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Tone in Kenyang Noun Phrases

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by

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ABSTRACT OF THE THESIS

Tone in Kenyang Noun Phrases

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Professor Bruce P. Hayes, Chair

Kenyang nouns and noun phrases provide a restricted
paradigm in which we can observe tone patterns and the
interaction of various tonal processes. An autosegmental
description of tone is presented in which noun roots carry
tone melodies of three tone segments. The association of
tones to tone bearing units occurs by general convention.
This accounts for the difference in distribution of
surface tone patterns on two and three syllable nouns.

Associative noun phrases are marked by a relatively
complicated set of vowel deletion alternations. However,
the reassociation of tones is seen to follow from a
commonly observed principle and a specification of the
domain for tone associations.

A result of theoretical interest is that the

Obligatory Contour Principle is not a part of the
phonology of Kenyang. Rejecting the Obligatory Contour
Principle at both the lexical and phrasal levels leads to
a much simpler description of tonal phenomena.

1. Introduction

Kenyang is spoken by about 45,000 people in the Southwest Province of the Republic of Cameroon. It is bordered by an Ekoid language, Ejagham, to the west, by Zone A Bantu languages to the south, and by Mbam-Nkam languages to the east. Previous linguistic surveys of Kenyang have concentrated on cognate counts and the noun class system to determine if Kenyang should be classified as Bantu or Bantoid.

This paper presents a descriptive analysis of Kenyang tone as observed in nouns and noun phrases. All of the data which will be presented is from my own work in the Lower Kenyang dialect spoken near the town of Mamfe. Evidence from monosyllabic and bisyllabic noun roots shows that a tonal melody of three tones is associated with each noun root. Associative noun phrases consisting of two nouns separated by an associative marker provide a restricted paradigm in which we can examine the interaction of vowel deletion and tonal processes. Downdrift and downstep will also be discussed.

2. Kenyang

The Kenyang language is variously referred to in the literature as Nyang, Banyang, Ba(n)yangi, Manyang, and Kóŋgūaŋ. The people themselves use the term Kenyang, so I will use that term here. There are three mutually intelligible dialects: Lower Kenyang, Upper Kenyang,

and Kitwii.

2.1 Previous studies

2.1.1 Early surveys

Kenyang first appears in the literature in Koelle's (1854) Poliglotta Africana. He refers to it as Kóŋgūaŋ (language number XII.E.17 in his system). The word list was obtained from a freed slave in Sierra Leone who was originally born in the village of "Bisóŋawaŋ" (present day Besongabang in the Lower Kenyang dialect area).

Two surveys during the German colonial period include word lists of Kenyang. Mansfeld (1908) presents an anthropological study of the area which is now administratively referred to as the Manyu Division. This includes word lists for seven of the languages of this area, including "Banjang". Bufe (1910/11) includes a comparative word list of "Banyangi" and four languages spoken to the south.

2.1. Comparative analyses

Later studies were preoccupied with trying to classify languages in this region as being Bantu or not. The following studies make at least passing reference to Kenyang:

Author	Language name
Johnston (1919, 1921)	Manya
Talbot (1926)	Banyangi
Tessmann (1932)	Banjangi
Westermann and Bryan (1952)	Banyang
Jacquot and Richardson (1956)	Nyang
Richardson (1957)	Nyang
Williamson and Shimizu (1968)	Nyang
Williamson (1971, 1973)	Nyang
Heine (1976)	Nyang
Voorhoeve (1981)	Nyang

2.1.3 Descriptive studies

Other than surveys, very little descriptive work has
been done in Kenyang. Ittmann (1935-36) discusses the
phonology, morphology, and some syntax of Lower Kenyang as
spoken in the villages to the south and west of Mamfe.
Voorhoeve (1980) presents the noun class system of Kenyang.
His data is clearly from one of the Lower Kenyang
sub-dialects, but he does not mention which village(s) his
speakers came from.

2.1.4 Published texts

Ittmann (1931-32a) presents some Kenyang folk tales
and their free translations (in German). He also
published a collection of 702 proverbs (Ittmann 1931-32b).
The Basel Mission did some translation work in Kenyang
which resulted in Wunderli and Meier's (1957) Kenyang song
book.

2.2 Overview of the segmental phonology

Vowels and syllabic nasals occur as syllable peaks
and both are tone bearing units. There are 10 phonetic

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vowels and 7 phonemic vowels in Kenyang:

(1) a. Phonetic vowels   b. Phonemic vowels

    i ɨ u   i ɨ u
    ɩ
    e ə o
    ɛ   ɔ   ɛ   ɔ
       a   a

The high front vowel /i/ is realized as the lax [ɩ]
when it occurs in closed syllables that end in a stop.

The phoneme /ɛ/ is most frequently realized as the
mid front unrounded lax [ɛ]. However, when /ɛ/ occurs
before /i/ or /y/, it is realized as the tense [e]. It is
realized as [ə] in word final position following /ŋ/.
/ɛ/ usually occurs as [e] in other word final positions,
but there is free variation with [ɛ].

The consonant phonemes are as shown in the following
table:

(2) Consonant phonemes

	Labial	Alveolar	Palatal	Velar	Labio-Velar
Stops	p	t	c	k	kp
	b	d	j	g	gb
Fricatives	f	s			
Nasals	m	n		ŋ	
Liquids		r	y	w	

The series of voiceless and voiced stops includes the
palatal affricates /c/ and /j/ ([tʃ] and [dʒ]
respectively). The voiced stops /b/ and /g/ are realized
as the fricatives [β] and [γ] intervocalically. /d/
becomes the flap [ɾ] in this environment. The contrast
between the voiceless and voiced stops is neutralized in

pre-pausal position where phonetically there are only voiceless unreleased stops.

Throughout the rest of the paper, I will use a phonemic alphabet corresponding to the charts of (1b) and (2). One exception is that the mid front vowel will be typed as "e" rather than hand writing "ɛ".

2.3 Syllable structure

Open and closed syllables both occur in Kenyang. Vowels and syllabic nasals occur as syllable peaks. Syllabic nasals do not occur with a syllable onset or rime. Thus, their distribution as syllable peaks is much more limited than vowels. The semi-vowels /y/ and /w/ are the only two consonants that can occur as the second member of a consonant sequence in a syllable. This is represented by using a S for semi-vowels in the chart below, whereas C represents any consonant.[1]

(3) Syllable patterns

Syllable pattern	Example	Gloss	Syllable pattern of this example
V	àtá	jaw	V.CV
N	ǹtà	hat	N.CV
CV	fá	where?	CV
CSV	pwɔ̀	lend	CSV
CVC	dɔ́g	go	CVC
CSVC	fwéd	pass by	CSVC

2.4 Nouns

Nouns consist of an obligatory class prefix plus the noun root. The prefixes are single syllables of the form

V-, CV-, or N- (where "N-" stands for a syllabic nasal
which is homorganic with the following consonant). Roots
are either one or two syllables and can be characterized
by the schema (N)C(S)V(C(V)) as exemplified below:

(4)   Examples of noun root syllable structure

-CV	-NCV
nè-bù 'sky'	nè-mbè 'star'
bè-nò 'hoes'	sé-ndé 'palm tree'
-CSV	
kè-gwɔ̀ 'vomit'	
ǹ-jwì 'pig'	
-CVC	-NCVC
bà-kèb 'bundles'	è-nsɨ̀ŋ 'anthill'
nè-yàd 'footprint'	né-nsáŋ 'tadpole'
-CSVC	
è-syêb 'sand'	
m̀-bwéb 'fever'	
-CVCV	-NCVCV
è-kɔ̀ŋɔ̀ 'millipede'	nè-mbádè 'climbing vine'
ŋ̀-kùbú 'antelope'	
-CSVCV	
m̀-mwèdé 'friend'	
ŋ̀-kwùbù 'leopard'	

Noun classes are distinguished by the form of the
prefix, the set of concord elements (e.g. possessive
pronouns, demonstratives, etc.), and by the singular/

plural pairing of class members. The segmental form of
the prefix is fixed by the class, but the tone of the
prefix is determined by the noun root.

As exemplified in table (5) below, there are 12 noun
classes in Kenyang (Voorhoeve, 1980). The nasal prefix
N- is homorganic with the initial consonant of the root.
In Lower Kenyang, the prefixes /ba-/ and /be-/ for
classes 2, 6, 6a, and 8 have the morphological variants
/ma-/ and /me-/ when the noun root begins with a nasal
consonant (this assimilation does not occur in the Upper
Kenyang and Kitwii dialects). In classes where there is
more than one prefix (e.g. N-/a- for class 3), the choice
of prefix is lexically determined. Nouns taking these
two prefixes are placed in the same class, because they
have the same set of concord elements and they all take
their plural in class 6. Voorhoeve (1980) gives a
detailed account of Kenyang noun classes, including
concord elements and singular/plural pairings that
provide evidence for this classification.

Noun roots taking a nasal prefix (N-) never occur
with a High tone on the prefix. This is marked by an
asterisk (*) in the chart. Even if the plural is formed
with a CV- prefix, the root will still not take a High
tone on the prefix. For example, all roots which take the
nasal prefix in class 1 also have a Low tone prefix for
their plurals in class 2.

