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TABLE OF CONTENTS

David Odden, FLOATING TONES AND CONTOUR TONES IN KENYANG ............. 1

Donald G. Churma, CONSONANT GRADATION IN FULA SUFFIXES:
THE UGLY TRUTH ................................................................. 35

Peter Unseth, MAJANG NOMINAL PLURALS, WITH COMPARATIVE NOTES ........ 75

Omen N. Maduka, SIZE AND SHAPE IDEOPHONES IN NEMBE:
A PHONOSEMANTIC ANALYSIS .................................................. 93

NINETEENTH CONFERENCE ON AFRICAN LINGUISTICS ........................ 115

CONFERENCE ANNOUNCEMENTS .................................................. 125

Advertising .................................................. 128

Guidelines for Contributors .................................................. inside back cover
FLOATING TONES AND CONTOUR TONES IN KENYANG*

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Tonal alternations in the Bantu language Kenyang appear on first consideration to be rather complicated but yield to analysis into a small number of rules, which reveal interesting properties of floating tones, contour tones, and the tone-bearing unit in the language. This study focuses on the following problems. First, there is a phonetic contrast, found only at the end of the utterance, between the downgliding L of eket and the unreleased L of basem*. Unreleased L will be shown to derive from rising tone. Second, I argue that syllable final consonants may be tone-bearing, a claim supported by analysis of tone alternations resulting from postlexical resyllabification. Third, Kenyang uses floating L prefixes to form morphological verb tense distinctions. There is a behavioral contrast between the free L tone marking the progressive, which triggers downstep and blocks a spreading rule, versus the free L used in the recent past, which docks to the first root vowel, thereby causing the root tone to shift rightward. The analytic problem is to find a way to represent these two types of floating L. The distinction can be handled by assigning them to different levels of the lexical phonology, so that the shift-inducing L is added when verb roots are inserted, but the float-only L is added at a later stratum. Finally, I show that the interaction between the two rules H Spreading and Fall Simplification provides evidence for the cyclic application of postlexical rules.

1. Basic Tone Mapping and Distribution

The starting point for the analysis of Kenyang tone will be the two phonetic classes of L tones, namely the downgliding L on the final syllable of

*An earlier version of this paper was presented at the 18th African Linguistics conference at UQAM. Data on Kenyang were collected during 1978-1981 from Oben Ako, to whom I owe a debt of gratitude. I would like to thank Larry Hyman, Mary Odden, and an anonymous reviewer for helpful comments on
eket 'house', and the unreleased L of the final syllable of ḅgem 'python', indicated by a raised circle. The lexical tone of nouns is determined solely by the noun root: noun class prefixes such as e and n are underlingly toneless. In (1) I give representative samples of the major surface tone patterns found in nouns, along with suggested underlying tone patterns.

Noun roots fall into two major tonal sets, those where the lexical tone pattern begins linking to the first root vowel, leaving the noun class prefix with no tone, and a smaller set of nouns where the lexical tone pattern begins linking to the second root vowel (the first tone of the noun's melody is mapped to the vowel of the noun class prefix).

(1) Nouns without lexically linked tone

<table>
<thead>
<tr>
<th>Noun</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-keṭ</td>
<td>L</td>
</tr>
<tr>
<td>ḅ-káp</td>
<td>H</td>
</tr>
<tr>
<td>e-nyāyā</td>
<td>HH</td>
</tr>
<tr>
<td>ḅ-gem</td>
<td>LH</td>
</tr>
<tr>
<td>ḅ-soṭ</td>
<td>LH</td>
</tr>
<tr>
<td>e-feŋē</td>
<td>LH</td>
</tr>
<tr>
<td>e-tā</td>
<td>HL</td>
</tr>
<tr>
<td>sērēŋ</td>
<td>HL</td>
</tr>
<tr>
<td>ḅ-gorē</td>
<td>LHL</td>
</tr>
<tr>
<td>ḅ-kuû</td>
<td>LHL</td>
</tr>
</tbody>
</table>

Nouns with root T₂ lexically linked to root V₁

<table>
<thead>
<tr>
<th>Noun</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>sē-nkp̥q</td>
<td>HH</td>
</tr>
<tr>
<td>ē-tēm</td>
<td>HL</td>
</tr>
<tr>
<td>ē-kīrī</td>
<td>HHH</td>
</tr>
<tr>
<td>ē-rokīn</td>
<td>HHL or HLL</td>
</tr>
<tr>
<td>ḅ-sūyūrů</td>
<td>HHHL</td>
</tr>
</tbody>
</table>

I will assume that tone melodies in Kenyang may contain multiple adjacent H's earlier versions of this paper. Throughout the work, L tone will be un-marked, except that L toned syllabic nasals are marked with a grave accent.
Floating Tones and Contour Tones in Kenyang

and L's, in violation of the OCP, as exemplified by enyá'yá. This assumption will be justified below.

As (2) shows, the phonetic distribution of H and L is relatively unrestricted. H and L tone may appear word-finally preceded by either H or L; H and L may appear word medially, preceded by either H or L and followed by either H or L. The contour tones fall and rise are highly restricted; there are no final short rising tones and no medial short falling tones, although rising and falling tones on long vowels are possible in any position.

(2) bacōt 'forests'   basem* 'slaves'   eket   'house'
    sēnkpōq 'hit on head'   āko* (name)   ṭch'īku 'I am buying'
    eér 'scream'   bēwōosi 'to dry up'   tatū wā 'my bee'
    matràs 'mattress'   sērēn 'shilling'   nyaā Tīkū 'Tiku's animals'
    ṭso: 'saw (n.)'   *esē   *bētū

These distributional patterns form the basis of the analysis of contour tones as well as unreleased L. First, fall and rise can stand on long vowels (transcribed as a geminate vowel sequence) anywhere in the word or utterance, whereas contour tones on short vowels are subject to severe restrictions. The asymmetry between long vowels and short vowels can be explained as follows. By "contour tone" we mean multiple tones associated to a single tone-bearing unit (TBU). By treating phonetic long vowels as two underlying vowels, and therefore as two TBU's, the lack of restrictions on rise and fall on long vowels is explained. What would have been contours on long vowel (ṅsō: and bēwō:si) may be treated as simple H and L tones on a vowel sequence (ṅsō: and bēwō:si) with one tone per TBU. The rules or other distributional limitations which apply to contour tones need not be modified to prevent them from overapplying to long vowels, since the phonetic rising and falling tones of ṅsō: and bēwō:si are phonologically not contour tones. Furthermore, treating long vowels as a single phonological unit requires the inclusion of a third contour, LHL, to account for nouns like tūtuū 'cuckoo' (phonetically tūtuū: with a rise-fall contour). The LHL contour may only appear on long vowels, and only in utterance-final position, just as the HL contour on short vowels may only appear in utterance final position. Treat-
ing long vowels as two phonological units, the LHL contour is analysed as a L on the first V followed by a true HL contour on the second V. That HL contour is subject to the same distributional restrictions exhibited by HL contours on phonetic short vowels.

The true contour tones, fall and rise on short vowels, have highly limited distribution. Fall can appear only at the end of the utterance, and rise can appear anywhere except at the end of the utterance. Looking at rise in utterance medial position, nearly all rises turn out to be morpheme-final. Since fall and rise are in complementary distribution, one might attempt a treatment of fall as the prepausal allotone of rise, or vice-versa. However there is another highly significant distributional fact to account for, namely the fact that the contrast between plain L and unreleased L is also limited to final position. Since rise and unreleased L are also in complementary distribution, distribution alone cannot provide an account of the relations between various contours and the two types of L tone.

Phonological alternations clarify the picture. To test the underlying representation of unreleased L, a word which ends with either type of L is simply placed in the middle of the utterance, as in (3). Without exception, the unreleased L becomes rise in medial position, while regular L never alternates.

(3) sete 'axe' setõ sêwû 'the axe is broken'
̂nsi 'fish' ̂nsî ya 'my fish'
̂nden 'clothes' ̂ndên bênére 'the clothes are wet'
eket 'house' eker e ya 'my house'
beno 'hoes' beno bekô 'new hoes'

This motivates the derivation of surface unreleased L from a LH sequence, since the unreleased L in final position alternates with rising tone. What is unclear at this point is whether the LH sequence which surfaces as a phrase medial rising tone in (3) is also a phonological rising tone in final position (subject to a phonetic rule realizing final rising tone as unreleased L tone). The input to the phonetic rule generating unreleased L might be either (4a), with a rising tone (a tone sequence linked to one vow-
Floating Tones and Contour Tones in Kenyang

el), or L tone followed by floating H tone as in (4b). A representation such as (4b) was in fact proposed by Asongwed and Hyman [1976] for the analogous unreleased tone of Ngamambo.

(4) a. seto                     b. seto
    \  \                           \  \                     L H               L H
         \                    \                         \               \     
         L       H               L       H                         L       H

Evidence for the rising tone representation (4a) will come from analysis of the tone-bearing unit in Kenyang.

With this basic understanding of the unreleased L tone in Kenyang, and in particular the fact that it derives from a more abstract rising tone, the next task is to explain why the distribution of contour tones is highly restricted within both the stem and the utterance. To solve this problem it is necessary to consider how tones are represented in underlying forms. To explain the distribution of contour tones in Kenyang, we need to assume that tones are not associated with tone bearing units in underlying representations, i.e. to assume lexical representations like those in (5a) with unlinked tones, as opposed to ones like (5b), with linked tones.

(5) a. L L H                      L H L                   H
    teņasaa                   kuu                   noq
    [se-teņasaa] 'crane'      [nkuû] 'antelope'  [e-nôq] "drum"

b. L L H                       L H L                   H
    \  \                           \  \                              
    teņasaa                  kuu                     noq

The analysis in (5a) assumes that free tones link to free vowels one-to-one left-to-right by universal association conventions. Such linking applies in the lexicon prior to addition of the noun class prefixes such as e and se, which are underlingly toneless. The noun prefix usually takes a default L tone, as in (5), which is representative of most nouns in the language. However, some stems cause these same class prefixes to appear with a phonetic H tone, as in (6).
The problem here is that the phonologically unusual behavior, a H toned noun class prefix, is conditioned by the noun stem but is phonetically manifested on the prefix. As the derivation (7) shows, these stems can be handled by giving an exceptional lexical link between the second tone and the first vowel in specific words. In fact, given that there is precisely one class of irregularly prelinked stems, one might postulate a lexically conditioned Initial Tone Association Rule mapping the second tone to the first vowel and mark the forms in (6) as undergoing that rule rather than the more general rule which maps the first tone to the first vowel. In nouns such as those in (6), the initial tone of the stem remains phonologically unattached until the class prefix (se-, ke-, be-, or n-, inter alia) is added. When the toneless class prefix is added, the free H tone at the left of the stem links to the free prefix vowel. (Later, it will be shown that é-rú has the underlying tone pattern HL, where L is prelinked to the first root vowel; the surface falling tone derives from the H Spreading rule, to be motivated below.) Noun stems which cause class prefixes to become H toned are an overwhelming minority in Kenyang, and the analysis proposed here explains that status, given that lexical linking of tones is less highly valued (see Goldsmith [1976] or Odden [1986] inter alia for discussion of the relationship between lexical association lines and the evaluation metric).

A further advantage of treating tones as unlinked in the general case is that it explains why contour tones appear only at the end of the morpheme. Left-to-right one-to-one linking results in more tones than TBU's only at the end of the stem. Given the analysis proposed above, the only way to create a contour tone on a nonfinal vowel would be to lexically prelink two tones to a single vowel. Since the only lexical prelinking is between the second tone and the first vowel, contours in the middle of the stem can never arise. This analysis also correctly predicts that nouns with no class pre-
Floating Tones and Contour Tones in Kenyang

(7) \[
\begin{array}{c}
\text{Underlying} \\
H H H L \\
\text{[suyuru]} \\
H H H L \\
\text{n[suyuru]} \\
H H H L \\
\text{n[suyuru]} \\
\end{array}
\begin{array}{c}
\text{Nouns class prefixation} \\
H H L \\
\text{[ru]} \\
H H L \\
\text{e[ru]} \\
H H L \\
\text{e[ru]} \\
\end{array}
\]

Association Conventions

(8) Free tone docking

\[
\begin{array}{c}
\text{T'} \\

\end{array}
\begin{array}{c}
\text{V} \\

\end{array}
\]

This rule applies quite transparently to medial LH sequences and final HL sequences, as shown in (9).

(9) etâ 'calabash'  \[\text{mfâm} 'medicinal object'\]

\[
\begin{array}{c}
\text{L H L} \\
\text{enô agha 'whose hoe?'} \\
\text{L L H} \\
\end{array}
\begin{array}{c}
\text{L H L} \\
\text{benyên bêkwên 'the things fell'} \\
\text{L L H} \\
\end{array}
\]

fix and a lexical prelinking between the first vowel and the second tone will exhibit contour tones on the initial vowel. An example of such a noun is tûtuû 'cuckoo'.

The free-tone docking rule, which applies to the leftover tones at the end of the stem to generate contour tones, is given in (8).

\[\text{(8) Free Tone Docking}\]

\[
\begin{array}{c}
\text{T'} \\
\end{array}
\begin{array}{c}
\text{V} \\
\end{array}
\]

This rule applies quite transparently to medial LH sequences and final HL sequences, as shown in (9).

\[\text{(9) etâ 'calabash' mfâm 'medicinal object'}\]

\[
\begin{array}{c}
\text{L H L} \\
\text{enô agha 'whose hoe?'} \\
\text{L L H} \\
\end{array}
\begin{array}{c}
\text{L H L} \\
\text{benyên bêkwên 'the things fell'} \\
\text{L L H} \\
\end{array}
\]

\[\text{1This predicts that when preceded by a class prefix, the initial L should shift to that prefix, resulting in an initial level H. Unfortunately this}\]
Since fall does not occur medially and rise does not occur finally, one might try to formulate (8) so that positional restrictions on contours would result from the formal statement of the rule. Such restrictions would be impossible to formulate without angled brackets or the like. Neither utterance final versus utterance medial position intrinsically blocks rule (8) nor does the nature of the free tone being docked, that is, H versus L. The two remaining positional restrictions on contour tones (lack of medial fall and final rise) will therefore be handled by independent phonological rules, and Free Tone Docking will remain in its maximally general form.

The first of these rules, Fall Simplification, delinks the L part of medial falling tone with the consequence that fall can only surface prepausally. Fall Simplification (11) is motivated by the fact that any word which has a falling tone in isolation always changes that fall to a level H in the middle of the utterance, as in (10).

(10) ̀nkù 'dress' ̀nkù pyò 'black dress'
̀ngorè 'woman' ̀ngorè Tíkù 'Tiku's wife'
matràs 'mattress' matràs á́pço 'the mattress is rotting'

The formulation of (11), with reference to "...]\_U", should be taken to read "when something follows within the utterance".

(11) Fall Simplification

\[
\begin{array}{c}
\text{H} \\
\downarrow \\
\text{L} \\
\text{V} \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
\text{...}\_U \\
\end{array}
\]

Note that in these examples (especially ̀ngorè Tíkù from ̀ngorè Tíkù), no downstep results from decontouring fall to H. This is due to the application of Free L Deletion (12) which applies to a free L tone standing at the end of its morphosyntactic domain, viz. word or phrase.

(12) Free L Deletion

\[
\text{L'} \rightarrow \emptyset / _{-}\]

noun takes no class prefixes.
When Fall Simplification applies to a tone which is not word-final, (12) cannot apply since a free tone in the middle of a word is not domain-final. In such a case, the resulting free L tone is realized as a downstep. One environment where this may arise is when vowels between words are (optionally) contracted; if the word final vowel of the first word is H toned and the following word begins with the tone sequence LH, vowel contraction results in the phonetic sequence H'H.

(13) mbongo 'owner'  ngó 'I saw'
    eno 'hoe'  ebá 'bag'
    enóq 'drum' enyáyá 'spinach'

mbongo'ono 'owner of the hoe' (/mbongo eno/)
mbongo'ba 'owner of the bag' (/mbongo ebá/)
mbongo'nóq 'owner of the drum' (/mbongo enóq/)
mbongo'nýáyá 'owner of the spinach' (/mbongo enyáyá/)
ngó'nóq 'I saw the drum' (/ngó enóq/)
ngó enóq (id.)

Contraction fuses the vowel sequences in (13) into a single vowel, with both tones of the underlying sequence preserved; ngó enóq thus becomes intermediate ngó'noq, whereupon the utterance medial falling tone undergoes (11) resulting in surface ngó'noq. The resulting free L is not deleted since it is not domain final, so it is interpreted as a downstep.2

The remaining rule is a rule of phonetic interpretation, which interprets final rising tone as unreleased L. I have formalized the rule as a feature fusing and changing rule (14), since the precise formulation of this low-level phonetic rule is not important here.

2While vowel contraction results in the automatic reassociation of the tones of the underlying vowel sequence to the remaining vowel, I assume that the morphosyntactic relations between tones is not affected. In other words, I assume that contraction results in (i) rather than (ii).

(i) v [L H] n [L H]  (ii) v [L H L] n [ H ]
    v| |
    | | n| |
    ngo (e) ba  ngo (e) ba
2. H Tone Spreading and the TBU

Having seen the basic rules that create and simplify contour tones, we may turn to a tone spreading rule which applies when words are concatenated, illustrated in (15). When a word ends in a H tone and stands before a word beginning with at least two L tones, the initial L becomes a H tone. In the examples in (15), the rule only applies in relatively fluid speech, and as a speech-rate controlled variant, the underlying LL sequence may be retained phonetically.

(15) ñku’ 'taro' seténé 'broomstick'
    Tambey (PN) bataŋ' 'judges'
    sekwob' 'eating spoon' ewú 'broken'

ñku bataŋ ~ ñku bataŋ' 'judges' taro'
ñku Támbeý ~ ñku Tambey 'Tambey's taro'
seténé Támbeý ~ seténé Tambey 'Tambey's broomstick'
seténé bataŋ ~ seténé bataŋ' 'judges' broomstick'
ewú sékwob ~ ewú sekwob' 'broken eating spoon'
ño bataŋ ~ ñgo bataŋ' 'I saw the judges'

A further example illustrates H Spreading. The Class 2 noun ba-baberî 'guards' has no lexical H tones, but when followed by Tambey in the possessive phrase bababerî Tambey ~ bababerî Támbeý 'Tambey's guards', a H tone is assigned to the final vowel of that noun, resulting in a rising tone. This syntactically conditioned H tone also triggers H Spreading.

When the following word starts with the tone sequence LH, H Spreading is impossible, as (16) shows.

(16) ñtí bebá (*ñtf bë... ) 'I sold bags'
ñku ekáti (*ñkũ é... ) 'school's taro'
seténé Ayóq (*seténé á... ) 'Ayoq's broomstick'
Floating Tones and Contour Tones in Kenyang

*ngó ekáti (*ngó é...)
'I saw the school'

ewú seté né (*ewú sé...
'broken broomstick'

This blockage of the spreading pattern might be due to a requirement that there must be a L tone after the vowel to which H spreads, or it could be blocked by the presence of the H tone. The examples in (17) resolve this question and also shed light on the formulation of the rule. When a L toned monosyllable at the end of the utterance stands after H, L tone becomes fall. As in (15), this spreading is optional.

(17) pyo 'black' chu 'red'
    nyaa pyo 'black animal' nyaa chu 'red animal'
    ñtaá pyó 'black stone' ñtaá chu 'red stone'
    ñkú pyó 'black frock' ñkú chu 'red frock'
    nyọ́n 'crocodile' nyọ́n o 'crocodile?'
    eyoq 'feather' eyọ́q o 'feather?'
    ebóq 'piece' ebóq o 'piece?'
    enóq 'drum' enóq o 'drum?'

We can account for both the H tone variant of spreading seen in (15) and the falling tone variant seen in (17) with a single rule, (18), which is blocked by following H.

(18) H Spreading (optional)

After H Spreading applies, Fall Simplification applies. The falling tone which would have been created by H Spreading (18) in the case of the examples in (15) (which show a simple H tone on the surface) undergoes Fall Simplification, as shown in the derivation (19) on the next page. These examples motivate an ordering relation as well, one which will become important below: H Spreading precedes and feeds Fall Simplification.
Now we may turn to another tonal problem which bears on the nature of the tone-bearing unit in Kenyang. There is an interesting alternation involving rising tones which argues that syllable final consonants in Kenyang are tone bearing. This alternation is exemplified in (20), which involves word-pairs where the first word ends in rising tone. The underlying rise shows up as a rise on the surface when the first word is vowel final or when the first word is consonant-final and the following word is consonant-initial. As expected, the H tone part of rise conditions the optional H Spreading rule. What is not expected is that, in case the first word is consonant final and the second word is vowel initial (labelled below as C+V), the H tone obligatorily and completely detaches from its original syllable, shifting to the following syllable. I have indicated the resyllabification of the final consonant with the following syllable by a hyphen. This will suggest a possible solution.

(20) V-final L∗ first word

sete∗ 'ax'    \hsil* 'fish'

C-final L∗ first word

enq* 'tree'    menq* 'trees'
epem* 'owl'    bepem* 'owls'
ngwot* 'I have tied'  \nsiq* 'porcupine'

C-initial second word

seko 'new (Cl. 19)'    beko 'new (Cl. 8)'
Floating Tones and Contour Tones in Kenyang

V-initial second word

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
<th>Tone Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>ekə</td>
<td>'new (Cl. 9)'</td>
<td></td>
</tr>
<tr>
<td>enoq</td>
<td>'drum'</td>
<td></td>
</tr>
<tr>
<td>achfuw</td>
<td>'it is dying (Cl. 9)'</td>
<td></td>
</tr>
</tbody>
</table>

Rise + LL, LL°

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
<th>Tone Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>sete sekə</td>
<td>'new ax'</td>
<td>V+C</td>
</tr>
<tr>
<td>hsye ekə</td>
<td>'new fish'</td>
<td>V+V</td>
</tr>
<tr>
<td>menge bekə</td>
<td>'new trees'</td>
<td>C+C</td>
</tr>
<tr>
<td>eno y-eko</td>
<td>'new tree'</td>
<td>C+V</td>
</tr>
<tr>
<td>epe m-eko</td>
<td>'new owl'</td>
<td>C+V</td>
</tr>
<tr>
<td>bepm bekə</td>
<td>'new owls'</td>
<td>C+C</td>
</tr>
<tr>
<td>ngwor menaq</td>
<td>'I have tied trees'</td>
<td>C+C</td>
</tr>
<tr>
<td>ngwo r-enoq</td>
<td>'I have tied a tree'</td>
<td>C+V</td>
</tr>
</tbody>
</table>

Rise + LH

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
<th>Tone Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>nyg y-acho wu</td>
<td>'the porcupine is dying'</td>
<td>C+V</td>
</tr>
<tr>
<td>hsya chfuwu</td>
<td>'the fish is dying'</td>
<td>V+V</td>
</tr>
<tr>
<td>ngwo r-enoq</td>
<td>'I have tied a drum'</td>
<td>C+V</td>
</tr>
<tr>
<td>ngwor menoq</td>
<td>'I have tied drums'</td>
<td>C+C</td>
</tr>
</tbody>
</table>

In the case of vowel-final words such as sete or consonant final words when they stand before consonant initial words such as ngwor menaq, spread of H to the following word can be explained as the result of applying H Spreading. This does not explain forms like eno y-eko or ngwo r-enoq. First, H Spreading is optional and applies only in fast speech, whereas the C-plus-V tone shift is obligatory and does not depend on speech rate. Second, H Spreading only spreads H to the right; it does not remove the H tone from its original syllable entirely, whereas in the C-plus-V tone shift, the H tone is removed completely from the original syllable. Third, while H spreading is blocked by a following H tone, as in ngwor menoq, a following H does not block the C-plus-V tone shift, as in ngwor eloq.

The C-plus-V tone shift can be explained quite simply if we assume that the H part of rise is underlingly associated with the syllable final consonant, which is to say that syllable final consonants are tone bearing units. When the stem ends in a consonant and the next word begins with a vowel, as in the
derivation (21), the consonant resyllabifies with the following vowel. Resyllabification does not intrinsically affect tone, so the final consonant carries along its tone. Making the further assumption that only segments in the syllable nucleus can bear tone (an assumption which is doubtless part of linguistic theory, since no language has been reported with tone-bearing syllable onset consonants), the tone of the consonant shifts to the nucleus of its new syllable,\(^3\) and the derivation terminates with the application of Fall Simplification to the syllable which received a contour tone as a side-effect of consonant resyllabification. Note that the rule Free L Deletion (12) does not apply, since the floating L is not at the end of the word. The floating L tone which results from Fall Simplification is therefore realized phonetically as downstep when it stands before another H, as in ǹgwor é'noq.

\(^3\)An alternative analysis suggested by Larry Hyman is for the tone of the consonant to be merely set afloat by convention and then invoke a later rule linking a free H to the right.
For further examples of tone shift induced by resyllabification, consider the forms in (22) involving the question clitic e. It can be seen here that words with final rise move the H tone to the clitic, which surfaces with a falling tone since Fall Simplification is inapplicable.

(22) enoq* 'tree'  eno γ-ô 'tree?'
    epem* 'owl'    epe m-ô 'owl?'
    nyoq* 'porcupine' nyo γ-ô 'porcupine?'

Thus, assuming final C's to be tone bearing units in Kenyang accounts for an otherwise unusual segmentally-conditioned tone shift.

