Some Hittite and Armenian Reduplications and Their (P)IE Ramifications*

Paul S. Cohen

Yorktown Heights, NY, USA

pausyl@aol.com

Abstract

In this paper I summarize the literature on, and generate and defend formally and semantically, explicit derivations for, the Hittite reduplicated pairings {^{GIS}*ḫaḫ(ha)r(a)*-‘rake’, “*ḫaḫḫarie*- ‘to rake’”} and {^{GIS}*sesarul*- ‘sieve’, “*sesarie*- ‘to sift’”} and the reduplicated Armenian nouns *mamul* ‘press; vice’, *mamuṛ*, ‘moss’, and *mamur* ‘sawdust’, all adduced by Joseph (1992). In addition, I give an explicit derivation for the Hittite reduplicated noun *mēmal* ‘grits, meal’. The first Hittite pairing, the three Armenian nouns, and hitt. *Mēmal* are shown to represent regular instantiations of the noun-reduplication process formulated in Cohen (forthc. a); the second Hittite pairing, perhaps surprisingly, turns out to be based on a (P)IE verb-reduplication process. In the course of the exposition, a previously-unreported Armenian sound-change affecting inherited word-final syllabic liquids emerges, and a well-known, but controversial, Armenian sound-change of **e* to *a* is buttressed via a phonological explanation, which has a strong parallel in Old English, eliminating the only putative counterexample. Ultimately, the derivations lead to an elucidation of the semantic functions (thematic roles) of (P)IE reduplicated nouns, with the support of an analogous morphological process in Swahili.

Keywords

noun reduplication – resultatives – instruments – thematic roles – Armenian sound-changes

* I am grateful to Joseph Eska, coeditor of this journal, for his support and for his selection of two perspicacious reviewers, whose comments and queries led to major improvements in this article. Any remaining errors and infelicities are, of course, my responsibility alone.

1 Introduction

Joseph (1992:105) has adduced the Hittite reduplicated pairings {^{GIS}*ḫaḫ(ha)-r(a)-* ‘rake’, “*ḫaḫḫarie-* ‘to rake’”) and {^{GIS}*sesarul-* ‘sieve’, “*sesarie-* ‘to sift’”) and the Hittite reduplicated noun *memal* ‘grits, meal’ as part of his insightful analysis of the reduplicated Armenian nouns *mamul* ‘press; vice’, *mamuṛ*, ‘moss’, and *mamur* ‘sawdust’. Making use of one of the accepted (P)IE verb-reduplication processes summarized in LIV (14–25) and the noun-reduplication process delineated in Cohen (forthc. a:§9), I generate and defend explicit derivations (in some cases, differing substantially from Joseph’s analyses) for the Hittite pairings, a probable Latin cognate of ^{GIS}*ḫaḫ(ha)r(a)-*, Hitt. *mēmāl*, and the Armenian nouns. I follow these with a discussion leading to an expansion of the semantics of the (P)IE noun-reduplication process.

2 Hitt. ^{GIS}*ḫaḫḫar-* ‘rake’ and *ḫaḫ(ha)rije/a-zi* ‘to rake’

EDHIL has no entry for these items. However, within *EDHIL*’s analysis of the Hittite verbal system, *ḫaḫ(ha)rije/a-zi* ‘to rake’ is listed (pp. 129 f.) as a member of the subclass “denominative *-je/a-*inflecting verbs” of the class of “*mi-*verbs with a thematic suffix” (there is no mention of the noun anywhere in *EDHIL*). Both verb and noun can, however, be found in *EIEC* (581 s.v. *thresh*), where they are given as reflexes of PIE “**h₂eh₂er-* ‘thresh, rake (for threshing)’”, along with Lat. “*ārea* (< **h₂eh₂erijeh_a*) ‘threshing floor’”, which is listed as another reflex. *EIEC* (*loc. cit.*) references Puhvel (1976), and it turns out that Puhvel’s article is the direct source for the subentry in *EIEC*. Puhvel’s argumentation (p. 201) for the cognacy of the Latin noun and both Hittite items¹ is persuasive, though he wrongly gives the PIE etymon with first, rather than second, laryngeals. Melchert (1994:157) gently corrects this error, writing “Puhvel’s comparison ... of *ḫaḫḫara-* ‘rake’ with Lat. *ārea* ‘threshing floor’ is attractive, but the shape suggests a reduplicated form **h₂e-h₂r-o-*.”²

It seems an obvious idea that the Hittite stem is indeed, as Joseph and Melchert posit, a reduplication, since it cannot be based directly on a simplex root, given the fact that it would then contravene the PIE root-structure constraint that bars *C_iVC_i ...* (see, e.g., *OHGCL* [44], Cooper [2009:56]). I agree with Tischler (1983:122, 169 f.) and Joseph (*loc. cit.*, referencing Tischler) that the sim-

1 Puhvel (*loc. cit.*) specifies that the verb is derived from the noun.

2 Melchert does not mention the verb.

plex root is the one given in *LIV* (272 f.) as **h₂erh₃-* ‘aufbrechen, pflügen’ (about the semantics of which more below).

The basic reduplication process would have been the one delineated for nouns in Cohen (forthc. a:§ 9), emended slightly here:

1. Copy the initial portion of the *e*-grade root up through the vowel and any immediately-following laryngeal (with [later] consequent coloration and lengthening), and prepose it to the root.
2. a) For intensive reduplications,³ reduce the vowel of the preposed portion to zero-grade (with concomitant syllabification of a following sonorant).
 b) For resultative reduplications, shift the accent to the preposed portion and reduce the vowel of the (original) root to zero-grade (with concomitant syllabification of a following sonorant).