(5) Kenyang noun classes

Class	Prefix	Low tone prefix	High tone prefix
sg. 1.	N-	m̀-fɔ̀ 'chief'	*
		ǹ-ném 'husband'	
	ta-	tà-tù 'bee'	tá-bìnì 'louse'
pl. 2.	ba-	bà-fɔ̀ 'chiefs'	*
		mà-ném 'husbands'	
sg. 3.	N-	m̀-bàŋ 'horn'	*
	a-	à-tú 'ear'	á-cwî 'canoe'
sg. 5.	ne-	nè-pém 'life'	né-nén 'knee'
			né-nyén 'tooth'
	N-	ǹ-tày 'stone'	*
pl. 6.	ba-	bà-tày 'stones'	bá-dɨ́ 'tongues'
		mà-nà̀ 'thighs'	má-nén 'knees'
	a-	à-mɔ́ 'hands'	á-mén 'teeth'
-- 6a.	ba-	bà-wèd 'oil'	bá-yá 'pepper'
		mà-nùŋ 'blood'	
sg. 7.	e-	è-tɔ̀g 'village'	é-púg 'place'
		è-nɔ̀g 'tree'	
pl. 8.	be-	bè-tɔ̀g 'villages'	bé-púg 'places'
		mè-nɔ̀g 'trees'	mé-mbé 'mosquitos'
sg. 9.	N-	ǹ-sɔ̀g 'elephant'	*
pl. 10.	N-	ǹ-sɔ̀g 'elephants'	*
sg. 19.	se-	sè-yèb 'bat'	sé-ncéb 'lump'
pl. 13.	ke-	kè-yèb 'bats'	ké-ncéb 'lumps'

3. Lexical Tone

There are two phonological tones, High (H) and
Low (L). It is possible for two different tonemes to be
linked to a single vowel and this results in a phonetic
contour tone. Both of the logical possibilities, Falling
(HL) and Rising (LH), are realized in surface forms. There
are never more than two tones realized phonetically on a
single vowel (i.e. there are no contours of the form HLH
or LHL on a single vowel). I will frequently use
traditional tone diacritics as an abbreviation of a multi-
tiered representation. These marks are not intended to
give a detailed phonetic description of pitch levels.
Where such a description is required, I have given both
an autosegmental representation and a chart of the surface
pitch contour.

3.1 Observed surface forms

Tone patterns on nouns can be characterized by eight
tone melodies. Given the tones High and Low, there are
eight possible combinations of a sequence of three tones.
All of these possible combinations are attested as shown
in (6) below. I assume that holes in the chart
are due to lack of data (especially for the three syllable
nouns) and not to a general restriction.[2]

Tone glides only occur on monosyllabic noun roots.
There are no examples of noun class prefixes or bisyllabic
noun roots which occur with a contour tone.[3]

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(6)   Tone melodies on two and three syllable nouns

Melody	Two syllables		Three syllables	
L L L	è-nɔ̀ɟ	'tree'	bè-s̄ɨ̄ŋè	'army ants'
L L H	bà-bǎ	'wasps'	bà-gɔ̀dé	'women'
L H L	è-t̂ɨ	'calabash'	bè-cíkè	'sneeze'
L H H	à-tú	'ear'	mè-ŋémé	'greed'
H L L	---		tá-bìnì	'louse'
H L H	tá-kɔ̌	'grass'	---	
H H L	á-ŝɨ	'net'	é-yémè	'cliff'
H H H	né-dɨ́	'tongue'	---	

Noun prefixes can be either High or Low tone, as
shown in (5) and (6) above. This tone is determined by
the root. That is, a root which takes a Low tone prefix
in the singular will also take a Low tone prefix in the
plural. If it takes a High tone prefix in the singular,
then it also takes a High tone prefix in the plural.

This stability of tone melody holds even for nouns
which have irregular singular/plural forms in the root:

(7)

	Gender	Singular	Plural
fingernail	5/6	né-nyây	á-mây
tooth	5/6	né-nyén	á-mén
breast	5/6	né-b̂ɨ	á-m̂ɨ

In the word for 'eye', the number of syllables varies
between the suppletive singular and plural forms, yet the
tone melody LHH remains constant:

(8) a. ǹ-nyésé 'eye' (cl.5)

b. à-mɨ́k 'eyes' (cl.6)

Nouns other than singular/plural pairs in which the noun root occurs in different noun classes also follow this pattern. A particular root always has the same melody, even if it occurs with different class prefixes. For example, various nouns formed from the verb roots géb 'steal' and gú 'die' all have the same melody:

(9)

		Gender	Singular	Plural
géb	'steal'			
	'thief'	1/2	ŋ̃-géb	bà-géb
	'theft'	3	à-géb	
gú	'die'			
	'death'	5/6	nè-gú	bà-gú
	'corpse'	3/6	ŋ̃-gú	bà-gú
	'carcass'	7/8	è-gú	bè-gú

3.2 Phonological analysis

A description of Kenyang tone should account for the following observations:

(10) a. The tone of the prefix is determined by the root.

b. Tone glides do not occur on prefixes.

c. Syllabic nasal prefixes always have a Low tone for nouns pronounced in isolation.

d. Tone glides occur on monosyllabic noun roots, but there are no examples of tone glides on bisyllabic noun roots.

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e. The same melody is always observed for a
   particular root, no matter which class the noun
   is. This is true for the singular and plural
   forms even when the segmental form of the root
   changes.

3.2.1 <u>Tonal melodies</u>

All of these observations follow straightforwardly
from the conventions of an autosegmental representation in
which class prefixes are toneless and each noun root is
lexically specified for a particular tone melody. There
are eight possible melodies as represented in (6) above.
The set of tone bearing units consists of syllable peaks,
i.e. vowels and syllabic nasals. The melodies are
initially unlinked to the segmental tier. However,
association lines are drawn between the tones of the
melody and the tone bearing units of the noun (prefix +
root) in the following way: Starting from the left, tones
are associated one to one with syllabic peaks. If there
are more tones than tone bearing units (as will be the
case for monosyllabic noun roots), then the final tone is
linked to the final vowel. This is a common rule of tone
association which has already been proposed for a number
of other languages (cf. Goldsmith 1976, Leben 1978,
Clements and Ford 1979). Examples in (11) below show the
association procedure for two and three syllable nouns
having a LLH melody:

(11) a.   L L H   →   L L H
              | V
         ba-ba   ba-ba   'wasps'

   b.   L L H   →   L L H
                     | | |
         N-gɔde   ŋ-gɔde   'woman'

The tonal melody of nouns provides evidence that
Leben's (1978) Obligatory Contour Principle (OCP) is not
part of the phonology of Kenyang. The OCP was proposed as
a universal principle whereby a sequence of two like tones
is indistinguishable from a single occurrence of the tone.
This would have the effect of reducing the eight tonal
melodies of table (6) to the following six melodies:

(12)   Tone melodies allowed by the Obligatory Contour

       Principle

   L   è-nàk   'tree'

   L H   à-tú   'ear' and bà-bǎ   'wasps'

   L H L   è-tɨ̂   'calabash'

   H L   á-sɨ̂   'net' and tá-bìnì 'louse'

   H L H   tá-kɔ̌   'grass'

   H   né-dɨ́   'tongue'

Four of the melodies of (6) have been reduced to two:

(13) a.   LLH and LHH   →   LH

     b.   HLL and HHL   →   HL

If the OCP is in fact operative, our rule of melody
association (one to one, left to right) is no longer
valid. For example, forms which we derived from LLH now
have a LH melody:

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(14)   L H   L H   L H
           | | | | N

n-ta 'trap'   *n-tá   (correct: n-ta)

Therefore, if we want to adhere to the OCP, we need some
way to distinguish between the associations of nouns like
bà-tú 'loads' and bà-tǎ 'traps'.   Each of these would
have a LH melody, but the associations are obviously
different as one has a contour tone and the other does not.
We must either (a) assume that tones are lexically
associated; or (b) adopt a system of accents. Both
solutions are unappealing, because they fail to express
the restrictions on tone distributions in a systematic
way.

    As Goldsmith (1976:133) noted for Etung, an accentual
description of tone association means that the lack of
contour tones on bisyllabic roots is an accidental gap.
Thus, if all possible combinations of accents on the tonal
melody and segmental tier were possible, we would expect
forms like (15a,b) as well as the unattested (15c):

(15) a. L   H   b. L   H   c. L   H
         * /\   * \   * N
        | / \   / \ \   /
       */   * \   *
    me-ŋeme   ba-gɔde   CV-CVCV
    'greed'   'women'

    This also has the undesireable effect of giving three
possible representations of a L tone melody on a three
syllable noun:

(16) a.   L   b.   L   c.   L
          *   *   *
        /|\   /|\   /|\
     *   *   *
    be-sɨŋe   be-sɨŋe   be-sɨŋe   'ants'

Based on (15c), we could say that nouns can only be accented on their first or second syllable. However, this still leaves the absence of cases like (17b,c) unaccounted for. Example (17a) shows that the initial Low of a LHL sequence may be accented, but this accented melody is unattested for nouns accented on the second syllable as in (17b,c).

(17) a.　　L H L　　　b.　L H L　　　c.　L H L
be-cike
'sneeze'
　　　　　　　　　　　V-CV　　　　　　CV-CVCV
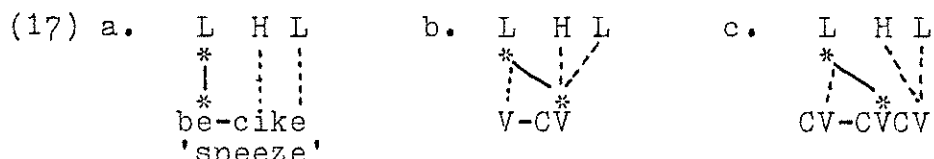
From these examples, I conclude that the OCP is not a valid principle in the Kenyang lexicon. The generalizations of observed tone patterns are obscured by assuming the OCP's existence. Further evidence against the OCP will be provided when we examine associative noun phrases. Thus, we will have shown that the OCP is neither operative in the lexicon nor in post-lexical derivations. On the other hand, distinguishing between melodies such as LLH and LHH allows us to accurately describe all (and only) the tone sequences observed on Kenyang nouns.

3.2.2 <u>Syllabic nasals</u>

At the beginning of Section 3.2, we listed five characteristics of the distribution of tone in Kenyang nouns (11a-e). Four of those characteristics were correctly accounted for by our description in which a noun consists of a prefix, a root, and a 3 tone melody (the

fifth observation that nasal prefixes are always Low tone
remains to be explained). It was shown that the prefixes
are not lexically marked for tone, but that all nouns
formed from a particular root have the same tone melody.
For example, the two words in (18) both belong to the 5/6
gender. However, (18a) "navel" places a Low tone on the
prefix, while (18b) "tongue" has a High tone prefix:

(18) a.   L H H   L H H

                 nè-toŋ 'navel' (cl.5)   bà-toŋ (cl.6)

     b.   H H H   H H H

                 nè-dɨ 'tongue' (cl.5)   bà-dɨ (cl.6)

However, as noted previously, nasal prefixes never take a
High tone. Furthermore, a root which takes a nasal prefix
in one class never occurs with a High tone prefix in
another class. For example, there is no singular class 1
noun Ñ-CV́ which has a High tone prefix bá-CV́ in its plural
class 2 form. This follows from our analysis which states
that a particular noun root always has the same tone
melody. What remains unexplained is that a root which
takes a nasal prefix never carries a melody that begins
with a High tone.

