A Quantitative and Qualitative Analysis of the Final Vowels [i] and [a] in Luganda Deverbal Nouns

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1. Introduction

In this paper, I propose a novel study of Luganda derived nominals that is based on a quantitative analysis of 642 Luganda deverbal nouns. The main objective of this paper is to shed light on the morpho-semantic nature of the final vocalic segments <i> and <a> of Luganda deverbal nouns. The question at stake is whether these final vowels are morphemes and what role do they play, if any, in the deverbal noun formation process.

The exploration of this issue from a quantitative perspective is necessitated by the fact that, up until now, all claims made in the Bantu literature regarding the nature of these final vowels have only been argued from a qualitative perspective. Consequently, the nature and the number of exceptions to assumed correlations between the final vowels and semantic and lexical features have heretofore not been properly weighted from a quantitative perspective.

Before laying out the terms of my proposal, let's first look at the size and nature of the database used for this analysis and at the different analyses put forth in the literature relative to the semantic and morphological function assigned to final vowels.

2. The database

The 642 Luganda deverbal nouns analyzed in this paper belong to Ferrari's (2005) noun database consisting of 1,080 nouns built on the lexical entries found in John D. Murphy's (1972) Luganda–English Dictionary. The 642 deverbal nouns mainly belong to the following singular noun classes and their corresponding noun class prefixes: Cl. 1 (mu), Cl. 5 (CC)[1], Cl. 6a (ma), Cl. 7 (ki), Cl. 9 (CC/n), Cl. 12 (ka) and Cl. 14 (bu). Noun classes 3, 11 and 15 have very few deverbal nouns, hence their exclusions from the present analysis. Ferrari's (2005) database was originally built with the goal of accounting for the semantic distribution of nouns across the different noun classes.

According Ferrari's data analysis, the Luganda noun class system is partially semantic. Nouns of classes 1, 3, 6a, 7 and 14 are semantically organized. In particular, class 1 contains nouns that are [+human], class 3 nouns that denote plants or long objects, nouns of class 6a are mostly mass, liquid and collective nouns, nouns of class 7 denote concrete nouns and objects, and finally nouns of class 14 are abstract nouns. A small percentage of nouns of classes 3, 6a, 7 and 14 are exceptions. The other remaining classes are all miscellaneous, i.e., they denote different entities, e.g., animate, inanimate, abstract, concrete and collective nouns.

As I argue later on in this paper the partial semantic nature of the Luganda noun class system is important in the understanding of the compositional meaning of the deverbal nouns here analyzed.

3. The final vowels in the Bantu literature

In Luganda, as in many other Bantu languages, deverbal nouns are formed by the combination of a noun class prefix (henceforth NCP) with a simple or modified verb stem followed by a final vocalic segment as represented in (1).

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[1]CC = doubling of the first consonant of the noun stem,e.g., ttuzi (cl. 5) selling. Consonant doubling is mainly found with nouns of class 5 and class 9.

1a. NCP + [V-stem /V+ applicative, causative, stative, passive] + final vowel
1b. MU + [GOB] +A 'driver'

As the data in (2) show, deverbal nouns can be prefixed by any NCP and they can end in one of the five possible Luganda final vowels, i.e., <a>, <e>, <i>, <o> or <u>[2].
2.

cl	-a	-e	-i	-o	-u
1	Mu-goba 'driver'	Mu-baage 'One who undergoes surgery'	Mu-beezi 'helper'	Mu-fumbiro 'cook'	Mu-jeemu 'rebel'
5	Jjeeza 'isolated place'	Ggulire 'piece of news'	Jjingirizi 'abundance'	Ddudumo 'thunder'	Ddulu 'pearl'
6a	Ma-boneka 'new moon'	Ma-tambulire 'whereabouts'	Ma-gezi 'wisdom'	Ma-gambo 'news'	Ma-kulu 'meaning'
7	Ki-baaga 'sharp spear'	Ki-bajje 'piece of carpentry'	Ki-bangirizi 'open space'	Ki-bajjo 'chip of wood'	Ki-butamu 'inclined land'
9	Nfaanana 'appearance'	Ndwadde 'sickness'	Ngassi 'recompense'	Nfukulo 'burrow'	Nkanu 'harshness'
12	Ka-bina 'curve'	Ka-baate 'tumult'	Ka-boyi 'dizziness'	Ka-bonero 'sign'	Ka-kyamu 'mistake'
14	Bu-baka 'message'	Bu-bage 'draft'	Bu-bazi 'accountancy'	Bu-fumbo 'marriage'	Bu-gimu 'fertility'