It should be pointed out that the only syllable final consonants which provide compelling evidence for consonants as TBU's are root-final consonants. Underlying syllable final consonants which are not word final are quite rare (words like matrás 'mattress' are syllabified ma.trás). The n of mā-njáya 'Keyaka person' is probably syllabic in underlying form, viz. mā-njáya, since it is root initial. Only a very few loan words like brīgda 'bricklayer' have clearly root-medial syllable final consonants. Still, postulating that syllable final consonants are TBU's may explain why the rule H Spreading appears to have failed in brīgda. It will be shown later that underlying áchwi becomes phonetic áchwî by H Spreading; however, brīgda does not become *brīgdâ. If g is tone-bearing in this word, H Spreading would spread H to the syllable final consonant, and no further. By application of Consonant Tone Transfer (23), the syllable final consonant loses its tone, nullifying the effect of H Spreading.

The conclusion that syllable final consonants are tone bearing in Kenyang has another implication for the treatment of unreleased L. It was conjectured earlier that unreleased L might derive either from rise or from L plus floating H. One argument against the floating H treatment of unreleased L is that it would entail a considerable complication of the Free Tone Docking rule to keep the rule from applying to free H at the end of the utterance. However, since consonants are tone bearing, then in the form nyoq* in (22), the stem tone pattern LH will be mapped by the universal association conventions to the two TBU's of the stem, and there are no free tones left for Free
Tone Docking to apply to in this instance. Thus deriving unreleased L from L plus floating H would complicate not just the Free Tone Docking rule but would also run afoul of the association conventions.

One detail has not yet been spelled out. While onset consonants cannot bear tone, nuclear consonants clearly can. Since syllable final consonants do not bear distinctive phonetic tone, we must seek an explanation for the surface lack of tone on the consonant when it remains in its original syllable. The H tone of underlying m in bepêm békÇ is phonetically transferred to the preceding vowel, which is the result of a general rule (23) drawing a tone off of a consonant and associating it to the immediately preceding vowel.

(23) **Consonant Tone Transfer**

```
T
A
\nV C
```

Rule (23) can be motivated quite easily, since it applies as a sentence level sandhi rule as well. When a phonetically tone-bearing nasal stands after a vowel, the nasal transfers its tone to the preceding vowel. When preceded by a consonant or in utterance initial position, an initial syllabic nasal retains its contrastive tone.

(24) ñúýúru 'orange'
ñân 'bird (sp)'
ache 'he gave'
asât 'he took'
asôr ñúýúru 'he took an orange'
asôr ñân 'he took a bird'
ache-n ñân 'he gave a bird'
achê-n ñúýúru 'he gave an orange'

When the preceding word ends with a H toned vowel and the following nasal is L toned, that L tone shifts to the preceding vowel. Subsequent application of Fall Simplification sets that L tone afloat. If it precedes a L tone, it has no phonetic realisation, but if it precedes a H tone it is realised as a
downstep between H tones. As in the case of vowel contractions discussed in (13), the floating L is not deleted since it is not final.

(25) aghó 'he saw'
    ñka' 'farm'
    ñtí 'head'
    aghó-n ka' 'he saw the farm'
    aghó-n !tí 'he saw a head'

The postlexical component needs Consonant Tone Transfer (23) anyway for these alternations, and this same rule accounts for the fact that the underlying tone of consonants in the syllable nucleus is phonetically manifested on the preceding vowel.

One might contemplate the elimination of Tone Transfer (23) from the grammar, especially in the case of forms like aĉé-n súyúru , in favor of certain assumptions about phonetic representations. As Larry Hyman has pointed out to me, languages with contour tones never contrastively mark the position within a syllable where the tone rises or falls. Thus, no language contrasts the hypothetical syllables ãm with ãm or ãm . Conceivably, then, the correct surface phonological representation of underlying ache ñ-súyúru is simply a-ĉeň-sú-yú-ru , where hyphens represent syllabification.

There are solid reasons for maintaining (23) as a part of Kenyang grammar, even if such lack of tonal contrasts is universal. The Unreleased L rule (14) and Fall Simplification (11) provide the necessary arguments. First, the Unreleased L rule simplifies a final rising tone linked to a single TBU, viz. eba becomes eba' 'bush farm'. Final "rising tone", that is, a LH tone sequence, when distributed over two TBU's within the syllable will not simplify, as in ñsɔɔ 'saw'. Without (23), underlying basəm 'slaves' should behave like ñsɔɔ and surface as *basəm ~ basəm rather than as basəm . Similarly, Fall Simplification affects only a sequence of medial HL on one TBU, viz. ǹgoré... from underlying ǹgoré , but not HL distributed over two TBU's within a syllable, viz. bèwòòsì 'to dry up'. However, a short falling tone derived from H+L via (23) will undergo Fall
Simplification, viz. agho-n 'tf 'he saw a head' from agho ntf, showing that the intermediate stage aghon tf is justified.

3. Tone in the Verb and Lexical Rule Application

Tone alternations in the verb illustrate further cases of the tone rules discussed above in the lexical phonology. Let us first consider the remote past of the H verb tf and the L verb ku. In (26), we see that adding a H-toned subject prefix before a L-toned verb causes L to become fall.

(26) L verb: ku 'buy' H verb: tf 'sell' Person

<table>
<thead>
<tr>
<th></th>
<th>ku</th>
<th>tf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1s</td>
<td>n-ku</td>
<td>n-tf</td>
</tr>
<tr>
<td>2s</td>
<td>o-ku</td>
<td>o-tf</td>
</tr>
<tr>
<td>3s</td>
<td>a-ku</td>
<td>a-tf</td>
</tr>
<tr>
<td>1p</td>
<td>sē-kû</td>
<td>sē-tf</td>
</tr>
<tr>
<td>2p</td>
<td>bă-kû</td>
<td>bă-tf</td>
</tr>
<tr>
<td>3p</td>
<td>bă-kû</td>
<td>bă-tf</td>
</tr>
</tbody>
</table>

This illustrates application of H Spreading within words. While postlexical application of the rule is optional, word internally Spreading is obligatory. A similar change in rule properties when a rule is manifested in the lexical component versus the postlexical component has been noted elsewhere, e.g. Kiparsky [1985].

In (27) we see an example of a L-toned polysyllabic verb. After a H-toned prefix, the first root vowel becomes H.

(27) L verb: dayati 'tear' Person

<table>
<thead>
<tr>
<th></th>
<th>dayati</th>
</tr>
</thead>
<tbody>
<tr>
<td>1s</td>
<td>n-dayati</td>
</tr>
<tr>
<td>2s</td>
<td>o-dayati</td>
</tr>
<tr>
<td>3s</td>
<td>a-dayati</td>
</tr>
<tr>
<td>1p</td>
<td>sē-dayati</td>
</tr>
<tr>
<td>2p</td>
<td>bă-dayati</td>
</tr>
<tr>
<td>3p</td>
<td>bă-dayati</td>
</tr>
</tbody>
</table>

These forms illustrate application of H Spreading, followed by Fall Simplification. Thus underlying sē-dayati becomes sē-dayati by Spreading and sē-dayati by Fall Simplification. As with the alternations in (26), Spread-
ing in (27) is obligatory.

While the forms in (26) and (27) illustrate application of H Spreading within a word, they do not by themselves show whether these particular rule applications are postlexical or lexical. In fact, the applications in (26) and (27) can be shown to be lexical. Consider the data in (28), which consists of L toned verb stems preceded by a H prefix and followed by the L toned question clitic e. Notice that H Spreading applies once in the lexicon to give sekšt', followed by Fall Simplification and then H Spreading applies again postlexically to e.

(28) sé-kšt' 'we cut'
     sé-kôr ê 'did we cut?'
     bá-jêt 'they ran'
     bá-jêr ê 'did they run?'

Forms like sédâyatî in (27) show that we cannot simply revise H Spreading to apply to a string of L toned vowels; indeed, the only case where we get multiple applications of spreading is where the environment of the rule is brought about by independently applying the rule lexically and postlexically. Thus the forms in (26) and (27) represent lexical application of H Spreading. We will return to the lexical and postlexical application of H Spreading and Fall Simplification below.

In (29), another verb form, the progressive, exhibits two anomalies. First, Spreading fails to apply between the prefix H and the L toned verb, and second, there is a downstep before the prefix H and the H toned verb.

(29) L verb: ku
     H verb: tê
     Person
     h-chî-ku  h-chî-tê  1s
     o-chî-ku  o-chî-tê  2s
     a-chî-ku  a-chî-tê  3s
     sé-chî-ku  sé-chî-tê  1p
     bă-chî-ku  bă-chî-tê  2p
     bá-chî-ku  bá-chî-tê  3p

Both of these difficulties can be explained by postulating a floating L before the verb root in the progressive. Thus, the underlying representations of (29) would be (30).
Treating downstep as a floating L tone, the H toned verbs are accounted for directly. The failure of H Spreading is also explained, since the floating L tone blocks Spreading, standing between the H tone and the L toned vowel to which the H would spread. Free L Deletion cannot apply since the floating tone is in the middle of the word, and Free L Deletion only applies at the end of the word.

(31) \[ \begin{array}{c|c|c} L & H & L \\ \hline \end{array} \]

\[ \chi \]

\[ \text{k} \]

Now let us consider how prefix and root tones are linked to vowels in a lexical phonological analysis of Kenyang. Parallel to the argument which Pulleyblank [1986] makes for Tiv, we can see that mapping from tone to vowel is cyclic, and the floating L prefix must be added after root tones are linked to root vowels, as in (32a). If tone were to be mapped to vowels non-cyclically as in (32b), the lexical H would be shifted to the right, and after free tone docking, it should surface as a rising tone or else final unreleased L. Notice that Free Tone Deletion later links the floating L of (32a) to \( \chi \), but Fall Simplification then detaches that L tone. The medial L tone does not link by the Association Conventions, especially in the second step of (32), since the conventions assign the leftmost free tone to the leftmost free vowel. Thus, the floating L prefix of the progressive must be added to the root on a cycle after the initial association of root tones and vowels.
There is a second past tense in Kenyang, the recent past, which is tonally distinct from the remote past illustrated in (26). This tonally distinct past tense exists only for H toned verbs. The recent past of L verbs is the same as the further past. Note that H toned stems in this tense change the lexical H tone to a rising tone, which becomes unreleased L before pause.

(33) **H verb**

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ćköpt</td>
<td>'you hacked (rem)'</td>
</tr>
<tr>
<td>ćköpt'</td>
<td>'you hacked (rec)'</td>
</tr>
<tr>
<td>séköpt</td>
<td>'we hacked (rem)'</td>
</tr>
<tr>
<td>séköpt'</td>
<td>'we hacked (rec)'</td>
</tr>
<tr>
<td>ćköpo r-ê</td>
<td>'have you hacked? (rec)'</td>
</tr>
<tr>
<td>ćköpo r-ê</td>
<td>'have you hacked? (rem)'</td>
</tr>
<tr>
<td>ńgo</td>
<td>'I saw (rem)'</td>
</tr>
<tr>
<td>ńgo'</td>
<td>'I saw (rec)'</td>
</tr>
<tr>
<td>séghó</td>
<td>'we saw (rem)'</td>
</tr>
<tr>
<td>ségho'</td>
<td>'we saw (rec)'</td>
</tr>
<tr>
<td>ségho beta</td>
<td>'we saw (rec) calabashes'</td>
</tr>
</tbody>
</table>
L verb

ôku  'you bought (rec,rem)'
seku  'we bought (rec,rem)'
ôkô  'you cut (rec,rem)'
seko  'we cut (rec,rem)'

There is a simple explanation for the tone shift which H verbs undergo, as well as for the neutralization of the tense distinction in L verbs. The recent past is marked by a floating L added before the root tone, whereas the remote past has no such L. The recent past is therefore tonally similar to the progressive in selecting a floating tone which is inserted to the left of the root tone. However its floating L is concatenated with the root tone on the first cycle, prior to application of the association conventions. Adding the recent past L tone has the unusual effect of shifting the lexical tone one tone bearing unit to the right, or in case the stem has only one tone bearing unit as in (34), leaves the lexical tone unassociated at the end of the stem, which is then linked to the final vowel by the free Tone Docking rule.

(34)  L H

Underlying

gko

L H

Association conventions

gho

H L H

Subject prefixation

segho

H L H

Free Tone Docking

segho

(→ [séghoʰ] by phonetic interpretation of prepausal rise)

This same L prefix also explains why the two past tenses of L toned verbs are homophonous. Consider the derivation in (35). The recent past L tone
maps to the stem vowel, the lexical tone is left floating, and when it is eventually affiliated with the final vowel, it is simply deleted by the Twin Sister Convention.

\[(35) \quad \text{Underlying} \]
\[ \text{ku} \]
\[ \text{ku} \]
\[ \text{seku} \]
\[ \text{H L L} \]
\[ \text{seku} \]
\[ \text{H L} \]
\[ \text{seku} \]
\[ \text{H L} \]
\[ \text{seku} \]

In the case of a H toned verb stem with a final consonant, the floating pre-stem L is assigned to the initial stem vowel and the root H is assigned to the final consonant. If the consonant resyllabifies with the following vowel, as in \( \text{ok} \text{hr} \text{ênq'} \), the H tone shifts to the following syllable. Otherwise the tone is retracted to the previous vowel by (23), resulting in a rising tone that becomes unreleased L in final position.

\[(36) \quad \text{okot'} 'you hacked' \quad \text{ok} \text{hr} \text{ênq'} 'you hacked a tree' \quad \text{ok\text{hr} menôq 'you hacked drums' ok\text{hr} é'nôq 'you hacked a drum'} \]

4. Lexical and Postlexical Rule Applications

The next problem to be considered here is the interaction between H Spreading and Fall Simplification, especially in terms of their relative ordering and their application within words and between words. It would seem that the interaction of these rules should be a fairly simple matter—we
have seen that H Spreading creates a falling tone which later simplifies, a situation which is amenable to a simple ordering statement "Spreading precedes Simplification". By antisymmetry of rule ordering, we incorrectly predict that a H tone which derives by Fall Simplification therefore cannot trigger H Spreading. This is not the case. In (37) we have the lexical L toned verb stem ku which undergoes H Spreading due to the preceding subject prefix. That H tone then spreads to the following word, i.e. we have double application of H Spreading, with an application of Fall Simplification in the middle.

(37) sé-kù 'we bought' bomatrâs 'mattresses'
    sé-kù bomatrâs 'we bought mattresses' (/sé-kù bomatrâs/)
    bá-kôn 'they loved' baghorê 'women'
    bá-kôn baghorê 'they loved the women' (/bá-kôn baghorê/)

Thus arises the paradox that Fall Simplification applies before H Spreading in order to provide the latter rule an opportunity to apply, but Fall Simplification also applies after H Spreading, to clean up the result of utterance medial Spreading.

One response to this interaction between Spreading and Simplification would be to modify Spreading in some way so that it simply spreads H tone through the maximum sequence of L toned vowels and eliminate the intermediate step in which Simplification applies. According to this approach, the H of se in (37) would spread to the root, then to the following syllable, and would simply constitute a case of the self-feeding application of an iterative rule. This approach can be ruled out immediately by the data in (38). Here we see that both underlying H and H derived from a falling tone will spread to the first syllable of the succeeding word. If spreading is to apply to the maximal sequence of L tones, then it should not stop with the first syllable of the next word as it does in (38).

(38) sé-ghó 'we saw' sé-kôn 'we loved'
    sé-ghó sêtenasâá 'we saw cranes' sékôn sêtenasâá 'we loved cranes'
    *séghó sêtenasâá
    *sékôn sêtenasâá
Moreover, the revised iterative spreading rule would incorrectly generate forms such as *sé-dáyátí instead of sé-dáyati 'we (remote) tore' in (27).

The crucial observation which distinguishes those cases where H Spreading applies more than once from those cases where it applies only once is that multiple application of the rule always involves the word-external application of Spreading. We might try to handle the forms in (38) by applying Spreading once in the lexical phonology and then reapplying the rule a second time in the postlexical phonology, with Fall Simplification and Free L Deletion (12) applying in between. Such an approach is on the right track, but there is more to be said about multiple application of spreading. In (39) we see that spreading can apply to more than one vowel in a sequence of L toned monosyllabic words.

(39) mpol 'cow' mpol pyo 'black cow'
mpol pyo ajet 'the black cow ran'
 nkù 'dress' nkù pyó 'black dress'
 nkù pyó adaq 'the black dress tore'

The H tone of nkù (from nkù by Fall Simplification) spreads to the following adjective pyo, and from there to the initial syllable of the verb adaq.

If we consider only the sequence of underlying tones and number of syllables, there is no significant difference between the forms in (38) where Spreading applies to only one following syllable and those in (39) where Spreading applies to two following syllables. However, if we include morphological and syntactic bracketing, a striking difference between these cases arises.

(40) a. [S [NP [N nkù N] [A pyo A] NP] [VP adaq VP] S]
    b. [VP [V sè[kot] V] [NP seteñasáá NP] VP]

---

4 The noun nkù is in class 9, a class which does not induce insertion of the floating H tone in N+adj constructions, discussed in section 5. The H tone on the initial syllable of the verb therefore derives by Spreading from the noun nkù.
The difference between (40a), with maximal inter-word spreading of H, and (40b), with restricted spreading between words, can be explained under the assumption that the tone rules in question apply cyclically and that syntactic bracketing contributes to the definition of cyclic domains. The derivation of (40a) is that in (41).

(41) $N_{nkû}...$
    $N_{nkû'}...$
    $N_{nkû}...$
    $NP_{nkû pyû}...$
    $NP_{nkû pyû'}...$
    $NP_{nkû pyû}...$
    $S_{nkû pyû adaq}$
    $S_{nkû pyû adaq}$

In contrast, (40b) involves only two cyclic domains, namely, a lexical domain involving the subject prefix and the stem within the verb, and one involving the verb plus its object.

(42) $V_{sé - ku}...$
    $V_{sé - kû}...$
    $V_{sé - kû'}...$
    $V_{sé - kû}...$
    $VP_{sékû sêtenasáá}$
    $VP_{sékû sêtenasáá}$

The problem of multiple applications of Spreading, Simplification, and Free Tone Deletion can be solved by applying these rules cyclically. However, since syntactic structure contributes to defining a cyclic domain, this conclusion has theoretical consequences for the theory of lexical phonology. It is claimed in Mohanan [1986] and Kiparsky [1985] that the phonological cycle derives from the interaction between the phonological and morphological components within the lexicon. It is further claimed that postlexical rule application can never be cyclic. The evidence for postlexical cyclic applica-
tion presented here challenges this claim. Similar counterexamples to the claimed non-cyclic application of rules in the postlexical domain are presented by Liu [1980], Dresher [1983], and Kaisse [1985].

5. **HF Pattern Nouns**

The final problem in Kenyang to be discussed is the underlying representation of nouns with the surface tone pattern HF in isolation. Examples of these nouns are given in (43).

(43) é-řu 'vegetable' bě-řu 'vegetables'
åchwi 'car' ně-bâ 'breast'
sérene 'shilling' ĕ-tem 'hut'
á-sâ 'fish net' bá-sâ 'fish nets'
kápâ 'penny' wíndš 'window'
kasárâ 'cassava' bôkît 'bucket'

There are two conceivable underlying representations for these nouns. The noun åchwi might have the underlying tone pattern HHL, i.e. its surface isolation form is its underlying form. On the other hand, it might have the underlying form HL (åchwi), and it undergoes H Spreading. There is evidence that the latter analysis is the correct analysis in most nouns, including åchwi; however, for some nouns, including bôkît, the former analysis appears to be correct.

Let us consider the evidence relating to nouns such as åchwi, which includes all of the nouns in (43) except kasárâ and bôkît. These nouns are phonologically anomalous in a number of ways. First, when the former type stand before another word with an initial H tone, their tone pattern shifts to HL.

(44) ētem ēchísonô 'the hut is burning'
ńku éru ē'iyû 'I bought vegetables yesterday'
ńku åchwi ē'iyû 'I bought a car yesterday'
ńbôn sérene ē'iyû 'I found a shilling yesterday'
ńbôn séreń 'I found a shilling'
áse åchísap 'the fishing net is long'
ěru ē'pôś 'the vegetable rotted'
Nouns ending with a falling tone not preceded by H simply change that F to level H by Fall Simplification, viz. be'tê 'calabashes', be'tê be'pôô 'calabashes rotted'.

Second, when one of these nouns stands before a word with two initial L tones, H Spreading cannot apply between the HF noun and the following word.

(45) sérêŋ e wa 'my shilling'  *sérêŋ é wa
étêm e kô 'new hut'  *étêm é kô
érû e kô 'new vegetable'  *érû é kô

In contrast, nouns with final falling tone which is not preceded by H will spread their H tone to the following word, as in ṇkû 'frock', ṇkû é kô 'new frock'.

These anomalies are explained if their underlying tonal representation is HL, not HHL. In the case of étêm where the first H is phonetically assigned to a noun class prefix, the L tone is lexically prelinked to the root initial V. The surface falling tone will then derive by the postlexical application of H Spreading. First, the blockage of H Spreading in (45) is explained since there is only one phonological cycle where Spreading can apply, hence it can only apply once (later we will consider why Spreading does not apply in the lexical component).

(46) ![Input to Postlexical Component](image)

H Spreading

Fall Simplification

The unusual apparent change of fall to L in (44) is explained similarly: since H Spreading cannot apply to L tone before H tone and the word final L of ásô in ásô áchîsap is before a H tone, Spreading is blocked.

These explanations require application of Spreading in nouns such as
Floating Tones and Contour Tones in Kenyang

átchwî to take place in the postlexical component, since the crucial blocking H tone in .false áchísap is only available postlexically. There is one further anomalous pattern exhibited by these nouns which supports the postlexical application of Spreading. When a noun in the appropriate noun class is followed by a modifier which does not agree with it in morphological class, such as the adjectives chu 'red' and pyô 'black' or a noun serving as a possessive modifier such as Tambey, a floating H tone is inserted between the modifier and what precedes it (either the head noun or another modifier). If the head noun ends in a H tone, this floating H simply disappears. When the noun ends in a L tone, the H tone docks to the final vowel resulting in a rising tone. That H tone then spreads to the following adjective by H Spreading. Note also that nouns in classes 1, 4, and 9 do not select this floating H tone.

(47) nkî 'lion(s)'(Cl.9,10) nchu 'thatch(es)'(Cl.9,10) nkî pyô 'black lion'(Cl.9) nkî pyô 'black lions'(Cl.10) nchu chu 'red thatch'(Cl.9) nchu chu 'bunches of red thatch' nmbaberî 'guard'(Cl.1.1) bababerî 'guards'(Cl.2) (Cl.10) nkû 'frock' kentémé 'hunting' nkû pyô 'red frock' kentémé Támbe 'hunting of Tambey' mhaberî Tambey 'Tambey's guard'(Cl.1) bababerî Tambey 'Tambey's guards'(Cl.2) nkî chu Tambey 'Tambey's red lion'(Cl.9) nkî chu Tambey 'Tambey's red lions'(Cl.10)

However, nouns of the surface HF class are anomalous (when compared to nouns like nkû) in that their final syllable takes a rising tone.

(48) áchwî chu 'red car' áchwî Támbe 'Tambey's car' kápâ Tíkû 'Tiku's penny' wîndô Tíkû 'Tiku's window'

These examples have a very simple explanation: the nouns have the underlying tone pattern HL, and the floating H tone is assigned to the final vowel by (8) to yield a rising tone. Consequently, the final L tone is now followed by a H tone, so H Spreading cannot apply. If H Spreading applies postlexical-
ly in *áchwê*, blockage of Spreading by this morphosyntactically triggered floating H tone is not unusual. If the application of H Spreading in *áchwê* were a lexical application, then we would incorrectly expect the floating H tone to have no influence on the applicability of H Spreading, since that tone is not accessible within the lexicon.

There is a very strong argument that H Spreading in the *áchwê* type of noun does not take place in the lexicon. We have already seen one clear set of cases where H Spreading applies in the lexicon, namely between H toned subject prefix and L toned stem in verbs, viz. sékû 'we have bought'. Unlike the HF pattern in nouns, the clearly lexically derived HF pattern is not blocked by a following word which begins with H (sékû bèwâm 'we have bought fishhooks') and will spread to a following word by reapplication of H Spreading (sékû bèkpêre 'we have bought wooden plates'—cf. bèkpêre 'wooden plates'). Given that H Spreading is applying in the lexicon in the case of sé-kû, neither the irrelevance of the tone of the following word nor the reapplication of H Spreading on a later postlexical cycle is any surprise.

One might wonder why H Spreading does not apply until the postlexical component in nouns like *áchwê* or *é-ru*, whereas it applies lexically in verbs like sé+ku. In fact this is nothing more than the familiar blockage of rules in underived environments (Kiparsky [1973]). H Spreading can apply to verbal forms such as sé+ku lexically since their structural description is satisfied only in a morphologically derived representation, namely after a H toned subject prefix. On the other hand, in nouns such as *áchwê* or *é-ru* from *áchwê* and *e-ru*, the form to which H Spreading would apply is not a derived form. The phonological environment for H Spreading is a H tone before a L toned vowel, which is present in the underlying representation of the roots for *áchwê* and *e-ru*. Although *e-ru* is morphologically complex, the noun prefix *e-* contributes nothing to satisfying the phonological requirements of the rule, hence *e-ru* is an underived form in the relevant sense. Since lexical rule applications are constrained not to apply to underived forms in the theory of lexical phonology (whether that blockage is derived from the Elsewhere Condition or is stipulated as an independent con-
H Spreading therefore cannot apply in underived nouns. Since the postlexical component is not so constrained, H Spreading can apply in that component to give áchwî and é-ru.