It is not clear how to incorporate this restriction
into the analysis. It cannot be explained simply by
restricting tone linking. For example, we might propose
that only vowels are underlyingly tone bearing units.
Then there is a late phonetic rule which supplies a

default Low tone to syllable peaks (both vowels and syllabic nasals) that are unlinked for tone. The problem with this solution is that it reduces the number of tone bearing units on the segmental tier without reducing the number of tonal segments. Therefore, based on the association of melodies and nouns which we have already seen, we would expect to find tone glides on bisyllabic noun roots which take nasal prefixes (as in 18a). Furthermore, there would be a change of tone patterns on the root when the plural is formed with the /ba-/ prefix as in (18b). However, as we have already seen, tone glides do <u>not</u> occur on bisyllabic noun roots and tone patterns remain constant between singular and plural forms.

(18) a. Tone linking if nasals are not considered as tone bearing units.

```
   L   L H
    \   \|
   ŋ-gɔde      *ŋ̀-gɔ̀dě  'woman'  (correct:  ŋ̀-gɔ̀dé)
```

b.
```
      L   L H
      |   | |
      |   | |
      ba-gɔde    'women'
```

A second proposal (which also fails) is to stipulate a constraint whereby High tones cannot be linked to nasals (19a). Or there could be a rule which delinks a High tone from a nasal (19b).

(19) a. * H   b. H
           | ╫
           N   N

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We must again assume a rule which supplies a default Low
tone to syllable peaks that are unspecified for tone.
However, this incorrectly predicts that some noun roots
which take a Low tone nasal prefix in the singular (20a)
will take a High tone V- or CV- prefix in the plural (20b):

(20) a. N- prefix in the singular

$$
\begin{array}{c}
\text{H H H} \\
| \;\; \vee \\
\text{N-CVC}
\end{array}
\quad
\xrightarrow[\text{Insert L}]{\text{Delink H}}
\quad
\begin{array}{c}
\text{L H H H} \\
\vdots \quad \!\! \diagup \\
\text{N-CVC}
\end{array}
$$

b. $\begin{array}{c}\text{H H H} \\ | \;\; \vee \\ \text{CV-CVC}\end{array}$
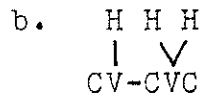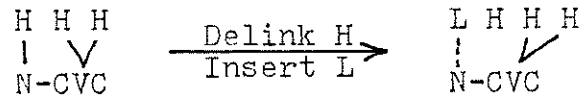
To summarize, there is a clear restriction on the
distribution of tone melodies with respect to nasal
prefixes. This remains unexplained in my analysis, since
tone melodies are specified by the root. However, the
fact that the melody remains constant from class to class
is captured by my analysis.[4]

3.2.3 LH Simplification

There is a rule of LH Simplification which changes
a LH glide to a downstepped High when the glide follows a
High tone. For example, the bisyllabic nouns (mono-
syllabic roots) of (21) have the underlying tone melody
HLH. This is realized as H!H (High - Downstepped High).
However, when the underlying LH glide follows a Low tone,
as in (22), it is realized phonetically as a Rising tone.

(21) a. $\begin{array}{c}\text{H L H} \\ | \;\; \vee \\ \text{ta-k}\mathfrak{o}\end{array}$ [ták'ɔ́] 'grass'   b. $\begin{array}{c}\text{H L H} \\ | \;\; \vee \\ \text{ta-w}\mathfrak{o}\end{array}$ [táw'ɔ́] 'tobacco'

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(22) a.   L L H   b. L L H

             | V | V

         ba-ba   [bàbǎ] 'wasps'   n-ta   [ǹtǎ] 'trap'

There are two ways in which rules of this type are stated in the literature. Goldsmith (1976) uses a representation as in (23) where the glide is replaced by a new phonological tone D (= Downstepped High):

(23) LH Simplification (formulation #1)

$$L \underset{V}{\underset{\vee}{\,}} H \rightarrow D \underset{V}{|} / \; H \underline{\quad}$$

An alternative method is proposed by Clements and Ford (1979). In (24), the Low is delinked, but it remains in the tonal tier throughout the derivation:

(24) LH Simplification (formulation #2)

$$H \quad L \underset{V}{\underset{\times\vee}{\,}} H$$

When pitch values are assigned in the phonetic component of the grammar, the floating Low will not be directly realized, because it is not linked to any vowel. However, it will have the effect of downstepping the following High.

Either of these formulations is consistent with the Kenyang data. I prefer that of (24), because it more clearly represents the unitary nature of downstep and downdrift that will be described in Section 6. Briefly, the phonetic value of a downstepped High is the same as a High which follows a linked Low. In the example below, the downstepped High of [móŋgó] 'smoke' is realized at the

same pitch level as the High tone on the second syllable
of [mèŋkɔ́] 'shells':

(25) a. H L H   ⌈1—2—⌉   b. L H   ⌈2—⌉
         | /   ⌊2—⌋ | | ⌊4—⌋
        moŋgo   moŋgo   meŋkɔ   meŋkɔ
                'smoke'   'shells'
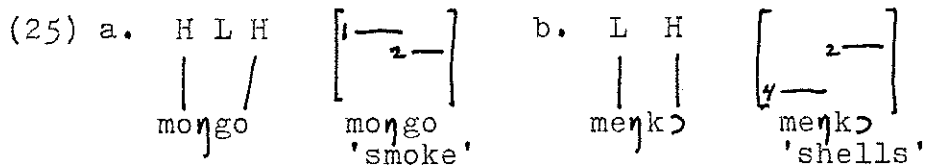
The formulation of the LH Simplification rule in (24)
gives us identical phonological representations (i.e. a
sequence of Low followed by High when viewed from the
tonal tier alone) for describing the pitch lowering of a
High in the case of downstep (25a) and downdrift (25b).
Kenyang is similar to Tiv and Igbo as described by
Pulleyblank (1983:66) in that a High is lowered without
regard to whether a preceding Low is linked or not.

4.   The Associative Construction

4.1 Syntactic form and semantic function

Two nouns can be joined together to form an
associative noun phrase (ANP). The structure of an ANP is:

Noun$_1$ + Associative Marker + Noun$_2$

This construction can usually be translated into English
as "Noun$_1$ of Noun$_2$" or Noun$_2$'s Noun$_1$", because it
frequently expresses a relationship of possession, kinship,
part-to-whole, or contents (26a-d). It can also be used
to express something's attributes or its purpose (26e-f).
In the examples which follow, the noun class will be marked
on the gloss (e.g. 7-bag), since the tone of the

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associative marker (AM) depends on the class of the first noun.

(26) a. possession   è-bà á tá-ncúŋ
                7-bag   1-youngest child
                "the youngest child's bag"

     b. kinship   tá-ncúŋ   ú kè-ŋkɔ̀
                1-youngest child   1-visitor
                "the visitor's youngest child"

     c. partitive   mà-ŋkɨ́   ɨ́ é-tá
                6-shoulders   1-father
                "father's shoulders"

     d. contents   è-bà á tá-kɔ̌
                7-bag   1-grass
                "a bag full of grass"

     e. attributive   bè-tàŋ   á é-tá
                8-strength   1-father
                "father's strength"

     f. purpose   bà-bé   é né-bɨ̂
                6a-medecine   5-breast
                "medecine for the breast"

4.2 The associative marker

The AM is a vowel having the same quality as the final vowel of the first noun.[5] Examples in (27) show how the form of the AM varies for each vowel that can occur in a -CVC root.

(27) a. AM = i   bè-tìg í mé-mbé
                8-work + AM + 8-mosquitos

     b. AM = e   mà-nyèb é kè-ŋkɔ́
                6a-water + AM + 1-visitor

     c. AM = ɨ   bè-pɨ̀ŋ ɨ́ bà-géb
                8-habits + AM + 2-thieves

     d. AM = a   bà-yàd á kè-nèn
                6-footprints + AM + 13-birds

21

e. AM = u   bè-kúg ú bè-tɔ̀g
                  8-cups + AM + 8-villages

f. AM = o   è-yòⁿ ó tá-ncúg
                  7-voice + AM + 1-youngest child

g. AM = ɔ   ŋ̀-kɔ́g ɔ́ mɔ̀
                  3-ladder + AM + 1.child

All of the examples in (27) show a High tone AM.
However, the assignment of tone is morphologically
conditioned. When Noun$_1$ is of class 9, then the AM has
a Low tone:

(28) a. Class 9 (singular) <u>Low</u> tone concord

         ŋ̀-kɔ́g ɔ̀ mɔ̀   "the child's chicken"
         9-chicken + AM + 1.child

     b. Class 10 (plural) <u>High</u> tone concord

         ŋ̀-kɔ́g ɔ́ mɔ̀   "the child's chickens"
         10-chickens + AM + 1.child

Most of the class 1 and class 6a nouns in Kenyang take
a High tone concord on the AM (e.g. (27b) above "water").
However, some class 1 and class 6a nouns take Low tone
concord in the ANP construction.[6] In the examples of (29),
the AM is deleted due to a rule of vowel deletion which is
discussed below. However, we can tell that the AM has a
Low tone in contrast to examples like (30) where the AM
segment is deleted, but the High tone remains.

(29) a. m̀-fɔ̀ ɔ̀ bè-tɔ̀g   m̀fɔ̀ bètɔ̀g
         1-chief + AM + 8-villages

     b. bà-cè è è-sɔ̀b   bàcè èsɔ̀b
         6a-urine + AM + 7-bush dog

(30)   bà-fɔ̀ ɔ́ bè-tɔ̀g   bàf̌ɔ̀ bètɔ̀g
         2-chiefs + AM + 8-villages

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Historically, Low tone was a part of the concord system in that nouns of classes 1, 6a, and 9 took Low tone concord on the AM. All other classes took High tone.[7] However, the morphological source of this rule is being lost in classes 1 and 6a where the more frequent High tone concord is replacing Low tone concord. There is a much stronger resistance to change in class 9, because the only difference between singular forms of class 9 and plural forms of class 10 is the tone concord, e.g. (28) above.