In the Bantu literature, there is a lively discussion with regards to the morphological role of final vowels and NCPs in deverbal noun formation. The core issue of this discussion is whether the NCP or the final vowel functions as a derivational N-head that turns a verb stem into a noun.

The debate is fueled mainly by the following two facts concerning the morphological nature of deverbal nouns. Firstly, NCPs have a double morphological nature (inflectional and derivational), as noted, among many others, by Ashton et al. (1954) for Luganda, by Mchombo (2004) for Chichewa and by Mufewe (1980) for several other Bantu languages. As inflectional heads, NCPs trigger DP and VP agreement (see 3a) and as derivational heads they take part in derivational process (see 3b-d).[3]

3a. Aba-ana ba-no aba-satu   a-ba Mukasa te-ba-leese kintu; (Ashton 1953:23)
    NCP-ChildrenAC-these NC-three VC-of Musaka not-Sub-marker-have brought anything
    'These three children of Mukasa have not brought anything'
3b. b-beere (cl.5) 'breast' > Ki-beere (cl.7) 'udder'
3c. ki-batu (cl. 7) 'palm of the hand' > lu-batu (cl. 11) 'handful'
3d. avu 'poor' > bw-avu 'poverty'

Secondly, many authors have observed certain correlations between specific final vowels and specific deverbal noun types. Such correlations have lead many to the conclusion that final vowels are

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N-marked heads and, possibly, semantically specified. However, there is no scholarly consensus regarding the specific semantic and morphological nature of final vowels. For instance, according to Ashton et al. (1954) for Luganda, Mchombo (1979) for Chichewa and Mugane (1997a, 1997b) for Gikuyu, all final vowels are N-marked heads whose merge with a verb stem yields a derived nominal stem. Moreover, Ashton et al. (1954:375) for Luganda claim that the final vowels <a> and <i> are the expression of the semantic feature 'agentivity' for nouns of class 1 and of the feature 'abstract' for nouns of class 14[4]. Similar arguments for nouns of class 1 are found in Mugane (1997) for Gikuyu. But by contrast, Mchombo (1993) for Chichewa, Myers (1990) for Shona, Katamba for Luganda (2003) and Kinayolo (1991) for Kilega do not treat all the final vowels as N-marked heads. They make a morphological distinction between the vowels <a> and <e>, which are considered inflectional morphemes and the remaining final vowels <i>, <o> and <u> which are considered derivational heads.

This lack of agreement has consequences for the morpho-syntactic representation of nouns, especially with respect to the question of the derivational role of the NCP in the noun formation process. In this regard, two proposals have been put forth in the literature. One proposal, espoused by Mugane (1997a, 1997b, 2003), asserts that in deverbal noun formation processes, the final vowel is the nominalizer that turns a verb stem into a noun stem. This derived nominal is then, in turn, selected by the NCP, which functions simply as an inflectional head, assigning a noun class feature to the derived nominal as represented in (4).

4.
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              N
             / \
            /   \
          Ncl   N-stem
                /   \
               /     \
           V-stem   Nzer {i,a}
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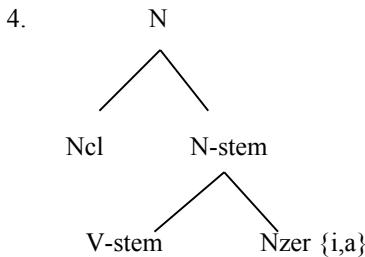
The second proposal endorsed by Mufwene (1980), Myers (1990) and Ferrari-Bridgers (2005, 2008) claims that in all types of nominal formation, i.e., simple, derived and complex, the NCP is the nominalizer head. According to Myers (1990:109), for instance, the NCP is an N-head that as the head of the NP takes a VP, NP or CP as a complement as shown in (5).