At the beginning of this section the existence of a second class of nouns was noted, which in my data includes the nouns bôkit 'bucket' and kasará 'cassava', as well as the noun póbrîk 'public works' which exhibits variable behavior. These nouns differ from the larger áchwî class, which includes a mixture of native Kenyang and borrowed words, in that they exhibit none of the tonal irregularities of that class. Their final H tone undergoes Fall Simplification before another H toned word, their final H will spread to the next word, and in general they do not replace their final fall with L tone as the áchwî group does.

(49) bôkit átey 'the bucket is broken' (átey 'it is broken')
    bôkit bâ'tey 'the buckets have broken' (bâ'tey 'they have broken')
    bôkit é wa 'my bucket'
    kasará Tîkû 'Tiku's cassava'
    póbrîk é wesé 'our public works'
    póbrîk e wesé id.

There are two conceivable explanations for these nouns. The less likely explanation is that, like verbs, they undergo H Spreading within the lexicon. This would require specially marking each member of the much larger áchwî group to not undergo H Spreading in the lexicon; furthermore, we are still faced with the theoretical prediction that H Spreading should be prevented from applying within the lexicon to underived bôkit. A more likely explanation for this class of nouns then is that they do not involve H Spreading at all. Instead, their underlying representations contain two H tones, rather than one H linked to two vowels. The noun póbrîk has two underlying representations, one with a single H and one with two H's.

(50) \[ \text{H HL} \]
    \[ \text{H LL} \]
    bôkit
The postulation of two consecutive identical tones violates the OCP. However violation of the OCP is independently motivated for Kenyang (as argued in Tyhurst [1985] for another dialect). Some of the nouns requiring OCP violation for the representation of their root tones are given in (51).\(^5\)

(51) se-teŋəsää 'crane'  \[LLHH\]
    ǹ-sʊɣʊru 'orange'  \[HHHL\]
    ो-rōkin 'lock'  \[HLL\]
    ो-rōŋɔri 'tree sp.'  \[HLLL\]
    me-ŋɔŋɔri 'laziness'  \[LLH\]
    kpárákpara 'mat for drying cocoa'  \[HHHL\]
    ajigijá 'string of beads'  \[LLLH\]

Adding nouns like bókît to the list will not complicate the grammar of Kenyang in any way and will provide a principled explanation for the contrasting behaviors of bókît and ąchwî.

\(^5\)The usual alternative to OCP violation is postulating a single tone and lexically prelinking that tone to a sequence of vowels. Thus, [ajigijá] might be given the underlying representation (i).

(i) \[\begin{array}{c}
    a j i g i j a \\
    L \quad H \\
\end{array}\]

As argued above, lexical tone melodies are not linked to root vowels in underlying representations, except for the class of nouns which prelink the second root tone to the first root vowel. Therefore, nouns like ajigijá cannot be accounted for by lexical prelinking of L to the initial vowel sequence. Furthermore, prelinking of tones cannot account for nouns like ǹ sʊɣʊru, whose underlying representation is (ii).

(ii) \[\begin{array}{c}
    n - s u y u r u \\
    H \quad H \quad H \quad L \\
\end{array}\]

The presence of a free H tone before a linked H is in clear violation of the OCP: lexical linking of tone does not provide an alternative to violating the OCP. It seems to be the case that the OCP plays no role in Kenyang toneology.
5. **Summary**

To summarize, a wide range of alternations in Kenyang have been accounted for here primarily by the action of two general phonological rules, H Spreading and Fall Simplification, in conjunction with the treatment of syllable-final consonants as tone-bearing. We have seen that two tenses are marked by prefixation of a floating L, but that the different tenses add their tones to the verbal melody at different points relative to the initial application of the Association Conventions. Finally, it has been shown that the core phonological rules of Kenyang apply both cyclically and postcyclically and that in the postcyclic component, rules apply cyclically with the domain of the cycle being defined by syntactic bracketing.
REFERENCES


CONSONANT GRADATION IN FULA SUFFIXES:
THE UGLY TRUTH*

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SUNY, Buffalo

Skousen [1972] has made the important observation that the complex set of phonological alternations found with respect to the initial consonant of Fula suffixes is nearly identical to that found with stem-initial consonants. He suggests that, in view of this fact, the alternations in question are due to the application of the same phonological rules, with the extra complications that are characteristic of suffixes being due to the existence of further rules that apply only in suffixes. With the exception of Marantz [n.d.], subsequent researchers have adopted (some "tentatively") this aspect of Skousen's analysis (cf. Anderson [1976], Lieber [1984]), although none accept the rules themselves in the form presented by Skousen. In this paper, I will argue that Skousen's account of the differences between stems and suffixes requires substantial revision and elaboration. I will argue further that the complexities of the behavior of suffixes preclude the possibility of providing an insightful analysis in terms of autosegmental phonology/morphology (contra Lieber [1983, 1984], Marantz [n.d.]). Instead, the alternations found in suffix-initial consonants, like those in stem-initial consonants [Churma 1986b], require a fairly extensive use of morphophonological diacritics. Indeed, it would appear that an optimal account of gradation phenomena (or at least those that have been heavily grammaticized, such as in Fula and Celtic), will never crucially make use of autosegmental tier-separation and association (cf. Churma [1986b], Willis [1986]), although I will not be able to address this issue here.

1. The Basic Data

My discussion will be confined to three "eastern" dialects of Fula, those that provided the basis for the descriptions of Klingenhheben [1963],

*This paper began as Churma [1986a], but came to be so large that I felt
Stennes [1967] (both which are said to be descriptions of 'Adamawa' dialects of northeastern Nigeria), and Arnott [1970] (based on the variety spoken in the town of Gombe, which is also in northeastern Nigeria). The latter is the dialect on which all generativist researchers have for the most part based their work, with the exception of Skousen, whose account is based on Klingengeheben's description.

The consonantal alternations found in Gombe Fula stems are given in Table 1 below, where the consonants involved are divided into three different categories which I will refer to, following Skousen, as "grades".  

<table>
<thead>
<tr>
<th>Consonant alternations</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>f s h r y y w w</td>
<td>continuant</td>
</tr>
<tr>
<td>p sh k d j g b g</td>
<td>stop</td>
</tr>
<tr>
<td>p sh k nd nj ng mb ng</td>
<td>(pre)nasal</td>
</tr>
</tbody>
</table>

That is, a consonant that surfaces as an in the continuant grade appears as in both the stop and nasal grades, one which has the form in the continuant grade appears as in the stop grade and nd in the nasal grade, etc. While most of these alternations take place regardless of

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1The terms "continuant", etc., are used here as cover terms. The symbol j represents a voiced alveopalatal affricate, and the digraphs other than sh (a voiceless alveopalatal fricative) represent monosegmental pre-nasalized stops. Gombe sh is cognate with Adamawa c, a voiceless alveopalatal affricate.
which vowel follows, the $\gamma/j/nj$ alternation occurs only before the back vowels $a$, $o$, and $u$, whereas the $\gamma/g/ng$ alternation is found only before front $e$ and $i$; similarly, while the $w/b/mb$ alternation is found before any vowel, $w/g/ng$ occurs only before back vowels.$^2$

The grade of the initial consonant in Fula noun stems is determined by the noun class to which the noun in question belongs, or, equivalently, but perhaps more perspicuously, by the suffix which is characteristic of the noun class. Each stem must be marked for the "unmarked" singular class to which it belongs, although there are a number of semantic quasi-regularities. Given the singular class, it appears to be possible to predict which plural class a stem will belong to [Arnott 1970:81, 85-86]. In addition, stems may combine with any of a set of diminutive and augmentative suffixes, each of which, in effect, brings with it its own specification of classhood. Because of this, a given noun stem may appear in up to seven noun classes. Nominal modifiers, which agree in class with the nouns they modify, may therefore appear in any one of the 25 classes.

As noted above, suffix-initial consonants show alternations that are for the most part identical to those exhibited by stem-initial consonants,$^3$ with the grade of the consonant depending idiosyncratically on the stem to which the suffix is attached. The effect of class/suffix on the stem-initial consonant and the allomorphy of the 25 class suffixes in Gombe are basically as illustrated in Table 2 on the following page (see Arnott [1960] for details). The terminology employed by Arnott, Anderson, Lieber, and Marantz is given in the top row, and Skousen's, together with a new term introduced by Skousen for a phenomenon that occurs only in suffixes (the

$^2$In addition to these consonants, there are a number of consonants that never alternate. These include the simple nasals ($m$, $n$, $ny$, $\eta$), the glottalized consonants (\textlangle{6'}, \textlangle{c'}, 'y'), glottal stop ('), $t$, and $l$. Glottalized $\textlangle{c'}$ is actually involved in an apparently related alternation in a number of suffixes (see below for the details); stem-initial $\textlangle{c'}$ never alternates.

$^3$This is not true for certain dialects not considered here (cf. Arnott [1960:259-260] and Miyamoto [1986]). For further discussion of these dialects, which are of some theoretical interest, see Churma [1986b, 1987].
Table 2: *Noun class suffixes, suffix grades, and effects of class on stem-initial consonant*  

<table>
<thead>
<tr>
<th>Class</th>
<th>Grade A (&quot;zero&quot;)</th>
<th>Grade B (continuant)</th>
<th>Grade C (stop)</th>
<th>Grade D (nasal)</th>
<th>Effect on Stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-o</td>
<td>-jo</td>
<td>-do</td>
<td>-do</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>-be</td>
<td>-&quot;en/-be</td>
<td>-be</td>
<td>-be</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>-el</td>
<td>-yel</td>
<td>-gel</td>
<td>-ngel</td>
<td>S</td>
</tr>
<tr>
<td>4</td>
<td>-al</td>
<td>-hal</td>
<td>-kal</td>
<td>-kal</td>
<td>S</td>
</tr>
<tr>
<td>5</td>
<td>-um</td>
<td>-yum</td>
<td>-gum</td>
<td>-ngum</td>
<td>S</td>
</tr>
<tr>
<td>6</td>
<td>-on</td>
<td>-hon</td>
<td>-kon</td>
<td>-kon</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>-a</td>
<td>-wa</td>
<td>-ga</td>
<td>-nga</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>-o</td>
<td>-ho</td>
<td>-ko</td>
<td>-ko</td>
<td>N</td>
</tr>
<tr>
<td>9</td>
<td>-re/-de</td>
<td>-re</td>
<td>-de</td>
<td>-nde</td>
<td>C</td>
</tr>
<tr>
<td>10</td>
<td>-ri/-di</td>
<td>-ri/-di</td>
<td>-di</td>
<td>-ndi</td>
<td>N</td>
</tr>
<tr>
<td>11</td>
<td>-ru/-du</td>
<td>-ru/-du</td>
<td>-du</td>
<td>-ndu</td>
<td>C</td>
</tr>
<tr>
<td>12</td>
<td>-a</td>
<td>-wa</td>
<td>-ga</td>
<td>-nga</td>
<td>N</td>
</tr>
<tr>
<td>13</td>
<td>-e</td>
<td>-ye</td>
<td>-ge</td>
<td>-nge</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>-o</td>
<td>-wo</td>
<td>-go</td>
<td>-ngo</td>
<td>C</td>
</tr>
<tr>
<td>15</td>
<td>-u</td>
<td>-wu</td>
<td>-gu</td>
<td>-ngu</td>
<td>N</td>
</tr>
<tr>
<td>16</td>
<td>-al</td>
<td>-wal</td>
<td>-gal</td>
<td>-ngal</td>
<td>S</td>
</tr>
<tr>
<td>17</td>
<td>-ol</td>
<td>-wol</td>
<td>-gol</td>
<td>-ngol</td>
<td>S</td>
</tr>
<tr>
<td>18</td>
<td>-a</td>
<td>-ha</td>
<td>-ka</td>
<td>-ka</td>
<td>N</td>
</tr>
<tr>
<td>19</td>
<td>-i</td>
<td>-hi</td>
<td>-ki</td>
<td>-ki</td>
<td>S</td>
</tr>
<tr>
<td>20</td>
<td>-o</td>
<td>-ho</td>
<td>-ko</td>
<td>-ko</td>
<td>C</td>
</tr>
<tr>
<td>21</td>
<td>-ol</td>
<td>-hol</td>
<td>-kol</td>
<td>-kol</td>
<td>S</td>
</tr>
<tr>
<td>22</td>
<td>-am</td>
<td>-jam</td>
<td>-dam</td>
<td>-dam</td>
<td>N</td>
</tr>
<tr>
<td>23</td>
<td>-um</td>
<td>-jum</td>
<td>-dum</td>
<td>-dum</td>
<td>S</td>
</tr>
<tr>
<td>24</td>
<td>-e</td>
<td>-je</td>
<td>-de</td>
<td>-de</td>
<td>S</td>
</tr>
<tr>
<td>25</td>
<td>-i</td>
<td>-ji</td>
<td>-di</td>
<td>-di</td>
<td>S</td>
</tr>
</tbody>
</table>

(C = continuant-initial, S = stop-initial, N = prenasal-initial)
'zero grade'), in the second row. I will use the two kinds of terminology interchangeably.

Thus, a noun stem such as wor- 'man' will take a suffix whose initial consonant is in the stop grade, regardless of which particular suffix/class is present, whereas waa- 'monkey' invariably takes a suffix that begins with a nasal grade consonant. In short, noun stems determine the grade of suffix-initial consonants, and suffixes determine the grade of the initial consonant of the stem to which they attach. Sample noun paradigms illustrating this complex system of gradation are given in Table 3 on the following page, where the parenthesized grade information indicates the grade of the suffix that the stem in question triggers.

The first three paradigms show stem-initial alternations of exactly the type that one would expect based on the system outlined in the last column of Table 2. The fourth, however, does not. In particular, even in classes which normally take the continuant grade (in this case, Class 14), we find a stop. There are other stems whose initial consonant normally participates

4 For reasons that I do not understand, the Grade B Class 2 allomorph is "typically" (to use Arnott's term) -'en, but there are a fair number of stems with the -əe that might be expected. The alternants in Grades A and B in Classes 9, 10, and 11 are phonologically governed, with the d-initial variants occurring after stem-final r, l, and n. Arnott gives only one example of a Grade B stem that ends in an appropriate consonant, Class 11 masar-du (which will be discussed, together with other consonant-final Grade B stems, in section 4), and he does not discuss the fact that there are no Class 9 Grade B stems which take a d-initial suffix. His discussion of this alternation on p. 123 makes it clear that the gap is not due simply to a misprint. It seems likely that the gap is just an accidental one, given the paucity of consonant-final Grade B stems (he mentions only three in the entire book). This gap is sufficiently surprising that Lieber [1984], in her version of Table 2, states simply that the r-initial suffixes "alternate with dV in Grades A, B", apparently having missed the fact that Arnott does not give such a variant for Class 9 Grade B stems.

5 A few remarks concerning the semantics of the classes are in order here. Classes 1 and 9-23 are unmarked singular classes, while Classes 3-5 and 7 are diminutive and augmentative singulars, respectively. Class 6 is the diminutive plural and Class 8 the augmentative plural. Classes 2, 24 and 25 are unmarked plural classes. Stems that take Class 1/2 suffixes refer exclusively to human beings in Gombe.
Table 3: Noun Paradigms

<table>
<thead>
<tr>
<th></th>
<th>wor-'man'</th>
<th>waa-'monkey'</th>
<th>hufine-'cap'</th>
<th>daag-'sleeping mat'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(stop)</td>
<td>(nasal)</td>
<td>(continuant)</td>
<td>(zero)</td>
</tr>
<tr>
<td>Class 1</td>
<td>gor-dô</td>
<td>11 waa-ndu</td>
<td>9 hufinee-re</td>
<td>14 daag-o</td>
</tr>
<tr>
<td>2</td>
<td>wor-be</td>
<td>25 baa-dî</td>
<td>24 kufinee-je</td>
<td>24 daag-el</td>
</tr>
<tr>
<td>3</td>
<td>gor-gel</td>
<td>3 baa-ngel</td>
<td>3 kufine-yel</td>
<td>3 daag-el</td>
</tr>
<tr>
<td>5</td>
<td>gor-gum</td>
<td>5 baa-ngum</td>
<td>5 kufine-yum</td>
<td>5 daag-um</td>
</tr>
<tr>
<td>6</td>
<td>ngor-kon</td>
<td>6 mbaa-kon</td>
<td>6 kufine-hon</td>
<td>6 ndaag-on</td>
</tr>
<tr>
<td>7</td>
<td>ngor-ga</td>
<td>7 mbaa-nga</td>
<td>7 kufine-wa</td>
<td>7 ndaag-a</td>
</tr>
<tr>
<td>8</td>
<td>ngor-go</td>
<td>8 mbaa-ko</td>
<td>8 kufine-ho</td>
<td>8 ndaag-o</td>
</tr>
</tbody>
</table>

in the gradation system, but which is invariant throughout a paradigm, such as hawsaajo/hawsa'en 'Hausa' and beebeejo/beebe'en/beebehon 'deaf'mute'. Stems in which we find a continuant in the continuant grade and either a plain voiced stop or a prenasalized stop in both the stop and nasal grades, however, do not exist. The asymmetry concerning which kinds of "partially variable" stems are found is of some importance in determining which of the alternants is basic (cf. section 2.1).

Although it seems clear that Skousen is right that the system of consonant alternations found in suffixes is essentially identical to that found in stems, there are three respects in which suffixes differ significantly. One, of course, is the existence of the "zero grade" in suffixes. Secondly, the /Ø/j/d/d\ alternation in the Class 1 and Classes 22-25 suffixes (cf. Table 2) has no parallel in stems. Finally, y alternates with g and ng even before the back vowel u in the case of the Class 5 suffix in Gombe and in the variety of Adamawa described by Stennes [1967:62], although in Klingensheben's Adamawa, the continuant grade shape of the initial consonant is the expected w. It is these differences with which this paper will be primarily concerned.

2. Previous Analyses: General Accounts of Gradation

In this section, I will present enough of the content of the various analyses of Fula gradation that a discussion of the stem-suffix differences
can be carried out. This presentation is extremely sketchy, and the interested reader is urged to consult the original analyses.

2.1. **Underlying representations.** In all of the traditional accounts in which a position on the matter is taken, including those of Klingenstein, Stennes, and Arnott, the continuant grade alternant in stems is taken as basic and the other alternants derived from it. The main reason for this, it seems, is the asymmetry with respect to partially alternating stems: since it would not be predictable whether or not a given stop would alternate with a continuant if stops are taken as basic (and similarly for prenasalized stops), the continuant grade consonant must be considered the basic alternant in those stems which have a continuant grade-initial allomorph. This position is argued for at some length in Anderson [1976] and Churma [1986b]. However, as Skousen points out, there is no way on this kind of account of predicting which stop w will alternate with when it is followed by a back vowel, since the required phonological rule would produce the same output from w, despite the fact that it should produce labials in some cases and velars in others. On the basis of this evidence, Skousen argues that it is the stop grade consonants which are found in underlying representations. In the autosegmental accounts of Lieber and Marantz, the alternating consonants have an "archisegmental" representation, i.e. they are lexically "underspecified" with respect to (at least) the features involved in the gradation system.

2.2. **Rules.** On Skousen's account, only those stems which are marked lexically with the diacritic [+A] will alternate. The gradation alternations in stems are actually triggered by another pair of diacritics that are part of the lexical representations of suffixes, [+AC] for those which appear with a continuant-initial stem and [+AN] for those that take the nasal

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6Anderson handles this problem by setting up abstract phonologically distinct representations for the phonetically identical w's in such cases. For an argument that the distinction should be encoded by means of a diacritic feature, see Churma [1986b:sec.2.2].
grade. The required rules would have the following form (p. 92). 7

(1) \([+\text{cons}, -\text{cont}, +\text{vcd}] \rightarrow [+\text{nasal}] /[_X]_\text{stem} + [+\text{AN}]_\text{suffix}\)

(2) \([+\text{cons}, -\text{cont}] \rightarrow [+\text{cont}] /[_X]_\text{stem} + [+\text{AC}]_\text{suffix}\)

If the suffix has neither of these diacritics, or if the stem does not have the feature \([+\text{A}]\), no rules will be applicable, and the stem-initial consonant will surface in its underlying form. Skousen does not give rules for the alternations in suffixes. Presumably he would require analogous rules that affect suffix-initial consonants and which are triggered by the diacritics \([+\text{AN}]\) and \([+\text{AC}]\), which would also be part of the lexical representations of the relevant stems. 8

Anderson does not formulate any rules, noting only that, in the case of the stem alternations, what is involved is "a system of consonantal correspondences which are correlated with noun classes" (p. 101), and that "we can reduce the suffix alternation to a special case of the ... alternation in stems, conditioned by ... the classification of stems as A/B, C, or D" (p. 104). Thus, apparently, rules which take the continuant grade as input

7I have reformulated these rules slightly so that they conform to the framework that Skousen develops later in his paper (pp. 94-95). Rule (1) would presumably create simple nasals rather than prenasalized stops, so it would have to be altered in some way to get the right results. Exactly how it should be altered depends on what the representation for prenasals should be. An autosegmental approach in which a prenasal would be, roughly, a sequence of nasal stop and oral stop melodies associated with a single C slot appears to me to be the most likely candidate at present. See Churma [1986b:sec. 5.1] for further discussion.

8Note that, although the rules for suffix alternations and the corresponding rules for stem alternations would be quite similar, they would not be identical. If it is in fact the case, as Skousen himself argues, that the "two" kinds of alternation are really a single phenomenon of consonant gradation, this consequence of the analysis is clearly unfortunate. Note further that partially variable stems like daag-/ndaag- (see Tables 2 and 3) will cause problems for this kind of analysis, since this stem would be an exception to the continuant-formation part of gradation, but not to the nasal-formation part (cf. Anderson [1976:120-122] and Churma [1986b:sec. 2.1] for further discussion).
and are sensitive to information about nominal class membership and diacritically marked grade properties of stems will produce the relevant alternations.

My own approach [Churma 1986b] is a sort of cross between Skousen's and Anderson's: continuant-basic representations are affected by diacritic-sensitive rules. The diacritics in question are properties of the affected morphemes and are the result of subcategorization information present in the lexical representations of stems and suffixes. Thus, for example, part of the representation of $waa-\ (\text{cf. Table 3})$ is that it requires that any suffix contain a diacritic $[+n]$, to which the nasal grade-formation rule is sensitive, and the Class 3 suffix contains the information that any stem to which it attaches must have a $[+s]$ diacritic, which triggers the stop grade-formation rule. The same rules thus can handle both the stem and suffix alternations.$^9$

$$(3)\ [C,+s] \rightarrow [-\text{cont}]/+_{-}$$

$$(4)\ [C,+n] \rightarrow (\text{prenasal})/+_{-}$$

That is, a ([+cont]) consonant that bears the diacritic $[+s]$ is converted to the corresponding "stop" morpheme-initially, and similarly for consonants with the feature $[+n]$. Thus, after $waa-$ and $-\text{yel}$ combine, the former will contain the diacritic $[+s]$ and hence undergo rule (3), whereas the latter will receive the feature $[+n]$ from the stem and so undergo (4) (cf. Table 3). When $waa-$ combines with $-\text{wa}$, which carries the lexical information that stems to which it attaches receive the diacritic $[+n]$, on the other hand, the stem-initial consonant will undergo rule (4) and surface appropriately with a prenasalized stop, as will the suffix-initial consonant.

The autosegmental approaches, roughly, make use of floating autosegments which supply the features involved in gradation by means of association of the features on the different autosegmental tiers.$^{10}$ For example,

$^9$Concerning the output of rule (4), see note 7.

$^{10}$Exactly how the floating autosegments that trigger stem gradation get positioned is somewhat of a problem, since the relevant autosegment and the
waa- will have in its lexical representation a final floating prenasal autosegment, which will be associated with the underspecified initial C slot of the suffix by means of a Fula-specific association rule.

3. "Unusual" Suffix Behavior

In this section, I will discuss those aspects of suffix behavior which might not be expected on the basis of the behavior of stems. These include the existence of the zero grade and the \( j/d/d^h \) alternation, the behavior of the Class 5 suffix, and the existence of consonant-final Grade B stems. In the final subsection, I will investigate some aspects of suffix behavior that have not yet been addressed in a generative account of the behavior of Fula suffixes. Taken as a whole, the behavior of suffixes provides massive evidence in favor of a diacritic approach to the alternations found in suffixes.

3.1. The zero grade. As both Arnott and Skousen note, stems that take suffixes in the zero grade are characteristically consonant-final, whereas those that take continuant-grade suffixes, with a very few exceptions, are not. This fact leads Skousen to propose that the zero grade allomorph is derived from the Grade B alternant by means of a strictly phonological rule (p. 84):

\[
(5) \ [-\text{cons},-\text{syll}] \rightarrow \emptyset /[-\text{syll}] + \_
\]

This rule is restricted so as to affect only glides (including \( h \) for Skousen), in view of the fact that suffixes with initial \( b \) and \( r \) in Grade B always retain this consonant even in the zero grade (cf. Table 2). However, \( j \) is deleted, although it is not a glide. Skousen suggests that it is a glide at the relevant level of derivation (cf. section 3.2 for discussion). Skousen also notes the existence of consonant-final stems that unexpectedly, on this account, take continuant-grade suffixes (cf. section 3.2), but he does not discuss how they might be handled within his account. Presumably, suffix must be separated by the stem, despite the fact that there appears to be only a single morpheme involved. For present purposes, the details of stem gradation can be safely ignored. See Churma [1986b:sec. 5] for discussion.
they could simply be marked as exceptions to rule (5).