To summarize, the underlying form of the AM is a vowel of unspecified quality. Segmental features are assigned to the AM by a copying rule which assigns the features of the preceding vowel to the AM. There is a lexically conditioned rule which assigns High or Low tone to the AM. This rule is partially based on morphological class membership.

4.3 Vowel deletion

Vowel sequences resulting from the concatenation of morphemes in an ANP are usually reduced by the deletion of one or more of the vowels. The chart below shows the possible CV sequences at morpheme boundaries where the first noun has a monosyllabic root. There are four cases where vowel sequences occur (31a-d). Remember that the AM is always identical in quality to the preceding vowel. Thus, in (31a-c) there is always a geminate formed by the root vowel and the following AM. Looking first at the

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(31) Consonant/Vowel sequences in ANP constructions

Prefix of Noun$_2$

		V-	CV-	N-
Root of Noun$_1$	-CV	a. -CV]v[v-	b. -CV]v[cv-	c. -CV]v[N-
	-CVC	d. -CVC]v[v-	e. -CVC]v[cv-	f. -CVC]v[N-

simple two vowel sequences of (31b,c), there is variation

between a long and short vowel:

(32) a. né-dɨ́ + tá-ncúg ∿ né-dɨ́ tá-ncúg
     5-tongue + AM + 1-youngest child

   b. è-gú ú ǹ-sòg ∿ è-gú ǹ-sòg
     7-carcass + AM + 9-elephant

This same optional deletion of the AM is observed in

sequences of three vowels. In addition, the prefix of the

following noun sometimes deletes yielding the alternations

of (33) below. Note that it is never the case that all

three vowels remain. At least one of them must be deleted:

(33) "the village's animals" /ǹ-nyà á è-tɔ̀g/
                        10-animals + AM + 7-village

   a. deletion of the AM ǹ-nyǎ è-tɔ̀g

   b. deletion of the prefix ǹ-nyà á tɔ̀g

   c. deletion of AM and prefix ǹ-nyǎ tɔ̀g

Finally, vowel sequences formed by an AM followed by

a vowel prefix also show optional deletion of the AM:

(34) nè-bwéd é á-cwî ∿ nè-bwéd á-cwî
     5-place + AM + 3-canoe

When the prefix /e-/ is part of the sequence, only one

vowel remains. Either the AM optionally deletes or else

the /e-/ obligatorily deletes following a short vowel:

(35)   "the place of monkeys"   /n̄-s̄ɨg ɨ́ é-púg/
                                        9-monkey + AM + 7-place

    a. AM deletion   n̄-s̀ɨg   é-púg

    b. prefix deletion   n̄-s̀ɨg ɨ̄   púg

In the following three sections, I will provide a set
of formal rules which describe the vowel sequence
alternations. At this point, we are concerned primarily
with the segmental facts. In Section 5, we will consider
the issue of tone linking and its interaction with rules of
vowel deletion.

4.3.1 Optional deletion of the associative marker

The segmental portion of the AM is sometimes deleted.
The environment in which this optional deletion takes
place varies from one sub-dialect to another. Phrases
collected in Egbekaw (the principal source for this paper)
never exhibited AM deletion in a C_C context. However,
the AM was optionally deleted when there was a neighboring
vowel:

(36) $[_{AM}V] \rightarrow \emptyset \,/\, V$ (Optional)

The cases where the AM follows a vowel are
demonstrated in (32-33) above. The form of the AM is
identical to that of the preceding vowel in this
environment. Therefore, we might consider an alternative
rule which optionally shortens long vowels:

(37) Degemination: $V \rightarrow \emptyset \,/\, V$
                                        $[\,]$

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This gives the correct result where the AM follows a root final vowel, but it does not account for AM deletion before a vowel. If we assume that it is the second vowel which is deleted, then we need a complicated tone association rule in the case where the AM precedes an identical vowel. Tone will be discussed further in Section 5, but the ANP in (38) below indicates that the AM is deleted. Note that the remaining vowel is realized with a High tone which is the underlying tone of the second vowel in the sequence:

(38)
```
     L  L    L  H  H L
     |  |    |  |  \ /
    /ŋ-gag  a  a-cwi/  ──→   [         ]
     9-knife + AM + 3-canoe       ŋgag  acwi
```
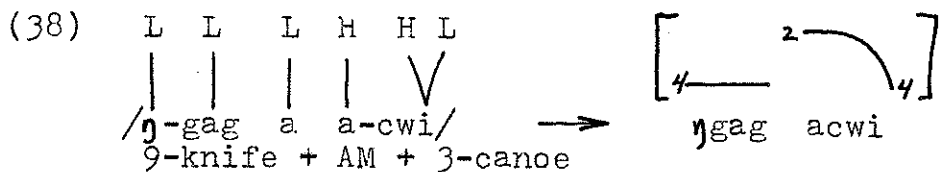
a. AM deletion   b. Prefix deletion

```
   L L    L  H  H L              L  L   L  H  H L
   | |    |  |  \ /              |  |   |     \ /
   ŋ-gag   a-cwi               ŋ-gag  a   -cwi
```
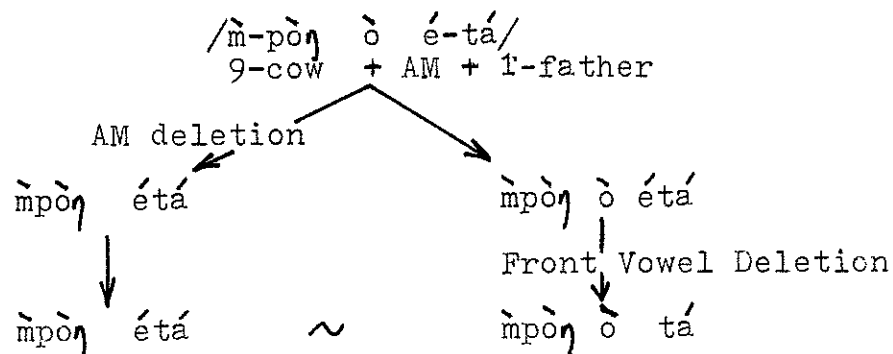
Based on this evidence, we might revise the degemination rule to say that it is the <u>first</u> vowel which deletes. However, we would still need a rule to delete the AM in (39). These examples show that the AM optionally deletes even when the following prefix vowel is not identical to it (the alternation in which the prefix is deleted will be discussed in the following section).

(39) a. /n̄-sɨg ɨ̀ é-tá/ ──→ n̄sɨg étá ∾ n̄sɨg ɨ̀ tá
         9-monkey + AM + 1-father

     b. /è-yòŋ ó é-tá/ ──→ èyòŋ étá ∾ èyòŋ ó tá
         7-voice + AM + 1-father

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Further evidence against a rule of degemination comes from other sub-dialects. They will require a rule to optionally delete the AM even when it is not adjoining another vowel. Phrases collected in Bachuo Ntai show that the AM frequently deletes even in C_C contexts. The rule of AM deletion for this sub-dialect is more general (i.e. the environment is less restrictive) than rule (36) given above for the Egbekaw sub-dialect.

(40) AM deletion (for speakers from Bachuo Ntai)

$$[_{AM}V] \rightarrow \emptyset \quad \text{(Optional)}$$

To summarize, a rule which optionally deletes the AM is internally motivated by alternations in the Egbekaw dialect we are considering. This rule describes the alternations in which the AM deletes either before or after another vowel. Further evidence for this rule comes from surrounding dialects in which a similar rule is required.

4.3.2 Prefix deletion

When the prefix /e-/ follows a short vowel, it is deleted:

(41) Front Vowel Deletion: $V \rightarrow \emptyset / V$ ___

$$[\;] \quad [\text{-back}]$$

Ordering this rule after the optional rule of AM deletion provides a description of VV sequences in which one of the vowels must be deleted. If the AM is deleted, then the prefix remains. Otherwise, if the AM remains, then the following /e-/ is deleted.

27

(42)   L   L   L   H   H

/m̀-pòŋ   ò   é-tá/
9-cow + AM + 1-father

AM deletion

m̀pòŋ   étá   m̀pòŋ   ò   étá

                                Front Vowel Deletion

m̀pòŋ   étá   ~   m̀pòŋ   ò   tá

One other rule is required at this point in order to
describe sequences involving the AM /u/ followed by the
prefix /e-/. In these cases, /u/ undergoes lowering:

(43) Lowering: [+high] ⟶ [-high] /   V   V
                                      | |
                                   ⌈+back⌉   ⌈-high⌉
                                   ⌊+rnd ⌋   ⌊-back⌋

This rule must apply before the Front Vowel Deletion rule
of (41) in order to derive the form in (44a) below.
Furthermore, we see in (44b) that geminates are unaffected
by this rule. Thus, the rule of lowering must also
precede the rule of AM deletion. Otherwise, AM deletion
would feed the lowering rule and this would result in
*ŋ̀kò tá.

(44) a. è-núg   ú   è-tɔg   ⟶   ènúg ó ètɔg
         7-drum + AM + 7-village   Lowering

                                   Front Vowel   ènúg ó tɔg
                                   Deletion

     b. ŋ̀-kù   ù   é-tá   AM ⟶   ŋ̀kù étá
         9-colocasha + AM + 1-father Deletion

                                   Front Vowel   ŋ̀kù tá
                                   Deletion

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The lowering process only applies to the high back vowel
/u/. Other high vowels (i, ɨ) are not subject to this
rule:

(45) ñ-sɨg ɨ é-tá   Front Vowel   ǹsɨg ɨ tá
      9-monkey + AM + 1-father ——————————→
                           Deletion

4.3.3 Tri-vowel shortening

When three vowels are brought together in an ANP, at
least one of them is deleted. Either the AM is deleted,
as in (46a), the prefix of Noun$_2$ is deleted (46b), or both
the AM and the prefix are deleted (46c):

(46) ñ-tà á é-tá   a. ñtǎ étá
      10-hats + AM + 1-father
                                         b. ñtà á tá

                                         c. ñtǎ tá

The two rules we have seen so far, Optional AM
Deletion and Front Vowel Deletion, only account for
example (46c). If AM deletion applies first, then the
structural description of Front Vowel Deletion is
satisfied and the prefix deletes as well.

