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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 interest-
ing 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 downglid-
ing L of eket  and the unreleased L of basem° .  Unre-
leased 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 distinc-
tions.  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 inter-
action between the two rules H Spreading and Fall Simplifica-
tion provides evidence for the cyclic application of postlex-
ical rules.

## 1.  Basic Tone Mapping and Distribution

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

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eket 'house', and the unreleased L of the final syllable of  ǹgem⁰ 'python',
indicated by a raised circle.  The lexical tone of nouns is determined sole-
ly by the noun root:  noun class prefixes such as  e  and  n  are underlying-
ly 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 pat-
tern begins linking to the first root vowel, leaving the nouns class prefix
with no tone, and a smaller set of nouns where the lexical tone pattern be-
gins 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)    <u>Nouns without lexically linked tone</u>

| | | |
|---|---|---|
| e-keṭ | 'house' | L |
| ǹ-káp | 'money' | H |
| e-nyáyá | 'spinach' | HH |
| ǹ-gem⁰ | 'python' | LH |
| ǹ-sɔɔ́ | 'saw' | LH |
| e-feŋé | 'key' | LH |
| e-tâ | 'calabash' | HL |
| sérêŋ | 'shilling' | HL |
| ǹ-gɔrê | 'woman' | LHL |
| ǹ-kuû | 'long-necked antelope' | LHL |

<u>Nouns with root $T_2$ lexically linked to root $V_1$</u>

| | | |
|---|---|---|
| sé-nkpɔ́q | 'rap on head' | HH |
| é-têm | 'hut' | HL |
| é-kírí | 'compound' | HHH |
| é-rókin | 'lock' | HHL or HLL |
| ń-súyúru | 'orange' | HHHL |

I will assume that tone melodies in Kenyang may contain multiple adjacent H's

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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.

and L's, in violation of the OCP, as exemplified by  enyáyá . This assump-
tion will be justified below.

As (2) shows, the phonetic distribution of H and L is relatively unre-
stricted.  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)  bacɔ́t      'forests'       basem˙     'slaves'      eket       'house'

     sénkpɔ́q    'hit on head'   áko˙       (name)        ńchíku     'I am buying'

     eérí       'scream'        béwɔ́ɔsi    'to dry up'   tatǔ wâ    'my bee'

     matrâs     'mattress'      sérêŋ      'shilling'     nyaá Tíkû  'Tiku's
                                                                     animals'

     ńsɔɔ́       'saw (n.)'      *esě                      *bêti

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 fol-
lows.  By "contour tone" we mean multiple tones associated to a single tone-
bearing unit (TBU).  By treating phonetic long vowels as two underlying vow-
els, 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 ( ńsɔ̌:
and  béwɔ̂:si ) may be treated as simple H and L tones on a vowel sequence
( ńsɔɔ́  and  béwɔ́ɔsi ) with one tone per TBU.  The rules or other distribu-
tional limitations which apply to contour tones need not be modified to pre-
vent them from overapplying to long vowels, since the phonetic rising and
falling tones of  ńsɔ̌:  and  béwɔ̂: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  tǔtuû  'cuckoo'
(phonetically  tǔtũ:  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 con-
tour is subject to the same distributional restrictions exhibited by HL con-
tours on phonetic short vowels.

The true contour tones, fall and rise on short vowels, have highly limit-
ed 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 comple-
mentary distribution, distribution alone cannot provide an account of the re-
lations 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 al-
ternates.

(3)   setə˚    'axe'          setə̌ séwú    'the axe is broken'
      ǹsi˚     'fish'         ǹsǐ yâ       'my fish'
      ǹden˚    'clothes'      ǹděn bénére  'the clothes are wet'
      eket     'house'        eker e yâ    'my house'
      benɔ     'hoes'         benɔ bekɔ    '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 unre-
leased 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-

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.  setə           b.  setə
        /\                 |
        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 re-
stricted 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 representa-
tions, i.e. to assume lexical representations like those in (5a) with un-
linked tones, as opposed to ones like (5b), with linked tones.