Both Lieber and ("tentatively") Anderson accept Skousen's account of the zero grade. Marantz's analysis, however, departs radically from the deletion approach. The characteristic property of Grade A stems, on this account, is that they end in a C slot that is associated with all relevant features. Grade B stems end in a C slot (despite the fact that they are phonetically vowel-final) that is associated with a [+cont] autosegment but no other feature specifications. Suffixes with alternating initial consonants, on the other hand, begin with point of articulation features, voicing features, etc., but no C slot and no specification for [cont] or [nas]. The suffixal features will eventually be associated with the stem-final C slot if it is not already associated with such features (as would be the case for Grade A stems). An illustration of how this system works is given in (6) (cf. Marantz [n.d.:5-6]):

(6) a. 

\[
\begin{align*}
\text{dim-} &\quad \text{el} \\
\text{di} &\quad \text{C} \\
\text{C} &\quad \text{el}
\end{align*}
\]

Grade A Class 3

b. 

\[
\begin{align*}
\text{leemu-} &\quad \text{yel} \\
\text{leemu-} &\quad \text{C} \\
\text{C} &\quad \text{el}
\end{align*}
\]

Grade B Class 3

In (6a), the floating melody unit of the Class 3 suffix cannot associate with the stem-final C slot, I presume because of the incompatibility of the non-gradation features, and the "stranded" features are not realized phonetically. In (6b), however, this unit can associate with the final semi-floating C slot of leemu-, and through this C slot with its [+cont] specification, surfacing as y.

The initial consonant of the Class 2 suffix is fully specified, which is why it surfaces invariably as 6. Suffixes whose initial consonant shows the -r/-r/-d/-nd alternation have everything specified except [cont] and [nas]. The presence of an initial C slot in these suffixes is said to ex-
plain why a consonant is present even in the zero grade (although [+cont] must be supplied in the zero grade by a language-specific "markedness convention"). The treatment of such suffixes is illustrated in (7):

(7) [+cont] [+cont] leemuu-re 'citrus fruit'

Here the suffix-initial C slot is associated, apparently by means of a language-specific rule, to the final [+cont] of the stem, and the stem-final C slot "ends up attached to the preceding vowel features" (p. 6) by means of an unspecified mechanism in order to account for the vowel lengthening that invariably takes place before r-initial suffixes in Gombe (cf. (6b)).

Although I have not gone into the details of this analysis, "the general outline of the solution should be clear", as Marantz puts it (p. 7).

3.2. The j/d/ḍ alternation. Skousen, noting (pp. 81, 85) that the expected j of the Class 1 suffix appears as w when following an o:-final stem (and a "couple of stems" that are a-final), suggests that at some stage of the derivation this consonant is actually γ. Having this ab-

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11Deletion-based accounts of the zero grade would presumably also require a special rule to account for such lengthening, which also occurs before j-initial suffixes in Gombe. Skousen [1972:90n] formulates a strictly phonological rule to account for the latter but does not mention the existence of the former phenomenon. It is actually impossible to tell from Klingeneheben's grammar whether there is pre-r lengthening in his Adamawa dialect, since all of the stems he gives that take r-initial suffixes either have underlying long vowels or are not given in their diminutive or augmentative forms (note that the "ordinary" plural of a vowel-final stem that takes an r-initial suffix in the singular will necessarily take a j-initial suffix in the plural and hence undergo lengthening in both the unmarked singular and plural). In the variety of Adamawa described by Stennes, the lengthening facts are radically different (cf. section 3.2 for discussion.)
stract segment would appear to allow one to explain a number of otherwise puzzling facts. First, of course, it would explain why the initial consonant does not appear in the zero-grade, despite the fact that otherwise only glides are deleted (cf. rule (5)). It would also make the appearance of w in the environment just noted easy to understand, although what exactly the rule that would derive it should be is unclear in view of the apparent stem-specific nature of the variation, at least in the case of a-final stems.12 And finally (although Skousen does not actually say so), y is, at first glance, a fairly reasonable output of the rule for suffixes that corresponds to (2), given d as input, at least more so than j, which is not even a continuant. But such an account would not explain why the output of this rule is not the glottalized continuant 'y or r, which is the only voiced alveolar continuant in the language and which is derived from t (cf. rule (2)). It would also require a rule that would "... make a stop [and, eventually, an affricate, in the dialects in question—DGC] out of y" (p. 86) in just this kind of case, a rule that Skousen does not state and which would apparently be thoroughly ad hoc.

Anderson, on the other hand, "... prefer[s] simply to differentiate morphologically between the behavior of j/d in suffixes and that of j or d in stems" (p. 104). How exactly this would be done is not made clear. Presumably he would need to amend or add to Skousen's glide deletion rule in order to account for the zero grade forms,13 and he would also need a rule that converts only suffixal j to d in the stop and nasal grades. Since there are no j's in suffixes other than the ones in question, there would be no need to distinguish these from other j's that conceivably could exist as the stop grade variants of underlying y. Finally, as noted above, a further rule would be needed in order to handle the alternation

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12All of the o:-final stems that Skousen gives are agentives. Arnott (p. 124) in fact describes the allomorphy in question in terms of the agentive suffix.

13Due to the small number of Grade B suffix-initial consonants, it is possible to characterize the full class of segments that undergo deletion as simply as it is to describe the class of glides (assuming that the dele-
with \( w \), as would one to take care of the fact that stem-final vowels are lengthened before \( j \) (and \( r \)). All of these rules would be morphologically conditioned, in the sense that they would somehow have to refer to the fact that the segments in question are suffix-initial. I take it that this kind of account would be preferable to that advocated by Skousen, since it does not require positing underlying segments that never surface as such, although neither alternative is particularly satisfying—and, it turns out, neither works quite right (see section 3.5 below).

Lieber does not discuss this problem, aside from agreeing in a footnote with Anderson that this alternation "... must be provided for specially..." [Anderson 1976:103], but it would appear to be particularly problematic for a strictly autosegmental approach, i.e. one that attempts to attribute all alternations of initial consonants primarily to the effect of autosegmental

tion rule precedes gradation in a continuant-basic account). We need only distinguish \( \delta \) and \( r \) from those consonants that are deletable, viz. \( j \), \( y \), \( w \), and \( h \). Since the latter are all \([-\text{ant}]\), while the former are \([+\text{ant}]\), the class in question is simply those segments that are \([-\text{syl},-\text{ant}]\). In view of the small size of the entire class of Grade B suffix-initial consonants, it is open to question whether this is just an accident, as is the fact that 3/4 of the deletable consonants and half of all possible Grade B suffix-initial consonants are glides (the basis for Skousen’s formulating the rule as one of glide deletion). I suspect that the true explanation for what is going on here is diachronic in nature: many, but not all, of the clusters that would have occurred had deletion not taken place are impermissible for what are apparently strictly phonological reasons in Fula (at least for Stennes’ Adamawa speakers—see the chart on p. 31 of his grammar). The extension of initial consonant deletion to all cases in which suffixes had the initial consonants in question (even if the input cluster is not prohibited) would be due to a diachronic process of analogical extension. The class of consonants in question could thus be an entirely arbitrary one from a synchronic perspective. Further discussion of the synchronic fate of clusters that arises via suffixation will be given in section 3.5.

\[14\]The "anaptyctic vowel" that Arnott posits as occurring in order to break up certain kinds of consonant clusters that arise when consonant-final stems combine with \( r\)-initial suffixes, among others, is not lengthened, presumably because the rule inserting such vowels is ordered after the lengthening rule (cf. Arnott [1970:110-111]). See section 3.5 for further discussion of the role of anaptyxis in the gradation system.
association, \(^{15}\) since it is hard to see how it could be considered as being part of an alternation involving essentially only different values for the features \([\text{cont}]\) and \([\text{nas}]\). Since the floating autosegments in question are part of the stem morphemes, there would be either no way of preventing the features supplied by these stems from attaching to the suffix-initial melodies or, if they can be prevented from attaching, no way to account for the fact that the suffix-initial consonants do in fact alternate. The problem here is that a different kind of phonological alternation is found in the same morphological environments as those in which we find "normal" gradations, and unlike in rule-based accounts, there is no way to get the effect of having different morphologically conditioned phonological rules to produce different alternation patterns, given that the alternations are held to be due solely to the "phonological" nature of the stems in question.

It might be suggested that one could simply maintain that certain stems end in floating autosegments other than those "normally" found which, when associated with the underspecified suffix-initial consonants, have this different alternation type as a result. This kind of approach could conceivably work for nouns with Class 22 or 23 singulars (and no diminutive or augmentative forms), since these stems would take suffixes that show only the alternation in question (cf. Table 2). However, most stems have either a plural form, e.g. \(-\text{be}/'\text{en}\) in the case of Class 1/2 nouns, or a singular form, e.g. \(r/d/\text{nd}\) for Class 11, that displays a different alternation type, so (even ignoring potential diminutive and augmentative forms) this kind of approach would fail to account for the behavior of the suffixes that show normal gradation behavior. Thus, a strictly autosegmental theory of gradation is quite restrictive, allowing only one basic kind of phonological alternation per morphological context. But these kinds of cases appear

\(^{15}\) Due to the existence of the \(s/sh\) alternation and those alternations that are partially conditioned by the quality of the following vowel, it is not possible to provide a truly strictly autosegmental account of Fula gradation even apart from the alternation in question (see Churma [1986b:2.3, 4.1] for details).
to indicate that it would be overly so.\textsuperscript{16} Even if some of the gradation facts could be handled neatly using a strictly autosegmental approach, then, one would apparently have to use the same kind of brute force rules that rule-only theories would require for the rest, in addition to all of the requisite autosegmental machinery. Note that these rules either would entail setting up an abstract segment that does not otherwise exist in the language (this is Marantz's approach—see below) or would require reference to noun class information (only the five suffixes in question exhibit the aberrant alternation type), which is available only in cumbersome fashion under both Lieber's and Marantz's approaches, since the only indications of class in the lexicon are the floating autosegments that trigger the stem alternations and the suffixes themselves.

Marantz [n.d., p.1] argues, however, that it is in fact possible to give an elegant autosegmental account of the facts in question. This account depends partially on analyzing $\dd$ as being "doubly articulated" and

\textsuperscript{16}Fula is not unique in presenting a problem of this nature. For example, in the case of the Welsh and Breton "soft mutations" [Willis 1986:2], whereby voiced stops are spirantized, voiceless ones become voiced (but not spirantized), and $m$ becomes $v$, we find three quite different kinds of alternations (although, as Willis points out, they appear to be related, at least from a functional perspective, by virtue of all being forms of lenition). It is difficult to see how an autosegmental account could handle all three of these in terms of a single template or floating autosegment. Lieber [1983:173, 175] proposes to account for the soft mutation facts in Welsh by means of a floating [+cont,+voice] autosegment, which might lead one to expect spirantization of all oral stops. Lieber proposes (p. 175) that all "forms that begin with voiceless stops ... have a lexically preattached [-cont] feature", a fact that would either be outlandishly improbable or would require a curious morpheme structure constraint; she has nothing to say about the $m/v$ alternation. See Zwicky [1984] for criticism of Lieber's account of Welsh on quite different grounds and Willis [1986] for an extensive argument that the Celtic mutations are best analyzed in terms of morphosyntactic diacritics. Some of the other West Atlantic languages reported on in Sapir [1971:67] will present massive difficulties for such an approach. For example, both Bedik and Basari have, in addition to Fula-like alternation types, an $\text{I/\text{\char27}n}$ alternation, and the former also has $\text{\char27}m$ and $\text{\char27}v/n\text{\char27}y$ alternations; these latter are cognate with $\text{\char27}w/m$ and $\text{\char27}w/n\text{\char27}y$ alternations in Basari. It is hard to see how such alternation patterns could be characterized in terms of a single set of floating autosegments.
thus represented as in (8):

(8) \([-\text{cont}]\) \([-\text{cont}]\)

Given that there is no evidence that implosives are in fact phonetically doubly articulated in the way that this representation suggests (the two closures for glottalized consonants at the glottis and in the oral cavity are simultaneous, not in sequence), this is somewhat suspicious. Furthermore, it violates the Obligatory Contour Principle [Leben 1973, 1978] in a way that, as far as I know, has never before been suggested, in that a sequence of identical melody elements is attached to a single \(\text{CV}\)-tier slot. Equally suspicious is his highly abstract representation of the \(j\) that alternates with \(\text{d}^\text{r}\) (other \(j\)'s are, roughly, palatal stops), which is as in (9):

(9) \([-\text{cont}]\) \([+\text{cont}]\)

\(\left[+\text{ant}\right]\) \(\left[-\text{ant}\right]\)

\(\left[+\text{cor}\right]\) \(\left[-\text{cor}\right]\)

That is, it is an affricate whose first part is alveolar and whose second part is palatal—despite the fact that there is no phonetic difference between the "two kinds of \(j\)'s", that the kind of \(j\) represented in (9) occurs only in suffixes, and that the single phonetic [\(\text{j}\)] described by Arnott [1970:384] is "an alveo-palatal affricate, with tip of tongue down". Assuming such representations, however, it is possible to "explain" why the phonetically alveopalatal \(j\) alternates with alveolar \(\text{d}^\text{r}\). The relevant suffixes will begin with, roughly, the representation in (9), but without the \(C\) slot. When attached to a stem with a final floating \(C\) slot preattached to \([-\text{cont}]\), the first of the suffixal autosegments on the uppermost tier and both of those on the lowest tier will associate, for reasons not specified by Marantz, with the stem-final \(C\) slot, as in (10a):
The result of association is thus a C slot associated with a sequence of two [-cont] autosegments and with alveolar point of articulation features, i.e. \( \mathcal{C} \). As illustrated in (10b), Grade B stems somehow end up with all of the floating suffixal autosegments associated with stem-final C slot, to give (eventually) surface \([\mathcal{J}]\), and the circled V slot is inserted by an unspecified mechanism and is associated with the [+cont] that was originally pre-attached to the final C slot, in order to handle the requisite pre-j lengthening.

Via the use of these various pieces of autosegmental machinery, the language-specific "markedness convention" mentioned above, and the required unstated, and apparently language-specific, association rules, this analysis does appear to account for the data considered as well as the phenomena discussed in section 3.1 (although one can't be certain, given that, as we have seen, Marantz (p. 7) "skip[s] over certain details of execution"). But the analysis requires making ad hoc distinctions between putatively different kinds of \( \mathcal{J} \) (precisely the five suffixes that exhibit the \( \mathcal{J}/\mathcal{D}/\mathcal{D} \) alternation would have the representation in (9)), and a way of representing glottalized consonants that should probably be universally disallowed. This kind of account, like that of Lieber, will also encounter a redundancy problem: given that all but one of the kinds of grade properties of stems has been specified in their lexical entries, it is possible to predict the grade properties of the remaining stems. Since this account already employs a "markedness convention" that supplies the feature [+cont] to segments that are not specified in any other way for this feature, representing stems that
take continuant grade suffixes as having a final [+cont] seems to require making use of a significant amount of redundant lexical information. But since the lexical representation of Grade B stems plays a role in handling the lengthening of stem-final vowels before suffixal r (cf. (7)), eliminating the redundancies would also result in the loss of an account of pre-r lengthening. Thus, either redundancy-free representations of stems or the autosegmentally-based account of this lengthening phenomenon must be given up.\(^{17}\) A further problem concerns the fact that j also alternates with w; it is hard to see how a straightforward account of this alternation could be given (although the environment would presumably be strictly "phonological"). Finally, this kind of approach would also entail the existence of a regularity that could only be considered an accident in such a system, since all Grade B, C, and D stems would end in a C slot specified only for [cont] (and [nas] in the case of Grade D stems). But this regularity cannot be expressed, since the notion grade has no independent existence in the system, all of the grade effects being derivative of the nature of the stem-final floating C slot of individual lexical items.

Furthermore, there is evidence that the vowel length alternation, at least, is morphologically conditioned, rather than being due to (pseudo-) phonological properties of stems or suffixes, as Marantz's account would have it.\(^{18}\) In the Liptako (Burkina Fasso) dialect, Bideau and Prost [1982: 22] (who adopt Arnott's class numbering system) note that "avant les suffixes re, ri, ru des classes 9, 10, 11, avant les suffixes jo de la classe 1 et je, ji des classes 24, 25, les voyelles qui les précèdent sont

\(^{17}\)In addition, since this kind of approach makes use of lexical marking in the case of all four grades (whereas the zero grade was held, at least tentatively, to be derived phonologically from the continuant grade in earlier analyses), it might appear that still more redundant material is specified. However, it will turn out that there are problems for the phonological deletion approach (see section 3.5 for discussion).

\(^{18}\)If this is so, then it would be clear evidence of the incorrectness of Marantz's position that "morphologically triggered phonological rules must be banned entirely" (p. 1). See Churma [1986b:sec. 6] for further discussion of this issue.
allongées". That is, lengthening occurs before only three of the five initial suffixes, unlike in Gombe, where all five trigger lengthening. Note that it would not be possible to alter the phonological representations of the Class 22 and Class 23 suffixes, since doing so would make it impossible to account for the fact that these suffixes have the $j/s/d$ alternation. Even more problematic, if anything, are the facts about lengthening for Stennes' Adamawa speakers. Basically, underlying short vowels "are long unless the [following morpheme] begins with a semivowel or faucal $\gamma$, $w$, $', \ h$" (p. 43), i.e. lengthening occurs here before a strikingly larger set of consonants than in either Gombe or Liptako. Indeed, Stennes appears to be suggesting (p. 43n) that the long vowels in question are basic, and the short variants derived via some kind of shortening rule. Furthermore (p. 45), some stem-final vowels (some of which, at least, occur in words that "are known to be borrowed") fail to undergo lengthening, e.g. maapindi-jo 'huge person'. Since for these speakers a partial determinant of whether a given vowel undergoes lengthening is simply the stem of which it is a part, any analysis which attributes lengthening solely to the way in which the suffix-initial consonant is represented phonologically, such as that of Marantz, will be unable to account for such data. Thus, even if the formal extravagances that Marantz makes use of are permitted, such an analysis will not be tenable for all dialects. 19 Even in Gombe, there are vowel length alternations that do not come under those that this analysis is set up to account for. Arnott notes (p. 116) that "the stem-final vowel of the generalized relationship terms with stem in -ira(a)- ... is long before the [Class 1 allomorph -wo and the Class 2, Grade B atypical allomorph -$\delta$e ], but short before all the diminutive and augmentative suffixes, as well as the ordinary [Class 2, Grade B] suffix -'en ". Here again, it is not possible to attribute the lengthening effects to "phonological" properties of the suffixes in question, since they do not cause lengthening when attached to other kind of stems.

Stems like that in (10a) will also turn out to be problematic for this kind of approach. Arnott (p. 55) treats this stem as being basically

19 This kind of treatment of suffixes will also cause problems for an analysis of the stem-initial alternations. See Churma [1986b:sec. 5.1].
Consonant Gradation in Fula Suffixes

\(\text{tumm-}\), with the second \(u\) being the result of anaptyxis, on the basis that "the few forms of this type would [otherwise] be the only examples of stem-final short vowel" among Grade C and D stems (p. 117). Thus, if Marantz's analysis of such stems is accepted, there will be an extremely odd distribution of (phonetically) stem-final short vowels in such stems. Moreover, Marantz's approach will not work for Grade B adjective stems with two final consonants on Arnott's analysis, e.g. 'yukk- 'hunched, humped' (p. 111), since the anaptyctic vowel, according to Arnott (pp. 55, 87), is \(u\) except before an \(r\)-initial suffix, in which case it takes on the quality of the following vowel. In order to maintain an analysis in which the allegedly anaptyctic vowel is present underlyingly in such cases, an additional rule or rules would be needed in order to adjust the vowel quality appropriately.

Marantz does not say why he departed from Arnott's account, but it appears that attempting to give an analogous account in his system would cause fairly serious problems. The floating features of the suffix must attach to the stem-final C slot in order to be realized phonetically, but if the final C slot is already specified for place of articulation (and nasality in this case), as in Arnott's account, then whatever prevented attachment of the suffixal features in (6a) will presumably also prevent attachment of the suffixal features in this case. (Even if these features could associate, the wrong results would be derived unless much fixing up takes place.) That is, only "dummy" C slots allow the system to work properly, so it might be suggested that we could simply add one at the end of this stem: \(\text{tumm[C, -cont-]}\). This would in fact get the suffix-initial consonant right, as in (7), and anaptyxis could supply the needed \(u\). But it would require setting up representations that contain three consecutive morpheme-

\[\text{20It is not possible to find analogous noun stems, since (roughly—see below) the rule that deletes suffix-initial (Grade B) consonants effectively bleeds anaptyxis, except when the suffix-initial consonant is } \text{b} \text{ or } \text{r}. \text{ Since the former is present only in Class 2, which is the plural that corresponds exclusively to Class 1 singulars, there could never be a noun stem that takes both kinds of suffixes (r-initial suffixes being characteristic of Classes 9, 10, and 11 only).}\]
internal C slots, which do not otherwise occur, and the difference between pre-r anaptyctic vowels and the u found in other phonological contexts would have to be accounted for in some way.

3.3. The Class 5 suffix. Recall that in the Gombe and Stennes-Adamawa varieties of Fula, the Class 5 suffix displays an uncharacteristic y/g/ng alternation, since the initial consonant precedes a back vowel. As Anderson [1976:126-127] points out, the existence of this alternation adds further support for a fully-specified continuant-basic position of the type argued for in Anderson [1976] and Churma [1986b]. Assuming a fully-specified underlying /y/ would allow one to "state the facts about the alternation of y as follows: underlying /y/ becomes [ỹ] in the stop grade and [ŋ] in the nasal grade before back vowels in roots; otherwise, /y/ becomes [ŋ] in the stop grade and [ŋg] in the nasal grade", where the otherwise clause would include, among other things, all cases of suffixal /y/ . Note that, if we were to posit an underlying velar (or velar melody unit) here, then even if we were to invoke a stem/suffix distinction, we would be unable to distinguish this segment from the corresponding initial velar of the Class 15 suffix, which also precedes a back vowel, but alternates "appropriately" with w. Apparently, unless an underlying /y/ is posited in the case of alternations involving this segment, a thoroughly ad hoc rule that refers explicitly to the Class 5 suffix will be required.21 Note further that, even if a palatal (or palatal melody unit) is posited, the rule would not work unless one is able to appeal to the stem/suffix distinction. Thus, the behavior of this suffix provides further support for the position that (fully-specified) continuant grade alternants are present in underlying representations.

3.4. Consonant-final Grade B stems. An important type of data that has been discussed in generative terms only by Skousen is the existence of consonant-final Grade B stems. Although there are only a few such stems (see

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21This would be another counterexample to Marantz's claim about the nonexistence of morphologically triggered phonological rules (cf. note 18).
(11) below for a list of all that are known to me), the fact that they exist at all is somewhat of an embarrassment to any account which attributes the lack of a suffix-initial consonant in Grade A to the presence of the stem-final consonant, despite the fact that, as noted above, all Grade A stems surface with a final consonant. All of the accounts considered here have this property in some form or another (for Marantz, the crucial property of Grade A stems is that they have fully-specified final consonants). If some version of Skousen’s glide deletion rule is accepted (cf. note 13), then, as noted above (section 3.1), the unusual stems would presumably have to be simply marked as exceptions to this rule, say by virtue of the diacritic [-DEL], if the "standard theory" of diacritic features is adopted (cf. Zonneveld [1978] and the references cited there). Notice that, as was the case in Skousen’s gradation rules, the exception feature would not be part of the affected morpheme, but of the morpheme whose final consonant would otherwise be expected to trigger application of the rule.

In Churma [1986b:secs. 3,6], I developed an approach to diacritic features which shows promise of making it possible to eliminate entirely from linguistic theory this kind of use of diacritic features, thereby allowing for a relatively restrictive theory of diacritic features. Within this approach, such stems would instead subcategorize for taking suffixes that have this feature, and the deletion rule would then be blocked when the input segment, rather than the environment, was [-DEL]. I will argue in this subsection and the next that the existence of consonant-final Grade B stems, together with the variety of possible ways of dealing with suffixation-induced clusters, requires extensive use of some variety of the diacritic approach.