When AM deletion optionally does not apply, the
structural description of Front Vowel Deletion is not
satisfied, since the AM forms a geminate with the root
final vowel. The structure I am assuming for (46) is
given in (47), where the phoneme symbols are listed as an
abbreviation of their corresponding feature matrices.
This is the structure after AM Deletion has optionally not
applied and Front Vowel Deletion has been unable to apply.

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(47)
```
     L  L  H   H  H
     |  |  |   |  |
    V-CV  V  V-CV
     | | \ /   | ||
     n t  a    e ta
```

But this structure does not occur as a surface form, since
all three adjoining vowel slots are never realized at the
same time. When a long vowel is followed by another
vowel, either the long vowel must be shortened or the
following short vowel must be deleted. Given the
structure of (47), either the AM must be deleted to yield
the surface form of (46a) or the prefix must be deleted to
yield (46b).

When the following prefix is /a-/, it is never
deleted. In these cases, the long vowel formed by the
root vowel and AM must be shortened:

(48)   bà-bé é á-mɨ̂   bàbé ámɨ̂
       6a-medecine + AM + 6-breasts

I propose two additional rules to describe the
observed alternations in sequences of three vowels. The
first is that /e/ optionally deletes after a long vowel.
When deletion occurs by this rule, it generates forms like
(46b) where the AM remains, but /e-/ is deleted. What
seems peculiar is that we now have two rules for deleting
front vowels:

(49) a. Obligatory   b. Optional

```
      V → ∅ / V                      V → ∅ / V V
              |   ‾                           \ /   ‾
             [ ] [-back]                      [ ] [-back]
```

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The obligatory rule of (49a) was motivated by two vowel
sequences in which either the AM or the prefix deleted.
Rule (49b) must be optional, however, to allow us to
generate forms like (46a) where the prefix remains even
though it follows a short vowel (on the surface). A final
rule is required for (46a) and (48) above. If there is
still a sequence of three vowels after all the other rules
have applied (or optionally not applied), then the sequence
must be shortened to two vowels:

(50) Tri-Vowel Shortening: $V \rightarrow \emptyset \;/\; V \underline{} V$

The motivation for proposing the optional Front Vowel
Deletion rule (49b) and Tri-Vowel Shortening (50) is that
when a long vowel is followed by another vowel, one of the
three vowel slots must be deleted. When the prefix is /e-/
the possible alternations are described by the optional
application of (49b) and the obligatory application of (50).
In examples like (48) above where no rule applies to
delete the prefix /a-/, rule (50) obligatorily deletes
the AM.

5. Tone Association

The associative noun phrase (ANP) has been chosen as
a starting point for examining tonal processes, because it
is easy to determine the underlying forms. In Section 3,
we discussed lexical tone observed on nouns spoken in
isolation. The segmental form of the associative marker
(AM) and its tone was presented in Section 4.2. In this

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section, we will examine the process by which tones become reassociated when a vowel deletes. The facts which must be accounted for are presented in Section 5.1. Then a set of formal rules to describe these facts are given in Section 5.2. The phonetic realization of different tone patterns will be discussed in Section 6.

5.1 Vowel deletion and tone reassociation

We have seen that the AM optionally deletes when it either follows or precedes another vowel. When the AM is in a sequence of three vowels, then it deletes obligatorily. In the two cases where the AM follows a vowel and gets deleted, the tone of the AM reassociates with the preceding vowel. If the two tones are different, then a contour tone results. For example, in (51a,b) the AM optionally deletes and the root final vowel remains with a rising tone.

(51) a.

b.
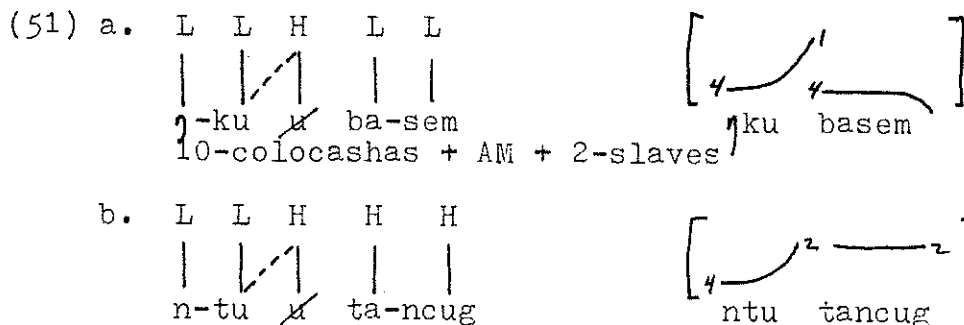
In (52) below, the root vowel already has a contour tone, so the deletion of the AM results in a sequence of three tones. This HLH sequence is reduced by the LH Simplification rule (introduced in Section 3.2.3) to H (L) H.

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This sequence is realized phonetically as a High to down-stepped High glide:

(52)

```
    L H L H  L L                    L H L H L L
    | V / | |        AM             | V/´ | |
   /be-tɨ + be-tɔg  ——————>         betɨ   betɔg
                     Deletion
   8-calabashes + AM + 8-villages
```

```
         LH                L H (L) H L L         [  ´ ⌣   ]
     ——————————>           | V  | |     ——>       [ ⟋— ⟍ ⟋— ]
     Simplification        betɨ  betɔg            betɨ  betɔg
```
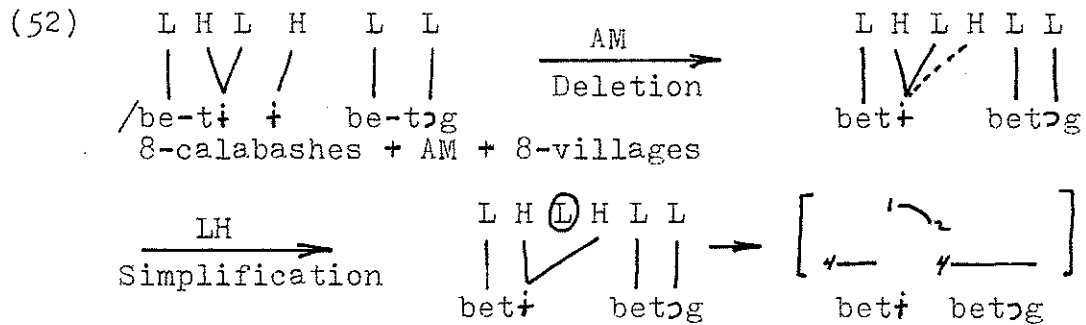
The rule for LH Simplification (restated here as 53) does not explicitly show the link of the preceding High tone:

(53) LH Simplification:

```
        H    L    H
              ⟩⟨/
               V
```
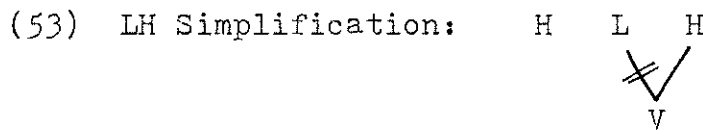
The reason is that this rule has been used as a description of two different ways in which LH contours are reduced to a level downstepped High. In both cases, the LH sequence was preceded by a High. In the lexical forms, for example /tákɔ̌/ "grass", the preceding High was linked to another vowel. However, in the ANP examples, the preceding High tone which conditions the contour reduction is linked to the same vowel as the LH sequence which gets simplified. Thus, the rule of LH Simplification can be thought of as a "collapsed" form of the following rules:

(54) a.
```
    H    L    H
    |     ⟩⟨/
    V  C  V
```
b.
```
    H    L    H
     ⟍⟋≠⟋
         V
```
c.
```
    H    L    H
     ⟍ ⟋≠⟋
    V  C  V
```

33
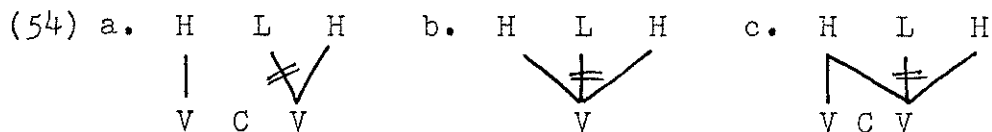
The generalization expressed by rule (53) is that the
linking of the conditioning High tone is irrelevant to the
structural description of the rule. Based on phenomena
having to do with long segments, Hayes (n.d.) has
suggested a Linking Constraint by which "association lines
in structural descriptions are interpreted as exhaustive."
The evidence from LH Simplification indicates that the
links in the conditioning environment need not be
exhaustive.

When a root vowel + AM sequence is shortened by the
Tri-Vowel Shortening rule of (50) above, the result is a
short vowel which bears both tones. If the two tones are
different, then the vowel is realized phonetically with
a contour tone:

(55)   L L H L L
       | | | | | |
       ba-k+ e-tɔg
       6-farms + AM + 7-village
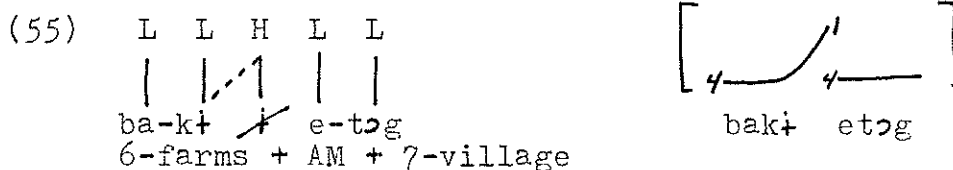
If this new tone association forms a HLH sequence,
then it will be reduced by the LH Simplification rule:

(56)   H H L H L L
       | | | | | |
       ba-s+ e-tɔg
       6-nets + AM + 7-village
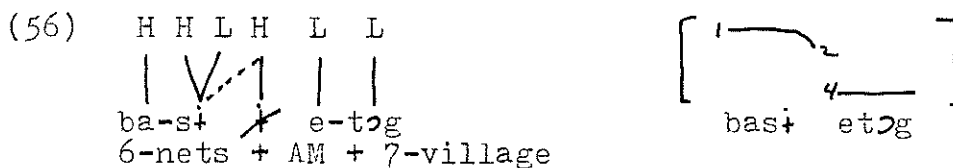
So far, we have considered deletion of the AM when
it is preceded by another (identical) vowel. In these
cases, the AM tone relinks to the preceding vowel. When
the deletion of the AM is conditioned by the following

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vowel prefix, there is no reassociation of the AM tone.
Example (57) shows that the AM tone does not relink to the
left to form a contour tone on the Noun$_1$ stem. While
contour tones are rare in closed syllables, they do exist
(e.g. ə̀-ntíŋ 'cl.7-lake'). So I presume that this
absence of reassociation is not the result of a general
well-formedness condition which might exclude such a
relinking.