5.
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              NP (cl.1)
             /   \
            /     \
         Ncl.1    XP {VP, NP, N-stem or XP}
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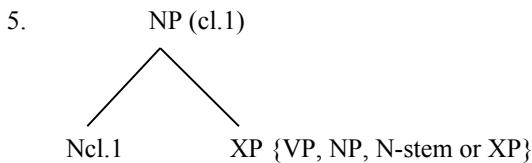
Similar conclusions are reached more recently by Ferrari (2005) and Ferrari-Bridgers (2008), who, within a syntactic approach to noun formation processes, argues that noun class features are N-marked heads, an expression of the lexical feature [n], whose merger with any base (N-stem, V-stem, A-stem or XP) yields a noun.

Without arguing which of the two syntactic representations of nouns best suits the Bantu languages, it is worth noting that both models do not clearly address the question of how NCPs and final vowels interact with each other in deverbal noun formation processes. Both models leave many questions unanswered. With regards to the first model, for instance, nothing is said about the morphological nature of the final vowels of simple, denominal and deadjectival nouns, though these vowels are identical to the final vowels of derived nouns. Similarly, this model does not explain why,

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[4] The claim that the final vowel is the expression of the feature [+abstract] is restricted to the final vowel <i> only.

in denominal and deadjectival noun formation processes, the NCP functions as the nominalizer (see examples in 3b), but the same cannot be true for deverbal noun formation processes. Finally, though the second model proposes a more uniform account for the derivation of all noun types, it does not investigate the question of the nature, role and function of final vowels in all noun types.

4. Proposal

To clarify some of the above unresolved questions, in the remaining part of this paper, I present the results of the quantitative analysis relative to the final vowels <a> and <i>. The data analysis of these two vowels provides great insight about their role, nature and function in deverbal noun formation processes. More specifically I argue the following points.

1. Final vocalic segments have no semantic content. This holds true whether the final vocalic segments are analyzed in isolation or combined with a NCP. Therefore, there is no basis for the claim that they are morphemes expressing a specific semantic feature.

2. Similarly looking in details at the analysis of each final vowel, I argue that there is no substantiate basis for assuming that final vowels are N-marked heads.

4.1. Lack of semantic content of the vowels <i> and <a>

My claim regarding the lack of a specific semantic nature for final vowels is based on the observation that the final vowels <a> and <i> are found as endings of semantically miscellaneous nouns. Figures 1 and 2, in fact, show that the final vowels <a> and <i> are fairly distributed across several noun classes.

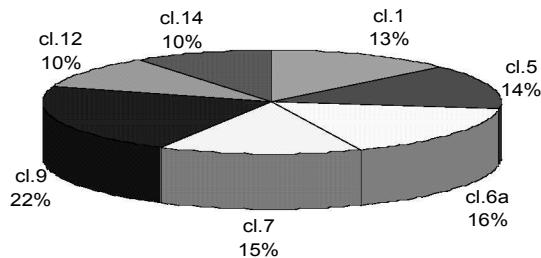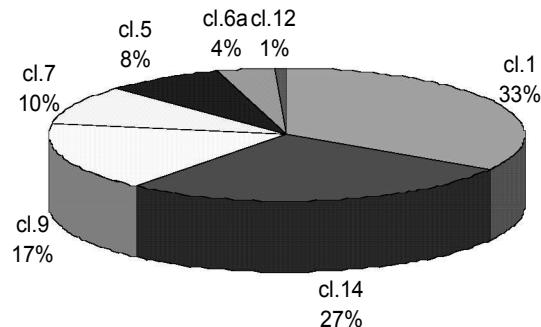Figure 1: Nouns ending in <a>

Figure 2: Nouns ending in <i>

Given the noun distributions in pictures (1) and (2), one can conclude that nouns ending in <a> are equally represented among all classes, which supports the thesis that the final vowel <a> can be associated with nouns having different semantic connotations.

Nouns ending in <i>, on the other hand, are mainly found in classes 1, 14, 9 and 7. Although classes 1, 14 and 7 are semantically specified, one can still conclude that there is no preferential semantic feature for nouns ending in <i> given that each class is characterized by a specific semantic meaning. Moreover, the final vowel <i> is found with nouns of class 9, which are miscellaneous.