On Marantz’s account (assuming, as he apparently does, an approach strictly without exception features), one would probably have to set up stems that end in a fully specified consonant followed by a C slot that is preattached only to the feature [+cont], so that the suffix-initial melody unit would have a C slot and a value for continuancy after autosegmental association. The only difference between ordinary Grade B stems and those under discussion, assuming this kind of approach, would be that the final un-
derspecified consonants happen to be preceded by fully specified consonants, rather than vowels, in the case of the latter. This does not sound at all implausible assuming that one accepts the overall approach, and in fact, given that there are stems that end phonetically in a sequence of two consonants, e.g. dept- 'book', yul'B- 'charcoal' (cf. Arnott [1970:111]), this kind of account would appear to predict the existence of such stems. But it would provide no explanation for the extremely small number of stems that appear to violate the rule that deletes suffix-initial consonants (cf. rule (5) and note 13). I found exactly three in Arnott's grammar, and Skousen presents three different ones that he found in that of Klingeneheben. Nor is there any evidence for the existence of stems that end in a real consonant plus a floating C slot with an attached [-cont]. Furthermore, when we examine these stems more closely, we will find that they in fact will present problems for this kind of approach. All six are given in (11) cf. Arnott [1970:399, 401] and Skousen [1972:85]):

(11) a. masar-di 'maize' (see note 8 on the suffix-initial d)
    b. mekes-je 'scissors'
    c. bos-wa 'bus'
    d. yakatab-wo/yakatab-je type of shoe
    e. pampam-wu/pampam-ji 'empty peanut shell'
    f. merlem-ru/merlem-ji type of frog

Not surprisingly, Arnott notes (p. 399) that (11c) is a loan word (ultimately from English, via Yoruba and then Hausa). The word in (11b) is very likely a loan ultimately from Arabic, since the Classical Arabic word for 'scissors' is miqaaS (Mohamad Abd-Rubbo, p.c.), and the fact that the word for 'maize' in Hausa is masara indicates that some borrowing has taken place in this case as well (perhaps from a separate additional language or languages, in view of the post-masar material). None of the Fula dictionaries and lexica I have consulted contain any of these words, with the exception of (11a), which occurs in Labouret's [1955] lexique, where it is noted that it is restricted to the "dialectes orientaux", and in fact is cited as Class 15 masaru with the "expected" Grade A suffix allomorph.
Furthermore, the semantics of at least most of these words, together with the nature of traditional Fulani culture (nomadic pastoralism), makes it unlikely that these words are native to the language. Thus, three of these words are clearly borrowings, and there is reason to suspect that the remaining three are borrowed as well. But it would seem thoroughly unlikely that a loan would have a representation like the one suggested, since an abstract representation of this type would presumably be posited only if the facts of the language force it (one cannot hear a C slot with a preattached [+cont]). Indeed, the facts of the language would force such an analysis once the forms have been adopted as they now stand. But the original borrowers would not have been faced with such surface facts; rather, they would have discovered simply that the Hausa word for bus, for example, is *bos*. Since they would have had no evidence to the contrary, they must have set up the lexical representation /bos/. Once borrowed, this noun will have to belong to some nominal class. In this case, rather than putting it into the catch-all Class 23 (cf. Arnott [1970]), the original borrowers apparently "decided" that it should go into the augmentative Class 7, buses being inherently rather large. The representation for the entire word would then be, roughly, /bos + [-ant,-cor,+voi] a/, i.e. the stem has a fully specified final consonant, while the initial underspecified segment of the suffix has no C slot and no specification for continuancy or nasality. Such a representation should surface as *[bosa] (compare (6a) above), however. In order to derive the correct form, we would have to hypothesize that the borrowers decided, out of the blue, to add a C slot preattached to [+cont] at the end of the stem. But of course there is absolutely no reason to believe that this is actually what happened, so the approach suggested for handling such cases has severe drawbacks.

Exception feature approaches would fare no better, however, since within such approaches it would have to be hypothesized that the forms in question had been borrowed into the language either with the feature [-DEL], or subcategorizing for a suffix with that feature, depending on the approach to exception features adopted. There is no more reason to believe that borrowers would gratuitously add such a feature to the lexical representations in
question than there is to accept that they for some reason added a (nearly) empty final C slot. In order to understand what is really going on here, I feel that it is necessary to investigate in more detail what happens to consonant clusters created by the addition of underlyingly consonant-initial suffixes to underlyingly consonant-final stems.

3.5. The fate of consonant clusters created by suffixation. As Arnott makes clear in his discussion of such cases (pp. 49-53, 110-119), there are a number of different ways of dealing with this kind of situation, in addition to deletion of the suffix-initial consonant. Since it would be helpful if we could tell whether or not a given process is strictly phonological, i.e. exists by virtue of being able to eliminate a cluster that violates a real phonotactic constraint, rather than morphologically or lexically conditioned, and since it is not always possible to tell with certainty from Arnott's discussion the nature of the processes in question, I will make liberal use of the chart in Stennes [1967:31], which lists the number of tokens of each logically possible cluster type (excluding geminates) that occur in a 1,816-cluster corpus. Using this chart to supplement Arnott's description is not without methodological shortcomings. First, two different dialects are involved. In addition, there are the drawbacks that are inherent to corpus-based work, such as not being able to tell whether or not a gap is due to chance (although in this case Stennes does indicate the existence of clusters for which "there is a known occurrence" outside the corpus) or whether a given example should be considered an exception to a presumably valid generalization (cf. the case of word-initial sf clusters in English). The former kind of problem is potentially especially worrisome in the context of Gombe clusters, since "the single consonants b, g, p, sh, and k are relatively rare in [stem-]final position" (p. 42) and since the 35 cluster types represented by a single token in Stennes' chart is an uncomfortably large number. Decisions about the nature of a given process, then,

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22For purposes of discussion, I will presuppose that suffixes begin with fully-specified continuants at the stage of the derivation that is relevant for present purposes.
must be considered somewhat tentative.

In addition to consonant deletion, we also find the following phenomena. First, and probably most commonly, a cluster may be broken up via the insertion of the "anaptyctic" vowel (recall that this vowel is -u-, except before an r-initial suffix, where it takes on the quality of the post-r vowel). This phenomenon occurs (p. 55) when the stem "ends in two consonants [including geminates—cf. p. 111] or a single consonant in the range sh, k, t, d, j, g, nd, where it serves to avoid [clusters] which appear to be incompatible in the system of the language." Here Arnott is clearly attributing the application of this process to the existence of an (unformulated) phonotactic constraint, but the class of "single consonants" that triggers this process is sufficiently unusual that it is open to question whether this is in fact the case, e.g. why are the labial stops not included, why is only a single prenasalized consonant present?23 In Stennes' chart, c (the Adamawa cognate to Gombe sh) does not occur at all as the first member of a cluster (although it is particularly dangerous to generalize across dialects in this case, given the phonetic disparity), nor does j. The stem sook- 'poor, deficient' has the form sook-ge when in Class 2 (p. 111), and Arnott notes (p. 111n) that there is variation with respect to whether the anaptyctic vowel is present before r-initial suffixes for this stem, so it seems clear that the rule is not totally phonological in the case of k-final stems. Furthermore, there is one token of a kr cluster and six tokens of kl in Stennes' chart. This latter cluster type is relevant because the Grade C and D suffixes in Classes 3, 6-8, 24, and 25

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23 There is a similar phenomenon that occurs in verbs, although in this case it appears to be the nature of the cluster that would result if a syncope rule were allowed to apply that is relevant. Here the set of final consonants includes all of those listed above plus h, b, ng, 'y, and ' (pp. 56-57). The consonants ' and h are explicitly noted by Arnott to behave differently in nouns and verbs, and 'y does, too, at least in "a few individual stems" (see below), but I can see no reason why the others would result in clusters that are unacceptable only in verbs. This suggests that the strangeness of the class under discussion is more apparent than real, due at least in part to the vagaries of the distribution of stem-final consonants (from a synchronic perspective, at any rate).
have "atypical" allomorphs "of relatively frequent occurrence" that are \(-t\)-initial, especially in the case of the latter two classes—cf. Arnott [1970: 124-126].

There are also two tokens of \(\text{tk}\), three for \(\text{tg}\), and one for \(\text{td'}\), so anaptyxis into \(-t\)-initial clusters may well also occur for reasons that are not totally phonological. The behavior of stem-final \(d\) is complicated by the fact that it assimilates totally before \(-r\)-initial suffixes in (p. 114) "a few individual stems" in addition to triggering anaptyxis in the case of other stems. (Arnott does not say what happens to final \(d\) in the former kind of stem before other consonants.) There is a single \(d\)-initial cluster type in Stennes' chart, \(dn\) (one token), but since no nominal suffix begins with \(n\), the existence of such a cluster is irrelevant as to whether clusters involving \(d\) and possible suffix-initial consonants are impermissible on strictly phonological grounds.

\(g\)-initial clusters in the chart include those with \(d\), \(\text{dg}\), and \(r\), with three tokens of the first type, and one each of the other two. No prenasalized stops occur as the first member of a cluster, so the presence of only \(nd\) in Arnott's set is curious. There is at least one non-\(nd\) prenasal-final stem, \(doomb- 'rat'\). Here the oral component is lost before the Grade A Class 11 suffix \(-ru\) (p. 114), so it may be possible to put all of the prenasals into the set in question, as long as the prenasal-simplification rule that would handle this alternation applies before anaptyxis. But there is good reason to question whether all of the clusters that are broken up via anaptyxis are in fact "incompatible in the system of the language", at least from a strictly phonological point of view.

Consider now the consonants that Arnott did not mention as triggering the process in question. As far as the absence of the labial stops is concerned, \(p\) does occur as the first member of a relevant cluster, \(pk\), although this cluster type is instanced by only a single token. There are, however, four tokens of \(bl\) and eight of \(br\), so it is likely that Arnott was excluding at least \(b\) for empirical reasons. The glottalized consonants appear to cluster fairly freely, with four tokens each of \(bg\) and \(dg\) in the chart, fifteen of \(br\), and eight of \(bd'\), although in Gombe
(pp. 52, 114), at least one final $t'$ (on Arnott's analysis) assimilates totally to a following $6$. The chart shows no $dr$, $24$ and no '-initial clusters (see below). Unfortunately, $γ$ has merged with $' in the speech of Stennes' informants, so there is of course no information in his chart concerning the clustering behavior of the former. In the five examples that Arnott gives (p. 114), it is deglottalized. In any event, since some of the glottalized consonants do cluster with possible suffix-initial consonants, their failure to trigger anaptyxis is not unexpected. As for the remaining consonants (the continuant grade consonants, liquids, pure nasals, and glottals), aside from the latter, which will be treated below, it is hard to generalize. Some potential suffixation-induced clusters are instanced in Stennes' chart while others are not, with little in the way of a relevant pattern being apparent. At least one of the uninstanced cluster types, s-h, does exist in Gombe; Arnott (p. 80) gives bos-ho and mekes-hon, although, as noted above, both of the stems in question are probably fairly recent borrowings.

In sum, the only consonants for which a really solid case can be made that epenthesis is the result of a purely phonological constraint are the prenasals and the affricates (and the descendant of an affricate in the case

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$24$There are also no $tr$, $dr$, $dr$, or $nr$ clusters. The class of consonants that do not appear to cluster with the following $r$ is sufficiently homogeneous that it is likely that a genuine phonotactic constraint is involved here. If $l$ is $[-cont]$ (cf. Chomsky and Halle [1968:318] on the somewhat ambiguous status of $[l]$ with respect to this feature), then the class of consonants that fails to cluster with the following $r$ is the non-continuant coronals. Note that if $l$ is instead $[+cont]$, then since $sr$ clusters are not uncommon (there are three tokens in Stennes, and cf. also Arnott, p. 94), this class cannot be characterized as either $[-cont,+cor]$ or simply $[+cor]$. Geminate $r$ also occurs, at least as the result of total assimilation of $d$ in expected $dr$ clusters (see above), but would presumably be immune to the effects of anaptyxis and deletion of the suffix-initial consonant by virtue of some version of the "geminate inalterability" constraint (cf. Hayes [1986] and the references cited there). As pointed out in note 4, underlying heteromorphemic $r+r$ clusters surface as $rd$, at least in nominal stem-suffix combinations. If the $r$-dissimilation rule precedes the other rules that affect clusters, the full range of facts concerning $r$-initial clusters can be derived.
of Gombe sh, although the apparent existence of this constraint in Gombe may thus be simply an accident of history).25

Anaptyxis is not the only alternative to deletion of the stem-initial consonant. When the stem ends in a glottal h or ' , the final consonant is lost and the preceding vowel compensatorily lengthened. According to Arnott, this process "occurs regularly in relevant nominals" (p. 50), but it is "normal, though apparently optional, in some relevant verbal forms, but not in all, especially in deliberate speech" [italics in original]. Otherwise, the cluster may be broken up via insertion of an anaptyctic vowel (p. 295). "[I]n a few individual stems" (pp. 52, 114), 'y loses its glottal closure,26 and ny is denasalized. In at least one stem (p. 111), woot- 'one, single, the same', the final † is deleted before r-initial suffixes, although anaptyxis applies before -bē in the Class 2 form. The final w of Grade A (for Arnott) rew- 'female' also appears to be deleted before stem-initial γ, w, and h, but not s, r, or j (pp. 95, 113). Arnott treats the behavior of this stem (p. 113) as being the result of normal behavior of the suffix, but with the stem exhibiting extensive allomorphy (cf. Class 1 debb-o, Class 2 rew-bē, Class 3 dey-el, Class 7 ndew-a, and Class 8 ndeh-o). On this kind of account, it is simply an accident that the "stem-final" consonant in the case of the latter three examples is the same as the initial consonant of the Grade B allomorph of the

25Perhaps significantly, these consonants are precisely those that are "complex segments", i.e. ones which would have two melody units in the standard autosegmental representation. From this point of view, only triconsonantal clusters (on the melody tier) would be broken up. Unfortunately, Stennes' chart shows that affricates and prenasals occur relatively frequently as the second member of a cluster, so it cannot be quite this simple, although it would not be difficult to formalize the generalization in question even if one allows for this fact.

26If pre-consonantal glottals are treated as having the point of articulation of the preceding vowel, then this latter process could be considered as being part of the same process as glottal 'deletion'. What would be going on in the case of deletion would be, under this approach, simply loss of the glottal constriction (together with voicing of the resulting voiceless second mora of a long vowel), which is exactly what happens when there is deglottalization.
suffixes in question, whereas if the final w is deleted as suggested above, thereby bledding the rule that deletes suffix-initial consonants, the actual surface forms can be accounted for without resorting to the massive stem allomorphy that Arnott posits.

As for the geminate bb in Class 1 (and Classes 22-25), it appears to arise in the following manner, at least historically (see note 29 on the qualification). There are "a few individual stems" (pp. 50-51, 112-113), all of which take Grade A suffixes on Arnott's account, that end in a non-geminate continuant grade consonant which alternates with the corresponding stop grade consonant. As far as I can tell from Arnott's examples, the stop grade alternant appears only in Classes 1, 24, and 25 (with two exceptions—see below). The relevant shared property of these classes appears to be that the initial consonant of the class suffix in Grade B (its underlying form) is j, although it is not clear to me why this property should be relevant. Thus, there seems to be some kind of diacritically-triggered rule that changes continuant grade consonants appropriately before j.27 This rule could account for the presence of a b, though not of course for the gemination. Now there is another alternation, found again in "a few individual stems", between a single consonant and the corresponding geminate, with the geminate appearing, again, before suffixes whose Grade B alternant

27Note that formulating the rule in these (quasi-)phonological terms predicts that there should be Class 22 and 23 stems that show the stop grade alternant. Arnott does not give any such examples, but evidence will be presented below for their existence, at least at an intermediate stage of the derivation (cf. note 30 and the related discussion). It would be nice if the alternation in question, which looks for all the world like gradation, could be handled by the already existing gradation rules. Unfortunately, it can't, as the gradation rules now stand (cf. section 2.2), since they require morpheme-initial position. This requirement could not be removed, since doing so would cause all non-exceptional stems with a final continuant grade consonant to exhibit this alternation, which is actually found "in a few individual stems". For further evidence that morpheme-initial position is a necessary part of the environment for gradation, see Churma [1986b, sec. 4.4]. Historically, the two phenomena undoubtedly were one, but the synchrony requires two separate rules (per alternation type, most likely—cf. Churma [1986b, section 4.1]).
begins with \(j\). If we suppose that the \(j\) is assimilating totally to the stem-final consonant in such cases, we will have an explanation for the otherwise unexpected occurrence of the geminate only in those cases in which the Grade B suffix is \(j\)-initial, although since this process, too, would be found to operate only in "a few individual stems", our explanation would be lacking somewhat in that the stems that trigger this process would have to be marked diacritically.29

28Class 15 \(\text{pucc-u} '\text{horse}'\) (pp. 50, 112) would be an exception to this generalization, since the Grade B allomorph of the Class 15 suffix is \(w\)-initial. The only way of accounting for this form within the approach being presented would be to posit radical stem allomorphy along the lines of Arnott's approach (cf. the diminutive \(\text{push-}e\)l, where \(cc\) is regularly the geminate version of \(sh\), at least for most Gombe speakers). The plural, \(\text{pucc-i}\), behaves as expected, and may well have been the basis for reanalysis of the singular, if what I have to say is correct. Interestingly, however, Arnott [1960:263] reports that "in some varieties of Fula", this word "requires the ... agreement characteristic of" Class 23 nouns, for which the Grade B suffix allomorph is \(j\)-initial. It is tempting to speculate that this word, which is for cultural reasons likely to be a borrowing, originally took, like other loans, Class 23 agreement and no overt suffix [Arnott 1970:75, 391], but was for some reason later reassigned to Class 15, which Arnott characterizes in terms of its "meaning content" as containing "some animals", as well as some things that are decidedly not animals like "some collectives and abstract nouns ..." (pp. 390-391). Since the suffix vowel in both classes is \(u\), it is not hard to imagine that the gemination that is characteristic of Class 23 suffixes would also be transferred to the newly-Class 15 stem. Further support for this suggestion comes from the fact that, as Russ Schuh has pointed out to me, the word for 'mare' in the dialect described by Labouret is the stem for 'female' \(\text{rew-}\) seen above plus the Class 15 suffix: \(\text{ndewu}\). Apparently, this class is the one used for horses! The reassignment in question could not have been very recent, given that the singular for this stem is Class 15 in all dialects for which I have the relevant information, although whatever the cognate would be in the Gambian dialect that is the basis for Gamble and Baldeh's [1981] dictionary does not appear there. The word for 'cotton' would also be an apparent exception (see note 29 for discussion).

29There is some evidence that, while this is how the alternation in question came about diachronically (roughly—the stem-specificity of these processes would have to be accounted for other than by using diacritics), there is some reason to be suspicious concerning its synchronic status. The diminutive of what would presumably be underlyingly \(/\text{hoto}l-/ '\text{cotton}'\) is \(\text{koto}l-\)al, whereas the unmarked singular form is Class 20 \(\text{hottol}-\)
If we put these two analyses together, we predict the occurrence of stems which, on Arnott's account, show an alternation between a final continuant grade consonant and the corresponding geminate stop grade consonant: the stop-formation rule alluded to above will convert the underlying continuant to the corresponding stop, to which the initial j will then assimilate. This is exactly what we find in the case of rew- and a few other stems (cf. Arnott, p. 113). Such stems will be doubly marked diacritically, as triggering both stop-formation and j-assimilation. If this analysis is accepted, then there is yet another process that may affect a cluster, viz. deletion of stem-final w, but once again not all such consonants will be subject to the deletion rule (cf. cow- 'mosquito' (p. 90), which invariably retains its final w). We would also have to move the morpheme boundary in the forms cited above one segment leftward, except in the case of the Class 2 form.

One final indication that the rule that deletes suffix-initial consonants is not fully phonological in nature is the existence of what on Arnott's account is an "atypical" allomorph of the Grade A Class 12 suffix, (p. 112). This latter form is doubly problematic in that not only do we find unexpected gemination of the final l, but also of the medial t. Thus, it may be that speakers have reanalyzed this phenomenon in such a way that there is now simply a rule that says, roughly, "double all but the initial consonant for certain stems in certain classes". It is tempting to treat this particular case in terms of a "gemination prosody" (in the Firthian sense) that applies to all but the initial consonant in the relevant classes, although the fact that this example may be the only one of its kind in Fula should make one a bit hesitant; in any event, an analysis along these lines is unformulable in any current generative theory, as far as I can tell. Further suggestive evidence that an ad hoc rule of gemination is the correct synchronic description can be found in Churma [1987].

30 The fact that geminate bb appears in Classes 22 and 23 is evidence in favor of stating the rule that derives stop grade consonants from the corresponding continuant in the terms used above (cf. note 27 and accompanying discussion), since this rule must apply in order to derive the input to the j-assimilation rule. Interestingly, the stem wuy- 'thievish' has a stem-final jj- (on Arnott's account) in Class 1 and Classes 22-25, and variants with final y- in the case of the latter four classes (p. 95), further evidence in favor of the quasi-phonological formulation.
-wa (pp. 112, 126), which is "found with three stems" (lel-wa/lel-i 'gazelle', mbe-e-wa/be'-i/be'-el , etc. 'goat', and ndaw-wa/dabb-i 'ostrich', where the Class 25 plural suffix in these cases is underlyingly -ji ). Arnott treats this allomorph as being on a par with the other atypical suffixal allomorphs, i.e. in terms of what appears to be simple suppletion. But while this kind of approach is clearly called for in cases such as that of the Class 2 Grade B suffix ( -be/-'en ), it neglects the fact that in the case under discussion this allomorph is phonetically identical to the Grade B allomorph. If the underlying representation of the Class 12 suffix is /wa/ , then we can see why this suffix has this shape, although again an appeal will have to be made to rules triggered by arbitrary diacritics. In the case of the first of the above forms, the stem lel- would be marked as failing to trigger deletion of the suffix-initial consonant and as triggering j-assimilation. In the case of the second, the underlying shape of the stem would be /be?-/ , and the glottal-deletion rule mentioned above, together with rule (4), would derive the first variant. Note that in this case there is a conflict between the glottal-deletion rule and the one that deletes suffix-initial consonants. For the first variant, the former rule "wins", while the latter takes precedence in the case of the others. This suggests that the latter rule should be broken up into two or more rules, since presumably we would want to mark this stem as failing to trigger deletion of suffix-initial w , while not preventing the deletion of j or y.31 The final stem would also have to be specified as not triggering w-deletion and as triggering j-assimilation. Note that if this analysis is accepted,

31Actually, things are probably even more complicated than this. As it stands, the analysis being sketched predicts that the initial w of the Class 7 suffix would also not be deleted. Arnott does not discuss this form; he simply gives the Class 3 form (in this case, lel-ei ) in a column headed "3a-8a" and adds "etc." after the presumably representative Class 3 form. If this stem does in fact behave like other Grade A stems with respect to this suffix, then the diacritic would have to refer directly to the class of the only suffix that fails to lose its initial w . The fact that the suffixes for Classes 14-17 never lose their initial w would be attributed to the accidental failure of the lexicon to contain any relevant stems with the appropriate diacritic.
there will be not just two, but three different kinds of \( w \)-final stems: \( rew- \), in which the \( w \) is deleted; those in which it is not deleted and also fails to trigger deletion of the suffix-initial consonant ( \( daw- \)); and stems that behave 'normally', i.e. which cause deletion of all deletable suffix-initial consonants and surface as the first element of a cluster otherwise such as \( 6\text{ow} \).

The upshot of all this is that it is often not possible to predict the fate of a cluster that arises as a result of suffixation. Furthermore, the processes that deal with such clusters, including rule (5) or its equivalent, are not purely phonological, at least in modern Gombe and/or for Stennes' Adamawa speakers. Some of the unpredictability can be eliminated if the rules in question are ordered judiciously, but it will not be possible to account in this way for cases in which the applicability of a given process depends, apparently, simply on the stem involved. Thus, for example, in order to distinguish those \( d \)-final stems in which the \( d \) assimilates to a following \( r \) from those for which anaptyxis applies, we would need some sort of lexical information. In this kind of case, one could conceivably posit a "phonological" difference, with the latter ending in a bare \( V \) slot, at least as long as we are willing to make \( u \) the unmarked vowel in Fula and order the rule that would handle the behavior of the anaptyctic vowel before \( r \) before those that would make unspecified \( V \) slots \( u \). But notice that this kind of solution could not be extended to handle the behavior of \( woot- \), in which the final consonant is lost before \( r \), but anaptyxis applies before \( 6 \). Similarly, for those speakers who break up \( kr\) clusters, but not \( kr \) clusters, in the case of \( sook- \), the floating \( V \) slot solution will not work.

The fact that a number of the non-anaptyxis processes are specifically noted by Arnott to apply only in the case of "a few individual stems" also would require distinguishing in the lexicon stems that end phonetically in the same way, and at least some such cases must be dealt with via the use of diacritic features that are part of the lexical entries of stems. In fact, there would appear to be no good reason for not positing that most stems have as part of their lexical representations a diacritic that specifies
which of the myriad possible quasi-phonological processes that could apply actually do. Under such an approach, and assuming on the basis of the behavior of stems such as woot- and sook- that there are two separate rules of anaptyxis, the lexical representation of the latter in the case of the kinds of speakers in question would contain the diacritics [+UANAP] and [-VANAP], indicating that epenthesis of u is applicable, but that the "copy-cat" vowel is not to be inserted. (It is conceivable, and probably desirable, that rules that require a positive diacritic specification apply only when such a specification is present and do not apply if there is no mention of the diacritic in question. If this is the case, then only the former specification would be necessary.)

Similarly, rew- would have the feature [+YWHDEL] to indicate that the final w is to be deleted before y, w, and h, woot- would be marked [+TDEL] in order to trigger a rule of final t-deletion, as well as [+UANAP], etc. At this point, it might be questioned whether it might not be better to abandon the attempt to derive the surface forms by means of the quasi-phonological rules in question and simply list them in the lexicon. This might be feasible in the case of nouns, but the behavior of loans (cf. (11)) suggests that suffixation is quite productive and that the Grade B allomorph is basic. Furthermore, the fact that nominal modifiers may appear in any of the 25 classes makes this kind of approach much less palatable. There are regularities here. In particular, the class suffix is readily identifiable, and the putative underlying representation of the stem appears in most of the classes, with the exception of rew- in the case of the latter property.

Notice now that, if all native (and nativized) stems carry with them one or more diacritics that indicate their behavior in clusters, we have an automatic explanation for why recent borrowings are not subject to any of the rules in question (cf. section 3.4): they have none of the relevant diacritics. It is hard to see how an autosegmental approach could mimic this kind of approach, at least if it eschews the use of diacritics, so it would appear quite unlikely that any real explanation for the behavior of the forms in (11) will be possible unless substantial use of diacritics is per-
mitted.