(57)   L   L   H   H   H   ⎡   ₂——   ⎤
        | | | | | | ₄—— |
        e-yoŋ ø e-ta   ⎣ eyoŋ eta ⎦
        7-voice + AM + 1-father
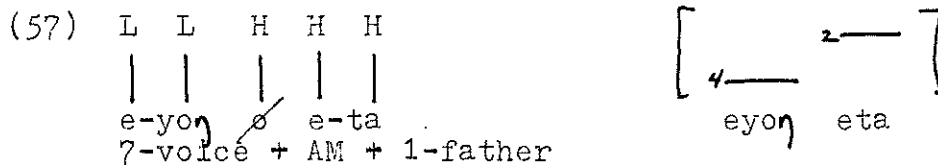
Furthermore, the AM tone does not link to the right
to form a contour on the prefix:[8]

(58)   L   L   L   H   H   ⎡   ₂——   ⎤
        | | | | | | ₄—— |
        n-síg ø e-pug   ⎣ nsíg epug ⎦
        9-monkey + AM + 7-place
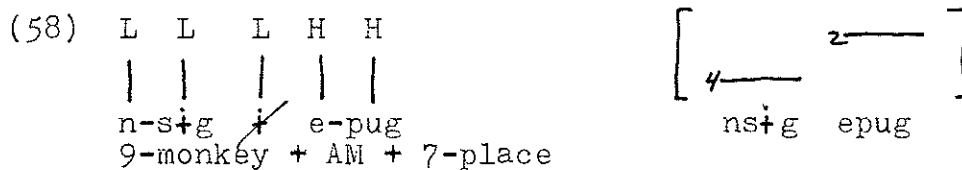
So the difference in tone associations between an AM
deleted when preceded by a vowel (51,52,55,56) or followed
by a vowel (57,58) must be accounted for in our formulation
of tone rules.

Turning now to the deletion of prefixes, there is
no apparent reassociation of tone resulting from this
deletion. Examples (59a,b) show that the prefix does not
link left to form a contour on the AM:[9]

(59) a.   L   L   L   H   H   [₂—   ]
          | | | | | [₄_____]
        n-nyuŋ u ǽ-ta   nnyuŋ u ta
        9-crocodile + AM + 1-father

    b.   L   L   H   L   L   [₁—   ]
          | | | | | [₄_____ ₄_____]
        ba-kaŋ a ǽ-nɔg   bakaŋ a nɔg
        6-roots + AM + 7-tree

The same holds true for examples of prefix deletion

following a surface long vowel:

(60) a.   L   L   L   H   H   [₂—   ]
          | | | | | [₄_____]
        n-so o ǽ-ta   nso o ta
        9-deer + AM + 1-father

    b.   L   H   H   L   L   [₂—⌣₁   ]
          | | | | | [₄____   ₄_____   ]
        a-ta a ǽ-sɔb   ata a sɔb
        3-jaw + AM + 7-bush dog

or following a short vowel which was underlyingly long:

(61)   L   L   L   H   H   [₂—   ]
          | | | | | [₄____   ]
        n-ta á ǽ-ta   nta   ta
        9-hat + AM + 1-father

5.2   Rules of tone association

The distribution of tone associations to be accounted
for are presented schematically in the figure below.
Where there is direct evidence for relinking (e.g. a
surface contour tone), it is shown by a dashed line. If
there is no such direct evidence, no dashed line has been
drawn. However, for some of these examples, I will argue
that relinking does in fact occur.

36

(62) a. Optional deletion of the AM (preceded by a vowel).

$$
\begin{array}{ccc}
\text{L} & \text{H} & \text{H} \\
| & \diagdown & | \\
-\text{CV} & \text{\textbslash{}} & \text{CV}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{H} & \text{L} \\
| & \diagdown & | \\
-\text{CV} & \text{\textbslash{}} & \text{CV}-
\end{array}
$$

b. Optional deletion of AM (followed by a vowel).

$$
\begin{array}{ccc}
\text{L} & \text{H} & \text{H} \\
| & | & | \\
-\text{CVC} & \text{\textbslash{}} & \text{V}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{L} & \text{H} \\
| & | & | \\
-\text{CVC} & \text{\textbslash{}} & \text{V}-
\end{array}
$$

c. Obligatory deletion of AM between two vowels.

$$
\begin{array}{ccc}
\text{L} & \text{L} & \text{H} \\
| & | & | \\
-\text{CV} & \text{\textbslash{}} & \text{V}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{H} & \text{L} \\
| & | & | \\
-\text{CV} & \text{\textbslash{}} & \text{V}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{H} & \text{H} \\
| & | & | \\
-\text{CV} & \text{\textbslash{}} & \text{V}-
\end{array}
$$
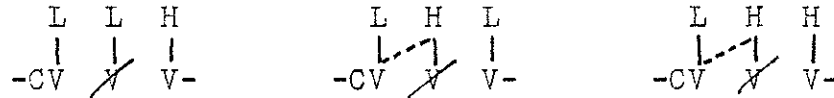
d. Obligatory deletion of Noun$_2$'s prefix.

$$
\begin{array}{ccc}
\text{L} & \text{H} & \text{H} \\
| & | & | \\
-\text{CVC} & \text{V} & \text{\textbslash{}}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{L} & \text{H} \\
| & | & | \\
-\text{CVC} & \text{V} & \text{\textbslash{}}-
\end{array}
$$

e. Optional deletion of Noun$_2$'s prefix.

$$
\begin{array}{ccc}
\text{L} & \text{H} & \text{H} \\
| & | & | \\
-\text{CV} & \text{V} & \text{\textbslash{}}-
\end{array}
\qquad
\begin{array}{ccc}
\text{L} & \text{L} & \text{H} \\
| & | & | \\
-\text{CV} & \text{V} & \text{\textbslash{}}-
\end{array}
$$

5.2.1 Tone adoption

The first alternation we will consider is the difference in tone linking when the AM is deleted. When the AM deletes in (63a), the tone of the AM relinks to the left to form a contour tone on the root. No such reassociation occurs in (63b).

(63) a.
$$
\begin{array}{ccccc}
\text{L} & \text{L} & \text{H} & \text{H} & \text{H} \\
| & | & \diagdown & | & | \\
\text{ne-me} & & \text{\textbslash{}} & \text{ma-nen}
\end{array}
$$
5-sickness + AM + 6-knees

$$\left[\,\underline{}\diagup\overline{}\,\right]$$

neme   manen

b.
```
    L  L  H  H H L
    |  |  |  | \/
   ke-noŋ  ø  a-sɨ
   13-rings + AM + 3-net
```
$$\left[\underset{\text{kenoŋ}}{\underbrace{}_{4}} \quad \overset{2}{\underset{\text{asɨ}}{\searchrightarrow}}_{4} \right]$$
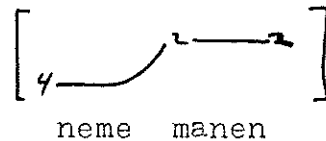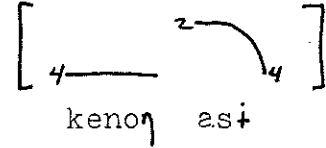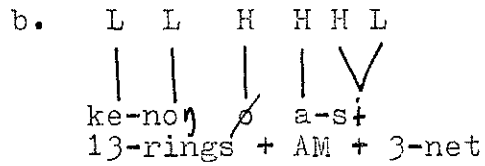
Based on the contrast between these two forms, we can immediately rule out several commonly observed rules of tone association. As a first hypothesis, suppose that tones which have been set afloat will dock according to the left to right, one to one procedure we described for lexical items. This correctly accounts for (63a), but not for (63b). Similarly, the Obligatory Contour Principle, Tone Absorption, or deletion of a floating like tone might be invoked to account for (63b), but they all give incorrect predictions for (63a) as shown below.

If there was an Obligatory Contour Principle (Leben 1978) operating at the phrase level, then there would be no floating tone when the AM segment deletes in (64). Some additional spreading rule would be required to yield the correct rising tone (see 63a).

(64)
```
       L        H
      /\      /\
   ne-me  ø  ma-nen
```
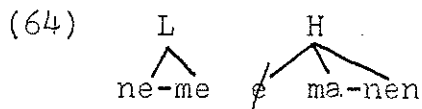
A rule of tone absorption: $[\alpha H] \rightarrow \emptyset \; / \; [-\alpha H] \underset{[\;]}{\underbrace{\qquad [\alpha H]}}$

or a rule which deletes floating like tones: $\text{(H)} \rightarrow \emptyset \; / \; H$ might be proposed to describe the lack of tone docking in (63b). But these would incorrectly prevent the AM tone from linking left in (63a).

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There is, however, another linking principle which gives the correct results for these examples. The relevant difference between the two cases we have been examining is the environment which conditions the AM deletion. In (63a), the preceding root vowel conditions the AM deletion and the AM tone links left. In (63b), the following prefix vowel conditions the AM deletion and the AM tone links right (I assume that two adjoining like tones on a single vowel are reduced to a single occurrence of the tone, but this is not necessary in this case). Therefore, a tone set afloat by vowel deletion relinks to the vowel which conditioned the deletion (Leben 1978:182, Clements and Ford 1979:207). For ease of reference in the discussion that follows, I will refer to this process as "adoption":

(65) Tone Adoption: When one tone bearing unit conditions the deletion of another, it is obliged to link to the resulting floating tone.

