help shed light on the durability of high-functional load units (though we have yet to see an experiment involving suffixal compared to palatalization as functional load-bearing units) and such results may be key to explaining this surviving feature of TA. As for the seemingly dissimilar Class II preterites of the two Tocharian daughter languages, it is surprising that both may have stemmed from a single reduplicated PT ancestor (Kim 2003:226). It remains unclear what the precise origin of the *pe*-reduplication is, the exact cause of dereduplication in the instances we have seen, and it remains nebulous what ultimately happened with the reduplicating participle vowel *e* reflecting PIE **o*, though computational models and advances in theoretical phonology in the future may help us come up with a better idea of their diachronic development.

VI – References

Adams D. Q. (1981) The Pre-History of Tocharian Preterite Participles. In *Bono Homini Donum: Essays in Historical Linguistics in Memory of J. Alexander Kerns*, eds Arbeitman Y. L. & Bomhard A. R., Amsterdam: John Benjamins Publishing.

Adams D. Q. (1999) A dictionary of Tocharian B. *Leiden Studies in Indo-European*, 10, xxxiv.

Blažek, V. (2001). Tocharian AB kät-" to scatter", its derivatives and relatives. *Indogermanische Forschungen*, 106(1), 81-83.

Cowgill, W (1965). Evidence in Greek. In *Evidence for Laryngeals*, ed. Winter W. The Hague: Mouton & Co., 142-180.

Demir, N. (2018). Turkish reduplicative adjectives and adverbs. *Proceedings of the Linguistic Society of America*, 3(1), 19-1.

Dempsey, T. R. (2015). Verbal reduplication in Anatolian, Doctoral dissertation, University of California at Los Angeles.

Dorian, N. C. (1977). A hierarchy of morphophonemic decay in Scottish Gaelic language death: the differential failure of lenition. *Word*, 28(1-2), 96-109.

Fortson IV, B. W. (2011). *Indo-European Language and Culture: An Introduction (Vol. 30)*. John Wiley & Sons.

Godel, R. (1945). Formes et emplois du redoublement en turc et en arménien moderne. *Cahiers Ferdinand de Saussure*, (5), 5-16.

Harðarson, J. A. (1997). Bemerkungen zum reduplizierten Präteritum II im Tocharischen und zum Kausativaorist im Altindischen. In *Sound law and analogy. Papers in honor of Robert S.P. Beekes on the occasion of his 60th birthday*, ed. Lubotsky A., 95–102. Leiden Studies in Indo-European 9. Amsterdam/Atlanta: Rodopi.

Isebaert, L. (1980). De Indo-Iraanse bestanddelen in de Tocharische woordenschat. Vraagstukken van fonische productinterferentie, met bijzondere aandacht voor de Indo-Iraanse diafonen a, ā. Universiteit Leuven, doctoral dissertation.

Jasanoff, J. H. (2013). The Tocharian Subjunctive and Preterite in *-a-. In *Multi Nominis Grammaticus: Studies in Classical and Indo-European Linguistics in Honor of Alan J. Nussbaum, on the Occasion of His Sixty-Fifth Birthday*, ed. Cooper, A. I., Rau J. & Weiss M., 105-120. Ann Arbor, MI: Beech Stave Press.

Kim, R. I. (2001). Tocharian B *śem* ≈ Latin *vēnit*? Szemerényi's Law and *$\bar{e}$ in PIE Root Aorists, *Münchener Studien zur Sprachwissenschaft,* 61, 119-147.

Kim, R. I. (2003). Uncovering the Prehistory of the Tocharian Class II Preterite. Historische Sprachforschung, 116(2), 190-233.

Kim, R. I. (2007) Vowel Weakening in Tocharian A Preterite Participles and Abstract Nouns. 京都大学言語学研究 [Kyōto-daigaku gengo-gaku kenkyū, 'Kyoto University Linguistic Studies'], 26, 1-30.

Kim, R. I. (2018). The root ablaut of Tocharian B/pər-/, A pär-'carry'revisited. *Chatreššar International Journal for Indo-European, Semitic, and Cuneiform Languages*, 1, 19-24.

Kocharov, P. (2019). Old Armenian nasal verbs: archaisms and innovations, Doctoral dissertation, Leiden University.

Krause, T. B. & Slocum J. (2020) *The Tocharian Lessons.* The University of Texas at Austin College of Liberal Arts, URL: https://lrc.la.utexas.edu/eieol/tokol

Krause, W. & Thomas, W. (1960). *Tocharisches Elementarbuch, Band I: Grammatik*, Heidelberg: Carl Winter.

Kronasser, H. 1956. *Vergleichende Laut- und Formenlehre des Hethitischen*. Heidelberg: Winter.