4. Conclusion

The above discussion has, I trust, established that the morphophonemic alternations found in Fula suffixes are complex and in many cases totally unpredictable on strictly phonological grounds. The only reasonable way of analyzing such facts, it would appear, requires making extensive use of ad hoc diacritic features, thereby reflecting the ad hoc item-by-item nature of the conditions on the applicability of the rules in question. Thus, diacritic-free versions of autosegmental phonology, such as those that are apparently advocated by Lieber and Marantz, are incapable of providing an account of the behavior of Fula nominal suffixes. 32

The picture that I have painted is not a pretty one, but it is, I would maintain, an accurate portrait of the phenomena under discussion. The lack of beauty may cause concern for some, but when truth and beauty clash in science, it is the latter that must yield. Claiming that a complicated set of facts is simple is just as wrong as claiming that real simplicity-inducing generalizations do not exist. Some consolation can be taken from the fact that the theory of diacritics employed in the analysis presented here is relatively restrictive (cf. Churma [1986b] for discussion). In the case at hand, furthermore, the ugliness will diminish if we take a step back and look at the overall picture, since treating phenomena that are not really

32It might be objected that it is unreasonable to demand of a theory that it do completely without diacritics. But autosegmental theory makes available a device, viz. "preattachment" of a feature that is normally supplied by a spreading rule (or a default rule), that in many cases allows a diacritic-free account of what one might be otherwise tempted to treat in terms of diacritics, and this fact is taken to be a significant advantage for the autosegmental approach. Thus, for example, non-alternating stems like hausa- (cf. section 1) can be analyzed as having a preattached [+cont] autosegment, thereby making them immune to association of other floating autosegments (cf. Lieber [1984]). In full-specification/segmental accounts (Anderson [1976], Churma [1986]), these would simply be marked [-GRADATION]. If both preattachment and diacritics are allowed, then there will be a general problem of deciding on a principled basis which kind of account to use for any given phenomenon.
phonological separately from those that are will allow a more highly con- 
strained, maximally articulated, and perhaps even aesthetically appealing, 
theory of honest-to-God phonology (cf. Churma [1986b]). This would appear 
to be, at least in principle, a general result of appropriately modularizing 
the grammar (cf. Chomsky [1972], Zwicky [1983]). Thus, in this case, recog- 
nizing the inordinate ugliness that it is possible to find in the morpho- 
phonological module of the grammar may well allow one to see through all the 
morphophonological mess to the beauty that is pure phonology.33

33 There may be a purely pragmatic reason for making this kind of distinc- 
tion as well, since knowing (more or less) in advance the kinds of phenomena 
that are susceptible to elegant synchronic explanation could prevent what 
would otherwise be an enormous, but wasted, expenditure of both time and in- 
tellectual endeavor. In this case, which is far from unique in my opinion, 
probably the only way of finding a truly insightful explanation of what is 
going on synchronically is doing a careful historical reconstruction, using 
not only (pseudo-)internal reconstruction, as is still often the case in syn- 
chronic analysis, but also comparative evidence.
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This paper describes the complex Majang system of noun plural formation. Majang uses singulative suffixes, plural suffixes, and suppletive plural stems to mark number on nouns. Majang is seen to exemplify in many ways the *N/*K pattern of singular and plural marking as described by Bryan [1968] for many Nilo-Saharan languages. Tiersma's [1982] theory of "Local Markedness" is shown to provide an explanation for singulative marking on some nouns in Majang and other Surma languages. A comparison of Majang noun plurals with plural forms in other Surma languages allows the reconstruction of some number marking for Proto-Surma.

1. Introduction

Building on the work of Cerulli [1948] and Bender [1983b], this paper describes the marking of number on nouns in Majang, a Nilo-Saharan language spoken by 20,000-30,000 people in western Ethiopia. It is classified within the Eastern Sudanic phylum, a member of the Surma group [Bender 1983a]. Fleming [1983:533] groups all Surma languages except Majang into Southern Surma, placing Majang in a crucial position for the reconstruction of Proto-Surma.

*I conducted Majang fieldwork under the Institute of Ethiopian Studies, Addis Ababa University, from August 1984 to March 1986. Much of the data on noun plural formation was gathered with Anbessa Tefera, who was sponsored by the Research and Publications Committee of the Institute of Language Studies, Addis Ababa University. I am grateful to the local officials who cooperated in making the fieldwork possible. Nicky De Jong and Hans-Georg Will gave me examples from Didinga and Me'en from their research. Carol McKinney of SIL and the University of Texas at Arlington provided many useful comments on an earlier draft. An anonymous SAL reviewer gave several useful suggestions, as did the editor, Dr. Schuh. My wife Carole was supportive through it all, from field work to proofreading.
Surma.

In this paper, section 2 describes the marking of number on Majang nouns, the behavior of liquid substances as syntactic plurals, and many manifestations of Bryan's [1968] *N/*K number marking pattern. Section 3 gives comparisons of number marking in other Surma languages.¹ Evidence is given for a Proto-Surma plural suffix -Vk marking derived nouns and for a singulative suffix. Tiersma's [1982] theory of Local Markedness is shown to provide an explanation for these singulative suffixes.

2. Marking of Number

The marking of number on nouns in Majang is complex, as in other Surma and Eastern Sudanic languages. Singular and plural nouns are differentiated in a number of ways: suppletive stems for singular and plural, singulative suffixes, plural suffixes. Some words have both singulative and plural suffixes.

A certain amount of variation for marking number on some nouns is noticeable, even by one speaker, as noted by Bender [1983b:127]. Generally, the variation consisted of alternate suffixes. For examples, I have recorded the plural of taame 'face' as taama, taametun, and taamekork. The nouns that have suppletive singular and plural forms were consistent in geographically separate areas of my research, as well as with Bender's examples, such as tan/togi 'cow,cattle'. Comparing data from the far north of Majang territory and the central area (near Tepi, Illubabor), I found little variation in the formation of noun plurals, no more than within one local area.

The present complexities of marking number on nouns may very well reflect an archaic noun class system, as suggested for Didinga and Murle by

¹In Majang, Bender [1983b:116-117] described [s], [ʂ], [s̥], and [č] as variants of a single phoneme /c/. When citing examples from Bender, they will be given with Bender's transcriptions. In my data, I use the symbol /c/ for all forms. Tone and ATR vowel articulations are not fully understood yet. For descriptions of plural marking in other Surma languages, see Arensen [1982:27-47] on Murle, Odden [1983:170-173] on Didinga, Turton and Bender [1976:544, 545] on Mursi, and Will [forthcoming] on Me'en.
Majang Nominal Plurals

Tucker [1933:894].

2.1. Suppletive stems between singular and plural. For three words in my data, plurals are shown by suppletive stems, viz. ṇaa 'woman', ṇon 'women', ṭaŋ 'cow' ṭogli 'cattle', and ḍidit 'person' joop 'persons', though Cerulli [1948:155] listed jo as a Majang singular form. Presumably, such cases can be traced to different stems historically.² For example, Hieda [1983:327] lists *ltaŋ as Proto-Nilotic 'cow', cognate to the singular in Majang and several other Surma languages. The Majang plural form ṭogli is very similar to the Gaam plural ṭogi [Bender and Malik 1988:151] and also to the Proto-Nilotic *dhok [Hall et al. 1975:7]. This is not to say that Majang borrowed these stems directly from a Nilotic language or from Gaam, but to illustrate that both of the Majang forms can be compared to an extant root in languages that are both geographically close and genetically related.

2.2. Singulative suffixes. Similar to the situation described by Dimmendaal [1987:196, 197] for the Bari group of Nilotic languages, in Majang, "there are certain nouns whose principal form has a plural meaning, but these nouns take a singular suffix in order to indicate one item" from a group. That is, the uninflected noun is plural, as in (1), below.

(1) singular       plural
    weena         ween      'ear'
    ṃećiŋ         ṃeći     'louse'

A few nouns are marked with singulative -t, such as keet 'tree'³ and

---

²'Cow' and 'cattle' are suppletive in a number of Eastern Sudanic languages, Didinga [Odden 1983:172], Gaam [Bender and Malik 1980:151], and many (all?) Nilotic languages, (including, by implication, Proto-Nilotic [Hall et al. 1975:6]). The singular and plural are also suppletive in unrelated English, again showing the cross-language tendencies of local markedness.

³The Proto-Surma forms must have been *keet+t 'tree' and *keet+n 'trees', with the consonants functioning as number suffixes. Several Kalenjin languages of Southern Nilotic have a form keet for 'tree', adding a suffix -it to form the "secondary" singular form keetit [Van Otterloo
'trees'. Another example is 'hand'. The singular is arit (though the final -t is lost in most grammatical environments), and the plural is arn.

The most common singulative suffix is -n. Many Majang nouns that have singulative -n also have a suffix -k for plural, such as tutukan 'egg', tutukak 'eggs' [Bender 1983b:124]. Many of the Majang nouns that are marked with singulative -n are also marked for singulative in other Surma languages (see 3.2 below).

(2) singular   plural
piŋon  piŋok      'leaf'
ŋiidan  ŋiidan    'tooth'
waikun  waikuk    'seed'
marion  mariok    'star'
gopan  gopak      'path'

2.3. Plural suffixation. The usual way to distinguish singular from plural nouns in Majang is by adding a suffix to the singular form, as in ugul 'crocodile', uguler 'crocodiles'. Bender [1983b:127] correctly pointed out Cerulli's oversight in listing -ke as the only plural suffix. Rather, there are a variety of such suffixes, including many examples of -(V)r for animate objects and body parts, fitting Greenberg's [1970:114] Eastern Sudanic pattern of r for animate plural. There is a wide variety of plural suffixes, with twelve clearly attested types identified thus far, most involving either a final vowel, -r, or -k.

(3) suffix  singular  plural
-n/-k  tutukα+n  tutukα+k    'egg'
-k     dšane     dšane+k   'beehive'

1979:Appendix 1, p.4]. Tucker and Bryan [1962:160] with more opportunity to study phonetic detail, give the Kalenjin "primary" singular as kẽ:õ, a match with the Majang form. I do not yet have sufficient evidence to decide whether Proto-Surma interpreted a root final consonant as a suffix or whether the Kalenjin languages are descended from a stage where a singulative suffix -t was interpreted as part of the root.
Majang Nominal Plurals

-ak  gaput       gaput+ak       'bat'
-kok  tol         tol+kok       'hole through'
-ako  rii         rii+ako       'shadow'
-atok gati       gati+atok       'debt'
-r  komoi       komoi+r       'clan'
-νr  ugul       ugul+er       'crocodile'
-ter  kaad♀a   kaad♀a+ter       'tongue'
-i  atiin       atiin+i       'bachelor'
-e  tuusi       tuusi+e       'house pole'
-tun  ato       ato+tun       'mouth'

Some generalizations concerning various plural noun classes are noticeable. Some of the plural classes are grouped by phonological criteria and others by semantic criteria. These criteria are usually not 100% predictive as to which plural suffix a noun will take. Rather, these criteria are descriptive of the groups of nouns which are found within a class and which take a common suffix. For example, nouns whose roots end in oi- often take the plural suffix -r and nouns that take the plural suffix -ako all have monosyllabic roots. There is also a tendency for (seemingly) reduplicated nouns to form plurals by the suffixation of -e:

(4) keketi  'snake'  keketie  'snakes'
    tulul  'root'  tulule  'roots'
    bülböl  'burrow'  bülböl  'burrows'
    polpol  'finger/toe'  polpole  'fingers/toes'
    siisil  'lizard (sp.)'  siisile  'lizards (sp.)'

The only rule that is 100% predictive for a large group of nouns is that any derived noun will take the suffix -ak, a pattern found in other Surma languages, as well (sec. 3.1).

(5) singular           plural
    dōwarkan       dōwarkanak       'hunter'
    ibaalkan      ibaalkanak       'dancer'
    ŋonkan        ŋonkanak       'liar'
    laaltan       laaltanak       'crack' (n)
The form muktan 'marriage song', appears to be a derived noun formed with the product suffix -tan, but I have found no root muk-. Its plural is muktanak, but this may be by analogy with the many other (derived) nouns which end in -tan.

2.4. Double plurals. Double plurals are those where a language adds a plural marker to a form that is already plural, such as feets or datas. This process seems to have happened to create a double plural on 'termite', the singular of which is mootak and the plural mootakok. The singular seems to end with the common plural suffix -ak. Since the word most commonly occurs in its plural form, the earlier plural form was re-analyzed as a singular and then pluralized.

Another probable case of Majang adding a plural suffix to an already plural form appears in 'flying termite' d summedun/d summedunak. The -tun at the end of the singular is probably an example of the plural suffix -tun, as in waarr/waartun 'dog/dogs', ato/atotun 'mouth/mouths', kooli/kooli'tun 'tail/tails'. This suggests an earlier singular form dumu for 'flying termite'. The plural of this earlier singular dumu was dumutun. Later, the plural suffix -ak was added to dumutun. What had been a plural was later reinterpreted as singular, then an additional plural suffix was added.

The fact that 'termite' and 'flying termite' have both received -ak as a plural suffix suggests that semantic classes may be involved in the selection of some plural forms.

Tiersma [1982:837-839] has pointed out that creation of such diachronic double plurals is quite common on nouns which are more commonly referred to in the plural than in the singular, what he terms "locally unmarked" nouns.

2.5. Inherently plural nouns. Bender [1983b:126-127] pointed out that some Majang nouns are inherently plural, e.g. 'twins', 'water', 'name', 'spirit', and 'thing'. He also listed a group of nouns as "not having plurals", most of which are "mass nouns or unique things". Some of the nouns...
"not having plurals" are plurals, at least syntactically. It could be as easily argued that they do not have singular forms. This can be demonstrated by the use of a possessive frame. As Bender [1983b:129] explained, "There is a distinction according to singular thing possessed and plural things possessed ... The use of possessives shows up inherently plural nouns." The possessive pronoun for a singular third person possessing a singular object is neek, possession of a plural object is marked by geeŋk. This is shown below with the countable noun 'bull'.

(6) jegoy neek        'his bull'
    jegoyir geeŋk     'his bulls'

Since most liquid substances take the plural possessive form, this indicates that they are syntactic plurals. The following list of liquids with plural possessed forms demonstrates that most liquids are syntactic plurals, as they are also in related Mursi [Turton and Bender 1976:545]:

(7) erce geeŋk        'his milk'
    mooe geeŋk        'his coffee'
    maaw geeŋk        'his water'
    ogol geeŋk        'his honey mead'
    toyo geeŋk        'his urine'
    ūnutu geeŋk        'his faeces'
    paitankak geeŋk    'his vomit'

The last example is based on the verb root pai- 'vomit'. It has the product suffix -tan and carries the standard plural suffix -ak. Because liquids are plural, the derived noun is marked for plural.

There are a few liquids, all loan words, which are exceptions to this pattern of liquids as syntactic plurals. This foreign origin explains Bender's [1983b:129] one exceptional liquid 'blood'. Again, the use of a possessive frame indicates a noun's singular status.

(8) yerum neek        'his blood'
    caayi neek        'his tea'
    tajan neek        'his beer'
Fleming [1983:544] has pointed out that 'blood' ędzirum is from Omotic, found in the Majoid languages, Majang being adjacent to the Majoid language Sheko. 'Tea' is obviously from Amharic ʃay. The use of the singular with ɬaːjan 'beer' is more interesting. It appears to be borrowed from the Amharic ɬaːj 'honey mead'. A Majang man told us that it is better to say ɬaːjan neek rather than ɬaːjan geek because beer is sold by the bottle and counted to calculate cost.

Liquids also show themselves to be plural in some other syntactic constructions. For example, liquids can trigger plural markers in subject suffixes of verbs:

(9) ku+ɛr+ko moor+ɪt
    NEG+3pl+PST boil+NEG

Liquids are also plurals in adjective phrases. Singular adjectives are introduced by co, as in co mʊntənəŋk 'good one'. Adjectives modifying plural nouns are introduced by cigo, as in cigo mʊntənəŋk 'good ones'. Liquids take the plural form cigo, as well as the pluralized form of the adjective:

(10) ɬuːtaako ogol cigo mʊntən+a+ŋəŋk
    I-drank mead REL good+PL+ADJ

   dʒaːmaako ʈəɾ cɪ mʊntən+a+ŋəŋk
    I-ate meat REL good+ADJ

'I drank good mead'
'I drank mead which is good'
'I ate good meat'

Liquids trigger plural agreement on nouns marked for case. When a noun that carries a case marking suffix is plural, a suffix -k- (glossed PC) is inserted between the root and the case suffix (see 2.6 below).

(11) ŋaːka mooe+k+ŋəŋk
    arome coffee+PC+GEN

'aroma of coffee'

2.6. Plural marking on other NP constituents. Number is marked on other constituents of nouns phrases in addition to nouns. These include such constituents:

"The phonological correspondences are as follows: glottalized consonants lose their glottalization when borrowed into Majang, and the Amharic "first order" vowel (a fronted schwa) is pronounced as a short /a/ ."
Majang Noun Plurals

stituents as demonstratives, possessive pronouns, case markings, and relative markers.

Demonstratives are marked for number, as explained by Bender [1983b:130].

(12) cini ’this’ cigi ’these’
cinoi ’that’ cigoi ’those’

When a demonstrative is marked as a locative, there is an additional suffix marking number on both singular and plural forms:

(13) cinene ’in this’ cigege ’in these’

Adjectival constructions are generally formed by relative clauses with intransitive verbs [Unseth forthcoming a]. These are marked for plural by a plural affix which follows the intransitive suffix (IS). One exception to this is the word for ’big’ obi i , which becomes bobēr for plural, retaining a Proto-Surma process of stem reduplication for plural [Unseth forthcoming b].

(14) co muntan+η+ηk cigo muntan+a+η+ηk
which good+IS+REL which good+PL+IS+REL
’one which is good’ ’ones which are good’

Example (14) again illustrates what was pointed out above in 2.5, that singular relative clauses are introduced by co and plurals by cigo .

Majang nouns are overtly marked for case when they indicate genitive (GEN), locative (LOC), or oblique (OBL) cases [Unseth forthcoming a]. If nouns that are marked with these cases are plural (including liquids), they are marked with a -k- suffix (glossed PC) preceding the case marker.

(15) gab ciò+aa mooyi tan+a gab ciò+aa mooyi togi+k+a
give+ls salt cow+OBL give+ls salt cows+PC+OBL
’I give salt to the cow’ ’I give salt to the cows’
togi tapad ciò+ηk togi tapa+a+k+ηk
cows chief+GEN cows chief+PL+PC+GEN
’cows of a chief’ ’cows of chiefs’

2.7. Bryan's \(*N/\)K number marking pattern. In a discussion of Majang noun plurals, it is useful to consider a brief summary of ways in which Majang uses the \(*N/\)K pattern, \(*N\) to mark singular and \(*K\) to mark plural. Foreshadowing Bryan, Cerulli [1948] had noted several examples of \(k\) for marking plural constructions. Bryan [1968:169] used \(*N\) and \(*K\) to refer to proto-segments whose reflexes vary from language to language. For example, Majang often has a voiced velar stop \(g\) as a reflex of \(*K\), such as in possessive pronouns. Bryan [1959] earlier wrote about a possible substratum using a \(?T/K\) marking pattern, but here I refer mostly to her later, more developed work.

The following types of constructions have been explained above, all of which show evidence of the \(*N/\)K pattern:

(16) Demonstratives  
\(\text{cini} \ 'this' \quad \text{cigi} \ 'these'\)

(17) Locative demonstratives  
\(\text{cinene} \ 'in this' \quad \text{cigege} \ 'in these'\)

(18) Noun plurals when marked for case  
\(\text{gabl\+aa mooyi tan\+a} \quad \text{gabl\+aa mooyi togi+k+a} \)  
\(\text{give+ls salt cow+OBL} \quad \text{give+ls salt cows+PC+OBL} \)  
\(\ 'I give salt to the cow' \quad \ 'I give salt to the cows'\)

(19) Relative markers  
\(\text{co} \ (\text{singular}) \quad \text{cigo} \ (\text{plural}) \ (\text{see (12) above})\)
(20) Possessive pronouns

\[
\begin{align*}
\text{tan naak} & \quad \text{my cow} & \quad \text{to} & \quad \text{gan} & \quad \text{my cows} \\
\text{toon naak} & \quad \text{my child} & \quad \text{toomok} & \quad \text{gan} & \quad \text{my children}
\end{align*}
\]

(21) Number suffixes

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>tutukan</td>
<td>tutukak</td>
</tr>
<tr>
<td>gopan</td>
<td>gopak</td>
</tr>
<tr>
<td>pilan</td>
<td>pilak</td>
</tr>
<tr>
<td>djomon</td>
<td>djomok</td>
</tr>
<tr>
<td>lijan</td>
<td>lijak</td>
</tr>
</tbody>
</table>

In addition to these, some question words are also marked for plural when the expected answer is plural. Marking for plural on question words is based on suffixes containing reflexes of \*K.

(22) \[
\begin{align*}
\text{m\text{e}l+k+i+ko} & \quad \text{wod?} & \quad \text{m\text{e}l+k+i+ko} & \quad \text{wod?+ak} \\
\text{come+LOC+3s+PAST who?} & \quad \text{who (sg) came?} & \quad \text{come+LOC+3p+PAST who?+PL} & \quad \text{who (pl) came?} \\
\text{b\text{o}kot+u+ko} & \quad \text{jik} & \quad \text{b\text{o}kot+u+ko} & \quad \text{jik+onak} \\
\text{kill+3s+PAST what?} & \quad \text{what (sg) did he kill?} & \quad \text{kill+3p+PAST what?+PL} & \quad \text{what (pl) did he kill?}
\end{align*}
\]

On the question word 'which?', there is also a suffix -n for singular:

(23) \[
\begin{align*}
\text{k\text{e}t+e} & \quad \text{k\text{e}t w0+n} & \quad \text{k\text{e}t+e} & \quad \text{k\text{e}n w0+g} \\
\text{chop+3s tree which?+SG} & \quad \text{which tree did he chop?} & \quad \text{chop+3s trees which?+PL} & \quad \text{which trees did he chop?}
\end{align*}
\]

3. Comparison with Other Surma Languages

A comparison of Majang data with the limited data available on other Surma languages reveals several points in common.

3.1. Plural suffixes. For Surma languages, the most thorough description of plural formation is Arensen's [1982:27-47] Murle Grammar, in which he demonstrates that some plural classes are based on semantic categories, some based on phonological criteria, yet others seem totally arbitrary. Since Murle's 18 plural classes are well documented, much of the same data was
gathered in Majang for comparison. I compared Majang's plural classes to Murle examples to see if the same nouns had similar suffixes or if the same sets of nouns grouped together.

Only two of the Murle noun plural classes appear comparable with Majang. The first is a semantic class of flying creatures. Both Murle and Majang have a class of flying creatures, though some of the specific members of this class varied in the two languages.

Second, the use of -ak to mark plurals of derived nominal forms in Majang (see 2.3) closely parallels the Murle suffix -ok for plurals of derived nouns [Arensen 1982:87] and also the suffix -k for derived nominals in Didinga [Nicky De Jong, p.c.].

This strongly suggests that Proto-Surma marked plurals of derived nouns with a suffix *-Vk. The Didinga examples contain another example of a singulative suffix.

3.2. Singulative suffixes. All other Surma languages (for which there are adequate descriptions) also have singulative suffixes, Murle [Arensen 1982:40-44], Didinga [Odden 1983:170], Me'en [Will forthcoming], and Mursi [Turton & Bender 1976:544]. Many of the same nouns that are marked for singulative in Majang are also marked for singulative in other Surma languages. The following are only a few of the many examples:

<table>
<thead>
<tr>
<th>(23)</th>
<th>Majang</th>
<th>Murle</th>
<th>Didinga</th>
<th>Me'en</th>
</tr>
</thead>
<tbody>
<tr>
<td>'tree'</td>
<td>sg.</td>
<td>keet</td>
<td>keet</td>
<td>xeeet</td>
</tr>
<tr>
<td></td>
<td>pl.</td>
<td>keen</td>
<td>keen</td>
<td>xeenA</td>
</tr>
<tr>
<td>'egg'</td>
<td>sg.</td>
<td>tutukan</td>
<td>buurnet</td>
<td>buurryanit</td>
</tr>
<tr>
<td></td>
<td>pl.</td>
<td>tutukak</td>
<td>buuro</td>
<td>burru</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(22)</th>
<th>singular</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murle</td>
<td>paay+in</td>
<td>paay+in+ak</td>
</tr>
<tr>
<td></td>
<td>keeb+in+ct</td>
<td>keeb+in+ok</td>
</tr>
<tr>
<td>Didinga</td>
<td>igor+ya+hit</td>
<td>ogor+ya+k</td>
</tr>
<tr>
<td></td>
<td>ben+yo+hit</td>
<td>ben+yo+k</td>
</tr>
</tbody>
</table>

This strongly suggests that Proto-Surma marked plurals of derived nouns with a suffix *-Vk. The Didinga examples contain another example of a singulative suffix.
Tiersma [1982] provides an explanation of this consistent use of singulative suffixes on the same nouns in the four languages. He compared languages where singular nouns are more "marked" (more complex) than their plurals. He labels these cases "locally unmarked", since they are an exception to the universal trend of marking plurals rather than singulars. He has noted that such locally unmarked plurals generally fall into certain classes, "When the referent of a noun occurs in pairs or groups, and/or when it is generally referred to collectively, such a noun is locally unmarked in the plural" [1982:835]. The examples in (23) all fall into this category. In fact, Tiersma [1982:842] specifically cites 'leaf' as a word that is frequently unmarked in the plural in the world's languages. This concept of locally unmarked plurals is at least a partial explanation for a group of nouns that share singulative marking.