(5) a.  L L H            L H L              H

        teŋasaa          kuu                noq

        [se-teŋasáá] 'crane'   [nkuû] 'antelope'   [e-nóq] "drum"

    b.  L L H            L H L              H
        | | \            | /                |
        teŋasaa          kuu                noq
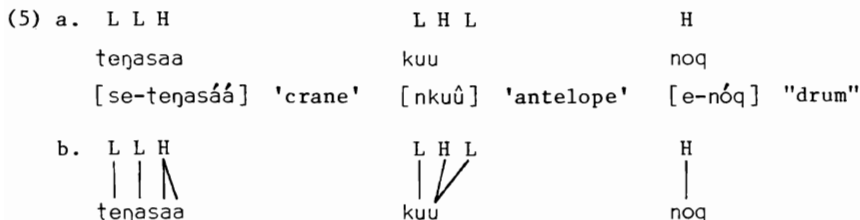
The analysis in (5a) assumes that free tones link to free vowels one-to-one
left-to-right by universal association conventions. Such linking applies in
the lexicon prior to addition of the noun class prefixes such as  e  and  se ,
which are underlyingly toneless. The noun prefix usually takes a default L
tone, as in (5), which is representative of most nouns in the language. How-
ever, some stems cause these same class prefixes to appear with a phonetic H
tone, as in (6).

(6)  sé-nchét   'food item'        ké-nchét  'food items'

  né-ré      'tongue'           ń-súɣúru  'orange'

  é-rû       'vegetable'        bé-rû      'vegetables'

  é-cháá     'meeting house'    bé-cháá    'meeting houses'

The problem here is that the phonologically unusual behavior, a H toned
noun class prefix, is conditioned by the noun stem but is phonetically mani-
fested on the prefix. As the derivation (7) shows, these stems can be han-
dled 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 condi-
tioned 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 rû
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 mo-
tivated 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 relation-
ship 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 cre-
ate 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-

(7)     H H H L                    H H L
          |                          |                    Underlying
        [suɣuru]                    [ru]

        H H H L                    H H L
          |                          |                    Nouns class prefixation
        n[suɣuru]                  e[ru]

        H  H H L                   H  H L
        |  | | |                   |  | |                 Association Conventions
        n[suɣuru]                  e[ru]

        H  H H L                   H  H L
        |  | | |                   | |/                   Free tone docking
        n[suɣuru]                  e[ru]

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 tŭtuû 'cuckoo'.[1]

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).

(8)   Free Tone Docking

           T′
           ⋮
           V

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

(9)   etâ̂          'calabash'         m̀fâm            'medicinal object'
      | /\                            | /\
      L H L                          L H L

      enŏ  agha  'whose hoe?'        benyĕŋ  békwén   'the things fell'
      |  /\                          | /\
      L L H̀                          L L H̀

_____

[1]This 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)  ǹkû        'dress'        ǹkú pyɔ̂        'black dress'
      ǹgɔrê      'woman'        ǹgɔré Tíkû      'Tiku's wife'
      matrâs     'mattress'     matrás aápɔɔ    'the mattress is rotting'

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

(11)  <u>Fall Simplification</u>

$$\begin{array}{c} \text{H L} \\ \diagdown\!\!\!\diagdown\!\!\!\!\!\#\!\!\!\diagup \\ \text{V} \quad ...]_U \end{array}$$
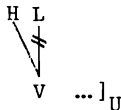
Note that in these examples (especially  ǹgɔré Tíkû  from  ǹgɔrê Tíkû ), no downstep results from decontouring fall to H.  This is due to the application of Free L Deletion (12) which applies to a free L tone standing at the end of its morphosyntactic domain, viz. word or phrase.

(12)  <u>Free L Deletion</u>
          L′  →  Ø / ___]

---

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)    m̀bɔŋɔ́        'owner'             ǹgɔ́     'I saw'

       enɔ            'hoe'              ebá     'bag'

       enɔ́q          'drum'           enyáɣá 'spinach'

       m̀bɔŋɔ́nɔ       'owner of the hoe'       (/m̀bɔŋɔ́ enɔ/)

       m̀bɔŋɔ́'bá       'owner of the bag'       (/m̀bɔŋɔ́ ebá/)

       m̀bɔŋɔ́'nɔ́q      'owner of the drum'     (/m̀bɔŋɔ́ enɔ́q/)

       m̀bɔŋɔ́'nyáɣá 'owner of the spinach' (/m̀bɔŋɔ́ enyáɣá/)

       ǹgɔ́'nɔ́q        'I saw the drum'      (/ǹgɔ́ enɔ́q/)

       ǹgɔ́ enɔ́q       (id.)