Kümmel, M. J. (2009). The range of Tocharian a-umlaut. In *Internal Reconstruction in Indo-European: Methods, Results, and Problems: Section Papers from the XVI International*

Conference on Historical Linguistics, University of Copenhagen, 11th-15th August, 2003 (Vol. 3, p. 171). Museum Tusculanum Press.

Lindeman, F. O. (1969). Zur Reduplikation beim Verbum im Tocharischen. *Norsk Tidsskrift for Sprogvidenskap*, 23, 15–24.

Malzahn, M. (2010). *The Tocharian Verbal System*. Leiden & Boston: Brill.

Malzahn, M. (2016). The development of the Tocharian causative system–top-down or bottom-up? *Indogermanische Forschungen*, 121(1), 387-400.

Melchert, H. C. (2013). The Tocharian s-preterite. In *Tocharian Texts in Context: International Conference on Tocharian Manuscripts and Silk Road Culture*, Vienna, 127-135.

Peyrot, M. (2013). The Tocharian Subjunctive: A Study in Syntax and Verbal Stem Formation. Brill.

Peyrot, M. (2008). On the formation of the Tocharian preterite participle. *Historische Sprachforschung,* 121(1), 69-83.

Pinault, G.-J. (1988). Révision des fragments en tokharien B de la légende de Mahāprabhāsa. In *Studia Indogermanica et Slavica. Festgabe für Werner Thomas zum 65. Geburtstag*, ed. Peter Kosta, Gabriele Lerch, and Peter Olivier, 175–210. München: Sagner.

Pinault, G.-J. (1998). Tocharian languages and Pre-Buddhist culture. In *The Bronze Age and Early Iron Age Peoples of Western Central Asia. Vol. I, Archeology Migration and Nomadism, Linguistics*, ed. Victor H. Mair, 26:358–371. JIES Monogr. Washington: Institute for the Study of Man.

Pooth, R. A. (2015) Is the "tēzzi principle" a plausible inference? *The precursors of Proto-Indo-European: the Indo-Hittite and Indo-Uralic hypotheses Workshop,* Leiden University Centre for Linguistics, handout.

Ringe, D. (1989). Tocharian B ausu, ausu, aultsu. *Tocharian and Indo-European Studies*, 3, 35-50.

Ringe, D. A. (1990): The Tocharian active s-preterite. In *Münchener Studien zur Sprachwissenschaft*, 51, 183–242.

Saito, H. (1997). On the origin of the reduplicated preterite in Tocharian. *Tocharian and Indo-European Studies*, 7 155–161.

Schmidt, G. (1978). *Stammbildung und Flexion der indogermanischen Personalpronomina*. Wiesbaden: Harrassowitz.

Schmidt, K. T. (1982). Spuren tiefstufiger set-Wurzeln im tocharischen Verbalsystem. In Tischler, J. (ed.) *Serta Indogermanica; Festschrift für Gunter Neumann zum 60. Geburtstag*, 363-372.

Schulze, W. (1924). Die reduplizierten Präterita des Tocharischen und des Germanischen. *Sitzungsberichte der Preußischen Akademie der Wissenschaften*, 166–174.

Surendran, D., & Niyogi, P. (2003). Measuring the usefulness (functional load) of phonological contrasts. *Technical Report TR-2003-12*, University of Chicago.

Van Windekens, A. J. (1944). *Morphologie comparée du tokharien*. Louvain: Muséon.

van Windekens, A. J. (1972a). Études de phonétique tokharienne XVII. *Orbis*, 1, 101-104.

van Windekens, A. J. (1972b). Études de phonétique tokharienne XVIII. *Orbis*, 21, 391-393.

van Windekens, A. J. (1976). *Le tokharien confronté avec les autres langues indo-européennes, Vol. I : La phonétique et le vocabulaire*. Louvain: Centre Internationmal de Dialectologie Générale.

Weiss, M. (2019). K$_u$śiññe Kantwo Elementary Lessons in Tocharian B, unpublished draft.

Willi, A. (2018). *Origins of the Greek Verb*. Cambridge University Press.

Winter, W. (1985). Tocharian B soy, A se and related forms. *Journal of the American Oriental Society*, 105: 259–264.

Winter, W. (1994) Zum tocharischen Verb. In Schlerath B. (ed.) *Tocharisch: Akten der Fachtagung der Indogermanischen Gesellschaft*, Berlin, 284-309.

Yavaş, M., & Altan, A. (2016). Vowel epenthesis in the acquisition of English/s/-clusters by Turkish speakers. In *Exploring the Turkish Linguistic Landscape: Essays in honor of Eser Erguvanlı-Taylan*, 175, 3.