The Didinga forms of 'seed/s', xínomooc/xínomo, are an interesting example of local markedness, since the Surma singulative suffix has been applied to a loan word. According to Dimmendaal [1982:104], these forms are borrowed from Eastern Nilotic languages. He gives Eastern Nilotic cognates for 'seed', such as kiñom in Toposa, ñomo in Bari and Lotuxo. Didinga borrowed the Eastern Nilotic root as its own unmarked form and added a singulative suffix to make the singular form. The root was borrowed into Didinga, and Didinga speakers must have affixed their own singulative suffix. A similar situation holds for mulac 'egg' in Me'en, since mula, the plural, is an Omotic loan. Tiersma's principle of local markedness gives an explanation for the suffixed, longer singular form. In both of these cases,
the Surma singulative suffix and the general principles of its use are carried over onto loan words.

Singulative suffixes in various Surma languages show that Proto-Surma not only had the widespread -n singulative (found more in Majang than in other Surma languages), but also *T, as in kẹc† 'tree'. The pattern of *T for singular was also part of Bryan's [1968] work, found commonly on nominals. In several Surma languages, this *T is realized as /c/, e.g. Didinga iŋaac 'louse' and iŋá 'lice' [Odden 1983:170].

Linguists with a background in Ethiopian languages may be reminded of Ferguson's [1976:74] article on the Ethiopian Language Area (ELA), where he listed the singulative markers as one of the grammatical features of the ELA. Zaborski [1986:292] has shown that in the Cushitic languages (the largest part of the ELA), "a group of singulative suffixes contains the old Afroasiatic or Hamito-Semitic morpheme -t- ". It is indeed striking to find the same morpheme -t- for an uncommon grammatical category such as singulative in two language groups that are supposedly unrelated.

Bryan [1968:215] had found some Cushitic languages that fit her T/K number marking pattern, but called them "aberrant". If, however, as Zaborski states, they are reflexes of an Afroasiatic morpheme, they are not aberrant when viewed in the Afroasiatic context. Since Majang and Surma -n and -t singulative markers are part of a larger Nilo-Saharan pattern, and since the Cushitic singulative -t- is part of a larger Afroasiatic pattern, any discussion of relationship between the Surma singulative and the ELA singulative is inappropriate. We should probably credit this merely to coincidence.

3.3. Suppletive singular and plural stems. Tiersma's work helps explain the co-existence of suppletive singular and plural stems for 'cow' (tẹn/ togi), 'person' (idit/joop), and 'woman' (ŋaai/ŋon). He points out [1982:841] that when a word is used often enough in the plural, there is a greater tendency to preserve and tolerate morphological irregularity in its forms. The comparative evidence confirms this with Murle also showing suppletive stems for the singular and plural of 'person' (eet/ọ) and 'cow'
3.4. **Double plurals.** There is at least one example of a double plural (a plural form marked with a second plural marker) that becomes evident by comparing Majang data with that of other Surma languages, shown in (24) below:

(24) 

<table>
<thead>
<tr>
<th></th>
<th>singular</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murle</td>
<td>ibaa</td>
<td>ibaatì</td>
</tr>
<tr>
<td>Majang</td>
<td>baadì</td>
<td>baadìak</td>
</tr>
</tbody>
</table>

The Murle plural for 'arm' is clearly cognate to the Majang singular 'bicep'. Based on these two forms, the Proto-Surma plural of 'arm/bicep' was approximately *baaDì*, (the medial consonant being some type of alveo-dental stop). Majang has apparently added a typical plural suffix -ak to what was already a plural in Proto-Surma. Tiersma [1982:834, 835] specifically cited 'arm' as a word that is often locally unmarked in the plural, so it is not surprising to find double plural marking on this form.

3.5. **N/K patterning.** Just as Bryan's N/K pattern for marking singular and plural was found in Majang, it is also common in other Surma languages, marking number on some of the same constructions, such as interrogative pronouns, demonstratives, possessive pronouns [Bryan 1968:180-183].

4. **Summary**

In summary, this paper has shown that Majang marks number on nouns by three methods (singulative suffixes, plural suffixes, suppletive stems), has shown the Majang singulative suffixes to fit a larger African pattern, has shown that Tiersma's "local markedness" concept gives explanations for some

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6 Alternatively, Murle reinterpreted the Proto-Surma singular as its plural, then removed the final syllable -tì to form a singular. This is less likely for two reasons. First, it is the reverse of what is suggested by the concept of local markedness, which would be that a noun which is used more often in the plural would be more basic in the plural and therefore a candidate for double plural affixation. Secondly, -tì, the final syllable of the Murle plural ibaatì, is a normal Murle plural suffix for body parts [Arensen 1982:36], so this also suggests that ibaa was the original singular.
points, has given evidence of a Proto-Surma plural suffix -VK for derived nouns, and has shown several ways in which most liquids are syntactic plurals.

REFERENCES


SIZE AND SHAPE IDEOPHONES IN NEMBE:
A PHONOSEMANTIC ANALYSIS

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Imo State University

In Nembe ideophones, as in symbolic words in all languages in general, there is direct connection between sounds and the meanings they convey. For Nembe ideophones describing the fields of size and shape, there are peculiar strategies for accomplishing this connection. For size, medial alveolars as well as vowels in the narrow set are used for smallness, while medial velars and vowels in the wide set are used for largeness. For shape, on the other hand, consonant and vowel melodies are used rather than single phonic units. A sequence of three different consonants invariably refers to crooked shape while a sequence of three consonants ending in two identical liquids refers to straight shape, etc. However, this whole neat pattern is complicated by the existence of hierarchies of phonosemantic suggestiveness whereby certain phonosemantic units displace others away from their legitimate values, leading to both the ability of otherwise opposing psychomorphs to get into construction and the ability of simultaneous multiple field representation by ideophones.

1. Introduction

The arbitrariness of the connection between sound and meaning in human language is one of the principal assumptions on which modern linguistics is based. Very often, however, evidence is presented indicating that this assumption needs another critical look. For instance, Sapir [1929] has shown the connection between the high, front vowel [i] and smallness for English (as opposed to the high, back vowel [u] for largeness), just as Crockett [1970] has done for the same vowel in Russian (as opposed to the low, back vowel [a] for largeness). For consonants it is generally accepted that alveolars and dentals refer to smallness while velars refer to largeness (Mathews [1970]; Crockett [1970]).
These more popular positions are, however, contradicted by some observations in a few other languages. For instance, Greenberg and Jenkins [1966], using English nonsense forms, reached the conclusion that [r] and [k] would suggest largeness and smallness, respectively. Also, Kim [1977] shows that the change from [i] to [ɛ] in sound symbolic words in Korean carries with it a connotation shift of smallness or intensity, or both. The same alternation holds between [u] and [o], etc. In all cases, according to Kim, what is involved is a vertical movement down on the Korean vowel triangle. In other words, in Korean lower vowel height has a symbolic value of smallness and/or intensity.

In African languages the same normal observation is the case. In Igbo, the vowel i (= t) has a phonosemantic connotation of smallness; vowel change conveys pejoration; medial [g] suggests uprightness and singularity, while medial [r] often suggests number [Maduka 1982, 1983-1984]. Awoyale [1983-1984] observes a correlation between high tone and smallness on the one hand, and low tone and largeness on the other in Yoruba, just as Maduka [1987] observes a general conveyance of pejoration through tonal polarization in most languages.

Nembe, a member of the Ijoid sub-family of the New Benue-Congo family of languages (Williamson, forthcoming) is a versatile ideophone language. It has adequately sophisticated facilities for painting verbal pictures in all descriptive areas of perception, both sensory and mental. It often has 20, 30, or more ideophones for describing even the smallest fields in respect of hardness or softness, smoothness or roughness, dryness or wetness, straightness or crookedness, brightness or dullness, and so on. In this paper, we take a look at the devices the language adopts for describing size and shape perception using ideophones.

One of the milder problems with phonosemantic analysis (which deals with the nature of sound-sense isomorphisms) is the existence of liaisons between disparate sub-fields in ideophonic codification. Particular ideophones can be observed to make focal contributions to size with supplemental support from shape or vice versa. The dichotomy between shape and size ideophones
made here is based on principal areas of reference.

2. Data Sources

The principal source of data is Kalhai's [1964/1966] work, *Nembe-English Dictionary* (Parts I & II). A subsidiary source is a rich list of ideophones used in context, received from Professor Kay Williamson of the Linguistics Department at the University of Port Harcourt, Nigeria. New data were also received from (and old data tested on) native speaker informants. Data are presented in the Appendix.

3. A Short Note on Nembe Sounds

3.1. Consonants. The following are the Nembe consonants: p, b, ɓ, m, f, v, t, d, ɗ, l, r, s, z, n, y, k, g, kp, gb, w.

2.3. Vowels. Nembe vowels are described in terms of feature values, thus:

<table>
<thead>
<tr>
<th>Feature</th>
<th>i (= i )</th>
<th>e (= ɛ )</th>
<th>a</th>
<th>o (= o )</th>
<th>o</th>
<th>u (= ɔ )</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Low</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Back</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Wide</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

The feature values [+wide] and [-wide] are used in African languages to refer to vowels produced with expanded and constricted pharynx, respectively. Expansion of the pharyngeal space can be achieved through raising of the tongue root, lowering of the larynx, or both [Lindau 1975, 1979]. Constriction of the pharyngeal space can be achieved through the opposing processes of lowering the tongue root, raising the larynx, or both. Many African languages with the phenomenon of vowel harmony have it based on pharynx size specifications. Wide vowels would co-occur with other wide vowels just as narrow (constricted) vowels would co-occur with others so specified in roots.

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1I wish to acknowledge my grateful indebtedness to the late Mr. Austin Nyananyo and to Mr. Aye I. Itua-Banigo who both acted as my native-speaker informants. I am also grateful to Professor Kay Williamson of the University of Port Harcourt, Nigeria, for her encouragement.
and occasionally in affixes as well. Often, in vowel harmony languages, there is one vowel that is neutral to the harmony system that can co-occur with either the wide or the narrow set. In Nambe this vowel is the low, non-back vowel [a].

3.3. **Tones.** Nembe has two basic level tone values: High (marked ' ) and Low (unmarked). Tone glides when permitted can always be analysed as a sequence of level tones.

4. **Ideophonic Canonical Shapes and Melodies**

Generally, there are four basic canonical templates in which Nembe size and shape ideophones are encoded. There are also restrictions on melodies, more in some than others.

4.1. **Canonical templates.** The four basic shapes are as follows:

(i) \( C_1 V_2 C_3 V_4 V_5 \): durée

(ii) \( C_1 V_2 C_3 V_4 + C_1 V_2 C_3 V_4 \): buruburu, golo golo

(iii) \( C_1 V_2 C_3 V_4 C_5 V_6 \): bagiri, gogolo

(iv) \( C_1 V_2 C_3 V_4 C_5 V_6 + C_1 V_2 C_3 V_4 C_5 V_6 \): k kokori, k kokori, k pokorok pokorô

Two proximate vowels are assigned to different syllables.

4.2. **Melodies.** Melodies can be stipulated in terms of statistical tendencies and absolute restrictions with respect to consonants, vowels, and tones.

4.2.1. **Consonant melodies.** For consonant patterns in 4-syllable (reduplicated) forms, nothing absolute can be said except that there is a very high tendency for \( C_3 \) to be alveolar. Patterns in 6-syllable forms are slightly more constrained as it appears that only grave sounds \([\ddot{g}, \ddot{k}, g, k, b]\) can be in the \( C_1 \) position. The \( C_3 \) and \( C_5 \) consonants can vary between a grave and a non-grave sound, with the non-grave invariably an alveolar. Finally, straight sequences of either grave or non-grave consonants are not simultaneously acceptable in \( C_1, C_2, \) and \( C_3 \) positions.

4.2.2. **Vowel melodies.** Statistically, a great number of ideophones are homogenous in their vowel melodies. For 4-syllable forms with polarized vowel
melodies, no easy pattern can be identified; however, for 6-syllable forms the patterns are quite interesting. Vowel melodies can be homogenous or polarized. When homogenous, the vowels marked [−high] (e, o, a, o, o) are statistically favoured. When polarized, the differing vowel can be in the $V_6$ position only, or in the $V_2$ position only. When $V_2$ is the odd vowel, $V_4$ and $V_6$ are identical. $V_2$ and $V_6$ cannot be identical while $V_4$ is different. The most favoured vowel in the $V_2$ position is the "neutral" vowel [a]. The $V_6$ vowel, when causing polarization, is invariably a vowel marked [+high] (i, i, u, u).

4.2.3. **Tone melodies.** There are seven basic tone melodies superimposed on the canonical patterns identified above:

(i) $L_Q H$: buruburu, kpokorokpokoro
(ii) $L_Q$: bogolobogolo, mogolomogolo
(iii) $L_Q H L_Q$: kagulúkagulu, kadígikadigi
(iv) $L_Q H L$: bagirí, gbogolóo
(v) $(H L)_Q$: gbódoroó, kétukétu
(vi) $(H L_Q)_Q$: bákala bákala
(vii) $(L H L)_Q$: girísigírísí

Restrictions on tone melodies include the fact that in reduplicated forms, a reduplicant cannot have more than one high tone, but may have none. If a 6-syllable ideophone has only one high tone, then this tone must occur on a $V_6$ vowel, either of the first or the second reduplicant. In 4-syllable, 3-consonant, non-reduplicated forms, the penultimate tone must be high and the last low.

5. **Size Ideophones**

Ideophonic size description in Nembe can be either relative or absolute. In relative size description, semantic values are not taken on the basis of a
general or even specific norm but on the basis of a direct comparison with another object which may in itself be big or small. In absolute size description, on the other hand, semantic values are relative to a standard norm.

5.1. Relative size. Relative size description is invariably encoded in ideophones that otherwise describe principal areas besides size, such as shape. The following are a sampling (see Appendix, A for a longer list):

(1) dégerée 'not too low (house)'
    dégerée 'low (house)'
    garak'î 'standing) strong and erect'
    garak'î '(standing) strong and erect (but of smaller object)'
    kágulúu 'twisted, rugged'
    kágulúu 'twisted, rugged (but of smaller object)'

It can easily be observed that pharynx size value of critical vowels, i.e. excepting [a], determines semantic value of ideophones in the area of relative size. Vowels produced with expanded pharynx (classified [+wide]) refer to larger or neutral size, while those produced with constricted pharynx (classified [-wide]) refer to smaller size. If we adopt the following formal feature representation:

\[
\begin{align*}
\text{large, larger} & = [+\text{LARGE(R)}] \\
\text{smaller} & = [-\text{LARGE(R)}]
\end{align*}
\]

then the relevant content of the data above can be formalized in terms of a phonosemantic rule,

(2) \[ V \rightarrow [\text{aLARGE(R)}] \]

5.2. Absolute size. Absolute size ideophones are fundamentally designed to describe size, but occasionally other subsidiary fields such as shape are also represented. Phonosemantic description of absolute size is more complicated than was seen in the area of relative size as consonants also make contributions in addition to the existence of certain restrictions based on a hier-
archicidal organization of phonosemantic suggestions. The following are a sample of absolute size ideophones (see Appendix, B for a fuller list):

(3) **buruburú**  
'dusty, finely powdered like dust'  

**buruburú**  

**dureducé**  
'unexpectedly small (of many things)'  

**gorogoró**  
'skinny, thin'  

**kutekuté**  
'tiny'  

**kétukédé**  
'dwarfish'  

**nikonikó**  
'thin, slender, emaciated (person)'  

**yegeyege**  
'Very large (artificial object)'  

**bolobiló**  
'(eyes) large and rounded, (writing) bold'  

**bogolobogolo**  
'(of grain, writing, etc.) bold, big, large'  

**bogolóo**  

**gbogbogbdó**  
'(figures) bold'  

**gbogbogbókó**  
'very tall or long'  

**sokosokó**  
'tall or high'  

**sorosoró**  
'bulgy, swollen'

5.2.1. **Phonosemantic rules for size.** On the basis of general information on this and other items in the full list, we may establish the following (yet) tentative phonosemantic rules for absolute size in Nembe, with exceptions to the rules. A more elegant and total picture is presented in 5.2.2 below. The rules are formalized on the basis of the following formal feature specifications:

- large, long, tall, bulgy, bold, etc. = `[+LARGE]`
- small, thin, dwarfish, fine, fragmentary, etc. = `[-LARGE]`

(4) \( i \rightarrow [-\text{LARGE}] \)

\( e \rightarrow [-\text{LARGE}] \) (exceptions: when \( C_3 = g \))

\( o \rightarrow [-\text{LARGE}] \) (exceptions: when \( C_3 = k, g \))

\( u \rightarrow [-\text{LARGE}] \)

(5) \( a \rightarrow \emptyset \) (i.e. has no phonosemantic value)
The following rule schemas can be used generally to represent the sets above: (10) for rule-sets (4) and (6), (11) for aspects of rule-sets (7) and (9), and (12) also for aspects of rule-sets (7) and (9).

(10) (= (3)) \( V \rightarrow [+\text{LARGE}] \)

(11) \( C_3 \rightarrow [+\text{LARGE}] \)

(12) \( C_1 \rightarrow [+\text{LARGE}] \)

5.2.2. Phonosemantic hierarchy for size. Rather than present the case as above, with exceptions to rules, we can isolate a system of hierarchical organization inherent in the presentation. This is done below, with higher values for \( n \) representing a higher level on the hierarchy. Elements on higher levels displace others below them just in case they are in construction in a particular ideophone and their phonosemantic values (as assigned above) are in opposition.
Size and Shape Ideophones in Nembe

Level n : o = LARGE; ̃ = SMALL
Level n-1: ĝ = LARGE; g₃ = LARGE; r₃ = SMALL
Level n-2: ĝb₁ = LARGE; d₁ = SMALL; e = SMALL
Level n-3: k₃ = LARGE
Level n-4: ̃ = SMALL
Level n-5: (other consonants and vowels and their values as specified in a comprehensive analysis)

On the basis of this hierarchical organization of elements and their phono-semantic values we can explain the meanings of Nembe size ideophones. The following are a sampling from the list, with appropriate comments in parentheses:

(13) lekeleke' 'thin, lean' (e displaces k₃)
gbokogboko' 'very tall or long' (k₃ displaces o)
nikoniko' 'thin, slender, emaciated' (i displaces k₃)
kutekute' 'tiny' (harmony, no displacements)
purupuru' 'fine, small' (harmony, no displacements)
yegyeyegé 'very large' (g₃ displaces e)
sokosoko' 'tall or high' (harmony, no displacements)
sorosoro' 'bulgy, swollen' (o displaces r₃)
kpokotopoto' 'bold, well-marked' (o displaces t₃)
yikayiká 'enormous, very large' (harmony, no displacements)
kirikiri' 'shallow, not deep' (r₃ displaces i)
yagiyagi' 'tiny, bony' (i displaces g₃)

From the foregoing, we can safely conclude that the vowel and the Cₘ consonant together are most responsible for conveying size. However, the question must be asked what segments do after they have been displaced by other segments higher in the hierarchy. It would appear as if displaced elements nevertheless take value from another field affinitive and complementary to the one from where they have been displaced. Consider, for instance, the ideophone sorosoro' 'bulgy, swollen'. The following can roughly be said to represent the displacement process:
As a phonosemantic process this can be represented thus:

\[
(14) \quad r_3 \rightarrow \begin{cases}
[-\text{LARGE}] \\
[+\text{ROUND}] / o -- o
\end{cases}
\]

In the same way, native speaker interviews show that \([k_3]\) in 4-syllable ideophonic forms when displaced from its primitive value LARGE (by \([\text{i}]\) and \([\text{e}]\)) refers to angular, thin, sharp-ended shape as opposed to the blunt-ended, round shape suggested by a displaced \([r_3]\). A displaced \([k_3]\) (or in fact \([g_3]\)) would therefore refer to objects such as pins, thin sticks, poles, etc., while a displaced \([r_3]\) (or perhaps \([l_3]\) in shape) would refer to balls, pellets, and other rounded or oval shapes. Therefore the following adjusted rule for \([k_3]\) seems to be well-motivated:

\[
(15) \quad k_3 \rightarrow \begin{cases}
[+\text{LARGE}] \\
[+\text{ANGULAR}] / V -- V
\end{cases}
\]

Finally, phonosemantic values of initial consonants are sometimes very difficult to determine but a well-designed experiment will probably be able to factor them out.

6. Shape Ideophones

Shape in Nembe ideophones can refer to straightness, crookedness, twistedness, roundedness—in other words, to regular or irregular geometrical configurations. The following are a sample of shape ideophones (see Appendix, C for a fuller list):
Size and Shape Ideophones in Nembe

(16) 6agulubagulu 'flexuous, undulating'
6agulubagulu (same as 6agulubagulu, but of a smaller object)
6agulu 'flexuous, crooked'
6agulu (same as 6agulu, but of a smaller object)
6ekelékekele 'tisted, uneven'
6ákalabáklaka 'sinuous, tortuous, crooked'
6ogoló6ogoló 'bold, big, large'
6gboró6gboró6oro 'straight (and wide/neutral)'
6gboró6gboró6oro 'straight and narrow'
6felelefelele 'straight'
6téletélé 'scattered'
6salasalá
6yarayará 'sharp and pointed'
6yoroyoró

6.1. Phonosemantic rules for shape. We may now proceed to formulate phonosemantic rules to account for the whole corpus, first for the 3-consonant melody sequences. We may formalize the feature specifications thus:

crooked, twisted, rugged, etc. = [+CROOKED]
straight (but not round) = [-CROOKED]

And since the ideophones under consideration also incorporate relative size specifications, size values are also included where necessary:

(17) a₂-a₄-i₆ → [+CROOKED]
    -a₄-i₆ → [-LARGE(R)]
    a₂ -i₄-i₆ → [+CROOKED]
    -u₄-u₆ → [-LARGE(R)]
    a₂-u₄-u₆ → [+CROOKED]
    -i₄-i₆ → [-LARGE(R)]
    a₂-a₄-i₆ → [+CROOKED]
    +LARGE(R)]
    a₂-i₄-i₆ → [+CROOKED]
These rules can be collapsed into two major sets of rules if we recognize that in general vowel-melody forms involving apophony (change in vowel quality from one syllable to the next) carry the meaning CROOKED, while those not involving apophony (with a sequence of identical vowels), with a few exceptions, suggest the meaning STRAIGHT. In the same way, consonant-melody forms involving assonance (change in consonant quality from the $C_3$-syllable to the $C_5$-syllable) carry the meaning CROOKED, while those not involving assonance (with identical consonants in the $C_3$ and $C_5$ positions), with a few exceptions, carry the meaning STRAIGHT. Rule-set (22) represents information in rules (17) and (19) above, while rule (23) represents information in rules (20) and (21):
(22) a. $V$-Melody $\rightarrow [+\text{CROOKED } ]$  
$[+\text{apophony } ]$  
$[+\text{large(R) } ]$

b. $V$-Melody $\rightarrow [-\text{CROOKED } ]$  
$[-\text{apophony } ]$  
$-\text{low }$
$[+\text{large(R) } ]$

exceptions: when $C$-Melody $= [+\text{assonance} ]$ and $β = −$.

These two rules may be collapsed (ignoring certain details) into:

c. $V$-Melody $\rightarrow [α\text{CROOKED } ]$  
$[α\text{apophony } ]$
$[β\text{large(R) } ]$

(23) $C$-Melody $\rightarrow [α\text{CROOKED } ]$  
$[α\text{assonance} ]$

6.2. Phonosemantic hierarchy for shape. Once again, the facts above can be presented in a more elegant and yet formal way in terms of a hierarchy of phonosemantic values, thus:

Level n: $V$-Melody $= \text{STRAIGHT } + α\text{LARGE};$  
$C$-Melody $= \text{CROOKED}$  
$[+\text{assonance} ]$

Level n-1: $V$-Melody $= \text{CROOKED } + α\text{LARGE};$  
$C$-Melody $= \text{STRAIGHT }$  
$[+\text{assonance} ]$

Level n-2: $V$-Melody $= \text{STRAIGHT } + α\text{LARGE }$

$[+\text{assonance} ]$

On the basis of the foregoing, the meanings of the following ideophones
can be justified:

(24) Ñekêleñekêle 'twisted, uneven' (ê-k-I displaces e-e-e)
    Ñâkalâbânkalal 'crooked' (ê-k-I only takes meaning)
    gororôgorororo 'straight and narrow' (harmony, no displacements)
    gbhorôgbgororo 'straight (and wide/neutral)' (harmony)
    kadigikadigi 'twisted (and large/neutral)' (harmony)
    feeleñéelele 'straight' (harmony)
    Ñogoloñogolo 'bold, big, large' (o-o-o displaces ê-g-I)
    mûgurûmûguru 'plump' (u-u-u displaces m-g-r)
    kpokorokpokorô 'bold, well-marked' (o-o-o displaces kp-k-r)
    gbalagígbalagi 'winding, twisting (and large/neutral)' (harmony)

It is interesting to observe what happens at the highest level (Level n) in this hierarchy. The two meaning-bearing units, a straight sequence of round (back) vowels and a sequence of two different consonants in the C₃ and C₅ positions, are directly in opposition, none higher in status than the other. They therefore cancel each other out, leaving as residue the other value aLARGE(R) conveyed by the vowel. A detailed investigation using native-speakers indicates that forms satisfying the two conflicting conditions (such as kpokorokpokorô, Ñogoloñogolo, etc.) refer invariably also to rounded, oval-shaped objects rather than to angular-shaped objects. Therefore, rule (22) can be adjusted to take care of this fine detail, thus:

(25) V-Melody → \([\text{apophony}]^{\text{low}}_{\text{+round}}\) \([\text{CROOKED }]_{\text{aLARGE(R)}} \) \([\text{+assonance}]_{\text{C-Melody}}\)

This together with rule (23) and stated hierarchy above leads to the following ultimate residue:

\([\text{aLARGE(R) } + \text{aROUND}]\)

This, in addition to the suggestion made by C₁, will constitute the full meaning of the appropriate ideophone. As stated earlier, C₁ values are often difficult to fathom. However, with the entries in (26),
(26) \( m_1 \rightarrow [+\text{SOFT}] \)
\( \text{kp}_1 \rightarrow [+\text{WELL-MARKED}] \)
\( \text{gb}_1 \rightarrow [+\text{WELL-MARKED}] \)

the following ideophones, for instance, have the ultimate meanings stated:

(27) kpokorokpokoro \( \text{LARGE(R) and ROUND and WELL-MARKED} \)
\( \text{gbódoróo} \quad \text{LARGE(R) and ROUND and WELL-MARKED} \)
\( \text{mógolomógolo} \quad \text{SOFT and SMALL and THIN} \)
\( \text{mügürümüguru} \quad \text{SOFT and LARGE and ROUND} \)

These constructions can be compared with their dictionary entries shown in the Appendix.