This principle would result in the following derivations:

(66) a.

```
    L  L  H   H  H        AM          L  L H  H  H
    |  |  |   |  |      ─────────→    | |    |  |
    ne-me  e  ma-nen    Deletion      ne-me   ma-nen
```

```
     Tone                 L  L H  H  H     ─→   phonetic realization
   ─────────→             |  |    |  |
    Adoption              ne-me   ma-nen        (see 63a)
```

b.

```
    L  L  H  H H L        AM           L  L  H H H L
    |  |  |  | \/       ─────────→     | |     | \/
    ke-noŋ  o  a-sɨ     Deletion       ke-noŋ    a-sɨ
```

```
     Tone                L  L  H H H L    ─→   phonetic realization
   ─────────→            |  |    \| \/
    Adoption             ke-noŋ    a-sɨ         (see 63b)
```

39
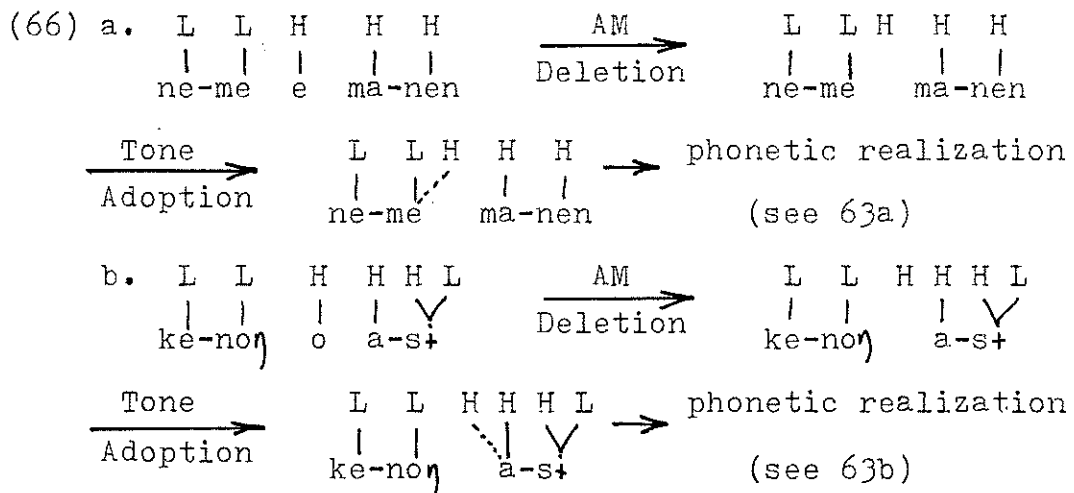
To summarize, the principle of Tone Adoption provides a correct account of tone relinking for the vowel deletion cases we have examined. We now turn to other environments for vowel deletion to demonstrate that the domain of tone associations is more limited than the previous examples would indicate.

5.2.2 Prefix tones

We have already noted that noun prefixes do not occur with contour tones. In the case of lexical tone, this was accounted for by the left to right, one to one procedure for mapping tone melodies onto nouns. Given the principle of Tone Adoption formulated above, we would expect to find contour tones on prefixes in noun phrases like (67a,b). The AM deletes as a result of the following prefix. Therefore, by Tone Adoption, its tone should relink to the prefix to create a contour tone. However, as shown by the phonetic realization, this relinking does not occur.

(67) a.

```
      L   L    L  H  H L
      |   |    |  |   \/
      ŋ-gag  a  a-cwi
      9-knife + AM + 3-vehicle
```

```
   [  4——    2——\  ]
         ŋgag   acwi  4
```

b.

```
      L  H   H  L  L
      |  |   |  |  |
      e-nug  a  e-tɔg
      7-drum + AM + 7-village
```

```
   [      1——        ]
      4—      4——
         enug    etɔg
```

We could stipulate a well-formedness condition which states that noun prefixes cannot take a contour tone:

```
*   [αH]    [-αH]
         \  /
      [_N V-
```

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However, this is an unappealing solution, since the absence of contour tones on prefixes of nouns spoken in isolation has already been accounted for by general principles of tone melodies and tone association.

Let us consider another restriction. Suppose that tones cannot link across word boundaries. Given that the AM tone sometimes links to the preceding noun, but not to the following noun, this presupposes that the AM is a suffix on the first noun. Evidence that this is so comes from the fact that the AM is formed by reduplication of the root final vowel of the preceding noun. Furthermore, the tone of the AM is determined by the noun class of the preceding noun.

Thus, contour tones are still acquired on root final vowels by Tone Adoption as in (66a) above, since there is no word boundary between $Noun_1$ and the AM. However, Tone Adoption is prevented from occurring in (67) (repeated as (68) below), since tones cannot link across word boundaries. In this case, the AM tone remains as a floating tone:

(68)

5.2.3 Prefix deletion

Further evidence for this analysis comes from examples of prefix deletion. This is always conditioned by the preceding vowel: either the AM or the root final

vowel if the AM has already been deleted. Yet the tone of
the deleted prefix never links left as demonstrated in
(59 - 61) above. If tones cannot link across word
boundaries as suggested above, then this lack of relinking
is accounted for. In the example below, the floating Low
tone resulting from the deleted prefix is prevented from
relinking to the preceding AM:

(69) # L H H # L L #   Front Vowel   # L H H #(L) L #
       | | | | | | | ───────────▶ | | | | | |
      # e-nug-u # e-tɔg #   Deletion   # e-nug-u # tɔg #
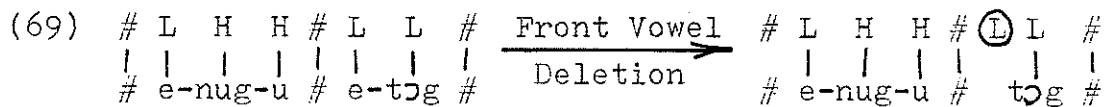
We have seen that tone associations are correctly
described by positing a principle of tone adoption whose
effect is limited to a particular domain. Word boundaries
delimit the tone association domain and prevent tone
adoption from applying across these boundaries. The
principal motivation for suggesting tone adoption is to
account for (1) the leftward linking of a floating tone
resulting from deletion conditioned to the left; and
(2) the lack of leftward linking of a floating tone
resulting from deletion conditioned to the right. The
lack of contour tones on either the AM or the following
prefix were taken as evidence that tones cannot link
across word boundaries.

6. Surface Pitch Contours

     I conclude this paper with a brief description of the
phonetic realization of tone patterns. In particular, the
unitary nature of downdrift and downstep will be presented.

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Since we have considered noun phrases that are only five
syllables long, we can only make tentative hypotheses
about downdrift as it may occur over a long utterrance.
For this reason, I will be content to point out some areas
for future research and I will not attempt a formal
statement of the tone to pitch realization process.

In the discussion which follows, pitch is marked
between 1 (= High in isolation) and 4 (= Low). The
discrete values 1, 2, 3, and 4 are sufficient to
distinguish the phonetic pitch levels for the associative
noun phrases (ANPs) which consist of two bisyllabic nouns.
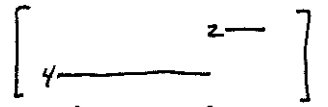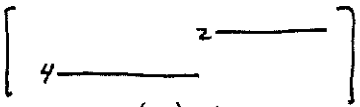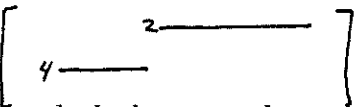
6.1 Downdrift

As pointed out in the discussion of lexical tone,
downdrift occurs in Kenyang. That is, a High tone which
follows a Low is realized phonetically one step lower than
a High pronounced in isolation. The two vowels of
/mánsáŋ/ "tadpoles" are produced at pitch level 1, but the
High tone of /mènsíŋ/ "anthills" is produced at pitch 2,
because it follows a Low tone:

(70) a.
$$\begin{bmatrix} \rule{2cm}{0.4pt} \\ \text{mansaŋ} \end{bmatrix} \text{'tadpoles'}$$
     H H

b.
$$\begin{bmatrix} \rule{2cm}{0.4pt} \\ \text{mensɨŋ} \end{bmatrix} \text{'anthills'}$$
     L H
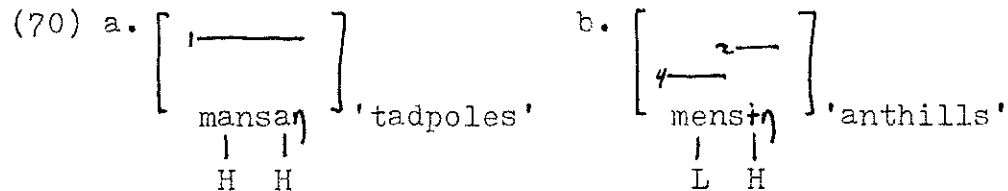
A downdrifted High tone sets a new upper limit on the
pitch range so that following Highs will also be realized
at pitch level 2 (assuming there are no intervening Lows).

The following examples show that an arbitrary number of
High tone vowels can be affected by a preceding Low tone.

(71) a.   L L L L H

ŋ-kɔg ɔ m-bog   ŋkɔg ɔ mbog
9-chicken + AM + 1-deaf person

b.   L L L H H

n-so o ta-ncug   nso (o) tancug
9-deer + AM + 1-youngest child

c.   L L H H H

be-bab a me-mbe   bebab a membe
8-wings + AM + 8-mosquitos

d.   L H H H H

ne-bwed e ba-ya   nebwed e baya
5-place + AM + 6-pepper

6.2 Downstep

Downstep in lexical items was discussed in Section
3.2.3. It was shown that an unlinked Low tone is not
realized directly in the segmental string. However, its
presence is made known indirectly by lowering the pitch of
a following High.

When a downstepped High follows a downdrifted High,
the upper limit of the pitch register is further decreased.
A downstepped High is realized one step lower than the
current pitch level for a High tone. This is demonstrated
by (72) in which the final High tone is realized at
pitch level 3.