Contraction fuses the vowel sequences in (13) into a single vowel, with both tones of the underlying sequence preserved; ǹgɔ́ enɔ́q thus becomes intermediate ǹgɔ̂nɔ́q , whereupon the utterance medial falling tone undergoes (11) resulting in surface ǹgɔ́ˋnɔ́q . 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.

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[2]While 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]
       | |      |
      ngɔ (e)  ba

(ii)    v[L H L]  n [ H ]
        | |       |
       ngɔ  (e)  ba

(14)   <u>Unreleased L rule</u>

$$\begin{array}{ccc} \underset{V}{\overset{L\;H}{\bigvee}} & \rightarrow & \underset{V}{\overset{L^{\bullet}}{\mid}} \end{array} / \underline{\quad} \,]_U$$
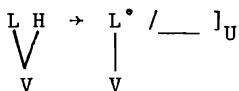
## 2.   H Tone Spreading and the TBU

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)   ǹku•       'taro'              setéŋé  'broomstick'

         Tambey    (PN)                batàŋ•  'judges'

         sekwob•   'eating spoon'      ewú     'broken'

         ǹkǔ bátàŋ• ~ ǹkǔ batàŋ•                 'judges' taro'

         ǹkǔ Támbey ~ ǹkǔ Tambey                'Tambey's taro'

         setéŋé Támbey ~ setéŋé Tambey           'Tambey's broomstick'

         setéŋé bátàŋ• ~ setéŋé batàŋ            'judges' broomstick'

         ewú sékwob• ~ ewú sekwob•               'broken eating spoon'

         ǹgɔ́ bátàŋ• ~ ǹgɔ́ batàŋ•                'I saw the judges'

A further example illustrates H Spreading.  The Class 2 noun  ba-baberì
'guards' has no lexical H tones, but when followed by  Tambey  in the posses-
sive phrase  bababerɤ̀ Tambey ~ bababerɤ̀ Támbey  '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)   ǹtí bebá  (*ǹtí bé...)            'I sold bags'

         ǹkǔ ekáti  (*ǹkǔ é...)           'school's taro'

         setéŋé Ayɔ́q  (*setéŋé á...)      'Ayoq's broomstick'

ǹgɔ́ ekáti  (\*ǹgɔ́ é...)           'I saw the school'

ewú seténé  (\*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)  pyɔ        'black'          chu        'red'

      nyaa pyɔ  'black animal'   nyaa chu  'red animal'
      ǹtaá pyɔ̂  'black stone'    ǹtaá chû  'red stone'
      ǹkú pyɔ̂   'black frock'    ǹkú chû   'red frock'

      nyoŋ       'crocodile'      nyoŋ o     'crocodile?'
      eyɔɣ       'feather'        eyɔɣ ɔ     'feather?'
      ebɔ́ɣ       'piece'          ebɔ́ɣ ɔ̂     'piece?'
      enóɣ       'drum'           enóɣ ô     '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)  <u>H Spreading</u> (optional)

          H L   ~ H
           \  |
            \ |
             \|
              V
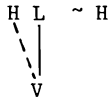
After H Spreading applies, Fall Simplification applies. The falling tone which would have been created by H Spreading (18) in the case of the examples in (15) (which show a simple H tone on the surface) undergoes Fall Simplification, as shown in the derivation (19) on the next page. These examples motivate an ordering relation as well, one which will become important below: H Spreading precedes and feeds Fall Simplification.