The derivation of the Hittite forms is as follows:

- PIE **h₂erh₃-* →
- (Step 1 of the noun-redup. process given immed. above) **h₂eh₂erh₃-* >
- (Step 2b of the noun-redup. process given immed. above) **h₂eh₂rh₃-* >
- (Laryngeal coloration) **h₂ah₂rh₃-* >
- (Syllabification of sonorant betw. consonants) **h₂ah₂rh₃-* >
- (Loss of laryngeal in non-initial sylls. of compounds and redups., discussed immed. below) **h₂ah₂r-* >
- (PAnat. reflex of **h₂*) **hah₂r*⁴ >

-
- 3 The intensive noun reduplications referred to here are exemplified and explicated in Cohen (forthc. a). These include Lat. *papāver* ‘poppy’ (based formally on **péh₂ur* ‘fire’ and having a figurative semantic reference to the field poppy’s fire-red color), Gk. *πάπυρος* ‘papyrus’ (also based formally on **péh₂ur* ‘fire’, but having a literal semantic reference to papyrus’s burning with an especially intense flame), and PIE **b^ha-b^heh₂-* ‘bean’ (based formally on **b^hueh₂-* ‘to grow’ and having a semantic reference to the bean-plant’s prolific growth pattern). They are to be distinguished as a class, semantically and formally, from those of a different type that are often labeled intensive—which are onomatopoeic and/or emotive, and generated from a (c)vc ... root by preposing a copy of that root up through the postvocalic consonant. Typical examples are “OCS *gla-gol-u* ‘word’ (< **gal-gal-o-*, from **gal-* ‘to cry out’)” (Fortson [2010:130]); Lat. “*mur-mur* ‘rumble’[,] ... *quer-querus* ‘causing a person to shiver’[,] ... *tur-tur* ‘turtle-dove’[,] ... *up-upa* ‘hoopoe; pickaxe’ ...” (OHGCL [267]); “... Grk. *βάβραρος* ‘non-Greek speaker’, OInd. *barbara-* ‘stammerer, non-Indic speaker’ ...” (EIEC [542 s.v. *stammer*]).
 - 4 The exact points of articulation of PIE **h₂* and of its Anatolian reflex are unknown (and, probably, unknowable), but there is good evidence that PIE **h₂* was a non-glottal post-velar—i.e.,

- (Hitt. reflex of PANat. syllabic sonorant) *ḥaḥar-* (= *ḥaḥḥar*⁻⁵) →
 - For the verb: (Denominative suffixation) *ḥaḥar-ṣe/a-* (= *ḥaḥ(ha)riṣe/a-^{zi}*)

The rule deleting the laryngeal in the stated environment is suggested in *OHGCL* (113), where we find at the end of a short section on the *νεογνός* Rule:

There may have been a more general rule of laryngeal loss in non-initial syllables of ‘long’ forms [i.e., compounds and reduplications], to judge from cases like **kom-d^hh₁tu-* ‘putting together’ > *Cōnsus* (Roman god of grain storage).

For another example, see the derivation as a noun reduplication of PIE **mēm̥s-* ‘meat, flesh’ (< **méh₁-mh₁s-*) in Cohen (forthc. b). And Michael Weiss (pers. comm.) has also pointed me toward two other relevant references on this topic:

- Lat. *vicissim* ‘in turn; on the other hand’ is often etymologized as < **viki-dh₃tīm* (see *EDLOIC* [674 f., s.v. *vicis* ‘turn, occasion’] for a brief discussion).
- Kuiper (1961), in keeping with the title of his article, focuses on examples from Sanskrit, with occasional excursions into other Indo-Iranian languages. He advocates the position that, for Sanskrit, compositional shortening (i.e., the sort of laryngeal loss we are talking about here) is an Indic or, perhaps, Indo-Iranian phenomenon (see esp. p. 23). However, he does allow for the possibility that at least some of the compositional shortening in his material goes back to PIE: On p. 21 (with fnn. 17 and 18), after citing an 1881 article by Johannes Schmidt as well as another article by Schmidt and the writings of Brugmann and Kuriłowicz,⁶ Kuiper writes, “Nun läßt sich freilich die Möglichkeit eines ursprachlichen Schwundes von -ə- (-H-) nicht prinzipiell bestreiten.” And on p. 23, “Prinzipiell bliebe damit freilich die Möglichkeit offen, die genannten Beispiele mit J. Schmidt und Brugmann aus einer ursprachlichen Lautentwicklung zu erklären ...”

faucal—voiceless fricative; (for discussion of the phonetics of PIE **h₂* [and **h₃*], see Cohen & Hyllested [2012:54–57 with refs.]). I have used the IPA symbol for a voiceless pharyngeal fricative here as a cover-symbol to represent any voiceless faucal fricative.

5 The spelling *-ḥḥ-* should not be interpreted as representing a phonemic geminate; rather, for Hittite at least, it represents an ungeminated (fortis and/or voiceless) phoneme (see Melchert [1994:22], Kimball [1999:105], *EDHIL* [27], Hoffner & Melchert [2008:39]).

6 Notably, Kuiper includes Lat. *vicissim* in the discussion here.

The derivation of the Latin form is as follows:

- PIE $*h_2erh_3-$ →
- (Step 1 of the noun-redup. process given above) $*h_2eh_2erh_3-$ >
- (Step 2b of the noun-redup. process given above) $*h_2eh_2rh_3-$ >
- (Laryngeal coloration) $*h_2ah_2rh_3-$ >
- (Syllabification of sonorant betw. consonants) $*h_2ah_2rh_3-$ >
- (Loss of laryngeal in non-initial sylls. of compounds and redups.) $*h_2ah_2r-$ →
- (“Material-suffix”-derivation,⁷ with concomitant resyllabification) $*h_2ah_2r-ejo-$ →
- (PIE or PItal. abstract/feminine nominalization [of Transponat]) $*h_2ah_2r-ejah_2-$ >
- (Pital. loss of laryngeals, with compensatory lengthening of prec. vowels) $*āre-ejā-$ >
- (PLat. loss of intervocalic ɪ ⁸) $*āreā-$ >
- (PLat. shortening of nom. sing. final $\bar{a}$ ⁹) $\bar{a}rea$

The semantics are based on the chief uses of rakes throughout (pre-)history and to this day. Thus, e.g., the first definition of *rake* in *OED* is “An implement ... used in field-work for drawing together hay, grass, or the like, and in gardening for similar purposes, or for breaking up, leveling, and smoothing the surface of the ground ...”.