The analysis above is in respect of forms with 3-consonant melodies. We have shown that such forms can refer to regular (straight, round) and irregular (crooked) shapes. However, 2-consonant melodies do also make reference to shape, namely regular (straight, round) and irregular (scattered) shapes. This can be represented with rule (28) if we formalize values, thus:

\[
\text{scattered} = [+\text{SCATTERED}] \\
\text{straight, sharp and pointed, etc.} = [-\text{SCATTERED}] \\
\]

(28) \( C_3 \rightarrow [α\text{SCATTERED}] \)
\[ \text{alateral} \]
\[ +\text{liquid} \]

Thus we can justify the meanings attached to the following ideophones (see Appendix, C):

(29) teletélé 'sporadic, scattered'
\( \text{kúlakúla} \quad '\text{strewn, scattered}' \)
\( \text{salasalá} \quad '\text{protruding, scattered}' \)
\( \text{karákara} \quad '\text{straight, without curve, vertical, upright}' \)
\( \text{yoroyoró} \quad '\text{sharp and pointed}' \)
\( \text{yarayará} \quad " \)
7. **Conclusions**

In Nembe ideophones, size and shape descriptions are very closely interconnected probably owing to the affinity existing between these two subfields. For relative size, pharynx size in vowels is used for conveying meaning. Large (expanded) pharynx size vowels are either neutral or refer to large(r) sizes while small (constricted) pharynx size vowels refer to small (er) sizes. For absolute size, consonants (especially medial (C₃) consonants) also make contributions in addition to vowels seen in the case of relative size description. Alveolars generally refer to smallness while velars generally refer to largeness.

However, in this area of absolute size description, there is included in the sound symbolic network a hierarchy of phonosemantic suggestiveness by which certain meaning-bearing units displace others lower in the hierarchy. Displacements leave residues that ultimately participate in meaning construction. Highest on the size hierarchy are the vowels [o] (for largeness) and [i] (for smallness). These would displace (cancel out contributions from) any other elements if opposition arises from their separate contributions. Next on the hierarchy are [g₃] (for largeness) and [r₃] (for smallness) and perhaps also [b₁] (for largeness), and so on. Least clear or relevant contributions to meaning are in general those made by C₁ (initial) consonants. Very carefully planned and executed experiments will be needed to clarify their phonosemantic behaviour.

For most of shape ideophones, on the other hand, consonant and vowel melodies, as opposed to lone segments, make relevant contributions. Consonant melodies involving assonance or polarization in the C₃ and C₅ positions suggest crookedness, while those not involving polarization, i.e. with identical C₃ and C₅ consonants, suggest straightness. In the same vein, vowel melodies involving apophony or polarization suggest crookedness, while those not involving polarization, suggest straightness. The two processes can really be viewed as one ontological phenomenon representable by the following rule:

(30) Prosodic Melody → [aCROOKED] [apolarized]
Once again, however, a system of hierarchy controls ultimate phonosemat-
tic values of segments in construction. Highest on the shape hierarchy are
a straight (non-polarized) sequence of back (round) vowels (for straightness)
and a polarized C₃-C₅ consonant sequence (for crookedness). The other mean-
ing-bearing melodies exist at a lower level. As is not clearly evident for
size ideophones, it is seen that in addition to pure displacement interac-
tions, there could also be mutual cancellation (or liquidation) interactions
between opposing units at the same strength level on the hierarchy. Thus
the two topmost meaning-bearing phonosemantic units can have both opposing
phonosemantic suggestions (STRAIGHT and CROOKED) liquidated. Since the fun-
damental aim is to describe shape, it does appear that nevertheless some
shape residue is invariably activated or incorporated that is different in
kind from the meaning suggestions liquidated. It will be very interesting to
pursue this matter further to establish generalizations pertaining to this
kind and other interactions.

In our opinion, discovering hierarchies is as important as discovering
meaning-bearing units ("psychomorphs") themselves and each is an authentic
psychological phenomenon. Hierarchies should logically exist if iconism is
at all a reality. Units make suggestions on the basis of physical and/or
spatio-temporal relationships between sign and signification. In the nature
of such relationships, certain suggestions are bound to be more evocative
(and therefore more memorable) than others. In situations where a conflict
arises, it is only logical that more evocative suggestions should hold sway
over less evocative ones. Besides, because of the inevitable existence of
residues, this amounts to a smart strategy for fully exploiting the sound in-
ventory and phonotactic possibilities in a language for conveying the much
more wide-ranging field of semantic notions. The discovery of phonosemantic
hierarchies is, in our opinion, the most significant step yet toward the elu-
cidation of phonosemantic phenomena.
APPENDIX

A. Ideophones of relative size

dégeréé 'not too low (house)'
dégeréé 'low (house)'
garakfí '(standing) strong and erect'
garakfí ' (but of smaller object)'
gororóó 'straight (and wide)'
gororóó 'straight and narrow'
gbalagígbalagi 'coiling, winding, twisting'
gbalagígbalagi ' (but of smaller object)'
kagulukagulu 'crooked'
kagulukagulu ' (but less emphatic or smaller in size)'
kágulúu 'twisted, rugged'
kágulúu ' (but of smaller object)'

B. Ideophones of absolute size

bürebürü 'dusty, finely powdered (like dust)'
bürebürü ' '
búrebürü 'not thick, scanty (of hair or brush)'
dökodoko 'slim, narrower at base'
duredure 'unexpectedly small (of many things)'
duree 'unexpectedly small'
girisigirisi 'gritty'
gorogoro 'skinny, thin'
burugburú 'sedimentary'
bugbugburú 'unexpectedly small'
kelukelu 'dwarfish, stunted (esp. mangrove)'
kétukétu 'dwarfish'
kirikiri 'shallow, not deep'
kokorikokori 'not deep (not fleshy)'
kokorókokoro 'shallow'
kutekuté 'tiny'
modolomogolo 'willowy, thin'
nikoniko 'thin, slender, emaciated'
Size and Shape Ideophones in Nembe

Very fine and small (writing)
'tiny, very small'
'fragmentary'
'fine, small (grains), fragmentary'
'fine, thin, tiny (sand)'
'tiny and bony (fish)'
'thin, lean'
'robust, big'
'bold, big, large (grain, writing, etc.)'
'large and rounded (eyes), bold (writing)'
'bulgy (eyes)'
''
''
'huge, very large, stout'
'bold (figures)'
'extraordinarily large'
'bold, well-marked (writing, wound)'
'thick, muscular'
'noticeably large'
'very tall or long'
'bold, well-marked (numerous)'
'bold, well-marked (single), stout'
'bold, well-marked'
'plump'
'tall or high'
'long'
'bulgy, swollen'
'large (meshes), very wide'
'very high and full (spring tide)'
'enormous, very large'
'very large'
C. Ideophones of Shape

Bagulu
'flexuous, undulating (stick, road, rope, etc.)'

(same as bagulu, but of a smaller object)

Bagulu
'flexuous, crooked (stick, road, *rope)

(same as Bagulu, but of a smaller object)

Bakalabakala
'sinuous, tortuous, crooked (road, stick)'

Bakalaa
'twisted (road, stick, *rope)'

Bekelibekele
'twisted, uneven'

Gbalagigbalagi
'coiling, winding, twisting'

(same as Gbalagigbalagi, but of a smaller object)

Kadigkadigi
'twisted, covered with protuberances'

(same as Kadigkadigi, but of a smaller object)

Kagulukagulu
'very uneven, crooked (road, wood surface)'

(same as Kagulukagulu, but of a smaller object)

Kaguluu
'twisted, rugged'

(same as Kagulu, but of a smaller object)

Yakayaka
'ripply'

Kulakula
'strewn, scattered'

Teletele
'sporadic, scattered, fallen wide apart'

Salasala
'protruding, scattered (bones)'

Yeegegege
'distended'

Felelefelele
'straight (road)'

Felelee
''

Gbololobololo
'straight (and wide/neutral)'

Gbololoo
''

Gborogbororo
''

Gbororoo
''

Gorogororo
''

Gororo
''

Gorororo
'straight and narrow (stick, legs)'

Gororo
''

Yarayaraya
'sharp and pointed'

Yororyoro
''

Karaka
'straight, without curve, vertical, upright'
REFERENCES


NINETEENTH CONFERENCE ON AFRICAN LINGUISTICS

Boston University
April 14-17, 1988

Thursday, April 14

Morning WORKSHOP: FUNCTIONAL APPROACHES TO
TEACHING AFRICAN LANGUAGE PROFICIENCY

Eyamba Bokamba, "Pedagogical & cultural considerations in the teaching of
African languages in the USA"

Steven Molinsky, "Tridimensional syllabus design: integrating grammar,
function & topic"

Afternoon LANGUAGE TEACHING 1

Abdulaziz Y. Lodhi, "The production & use of language laboratory drills"

Ivan Dihoff, "Acquisition drills in soft-immersion"

Karen F. Willetts, "African language teaching methodology at the University
of Abidjan"

Mallafé Drame, "Failure of the CLAD method "Pour parler français": lessons
for proficiency-oriented African language instruction"

LANGUAGE POLICY

C.M.B. Brann, "Language management in the Third Republic: prognosis"

Karega Mutahi, "Planning lexical expansion - the case of Kiswahili in Kenya"

Alex Igbineweka, "The Guosa language"

A.E. Odumuh, "The national language question in Nigeria: a third option
approach"

J.W. Snyman, "The teaching of Setswana as a third language"

Mary White-Kaba, "Critical evaluation of LACITO's (French CNRS) approach to
African language analysis"

S.J. Timothy-Asobele, "African literature, languages & culture: problems of
definition & dissemination"
Friday, April 15

KEYNOTE ADDRESSES

E. Nolue Emenanjo, "African language studies in Africa: perspective and prospective"

Russell G. Schuh, "African languages & linguistic research in Europe & North America"

Morning

Gerard Phillipson, "Metrical account of Comorian tone"

Lukowa Kidima, "The tone of verbs in Kiyaka"

Ngessimo Mutuka, "The tonal representation of nouns in Kinande: evidence from reduplication"

Alexander Kimenyi, "Compound-noun high tone assignment in Kinyarwanda"

LANGUAGE CONTACT

Alexandra Steinbergs, "Loanwords in Dholuo"

Nicolas Faraclas, "Preliminaries to the linguistic study of Nigerian Pidgin"

AFRICAN LITERATURE

H. Chimhundu, "Linguistic trends in Modern Shona poetry"

SYNTAX 1

Vicki Carstens, "Sentential subjects: a reanalysis (Yoruba)"

Abdelkadir Fassi Fehri, "IP structure, inflection, case & VS word order"

Camillia N. Barrett Keach, "NP switch in inalienable possession constructions"

Victoria L. Bergvall, "Questions, clefts, & COMP in two Bantu languages (Duala & Kikuyu)"

IDEOPHONES

Yiwola Awoyale, "A nonconcatenative phonology of Yoruba ideophones"

LANGUAGE POLICY

Mangoma Sumbu, "Belgium's language policy in the Congo (1880-1960) & its impact in the post independence period"

Thomas K. Adeyanju, "Indigenous languages & national development (Hausa)"

Manuel D. Goncalves, Filomena Cabral, & Ulisses Goncalves, "Language policy in Cape Verde"

Niyi Akinnaso, "Language planning & political development in Nigeria"

Jose Mateus Muaria Katupha, "The language policy of Mozambique"
Afternoon  TONE 2

Nick Clements, "Tone assignment in the Sesotho verb"
Michael Kenstowicz & Meterwa Ourso, "Tone in Lama"
Will Leben, "Contour tones, multiple tiers & underspecification in Grebo"
Moussa Bamba, "Tone & accent in Mahou"
Akinbiyi Akinlabi & Yetunde Laniran, "Tone & intonation of declarative sentences in Yoruba"
Annie Rialland & Mamadou Sangaré, "Organisation d'ensemble du système tonal bambara"

HISTORICAL 1

Roger Blench, "A proposed new subclassification of Benue-Congo"
J.M. Hombert, "Linguistic classification, animal names & population movements in Gabon"
Sarah Grey Thomason, "Greenberg's classifications: Africa vs. the Americas"
Robert Botne, "The historical relation of Cigogo (G11) & Zone J languages"
Ian Maddieson, "The "Ningi" group of Plateau languages"

PHONOLOGY 1

Mohamed Guerssel & Jean Lowenstamm, "Classical Arabic metathesis"
Alicja Gorecka, "Palatalization of labials in Tswana & feature geometry"
Khathatso E. Khabanyane & John Drury, "Problems with vowel raising in Southern Sotho"
Sam Rosenthal, "The representation of prenasalized consonants"
Outi Bat-El, "Complex segments in Kwanu-Akan"
Al Mtenje, "On autosegmental feature-spreading in phonology: evidence from Chiyao"

SYNTAX 2

Bonnie Chiu, "Verb particle construction in Akan"
Adebayo Ayelaagbe, "Verbs connected with structures involving complement clauses in Yoruba"
Mireille Tremblay & Ouadia Kabbaj, "The internal structure of PP in Amharic"
Ouadia & Rafiq Kabbaj, "Word order & focus in Tigrinya"
Olga Kapeliuk, "Syntactical & morphological means for indicating appurtenance in Amharic"
MORPHOLOGY 1

A.C. Nkabinde, "The Zulu modal -ya-

Lioba Moshi, "Tense & aspect in Kivunjo"

Solomon Chaphole, "The auxiliary in Sesotho"

Sukari Salone & Mahir Karaki, "Tense-aspect in Colloquial Arabic narrative"

Michele Emanatian, "Chagga relative tense and grammatical polysemy"

C. De.Bose and N. Farclas, "African roots of the Ebonic (Black English) tense/aspect & copula systems"

CHADIC

Kemp Williams, "Aspect & word order in Chadic"

Zygmunt Frajzyngier, "The non-relativistic nature of lexical categories: the adjective (Mupun, Chadic)"

Jean Lowenstamm, "What is the syllable structure of Ngizim?"

Robert Koops, "Purpose & reason markers in Proto-Chadic"

Meichun Liu, "Nominal & sentential conjunctions in Proto-Chadic"

Evening

Stanley L. Cushingham, "Microcomputer display, use, & printing of African language character fonts"

Saturday, April 16

Morning

PIDGINS & CREOLES

John S. Lumsden, "The structure of clefts in Haitian Creole"

Alexander F. Caskey, "On the status of 'resumptive pronouns' in Creole languages"

Frederick C.V. Jones, "The grammatical items bin, fo & mos in Sierra Leone Krio"

John A. Holm, "Features in the noun phrase common to the Atlantic Creoles"

Alain Kihm, "The lexical category of Kriol INFL"

Claire Lefebvre & John Lumsden, "The parameters of predicate cleft constructions"

HISTORICAL 2

Lionel M. Bender, "Gender in Omotic"


Marello Lambeati, "The position of Ari-Banna within Cushitic"
Stanley L. Cushingham, "Evidence for 3 relic verbal extensions in Birom (historical)"

Darius K. Jonathan, "Moru word order change"

Harold Fleming & Ephraim Isaacs, "New developments in Semitic studies"

**PHONOLOGY 2**

David Odden, "Postlexical rule properties in Kimatuumbi"

Lee S. Bickmore, "Phonological phrases in the prosodic hierarchy: evidence from Kinyambo"

Mary Clark, "Level ordering in the phrasal phonology of Igbo"

Carole Paradis, "On conflicting phonological constraints"

Emmanuel Nikiema, "Phonologie des catégories vides: le cas du Tangale"

**SYNTAX 3**

Alex Alsina & Sam A. Mchombo, "Grammatical linking in the Chichewa applicative construction"

T. Givón & H. Pasch, "Complementation in Sango &/or the binding hierarchy in Sango"

Nike S. Lawal, "Givon's binding hierarchy: the case of complementation & serialization in Yoruba"

Mary Bradshaw, "Suma personal pronouns: derivation from underlying forms"

Gnalibouly Boureima, "Semantique et syntaxe des catégories verbales derivées du fulfuldé"

**MORPHOLOGY 2**

Antonia Folarin, "Bistratal compounding in Yoruba"

Koichi Tateishi, "A morphological analysis of Mende consonant mutation"

William B. Dolan, "Possessives in Kwawu Akan: a case for lexical allomorphy"

Okon E.A. Essien, "The nature of tenses in African languages: a case study of morphemes & their variants"

Sharon Inkelas & Lioba Moshi, "The internal structure of adjectives in Kivunjo"

Joseph Tsonope, "The acquisition of Setswana noun class morphology"

**HAUSA**

Linda Schwartz, "Thematic linking in Hausa asymmetrical coordination"

Abdullahi Bature, "Evidence against wa as past of NP in Hausa"

Frank Wright, "Semantics of Hausa grade 6 verbs"
Bachir Attouman, "A propos de sais en Hausa"
Morris Goodman, "Ghanaian Hausa: a preliminary study"
Aaron Halpern, "Hausa verbal nouns: when verbs head noun phrases"

Afternoon

PIDGINS AND CREOLES
Frank Byrne, "A unified account of topicalization and WH-movement in Saramaccan & Atlantic Creoles"
Pieter Muysken & Norvil Smith, "Grammaticalization or reflexification: question words and reflexives in Creole languages"
Pieter Seuren, "Verb syncopation in Mauritian Creole & the implications for syntactic theory"
John Singler, "Pidgins, creoles & the search for universals"
Salikoko Mufwene, "Pidgins, creoles & universal grammar"

DIALECTOLOGY
Jacqueline H.A. Oduol, "Defining a dialect area: a case study (Dholuo)"
Alhassoumi Sow Salamatou, "Simplification des phonèmes mi-nasals dans les parlers peuls centraux du Niger"
Tucker Childs, "Cross-speaker variation in ideophones (Niger-Congo)"
Derek Nurse, "Borrowing of inflectional morphology: tense & aspect in Unguja/Standard Swahili"

SOCIOLINGUISTICS
Mwambo Kapanga, "Non-native varieties & second language acquisition theory: a case study from Shaba Swahili"
Linda Hunter, "Intelligibility & communication: African examples"
Timothy Wilt, "Directions of change in Zairean Swahili"
Philip C. Stine, "To read or not to read: sociolinguistic factors in planning literacy programs"
James J. Tyhurst, "Cultural identity perceived as linguistic identity: results from a survey of the Nyang languages"

SYNTAX 4
Marshall Lewis, "Semantic parameters of serializability: switch-trajectory SVCS in Gęgbę"
Richard Campbell, "Case & word-order in Akan serial verbs"
Caroline Isukul, "Serial verb construction in Ogbia"
Ann Biersteker, "Hivyo, ndivyo - "ndi" - forms in Swahili"
Marco Haverkort, "Clitic climbing in non-null-subject languages"
Nkonko M. Kamwangamalu, "Phonology-syntax interface: the Ciluba evidence"

MORPHOLOGY 3
M. Lafon, "Problème de lexicographie bantu: à propos d’un dictionnaire Shingazidja (grand-comorien)-français"
Ronald P. Schaefer, "Exploring individuation in Emai"
Laurie J. Gould, "Coordination & gender resolution in Kikuria"
Ella O. Yu, "Reconstruction evidenced for noun class splitting in Lama"
Karl H. Reynolds, "Noun class versus gender (Kiswahili)"
Abderrahim Youssi, "Lexical processes in the Berber of the media"

NIGER-CONGO
David Dwyer, "Proto-western Mande morphology"
Thomas J. Hinnebusch, "A data base for Niger-Congo lexis"

TONE 3
Peter Ihionu, "Toward a pedagogy of Yoruba & Igbo tones"
Laura Jo Downing, "Tonology of noun-modifier phrases in Jita (Bantu)"
Philomène N'guessan, "Le domaine de l'assignation tonale dans l'abe (Kwa)"

Sunday, April 17
Morning SYNTAX 5
Girma Halefom, "ECP effects of Amharic WH-constructions"
Rose-Marie Dechaine, "Binding domains in Haitian"
Rejean Canac Marquis, "Non-verbal sentences & the VSO parameter (Afroasiatic, Tchadic)"
Kasangati K.W. Kinyalolo, "Ergativity and raising in Kilega"
Victor Manfredi, "Serialization parameters"
Malillo Machobane, "Case assignment & the causative formation from verbs with S' complements"

TONE 4
Keith L. Snider, "Tone features on the register tier"
Brian D. McHugh, "Chaga tone sandhi & the phrasal cycle"
Francis Moto, "Tonology at three (Chichewa)"
Leo Sibomana, "Downstep in Nkem"
Grégoire Lyon, "Intonation in tone languages: an approach to the case of Yoruba"

PHONOLOGY 3

Jean-Pierre Angoujard, "Sur quelques langues à noyaux vides (arabe marocain, tachelhit, et luganda)"

Annie Rialland, "Modes de chute d'une consonne (dans deux langues gur: kasem & baasaar)"

Omar Ka, "Stress in Wolof"

Maria-Rosa Lloret, "Weightless /ʔ/ in Oromo"

Rainer M. Voigt, "On some phonological rules in Arbore (Lowland East Cushitic)"

Christian Dunn & Emmanuel Nikiema, "Against [-ATR] harmony: the case of Yoruba"

DISCOURSE

Keith Allan, "Discourse strategems in a Maasai story"

Ellen K. Eggers, "Verb phrase anaphora: evidence from Kirundi & Kiswahili"

Said A. Muhammed (Khamis), "Standardisation & degree of standardisation (the case of Swahili today)"

MORPHOLOGY 4

Rick Treece, "Kiswahili agentives: morphology & meaning"

André Twahirwa, "Le suffixe applicatif en kinyarwanda: semantique, syntaxe et perspective fonctionnelle de la phrase"

Y.I. Rubanza, "Restrictions in the linear ordering of the Haya verb morphemes"

Anne-Marie Brousseau, "Compounds in Fongbe & headedness"

Afternoon

SYNTAX

Joan Bresnan & Jonni Nikanerva, "Locative inversion in Chichewa: a case of factorization in grammar"

Carolyn Harford, "Locative inversion in Chishona"

Mark Baker, "A typology of Bantu applicative constructions"

Alec Marantz, "Constraints on syntactic affixation"

ARABIC

M.A. Mohammad, "Subject-verb agreement across Arabic dialects"

Mahmud Husein Salih, "Lexical representation"
O. Irshied, "Lexical & phrasal syncope in Arabic"
John M. Keegan, "Geminate clusters, morphological levels & syllable structure in Arabic"

PHONOLOGY 4
Girmay Berhane, "Some issues on the vowel system of Adere"
Cornelia Fales, "Formant manipulation & the illusion of pitch"
20TH ANNUAL CONFERENCE ON AFRICAN LINGUISTICS

April 19-22, 1989

Organized by

The Department of Linguistics & The Center for African Studies
University of Illinois at Urbana-Champaign

Abstracts for papers in all areas of African languages and linguistics are hereby invited. Papers dealing with the use of African and European languages in African literature are also welcome.

In addition to the usual parallel sessions, there will be several colloquia on selected topics of interest organized by individual scholars. Parallel session papers will be limited to 20 minutes and colloquium papers to 30 minutes. The following colloquium topics have been suggested, and additional suggestions are solicited.

1. African language teaching in the USA
2. Grammatical agreement in Bantu languages
3. Intonation in African languages
4. South African languages
5. Syntax-phonology interface

Please send abstracts and suggestions for additional colloquia to

Professor Eysaba G. Bokamba
20th Annual Conference on African Linguistics
Department of Linguistics
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Abstract Deadline: January 15, 1989
II. INTERNATIONAL SYMPOSIUM ON CUSHITIC AND OMOTIC LANGUAGES

Turin, April 1989

The Department of Glottoanthropological Studies of the Rome University "La Sapienza" and the Center for African Studies of Turin are preparing the II. International Symposium on Cushitic and Omotic Languages for the first week after Easter 1989. It will be held in Turin at the new Center for African Studies that can comfortably accommodate both the sessions and the sleep and food facilities for the participants.

If you are interested in taking part in the symposium, please contact as soon as possible

Giorgio Banti
Dipt. di Studi Glottoantropologici
Facoltà di Lettere
P. le Aldo Moro, 5
I-00185 Roma
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The "French Society for Ethiopian Studies" whose registered office is in Paris, 13 Rue du Four, 75006 Paris, at the "Centre de Hautes Etudes pour l'Afrique et l'Asie Modernes", aims at connecting all people studying or being interested in the study of Ethiopia from remote ages until modern times, in order to allow them to exchange ideas upon any question concerning Ethiopia, as well as to keep in touch with scholars and specialists of other countries. It also intends to contact the public un-initiated to Ethiopian studies and to publish all the proceedings connected with these studies, particularly in the Review ABBAY, from the Centre National de la Recherche Scientifique.

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