(19)
```
   L H H  L  L
   | | |  |  |          Underlying
   seteŋe Tambey
```
```
   L H  H L  L
   | |  /\|  |          H Spreading (18)
   seteŋe Tambey
```
```
   L H  H L  L
   | |  /\  |           Fall Simplification (11)
   seteŋe Tambey
```

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

    setə°   'ax'           ǹsi°    'fish'

    C-final L° first word

    enɔq°   'tree'       menɔq°  'trees'

    epem°   'owl'        bepem°  'owls'

    ǹgwot° 'I have tied'  nyoq°   'porcupine'

    C-initial second word

    sekɔ   'new (Cl. 19)'  bekɔ  'new (Cl. 8)'

<u>V-intial second word</u>

| | | | |
|---|---|---|---|
| ekɔ | 'new (Cl. 9)' | ekɔ | 'new (Cl. 7)' |
| enóq | 'drum' | achí⸢wú | 'it is dying (Cl. 9)' |

<u>Rise + LL, LL˙</u>

| | | |
|---|---|---|
| setš̌ sékɔ ~ setš̌ sekɔ | 'new ax' | V+C |
| ǹsʏ́ ékɔ ~ ǹsʏ́ ekɔ | 'new fish' | V+V |
| menš̌ɣ békɔ ~ menš̌ɣ bekɔ | 'new trees' | C+C |
| enɔ ɣ-ékɔ (*enš̌ ɣ-ekɔ) | 'new tree' | C+V |
| epe m-ékɔ (*epě m-ekɔ) | 'new owl' | C+V |
| bepěm békɔ ~ bepěm bekɔ | 'new owls' | C+C |
| ǹgwɔ̌r ménɔq˙ ~ ǹgwɔ̌r menɔq˙ | 'I have tied trees' | C+C |
| ǹgwo r-énɔq˙ (*ǹgwǒ r-énɔq) | 'I have tied a tree' | C+V |

<u>Rise + LH</u>

| | | |
|---|---|---|
| nyo ɣ-á⸢chí⸢wú | 'the porcupine is dying' | C+V |
| ǹsʏ́ achí⸢wú | 'the fish is dying' | V+V |
| ǹgwo r-é⸢nóq (*ǹgwǒ r-enóq) | 'I have tied a drum' | C+V |
| ǹgwɔ̌r menóq (*ǹgwor mé⸢nóq) | 'I have tied drums' | C+C |

    In the case of vowel-final words such as setš̌ or consonant final words when they stand before consonant initial words such as ǹgwɔ̌r menɔq˙ , spread of H to the following word can be explained as the result of applying H Spreading. This does not explain forms like enɔ ɣ-ékɔ or ǹgwo r-é⸢nóq . 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 ǹgwɔ̌r menóq , a following H does not block the C-plus-V tone shift, as in ngwor é⸢nóq .

    The C-plus-V tone shift can be explained quite simply if we assume that the H part of rise is underlyingly 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. Re-
syllabification 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 syl-
lable 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'nóq .

(21)
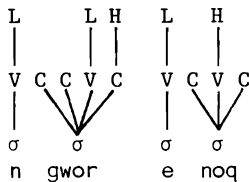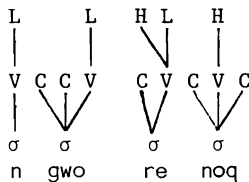
```
   L      L H   L   H
   |      | |   |   |                    Underlying
   V C C V C    V C V C
   |   \|/      |  \|/
   σ    σ       σ    σ
   n   gwor     e   noq


   L      L   H L   H
   |      |    \|    |                   Resyllabification and Readjustment
   V C C V    C V C V C
   |   \|/    \|/ \|/
   σ    σ      σ    σ
   n   gwo    re   noq


   L      L   H L   H
   |      |    |                         Fall Simplification
   V C C V    C V   C V C
   |   \|/    \|/   \|/
   σ    σ      σ    σ
   n   gwo    re   noq
```

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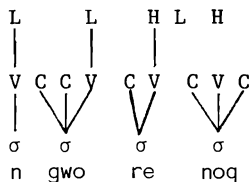
[3]An alternative analysis suggested by Larry Hyman is for the tone of the
consonant to be merely set afloat by convention and then invoke a later rule
linking a free H to the right.