In the Hittite items, we see the second function, “for breaking up ... the surface of the ground” (i.e. “aufbrechen” in *LIV*’s gloss for $*h_2erh_3$ -¹⁰), which establishes the relationship with plowing. Joseph (1992:105) puts it as follows:

[I]t is likely (so Tischler [1983:122]) that $^{GIS}hah(ha)r(a)-$ derives ultimately from the root $*AerO-$ found in Greek $\acute{\alpha}\rho\acute{o}\omega$ ‘to plow’, Latin *aro* ‘plow’, Armenian *arawr* ‘plough’, etc., and quite possibly Hitt. *harra-* ‘break, bruise, grind’ and/or Hitt. *hars-* ‘rip open, till (soil)’, (etc.), with a ‘rake’ representing an instrument through which a type of working/breaking the ground is accomplished ...

7 My thanks go to Brent Vine and Michael Weiss who, in personal communications, suggested the use of the diachronic processes in this step and the next one of the derivation.

8 See, e.g., *OHCGL* (83).

9 For discussion, see *OHCGL* (232).

10 The only example in the entry that does not refer directly to plowing is also the only Anatolian example given; it reads, “?heth. *haraszi*, *hārašta* ‘bricht/brach der Erde auf’”.

EDHIL is a bit equivocal, but, on balance, seems to favor this view. Thus, at the entry for “*harra-i* / *harr-* ... ‘to grind, to splinter up (wood), to crush (bread) ...’” (pp. 300f.), we find a list of cognates such as Gk. *ἄρῶ* and Lat. *arō*, ‘to plough’ and a diffidently suggested PIE etymon “**h₂ór_h₃-ei*, **h₂rh₃-énti?*”; and in the discussion (*loc. cit.*), we read:

A connection with PIE **h₂er_h₃-* ‘to plough’ (Gk. *ἄρῶ* and Lat. *arō*, Lith *ár_ti*, etc. ‘to plough’) ... would formally work perfectly indeed. The semantic side of this etymology is debatable, however. If one accepts this etymology, it has to be assumed that PIE **h₂er_h₃-* originally meant ‘to crush’, which developed into ‘to plough’ (from ‘to crush the soil’, cf. also s.v. *hārš-i* ‘to till the soil’ < **h₂or_h₃-s-*) only after the splitting off of the Anatolian branch.

Along with, e.g., *LIV* and Joseph, I see nothing particularly strained in this semantic connection or in postulating separate developments in the Anatolian and extra-Anatolian branches.

For Lat. *ārea*, the first function given in the *OED* definition is evident: On the threshing floor, rakes were (and still are) commonly used to remove dirt and stones, level sheaves for threshing, form round mounds of grain, smooth piles of grain out (e.g., for measurement), and move large amounts of grain around.

Some formal aspects of the Hittite items need further discussion.

- Puhvel (1976:201) states that it is attested both as a neuter (with nom.-acc. sg. ^{GIS}*ḫaḫḫar*) and as an animate (with nom. sg. *ḫaḫḫaraš* and acc. sg. ^{GIS}*ḫaḫḫaran*). However, an anonymous reviewer points out that “there is in fact no evidence that the word is neuter in Hittite.” Puhvel was apparently misled by “Akkadographic” spellings (occurring in lists) with the bare stem (see Hoffner & Melchert [2008:242]). The reviewer goes on to say that the word is a secondary animate *r*-stem of the type discussed by Hoffner & Melchert (2008:116), in which, moreover, the forms ending in *-araš* and *-aran* are later replacements; and states, “The word was originally an animate stem **h₂e-h₂r(h₃)-o-* (or possibly **h₂e-h₂r(h₃)-eh₂-*).”
- It is noteworthy that *ḫaḫḫar(a)* and *ḫaḫ(ha)rije/a* have single *r*, while *ḫarra* has *rr*. This is straightforwardly handled by the following rule: PIE **VRHV* > PANat. **VRRV* (see Melchert [1994:79], where *ḫarra-* is one of the examples explicitly discussed). The second *a* in *ḫarašzi*, *ḫārašta* is graphic; the forms actually have the sequence /rš/. This goes back to **rh₃š*, in which

the laryngeal is regularly lost (see Melchert [1994:73], where *harš-* is explicitly discussed).

- Finally, Puhvel (1976:201) writes that the neuter noun is “once misspelled *ḫarḫar* (KBo XI 12 I 6)”, and I think this is likely to be the right interpretation of that attestation. It is, however, conceivable that the form is the product of a (presumably folk-etymological) intensive reduplication of the type discussed in the latter portion of fn. 3 above.

3 Hitt. ^{GIš}*šešarul-* ‘sieve’ and *šešarije/a-zi* ‘to sift/sieve’

Joseph (1992:105) analyzes Hitt. “^{GIš}*sesarul-* ‘sieve’” as a reduplicated instrument noun, “... with a derived denominal verb *sesarie-* ‘to sift’ ...” He continues,

[O]ne might conjecture that ^{GIš}*sesarul* derives from PIE **srew-* ‘flow’ (as in Sanskrit *śrav-ati*, the root being an enlarged form of **ser-* ‘flow’, as in Sanskrit *śi-sar-ti*), with a ‘sieve’ representing the instrument through which a certain type of flowing, e.g. of grain, is accomplished ...

And *CHD* (2013:Š, 449 f.) has an entry for the verb it straightforwardly gives as *šešariške-* ‘to filter, strain’ and another for the noun *šešarul* ‘filter, strainer’;¹¹ although the entries reference each other, there is no indication of which might be primary. In contrast, *EDHIL* suggests an etymology for the Hittite items that is not reduplicative, and, inexplicably, offers contradictory conclusions concerning the relative primacy of the verb and noun. Thus, we find (pp. 129 f.), within an analysis of the Hittite verbal system, *šešarije/a-zi* ‘to sieve’ placed in the same subclass as *ḫaḫ(ḫa)rije/a-zi*, viz., “denominative *-ije/a-*inflecting verbs”. However, the entry for *šešarije/a-zi* (pp. 748 f.) gives the verb as primary, with ^{GIš}*šešarul-* ‘sieve’ as a derivative. Later in the entry we see, “The stem to both *šešarije/a-* and *šešarul-* must be *šešar-*.” And still later, a suggestion of a connection to OCS *sěti*, Lith. *sijóti* ‘to sieve’ is given, on the basis of which a PIE etymon “**seh₁-sr-je/o-*?” is, once again diffidently, offered.