(72) a.
```
     L  L  H  H (L) H
     |  |  |  |    /
   ba-keb  e  ta-kɔ
   6-bundles + AM + 1-grass
```
[pitch diagram] bakeb e takɔ

b.
```
     L  L  H  H (L) H
     |  |  |  |   /
   m-bog  o  mo-ŋ-go
   3-hole + AM + smoke
```
[pitch diagram] mbog o moŋgo

6.3 The domain of downdrift

Downdrift in Kenyang is not an iterative process.
That is, the upper bound of the pitch register does not
continue to decrease with each occurrence of a (linked)
Low tone. In (73), we see that each Low tone is realized
phonetically at the same level. Also, each High which
immediately follows a Low is realized at the same level
(i.e. the second and last vowels both have pitch 2).
However, the High tone on the AM is realized at pitch 1.
It appears that the last High tone of a sequence of
downdrifted Highs is reset to the original High pitch if
it precedes a linked Low tone:

(73)
```
     L  H  H  L  L  H
     |  |  |  |  |  |
   ma-nem  e  ba-gɔde
   2-husbands + AM + 2-women
```
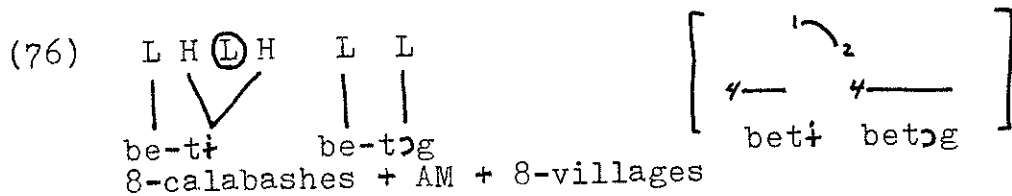[pitch diagram] manem e bagɔde

If there is only a single High between two Lows, then
there is no downdrift, because it is the "last" High of
the sequence. Thus, the AM of (74a) is realized with
pitch 1, but the AM and subsequent Highs of (74b) are at
pitch 2.

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(74) a. L L H L L
         | | | | |
        be-ked e ke-nen
        8-houses + AM + 13-birds

        beked e kenen

   b. L L H H H
       | | | | |
      e-ked e ta-mbe
      7-house + AM + 1-mosquito

      eked e tambe
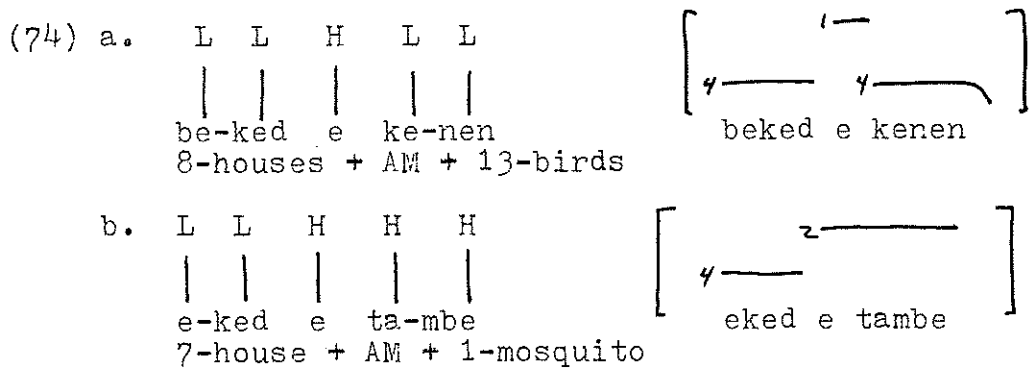
These observations of "upstep" of the last High
provide further evidence for treating sequences of like
tones as a sequence, rather than collapsing them by the
Obligatory Contour Principle. Given the different pitch
values assigned to the two High tones in the example below,
it is preferable that they remain as two separate tones
at the phonological level:[10]

(75)   L H H L
       | | | |
      ba-ta a ci
      6-jaws + AM + 1.father

      bata a ci
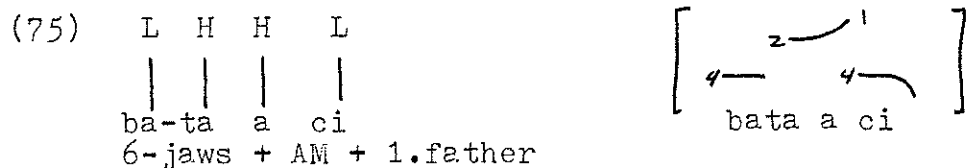
There are some complications with this notion of
upstep. In the following example, the root final vowel is
realized with a 1-2 glide. However, given our previous
observations, we might have expected this to be realized
as a 2-1 glide. The first High follows a Low and is not
followed by a linked Low. Thus, we expect pitch 2. On
the other hand, the second High is followed by a linked
Low which in other circumstances produces pitch 1.

(76)   L H Ⓛ H   L L   ⎡   ⌐ ⌐₂   ⎤
       │ \ / │   │ │   │ 4—   4—   │
       be-tɨ   be-tɔg   ⎣   betɨ   betɔg   ⎦
       8-calabashes + AM + 8-villages

In summary, we have seen that downdrift (lowering the pitch value of a High after a linked Low) and downstep (lowering the pitch value of a High after an unlinked Low) can be considered as a unitary process. That is, a High tone is lowered one step in pitch after a Low tone (without regard to whether it is linked or not). The upstep of a High tone generally occurs before a linked Low. However, more research is required to obtain a more complete set of examples and to determine the exact nature of this process.

7. Summary

The purpose of this paper has been to use the autosegmental framework to describe some tonal phenomena of Kenyang. At the lexical level, we examined the notion of tone melodies. Melodies and an independently motivated tone linking convention provide a simple characterization of the tone patterns observed on lexical nouns. The phenomena of downdrift and downstep are seen to operate within lexical items. We proposed a rule of LH Simplification which captures the unitary nature of these processes.

The associative noun phrase construction provides a

restricted paradigm in which to examine tone phenomena. The form of the associative marker is identical to the preceding vowel and its tone is morphologically conditioned. Vowel deletion and the persistence of tone were considered. LH Simplification was seen to operate on derived forms as well as at the lexical level. A generalized statement of LH Simplification provides evidence that Hayes' Linking Constraint is too strong, since tone links in the environment of the rule need not be listed exhaustively.

Examples of tone relinking after vowel deletion were seen to follow from the rule of Tone Adoption constrained by word boundaries. These examples, as well as lexical tone associations, gave evidence that the Obligatory Contour Principle is not operative in the phonology of Kenyang.

Notes

1. Based on this restricted distribution of consonant clusters, we might look for alternative analyses of palatalization and labialization. If we assume a contrast between palatalized, labialized, and unmodified consonants, then each consonant of (2) (except the liquids /r,y,w/) would be represented as three phonemes (e.g. /t, t^y, t^w/). Thus, the phonemic inventory would nearly triple. In any case, /y/ and /w/ would still exist as independent phonemes, since they occur in consonant positions other than the consonant sequences.

2. A very similar case of tone melodies has been documented for Etung (Edmundson and Bendor-Samuel 1966, Goldsmith 1976). Etung is one of the western dialects of Ejagham (Watters 1981), an Ekoid language which is Kenyang's western neighbor. Based on a list of 225 words, I found that Etung and Kenyang are 31% cognate.

3. The only apparent counter-example, něŋkwá 'plum' (class 5), has a contour tone on the prefix. However, it is possible that this is historically a derived form: nè-ń-kwá. Evidence that the root is -kwa and not -ŋkwa comes from the words bè-kwà 'plum tree' (cl.8) and bà-kwà 'plum trees' or 'plums' (cl.6).

4. The Ngamambo dialect of Moghamo (a Grassfields Bantu language which is geographically quite close to Kenyang) shows a somewhat similar restriction on nasal prefixes

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(Asongwed and Hyman 1976). That is, nasal prefixes always have a Low tone. However, the situations are not identical, since Ngamambo noun roots never determine the tone of the prefix. Nasal prefixes are always Low tone, V- prefixes are generally Mid tone, and CV- prefixes are High tone (with a few exceptions and complications). This contrasts with Kenyang where the tone of the prefix is determined by the root.

5. The form of the AM varies from one sub-dialect to another. Voorhoeve (1980:275) claims that the AM consists of tone concord only and has no segmental realization. Ittmann (1935-36:107) states that the AM is limited to the qualities [ɛ], [a], and [o] depending on the quality of preceding vowels.

6. A few examples of class 1 and 6a nouns are listed below:

	Low tone concord	High tone concord
Class 1:	m̀-fɔ̀ 'chief'	ǹ-sèm 'slave'
	ǹ-nò 'mother'	ŋ̀-géb 'thief'
		kè-ŋkɔ̀ 'visitor'
		tá-ncúg 'youngest child'
Class 6a:	bà-cè 'urine'	bà-wèd 'oil'
		bà-fó 'fat'
		bà-bé 'medecine'
		mà-nyèb 'water'

7. This same tone concord system is seen in many nearby languages: Western Grassfields languages (Asongwed and Hyman 1976), Mbam-Nkam languages (Hyman and Tadadjeu 1976), and Ejagham (Watters 1981).

8. Ideally, we would like to see examples where the tone of the AM differs from both its neighbors. This would show that it links neither right nor left as in examples (57, 58), but it would also shed light on various explanations (Obligatory Contour Principle, Tone Absorption, deletion of a floating like tone, etc.) which might be invoked to describe this process. I do not have any examples of AM deletion following a consonant where the tone of the AM differs from both the preceding and following tones. Examples that could be checked with a native speaker are:

```
a.   L  L   H  L  L          b.   L  L   H  L  H
     |  |   |  |  |               |  |   |  |  |
     e-fad  a  e-te               e-geb  ø  a-kug
     7-handle + AM + 7-pot        7-bone + AM + 3-pig
```

9. I do not have any examples of prefix deletion where the prefix tone differs from the following root tone. In order to show that the prefix tone does not link right, we should check examples like:

```
     L   L   H  L   H
     |   |   |  |   |
     be-taŋ  a  ø-nsɨŋ
     8-strength + AM + 7-anthill
```

10. I am speculating that this is true. Without a
detailed explanation of the tone to pitch mapping
procedure, we cannot say for certain which representation
is preferred.

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