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)  enɔq˙  'tree'           enɔ ɣ-ɔ̂  'tree?'

      epem˙  'owl'            epe m-ê  'owl?'

      nyoq˙  'porcupine'      nyo ɣ-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 maṭrâs 'mattress' are syllabified ma.ṭrâs ).  The  n  of mǎ-njáɣa 'Keyaka person' is probably syllabic in underlying form, viz. ma-ńjáɣa , since it is root initial.  Only a very few loan words like brígda '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  brígda .  It will be shown later that underlying áchwi  becomes phonetic  áchwî  by H Spreading; however, brígda does not become  *brígdâ .  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 stém, 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 sylla-
ble.  The H tone of underlying ḿ in bepěm békɔ is phonetically trans-
ferred 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 pre-
ceding vowel.

(23)  <u>Consonant Tone Transfer</u>



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)  ńsúɣúru          'orange'
      ǹsân             'bird (sp)'
      ache             'he gave'
      asɔt             'he took'
      asɔr ńsúɣúru      'he took an orange'
      asɔr ǹsân         'he took a bird'
      ache-n sân        'he gave a bird'
      achě-n súɣúru     '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)  aghɔ́        'he saw'
      ǹkə˙        'farm'
      ǹtí         'head'
      aghɔ́-n kə˙  'he saw the farm'
      aghɔ́-n ˈtí  '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  achɛ̌-n súɣúru , 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  ǎm̋ with  àm̋ or  àm̌ .  Conceivably,
then, the correct surface phonological representation of underlying
ache ń-súɣúru  is simply  a-cheń-sú-ɣú-ru , where hyphens represent syllabi-
fication.

     There are solid reasons for maintaining (23) as a part of Kenyang gram-
mar, 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 sin-
gle TBU, viz.  ebɛ̌  becomes  ebə˙  '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  ǹsɔɔ́  'saw'.  Without (23), underlying  basem̋
'slaves' should behave like  ǹsɔɔ́  and surface as  *basɛ̌m ~ basem̋  rather
than as  basem˙ .  Similarly, Fall Simplification affects only a sequence of
medial HL on one TBU, viz.  ǹgɔré... from underlying  ǹgɔrê , but not HL
distributed over two TBU's within a syllable, viz.  béwɔ́ɔsi  'to dry up'.
However, a short falling tone derived from H+L via (23) will undergo Fall

Simplification, viz.. aghɔ́-n ˈtí 'he saw a head' from  aghɔ́ ǹtí , showing
that the intermediate stage  aghɔ̂n tí  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  tí  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:  tí  'sell'       Person

|        |        |       |
|--------|--------|-------|
| ǹ-ku   | ǹ-tí   | 1s    |
| ɔ-ku   | ɔ-tí   | 2s    |
| a-ku   | a-tí   | 3s    |
| sé-kû  | sé-tí  | 1p    |
| bǎ-kû  | bǎ-tí  | 2p    |
| bá-kû  | bá-tí  | 3p    |

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:  daɣati  'tear'     Person

|             |     |
|-------------|-----|
| ǹ-daɣati    | 1s  |
| ɔ-daɣati    | 2s  |
| a-daɣati    | 3s  |
| sé-dáɣati   | 1p  |
| bǎ-dáɣati   | 2p  |
| bá-dáɣati   | 3p  |

These forms illustrate application of H Spreading, followed by Fall Simplifi-
cation.  Thus underlying  sé-daɣati  becomes  sé-dâɣati  by Spreading and
sé-dáɣati  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  sékɔ̂t , followed by Fall Simplification and then H Spreading applies again postlexically to  e .

(28)  sé-kɔ̂t 'we cut'          sé-kɔ́r ê 'did we cut?'
      bá-jêt 'they ran'         bá-jér ê 'did they run?'

Forms like  sédáyati  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:  tí                 Person
              ǹ-chí-ku                 ǹ-chí-!tí           1s
              ɔ-chí-ku                 ɔ-chí-!tí           2s
              a-chí-ku                 a-chí-!tí           3s
              sé-chí-ku                sé-chí-!tí          1p
              bǎ-chí-ku                bǎ-chí-!tí          2p
              bá-chí-ku                bá-chí-!tí          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).