Clearly, both *šešarije/a-zi* and ^{GIš}*šešarul-* have shapes indicative of reduplication. But other scenarios than those just summarized also need to be examined.

11 The only unbroken attestation for either the verb or the noun (*KUB* 13.3 ii 4) shows a use that makes the *CHD* glosses more likely to be accurate.

For example, based on the fact that the noun shows a *u* that is not present in the verb, one might argue for two different PIE verb roots being involved as simplexes: PIE (unextended) **ser-* ‘to stream, *vel sim.*’ for the verb and (extended) **srey-* ‘to flow, *vel sim.*’ for the noun. And it would be reasonable to assume that the noun is primary—as I do with the Hitt. *rake*-words, where the extra-Anatolian cognate is a noun with no corresponding verb. The problem with such a solution for *šešarije/a-^{zi}* and *GIS^ššešarul-* lies with supplying a derivation for the verb. If, on the one hand, we assume it goes back to PIE, we have to account for its not matching any of the PIE reduplicated thematic-verb types, as given by LIV, in terms of accent and location of full- vs. zero-grade vowels. If, on the other hand, we assume it was generated in Hittite or Proto-Anatolian, we have to deal with the inconvenient fact that Hittite verbs in *ije/a-* with attested matching nouns fit the synchronic description of having *ije/a-* attached to the full noun stem; that is to say, we should expect to find the nonexistent verb †*šešarulije/a-*. A possible solution emerges if we take **ser-* as the simplex root underlying both verb and noun, and for reduplication to have occurred post-PIE. And it is the verb that is primary, as is explicitly demonstrated by Hoffner & Melchert (2008:59):

The suffix *-ul-* forms neuter nouns from verbs ...: *takšul* ‘peace, friendship’ < *takš-* ‘to join’. The *a* of the verb stem is deleted before this suffix: *waštul* ‘sin, offense’ < *wašta-* ‘to miss the mark, sin’, *išhiul* ‘obligation, treaty’ < *išhiya-* ‘to bind’, *immiul* ‘mixture’ < *immiya-* ‘to mix’, *paršiul* ‘crumb’ < *paršiya-* ‘to crumble’, *šešarul* ‘sieve’ < *šešariya-* ‘to sift’ ... There is one example from an adjective: *aššul* ‘goodness, favor, well being’ < *aššu-* ‘good’, and two from nouns: *kazzarnul* (a textile) < *karza(n)-* (weaver’s tool) ... and *pahharul* (an implement¹²).

Another verb-based example can be added to these, as given by CHD (1997:P, 108 and 96 resp.): *GIS^špāpul(a/i)-*, defined as “(a wooden implement for carrying or arranging loaves of freshly baked bread; a bread tray?)” ← *pap(a?)-*, a verb defined as “(an action performed on fermented dough and resulting in loaves ready for baking; perhaps ‘to subdivide or shape’)”. It is also worth noting that all the nouns produced by the process of *-ul*-suffixation are instruments or resultatives.

12 It seems highly likely that this implement-name is derived from *pahhur* ‘fire’, and indeed *GIS^špahhurula-* is defined by CHD (1997:P, 17) as “(an instrument for tending or banking a fire)”.

As pointed out above, the process that generates the verb must be post-PIE. Given the existence of CLUV. *paršul-* ‘crumb, morsel’ (see *EDHIL* [643]), that process appears to be Anatolian.

The verb-stem *šešar-* is generated via a well-attested PIE process, continued into Anatolian: athematic *e*-reduplication of presents (*LIV*’s type 1g [p. 16]):

- PANat. **ser-* →
- (Athematic *e*-redup. of presents) **sésr-/ *sésor-* >
- If **sésr-*:
 - (Syllabification of sonorant betw. cons. and morpheme boundary) **sésr-* >
 - (Hitt. outcome of PANat. syllabic sonorant) **sésar-* (= **šešar-*) →
- If **sésor-*:
 - (Hitt. outcome of PANat. unaccented *o*) **sésar-* (= **šešar-*) →
 - For the verb: (Hitt. *-ie/a* thematization) *šešarije/a-^{zi}*
 - For the noun: (Hitt. *-ul*-suffixation) *šešarul*

4 Hitt. *mēmal* ‘grits, meal’; Arm. *mamul* ‘press; vice’, *mamur* ‘sawdust’, and *mamur*¹³ ‘moss’

The standard etymology for Hitt. *mēmal* ‘grits, meal’ comprises a reduplication of an *o*-grade form of **melh₂-* ‘to crush, to grind’ (see, e.g., Melchert [1994:51], *EDHIL* [575], Oettinger 2012 [244 f.]). But we can appeal to Ockham’s razor to eliminate any need for a putative *o*-grade-based noun-reduplication type in PIE or Anatolian, because, as given in Cohen (forthc. a:§ 9), the noun-reduplication process summarized in § 2 above (i.e., reduplication based on the *e*-grade of the root) handles the derivation of *mēmal*.¹⁴ I give an expanded, more explicit version of the derivation of *mēmal* here, as well as an explication of the variation between *l* and *ll* in attested forms; both the derivation and, more extensively, the explication have benefited from suggestions made by the anonymous reviewer mentioned above.

13 Nowadays, *ṛ* (rather than *ṝ*) is the symbol typically used to represent this Armenian rhotic.

14 Hitt. *ḫāḫḫal* ‘greenery, (wild) vegetation, etc.’ is sometimes adduced (e.g., by Oettinger [2012:245]) as a parallel for *mēmal* as an *o*-grade-based reduplication. The problem with that is, as pointed out by Melchert (1994:51), there is no etymology for the simplex root of *ḫāḫḫal*. *EDHIL* (268 s.v. (G18) *ḫāḫḫal*) agrees: “Although the word seems genuinely Hittite ... [it has] no good IE etymology”. In any case, as delineated in Cohen (forthc. a:§ 7), it too, like *mēmal*, can be derived directly from an *e*-grade simplex.