The fact that each final vowel finds almost equal distribution across a minimum of four to five different noun classes indicates that the final vowel cannot be assigned a specific semantic meaning. In other words, given that miscellaneous nature of nouns of different noun classes, final vowels alone do not carry any semantic meaning.

4.2. Lack of semantic content of final vowels in combination with NCPs

According to Ashton et al. (1954) for Luganda, Mugane (1997:41) for Gikuyu and Mchombo (1979, 1993) for Chichewa, the combination of a NCP of class 1 with the end vocalic segment <i>, [MU…-i], yields an agentive noun. Further, according to Mugane (1997:41), in Gikuyu agentive nominalization is very productive and "virtually any verb can be nominalized in this manner".

A similar claim is argued for nouns of class 1 ending in <a>, [MU…-a]. This second group is considered less productive and with specific selectional restrictions. In the case of Gikuyu for instance, [Mu…-a] nouns are not formed with intransitive stems (Mugane, 1997) and they are considered as "frozen", i.e., they have lost their phrasal nature, which is not the case for nouns ending in <i>. In the case of Luganda, Ashton et al. (1954) suggests that agentive nouns ending in <a> prefer a modified verb stem, i.e., [V + causative head].

Looking at the 100 nouns found in class 1 in the database, 49% of the nouns are agentive nouns and 66% of these 49 nouns are nouns ending in <i>. The remaining 34% is made up of nouns ending in <a>, <e> and <o>. Examples of agentive nouns of different classes are given in 6.

Agentive nouns ending in <-a>
6a. Muganga 'doctor' < ganga 'to treat'
6b. Mugoba 'driver' <goba 'to drive'
6c. Muvuga 'driver' < vuga 'to drive'

Agentive nouns ending in <e>
6d. mukoloze 'one who has a cough, cougher' < kolola 'to cough'
6e. mulyake 'extortioner' < lyakula 'to cheat'
6f. muduuze 'scoffer' < duula 'to deride'

Agentive nouns ending in <i>
6g. mufumbi 'cook' < fumba 'to cook'
6h. mufumisi 'one who spears in hunting' < fumitta 'to spear'
6i. muvuzi 'driver' < vuga 'to drive'

Agentive nouns ending in <o>
6j. mufumbiro 'cook' < fumba/fumbira 'to cook for'
6k. mulogo 'sorcerer' < loga 'to charm'

With regards to the semantic notion of agentivity of the [MU…-i] nouns, only 75% are agentive. The remaining 25% are non-agentive as shown by few examples in (7).

7a mujulizi 'witness' < jula/ juliza 'cause to bear witness'
7b mumanyi 'acquaintance' < manya 'to know'

7c. mujeemusi 'subdued rebel' < jeema/jeemuka 'to submit'
7e. mugenzi 'deceased person' < genda 'to go away'
7e. musisi 'heir' < okusika 'to inherit'

As suggested earlier, the percentage of agentive nouns ending in [a] is lower. In Luganda, in fact, only 50% of the 32 [MU…a] nouns are agentive. The remaining 50% are semantically miscellaneous as the examples in (8) suggest.

8a. Mujulirwa 'witness'< julirwa < jula 'to be a witness'
8b. mumanyibwa 'Acquaintance' <manya 'to become known'
8c. Mulagulwa 'one who consults a fortuneteller' <lagula 'to prophecy'
8d. Muwawaabirwa 'defendant' < waaba 'to charge'
8.e musika 'heir' < sika 'to inherit'.

The presence of a large number of exceptions weakens the hypothesis of a one-to-one correspondence between nouns of class 1 ending in <i> or <a> and the notion of agentivity. This hypothesis is further weakened by the presence in Luganda of pairs of agentive nouns such as (6c) and (6i) and non-agentive nouns such as (7e) and (8e) where the final vowels <a> and <i> are interchangeable and the two nouns have identical meanings. The possibility to alternate <a> and <i> for both agentive and non-agentive nouns is a further indication of the lack of semantic content of these final vowels. Therefore, I conclude that final vowels do not have any specific semantics even when combined with the NCP of class 1.