- PIE **melh₂-* →
- (Step 1 of the noun-redup. process given in § 2) **me-melh₂-* >
- (Step 2b of the noun-redup. process given in § 2) **mémlh₂-* >
- (Syllabification of sonorant between consonants) **mémlh₂-* >
 - (Hittite development for nom.-acc. sing.) **méml₁*¹⁵
- (Normal Hittite development of PANat. syllabic sonorants) **mémal-* >
- (Hitt. lengthening of short vowels in accented open syllables) *mémal-*

There is a great deal of attested variation throughout the paradigm of this word between forms with single *l* and those with *ll*.¹⁶ This can be attributed to the influence of the verb *mall/i-*, *malliya/i-* ‘to mill, grind’; the relationship between this verb and the reduplicated noun would have been transparent to Anatolian/Hittite speakers. In this regard, it is worth noting that forms based on the unextended root, simplex or reduplicated, seem to have come to refer primarily to the grinding of grain, whereas, as illustrated by CLUV. (simplex and reduplicated) *malwa-*, *mammalwa-/mammalhu-*, those based on the *u*-extended root refer to crushing or breaking.

Let us turn now to the Armenian items. Joseph (1992:101), giving Djahukian (1990:2) as his source for these, begins his article as follows:

There are several reduplicated nouns in Armenian ... that share a common phonetic shape of *mamuR-*, where *-R-* stands for any liquid ...: *mamul* ‘press, vice’ (Classical) ... [,] *mamuř* ‘moss’ (Classical) ... [and] *mamur* ‘sawdust’ (modern dialectal).

Joseph does not offer any specifics about a reduplication process for generating these forms; however, citing Djahukian, he gives for their underlying simplex roots (p. 102), respectively, **mel(H)-* ‘crumble, grind’, **m(e)u-s-*, and **mer(H)-* ‘rub; wear (out); strike’. Updated, these would be, respectively, **melh₂-*, **meus-*

15 Hittite noun stems in *-al* are neuter and endless in the nominative and accusative singular; forms in the other cases have vowel-initial endings (see Hoffner & Melchert [2008:106]). Laryngeals in absolute-final position are lost (see Melchert [1994:87, 180], Kimball [1999:425]). The other case forms would not have lost the laryngeal, however, since a vowel followed it. (Note that the rule **VRHV* > **VRRV* was no longer operational by the time **ǵ* > *aR* in Hittite; see, e.g., the discussion in Kimball [1999:411] based on Melchert’s analysis). The paradigm was then leveled, as one would expect, to the form without laryngeal.

16 Melchert (1994:51) writes that in the oblique forms they are of approximately equal frequency.

‘moss, mold; damp’ (see *EIEC* [385, s.v. *moss*], Watkins [2000:56]), and **merh₂-* (see *LIV* [440]). I offer explicit reduplication derivations here.

For both *mamul* and *mamur*:

- PIE **meRh₂-* →
- (Step 1 of the noun-redup. process given in § 2) **me-meRh₂-* >
- (Step 2b of the noun-redup. process given in § 2) **memRh₂-* >
- (Syllabification of sonorant between consonants) **memRh₂-* >
- (Loss of laryngeal in non-initial sylls. of compounds and redups.) **mem̥Rh₂-* >
- (Proposed rule for PARM., discussed below) **memuR-* >
- (PARM. lowering of *e* by *u* in foll. syll., discussed below) *mamuR*

The reflex of PIE syllabic liquids and nasals in Armenian is generally accepted as *a* + liquid/nasal, as evidenced by such works as *EIEC* (28), Beekes *apud* Kortlandt (2003:151), and Fortson (2010:386), with Fortson adding the explicit proviso: “Word-finally, the syllabic nasals became *-n*, as in the numerals *ewt’n* ‘seven’ and *tasn* ‘ten’ from **septm̥* and **dek̥m̥*.”¹⁷ I am hereby proposing, in addition, a specific assimilative development word-finally (or, alternatively, in closed syllables) for syllabic liquids and nasals after *m*—namely *u* + liquid/nasal.¹⁸ This would yield the final sequences of *mamul* and *mamur*. As derived below, the *u* of *mamu̯* continues the *u* from the underlying simplex root.

Armenian lowering of *e* by *u* in a following syllable has long been accepted by many scholars; for a modern example, see Clackson (1994:126 f.), who adduces

17 Presumably, in the case of word-final **m̥*, this occurred in stages—perhaps, **m̥* > **am* > **an* > *n*.

18 As pointed out by an anonymous reviewer, my proposal is quite similar to one made by Olsen (1999:806) in the section entitled “Notes on the phonological development from IE into Armenian”: “All labio-velars as well as **p* and **u* appear to have a rounding effect on a following vocalic liquid **l̥* or **l̥*, sometimes resulting in *(u)R*, in other cases *oR*.” Olsen goes on (pp. 806 f.) to give four examples of the former type and three examples of the latter type; I note, however, that that same reviewer finds all these examples “shaky”. Olsen (1999:779) also gives, without explicit discussion of rounding effects, the following: “**-l̥h₁v-* > *-al(v)-*: *malem* ‘I grind’ < **mul̥h₁e-*”. Moreover, in an analysis of the derivation of *ōr* (= *awr*) ‘day’, she writes (p. 177): “... [I]t may ... be possible that *ōr* is actually identical with *h̥uap* if it is accepted that a vocalic **l̥* is continued as *ur*, not *ar*, in connection with a neighbouring labial”; and exemplifying “*-m-* > *-w-*” (p. 792): “*ōr*, gen. *awowr* ‘day’ < **ām̥* (cf. Gk. *ἡμαρ*) or **āmōr*”. I will return to this word later in the present section.

vat'sun 'sixty', beside *vec* 'six'. This sound-change has been rejected by some scholars, however—in particular, members of the “Leiden school”. Thus, citing Kortlandt (1994),¹⁹ Beekes *apud* Kortlandt (2003:156) writes:

**e* > *a* ... is only found in the following words.
 **dek'm*: *tasn* 'ten'—Gr. *δέκα*, Lat. *decem*, Skt. *dásā*
 **suek's*:- *vat'sun* 'sixty'; cf. *vec* 'six' < **suek's*

Kortlandt considers the *a* the reduced grade (from cases where it appeared regularly as *shwa secundum*) that replaced zero grade vocalism ...

And we find in *EDAIL* (590 f. s.v. *vat'sun*):

The explanation of the change *e* > *a* through the lowering influence of the *u* in the following syllable ... is disproved by PIE **peruti* > Arm. *heru* 'last year' ... Most probably the vowel -*a*- can be explained by assuming a zero-grade form taken from the ordinal ...

Leaving aside the *a priori* unlikelihood of ordinal numbers causing changes in their cardinal counterparts (rather than the other way around), I propose a phonological solution for this problem. Beekes *apud* Kortlandt (2003:154) tells us:

Armenian shows no trace of the Indo-European accent. In the oldest phase we can reconstruct, the penultimate syllable ... was stressed. At a certain stage, as a result of this stress the following = last syllable was lost; not only the vowel, but the consonants following the vowel disappeared as well, except *r*, *l*, *n* (note that at this time *-*m* had become -*n*) ...

Before final-syllable loss, the /*u*/ of **peruti* would have been stressed and the /*e*/ unstressed, whereas the /*u*/ of **memuR* would have been unstressed and the /*e*/ stressed. Though this difference might, at first blush, seem insignificant, the Armenian lowering (or, equally, retraction) by /*u*/ in a following syllable of /*e*/—only when stressed—to /*a*/ is remarkably similar in every aspect to the prehistoric Old English sound change in which /*æ*/—only when stressed—in open syllables became /*a*/ when there was a back vowel in the following syllable

19 The relevant portions can be found reprinted in Kortlandt (2003:100).

(see, e.g., Hogg [2011:93 ff.]). The anonymous reviewer cited in fn. 18 above writes, “Since ... *mamowl* [= *mamul*] is an *o*-stem,²⁰ the pre-form is **mamulo*- and the accent must have been on the vowel /u/ in most of the paradigmatic forms, just as in **perúti*.” One solution to this potential problem is to assume that *mamul* (as well as *mamur*) was originally treated as a root noun, which became an *o*-stem secondarily. The reviewer notes that “root nouns are usually continued as *i*-stems in Classical Armenian”. However, there are examples of root nouns that have become *o*-stems; Olsen (1999:816) mentions “*att* with the specialized meanings ‘filth’ and ‘afterbirth’” and “*erbowc* ‘breast’ < **b^hrug*s (or **b^hrug*s) and perhaps *sowr* ‘sword’ if < **koh₃s*”.

The derivation of *mamuṛ* is as follows:

- PIE **meys-* →
- (Step 1 of the noun-redup. process given in § 2) **me-méys-* >
- (Step 2a of the noun-redup. process given in § 2) **m̥méys-* →
- (Primary nominal suffixation with concomitant vowel reduction) **m̥mus-ró-* >
- (PARM. normal outcome of syll. nasal after *m*, word-internally [or in open syllable]) **mamusró-* >
- (PARM. **sr* > *r̥*²¹) **mamuṛó-* >
- (PARM. stress shift to penult) **mamúṛo-* >
- (Arm. apocope²²) *mamuṛ*

The same anonymous reviewer has brought up the need to explicate another formal point that arises in the derivation of *ōr* (= *awr*) ‘day’: viz.,

... the question of how old a group /amu/ in Armenian can be in view of *awr* ‘day’ < **amur* < **āmōr* which is usually understood to have developed with u-epenthesis via **aumur* > **au^uur* > *awr*. Would one not expect the same development in the case of reduplicated nouns with the sequence /amu/, i.e. **mamuR* > **mau^uur* > †*mawR*?

20 I note that *EDAIL* (446) also lists *mamul* as an *o*-stem—though citing a 19th century dictionary that gives inflected forms “without evidence”.

21 See, e.g., Beekes *apud* Kortlandt (2003:197).

22 As, e.g., specified in the quote from Beekes *apud* Kortlandt (2003:154) given earlier in this section, and op. cit. (210 f.).

The question is, of course, eminently reasonable; however, the answer is crucially dependent on whether **amur* and **mamuR* have parallel histories. To make this determination, we need to look closely at the phenomenon of Armenian *u*-epenthesis. Olsen (1999:798–801) discusses *u*-epenthesis in detail, listing a dozen examples (including *ōr*). She concludes her discussion as follows:

[I]t may be quite tentatively suggested that the IE accent was still working when the process of *u*-epenthesis commenced: an unstressed *-u-* of a final syllable was anticipated in the preceding stressed syllable, while an originally stressed *-u-* in the same position was left unaltered until the fixing of stress on the old penult and eventual apocope of final syllables ... *U*-epenthesis would thus be dated quite early ... It will be observed that we have no certain evidence for *u*-epenthesis triggered by **ō* since the paradigm of *ōr*, *awowr* may be interpreted on the basis of lenition of **-m-* by an adjacent **-ō-*.

Olsen's suggestion would yield a straightforward explanation of the outcome of /amu/ in *awr* vs. that in *mamul* and *mamur*: It merely requires that *u*-epenthesis preceded the development of **_R* to *VR*, and that, *pace* Olsen's statement ending the discussion, *awr* is indeed based on **āmōr*, not **ām_r*. Obviously, because of its stress pattern, at no stage of its development did *mamu_r* fit the structural requirements for *u*-epenthesis.

One more query from the same reviewer:

Since ... reduplication is a productive means of word formation in Armenian, it seems less problematic to assume that these nouns are inner-Armenian creations (for *mamowr* cf. *mowr* 'soot; ink', for *mamow_r* cf. *mow_r* 'wet mortar, cement') ...