I reach a similar conclusion for abstract nouns of class 14, i.e., [BU…-i] nouns. According to Ashton et al. (1954:374), the combination of the NCP of Class 14 with <i>, [BU…-i], yields an abstract noun. However such a claim is not borne out by the data. In figure (3) below, I show the distribution of nouns of class 14 across the five vowel endings.

Figure 3: Distribution of nouns of class 14
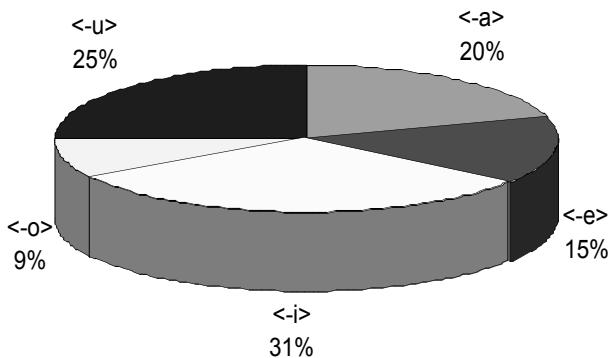
According to my data analysis 80% of the nouns of Class 14 (ending in all vowels) are abstract nouns. Abstract nouns are fairly distributed across nouns of all endings. Few examples of abstract nouns ending in all vowels are given below.

Abstract nouns ending in <a>
9a Bujulira 'quotation' < jula, julira 'to quote'
9b. Bukuusa 'deceit' < kuusa ' to deceit'

Abstract nouns ending in <e>
9c. Bufuge 'subjection' < fuga 'to rule'
9d. Bulabe 'hostility' < laba 'to see'

Abstract nouns ending in <i>
9e. Bukaayi 'bitterness' < kaawa 'to be bitter'
9f. Bubazi 'accountancy'< bala 'to count'

Abstract nouns ending in <o>
9g. Bukalubo 'hardness' < kaluba 'to harden'
9h. Buddiro 'recurrence' <dda, ddira 'to return'

Abstract nouns ending in <u>
9i. Bunyiikivu 'diligence' < nyiikira 'to persevere'
9j. Bukaawu 'bitterness' < kaawa

From the above data concerning the distribution of abstract nouns it is clear that the notion of [+abstract] derives from the NCP rather than from the final vowel itself. This also explains examples such as (9e) and (9j), where both <i> and <u> are interchangeable and both nouns have the same meaning.

To conclude the above data and observations clearly demonstrate that final vowels are not the expression of specific semantic features.

4.3. Final vowels are not N-heads

In this last part of this analysis, I argue that the final vowels <i> and <a> cannot be considered N-marked heads. Though my arguments are mainly based on data relative to each final vowel, the possibility of being able to use the final vowels <a> and <i> interchangeably without altering the meaning of the noun suggests that by transitivity the two segments play similar roles in the deverbal noun formation process.

With regards to <a>, it seems to be a widely accepted fact in the Bantu literature that the final vowel <a> found suffixed to verbs is either an inflectional morpheme or a default vowel. As an inflectional suffix, <a> has been interpreted as either a marker for indicative mood (Myers (1990), Downing (2000), Buell (2005) and Mchambo (2004) or a zero tense marker (Kinayolo 1991). As a default vowel, the final vowel <a> has been interpreted as having no morphological value and, therefore used only to phonologically fill out the final stem position (Mutaka and Hyman (1990) and Hyman, Inkelas and Sibanda (1998). Both interpretations, however, suggest that <a> is part of the verbal stem.

At the level of deverbal nouns, the claim that <a> is part of the verbal stem is supported by the observation that there is no evidence of the existence of two <a> morphemes, one derivational for deverbal noun formation only and one inflectional (or default) for all other nominal and verbal uses of the verb stem. This observation is further supported by the impossibility for the final vowel <a> to be an N-head in complex types of deverbal nominals such as nouns formed on relative constructions (10a,b) and nouns formed on with the negative morpheme TA (10c,d).