Clearly, derivational dependencies of this sort cannot be semantically direct, since, of course, sawdust and moss were familiar to IE speakers much earlier in (pre-)history than were ink and mortar. The reviewer does, however, point out in a subsequent note the possibility that "the innovated (i.e. reduplicated) forms may have retained the older meanings ..., while the old forms shifted semantically to newer meanings ..." But the formal facts argue strongly against such a solution, and so for a PIE-based derivation instead: Although it is true that reduplication is a productive means of word formation in Armenian, the type having the form *cīvcīvc*[...] is unusual in the language. Thus, e.g., Olsen

(1999:758) lists 35 representative examples of Armenian adjectival, adverbial, and substantival reduplicated formations; of these, not a single one is formally *civcivc*[...].²³

5 Discussion

I have, in the present article, given explicit etymologies as reduplications for Hitt. ^{GIS}*ḫaḫ(ḫa)r(a)-* ‘rake’, *ḫaḫḫarie-* ‘to rake’, ^{GIS}*šešarul-* ‘sieve’, *šešarie-* ‘to sift’, *mēmal* ‘grits, meal’; Lat. *ārea* ‘threshing floor’; and Arm. *mamul* ‘press; vice’, *mamur* ‘sawdust’, *mamuṛ* ‘moss’. Of these, while *mamuṛ* is a further example of what are referred to in Cohen (forthc. a) as intensive noun reduplications, ^{GIS}*ḫaḫ(ḫa)r(a)-*, *mēmal*, *ārea*, *mamul*, and *mamur* are examples of what is termed resultative noun reduplications there. Semantically, however, ^{GIS}*ḫaḫ(ḫa)r(a)-* and *mamul* are clearly instruments, not resultatives. It would appear, then, that this sort of noun reduplication can generate items in both semantic classes. We can add another member to the class of instruments generated in this fashion: Hitt. ^{GIS}*uaṣarkima-*,²⁴ traditionally glossed as ‘door-hinge’ but, as argued in *EDHIL* (991 s.v.), probably better taken as meaning “that part of the threshold or doorpost in which the door-axle is fixed and turns[;] ... perhaps ... some kind of wooden bearing between the wooden axle and the stone threshold”. In addition, PIE **k^ue-k^ulh₁-o-* ‘wheel’—which, following Manaster Ramer (2010:2), is derived as a morphological and semantic resultative in Cohen (forthc. a:§8)—falls, of course, comfortably in the semantic class of instruments as well. The production of both resultatives and instruments via a single morphological process, though perhaps seeming unmotivated, has a strong parallel in the Swahili process of nominalizing verbs by appending an *-o* suffix to the verb stem (as opposed to other Swahili nominalizing processes, which have different semantic functions with respect to thematic-role interpretation). The following observations are from Benji Wald (pers. comm.), who supplied abundant data; I have selected these examples as representative:²⁵

-
- 23 The reviewer is in agreement about the formal facts, writing, “apparently all clearly inner-Armenian reduplicated nouns show full root reduplication ...” However, it is only fair to note that Leroy (1986), focusing on nominal reduplications found in Classical Armenian, gives 136 examples, of which 14 (to be found on pp. 72f.), including *mamuṛ*, can be taken as *c_iVC_iVC*[...].
- 24 See Cohen (forthc. a:§7) for detailed etymological discussion.
- 25 All five of the examples included here under my heading of *Instrument* can be found in Ashton (1944 [1982]:287). Under my heading of *Resultative*, the example of *waza* → *waz-o* is

- Instrument
 - *fagia* ‘to sweep’ → *u*²⁶*-fagi-o* ‘broom’
 - *funga* ‘to close’ → *ki-fung-o* ‘button’ (i.e., ‘fastener’)
 - *fungua* ‘to open’ (lit., ‘to uncloze’) → *u-fungu-o* ‘key’
 - *tega* ‘to trap’ → *m-teg-o* ‘trap’
 - *ziba* ‘to stop up’ → *ki-zib-o* ‘stopper’ (e.g., ‘cork’)
- Resultative
 - *panga* ‘to arrange, put in order’ → *m-pang-o* ‘plan, arrangement’
 - *shindana* ‘to compete’ (lit., ‘to strive to win against one another’) → *shin-dan-o* ‘contest’
 - *umba* ‘to shape, form’ → *umb-o* ‘shape, form’
 - *waza* ‘to think, imagine’ → *waz-o* ‘idea, thought’
 - *zaa* ‘to cause to be born, bring into being’ → *ma-za-o* ‘product, produce, progeny’

One final note: As highlighted by Joseph (1992:104), the existence of Hitt. *mēmāl* ‘grits, meal’ and Arm. *mamul* ‘press; vice’ (both based on PIE **melh₂*- ‘zerreiben, mahlen’) shows that resultative and instrument noun reduplications generated from the same PIE simplex root can occur in the daughter languages, and presumably even in PIE itself.

References

- Ashton, E.O. (1944 [1982]). *Swahili Grammar (Including Intonation)*. 2nd edn. (repr.). N.p.: Longman.
- CHD = Hans G. Güterbock, Harry A. Hoffner & Theo P.J. van den Hout (eds.) (1979–). *The Hittite Dictionary of the Oriental Institute of the University of Chicago*. Chicago: The Oriental Institute of the University of Chicago.
- Clackson, James (1994). *The Linguistic Relationship of Armenian and Greek*. Oxford & Cambridge (MA): Blackwell.
- Cohen, Paul S. (forthc. a). “Reduplicated Nouns in IE”. Paper based on presentation given on 20 Sept. 2012 at the 14th *Fachtagung of the Indogermanische Gesellschaft* in Copenhagen (to appear in the Proceedings of the *Gesellschaft*).

also in Ashton (op. cit.: 288), whereas the other four examples were furnished by Wald. It should be noted that I have used *Resultative* in conformity with the terminology employed throughout this paper (following Cohen [forthc. a]); however, for some of the examples in this grouping, Wald understandably prefers *Process*, and I concur.

26 Prefixes on nouns in these examples are Swahili gender-class markers.

- Cohen, Paul S. (forthc. b). "A new etymology for PIE **mēms-* 'meat, flesh'". Paper based on presentation given on 10 Oct. 2013 at the *2nd Colloquium on Indo-European in Brno* (to appear in *Linguistica Brunensia*).
- Cohen, Paul S. & Adam Hyllested (2012). "A New Sound Law of PIE: Initial ***h₃u > *h₂u*". In Benedicte Nielsen Whitehead, Thomas Olander, Birgit Anette Olsen & Jens Elmegård Rasmussen (eds.) *The Sound of Indo-European: Phonetics, Phonemics, and Morphophonemics*. Copenhagen: Museum Tusculanum.
- Cooper, Adam I. (2009). "Similarity Avoidance in the Proto-Indo-European Roots". *University of Pennsylvania Working Papers* (= *Proceedings of the 32nd Annual Penn Linguistics Colloquium*) 15.1:55–64.
- Djahukian, Gevorg (1990). "Combinatory Vowel Changes in Armenian". *Annual of Armenian Linguistics* 11.1–16.
- EDAIL = Hrach K. Martirosyan (2010). *Etymological Dictionary of the Armenian Inherited Lexicon*. Leiden & Boston: Brill.
- EDHIL = Alwin Kloekhorst (2008). *Etymological Dictionary of the Hittite Inherited Lexicon*. Leiden & Boston: Brill.
- EDLOIC = Michiel de Vaan (2008). *Etymological Dictionary of Latin and the Other Italic Languages*. Leiden & Boston: Brill.
- EIEC = J.P. Mallory & D.Q. Adams (eds.) (1997). *Encyclopedia of Indo-European Culture*. Chicago & London: Fitzroy Dearborn.
- Fortson, Benjamin W., IV (2010). *Indo-European Language and Culture: An Introduction*. 2nd edn. Malden (MA), Oxford & Chichester: Wiley-Blackwell.
- Hoffner, Harry A., Jr. & H. Craig Melchert (2008). *A Grammar of the Hittite Language. Part 1: Reference Grammar*. Winona Lake (IN): Eisenbrauns.
- Hogg, Richard M. (2011). *A Grammar of Old English. Vol. 1: Phonology*. Malden (MA) & Oxford: Wiley-Blackwell.
- Joseph, Brian (1992). "Armenian Reduplicated Nouns *mamul*, *mamuř*, and *mamur*". In John A.C. Greppin (ed.) *Proceedings of the Fourth International Conference on Armenian Linguistics: Cleveland State University, Cleveland, Ohio, September 14–18, 1991*, 101–114. Delmar (NY): Caravan.
- Kimball, Sarah E. (1999). *Hittite Historical Phonology*. Innsbruck: Innsbrucker Beiträge zur Sprachwissenschaft.
- Kortlandt, Frederik. (1994). "Proto-Armenian Numerals". In Jens Elmegård Rasmussen & Benedicte Nielsen (eds.) *In Honorem Holger Pedersen: Kolloquium der Indogermanischen Gesellschaft vom 26. bis 28. März 1993 in Kopenhagen*, 253–257. Wiesbaden: Dr. Ludwig Reichert Verlag. [Repr. in Kortlandt (2003:98–101).]
- Kortlandt, Frederik (2003). *Armeniaca: Comparative Notes (with an Appendix on the Historical Phonology of Classical Armenian by Robert S.P. Beekes)*. Ann Arbor (MI): Caravan.
- Kuiper, F.B.J. (1961). "Zur kompositionellen Kürzung im Sanskrit". *Die Sprache* 7:14–31.

- Leroy, Maurice (1986). "Le redoublement comme procédé de formation nominale en arménien classique". In Maurice Leroy & Francine Mawet (eds.), *La place de l'arménien dans les langues indo-européennes*, 62–75. Louvain: Lovanii Aedibus Peeters.
- LIV = Helmut Rix (ed.) (2001). *Lexikon der indogermanischen Verben*. 2nd edn. Wiesbaden: Dr. Ludwig Reichert Verlag.
- Manaster Ramer, Alexis. 2010. "A Simply Perfect Bear of an Etymology, or Two, or Even More: PIE **h₂rt-t-ko-* [sic] 'bear', OInd. *ṛkṣá* 'bald, bare', PIE **te-tk-on-* 'craftsman' (with some discussion of **k^wek^w-l-o-* [sic] 'wheel', *mēms* 'meat', **tetr-* 'grouse', and several other "perfect" nouns)". Unpublished (and unfinished) ms. emailed to me by the author in Oct. 2010.
- Melchert, H. Craig (1994). *Anatolian Historical Phonology*. Amsterdam & Atlanta: Rodopi.
- OED1 = (1933 [1971]). *The Compact Edition of the Oxford English Dictionary*. London: Oxford University Press.
- Oettinger, Norbert (2012). "Das Verhältnis von nominaler und verbaler Reduplikation im Indogermanischen und Anatolischen". In H. Craig Melchert (ed.), *The Indo-European Verb: Proceedings of the Conference of the Society for Indo-European Studies, Los Angeles 13–15 September 2010*, 241–246. Wiesbaden: Reichert.
- OHGCL = Michael Weiss (2009). *Outline of the Historical and Comparative Grammar of Latin*. Ann Arbor (MI) & New York: Beech Stave.
- Olsen, Birgit Anette (1999). *The Noun in Biblical Armenian: Origin and Word-Formation—with Special Emphasis on the Indo-European Heritage*. Berlin & New York: Mouton de Gruyter.
- Puhvel, Jaan (1976). "Latin *ārea* and Indo-European Threshing Terminology in Hittite". *California Studies in Classical Antiquity* 9:197–202.
- Tischler, Johann (1983). *Hethitisches etymologisches Glossar*. Part 1 (a–k). Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.
- Watkins, Calvert (2000). *The American Heritage Dictionary of Indo-European Roots*. 2nd edn. Boston & New York: Houghton Mifflin.