10a. Ebisima
  Things which dig (lit.)
  'Construction tools'
10b. Ebirimibwa
  things which are cultivated (lit.)
  'crops'

10c. Omutawonga
    one who does not make an offer (lit.)
    'One who does not worship God'
10d. Obutabalika
    an uncountable number (lit.)
    'billion' (Ashton et. Al. 1954:381)

All these nouns are built up on an XP containing a VP ending in <a>. Relative clauses and negative phrases select a VP, they do not select a V-stem or an N-stem. Therefore, the final <a> on the verb must be part of the verbal stem and cannot be an N-head that is added later in the derivation.

Similarly, the final vowel <a> must be considered part of the verb stem rather than an N-head in nominalized infinitives, which in Luganda, are characterized by the presence of the NCP [KU] of class 15. Infinitives in Luganda, as well as in other Bantu languages (see Mugane (2003) for Gikuyu) can have a verbal and nominal function, depending on the syntactic context in which they are inserted. It follows, therefore, that the final vowel <a> does not play any specific derivational role in these formations and it is part of the verb stem. From the above data one can conclude that the hypothesis of two distinct final vowels <a> is implausible and that the final vowel <a> in all types of deverbal nouns corresponds to an inflectional (or default) marker that is part of the verb stem.

If <a> is not an N-marked head, it follows that, for transitivity, the final vowel <i> is not an N-marked head either, which is additionally supported by the following facts. Firstly, the final vowel <i> is used as an ending for adjectives and deadjectival nouns (11a-b), adverbs (11.c-d), denominal nouns (11e) and and simple nouns (11f).

11a. -gezi 'clever' > mugezi 'clever person'(cl.1), magenzi 'wisdom' (cl.6a)
11b. -bi 'evil' > kibi 'bad', 'evil'(cl.7)
11c. kaati 'openly, frankly'
11d. ddaaki 'finally, at last eventually'
11e. kisuuyi (cl.7) trap for large animals'
11f. mujoozi (cl.3) 'jersey'

Secondly, in Luganda one possible way to derive adverbs is by modifying the verb stem with the prefix BU and the final vowel <i> as in the following examples.

12a. A-tuula   bu-tuuz-i
    he sits   merely
    'he merely sits'
12b. Ba-mu-kubye   bu-kub-i
    they him- hit   just
    'they just hit him'

In the examples in (12), the final vowel <i> serves as a suffix in the adverbial formation process, which once again shows that <i> cannot be considered as an N-head. Taken together the above data and observations lead me to conclude that <i> is not an N-marked head.

5. Conclusion

The analysis presented in this paper clearly shows that final vowels <a> and <i> found on deverbal nouns are not semantically specified N-heads. This conclusion contravenes the representation of derived nouns proposed in (4). It follows that the NCP necessarily plays an important role in the deverbal noun formation process, which is plausible by virtue of its derivational nature. Thus the representation of derived noun proposed in (5) seems to be more adequate to describe the role of NCPs in the Luganda deverbal noun formation process.

Moreover, NCPs of class 14 and class 1 seem to also play also an important semantic role in derivational processes. As seen above, for nouns of class 14, the abstract meaning of these nouns

derives from the semantics of the predicate and the NCP. Similar conclusions can be reached for the expression of the feature agentivity through the NCP of class 1. With regards to agentive nouns one can claim that the combination of the NCP of class 1 with a predicate describing an action generates an agentive noun. The possibility for the NCP to be the expression of agentivity is evident in the following de-nominal nouns, where the merger of the NCP of class 1 with a noun stem denoting a musical instrument yields an agentive noun, though there is no verb overtly present.

13a. Mudongo (cl.1) 'harp player'< kidongo (cl.7), endongo (cl.9) 'harp'
13b. Mugoma (cl.1)'drummer' < ennoma (cl.9) 'drum'
13c. Mulere (cl.1) 'flute player' < mulere (cl.3) 'flute'

Though more research is needed to determine the semantic role of NCPs in derived nominals, it is plausible to assume that the specific meaning of a deverbal noun derives mainly from the meaning of the predicate and the NCP, at least for those nouns where the NCP belongs to a semantically marked noun class.

To conclude it seems clear at this point that at least in Luganda, the final vowels <a> and <i> do not play a major derivational role in deverbal noun formation processes. The data analysis demonstrates that the final vowels have no semantic content nor are they N-marked heads.

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