(30)   L verb:   ku                    H verb:  tí                     Person

          ǹ-chî`-ku                       ǹ-chî`-tí              1s
          ɔ-chî`-ku                       ɔ-chî`-tí              2s
          a-chî`-ku                       a-chî`-tí              3s
          sé-chî`-ku                      sé-chî`-tí            1p
          bǎ-chî`-ku                      bǎ-chî`-tí           2p
          bá-chî`-ku                      bá-chî`-tí           3p

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 float-
ing L tone blocks Spreading, standing between the H tone and the L toned vow-
el to which the H would spread.  Free L Deletion cannot apply since the float-
ing tone is in the middle of the word, and Free L Deletion only applies at
the end of the word.

(31)   L    H L L
       |    |  |  |
       ɔ  chi  ku

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 af-
ter free tone docking, it should surface as a rising tone or else final unre-
leased 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 left-
most free vowel.  Thus, the floating L prefix of the progressive must be add-
ed to the root on a cycle after the initial association of root tones and
vowels.

(32) a.                    H
                           |
                        [ti]                    <u>Association conventions</u>


                    H  L   H
                    |      |
                 [chi    ti]                     <u>Association conventions</u>


                L   H L   H
                |   |      |
              [ɔ chi    ti]                      <u>Association conventions</u>


     b.    L   H  L H
           |   |  |/
         [ɔ chi ti]                              <u>Association conventions</u>, <u>Free Tone Docking</u>

         *[ɔchȋti˙]


There is a second past tense in Kenyang, the recent past, which is tonal-
ly 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)    <u>H verb</u>
        ɔkpɔ́t                'you hacked (rem)'
        ɔkpɔt˙               'you hacked (rec)'
        sékpɔ́t               'we hacked (rem)'
        sékpɔt˙              'we hacked (rec)'
        ɔkpɔ r-ê             'have you hacked? (rec)'
        ɔkpɔ́ r-ê             'have you hacked? (rem)'
        ǹgɔ́                  'I saw (rem)'
        ǹgɔ˙                 'I saw (rec)'
        séghɔ́                'we saw (rem)'
        séghɔ˙               'we saw (rec)'
        séghɔ̌ betɚ̂           'we saw (rec) calabashes'

L verb

| | |
|---|---|
| ɔku | 'you bought (rec,rem)' |
| sékû | 'we bought (rec,rem)' |
| ɔkɔt | 'you cut (rec,rem)' |
| sékɔt | '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
        ghɔ

           L H
            |               Association conventions
        ghɔ

        H   L H
        |   |               Subject prefixation
        seghɔ

        H   L H
        |   |/              Free Tone Docking
        seghɔ

(→ [séghɔ˚] 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)     L L
                              Underlying
         ku

         L L
         |                    Association conventions
         ku

         H L L
         | |                  Subject prefixation
         seku

         H L
         | |                  Free Tone Docking (and Twin Sister Convention)
         seku

         H L
         ∖|                   H Spreading
         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 ɔkɔr énɔq˙ , 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)   ɔkɔt˙        'you hacked'         ɔkɔr énɔq˙ 'you hacked a tree'
       ɔkɔ̌r menóq  'you hacked drums'   ɔkɔr é!nóq '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 pre-
cedes Simplification".  By antisymmetry of rule ordering, we incorrectly pre-
dict 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-kû              'we bought'              bɔmatrâs  'mattresses'
      sé-kú bɔ́matrâs   'we bought mattresses'   (/sé-ku bɔmatrâs/)
      bá-kɔ̂ŋ            'they loved'             baghɔrê  'women'
      bá-kɔ́ŋ bághɔrê  'they loved the women'   (/bá-kɔŋ baghɔrê/)

Thus arises the paradox that Fall Simplification applies before H Spreading
in order to provide the latter rule an opportunity to apply, but Fall Simpli-
fication 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 intermedi-
ate 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 it-
erative 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 ap-
ply 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-ghɔ́            'we saw'              sé-kɔ̂ŋ              'we loved'
      sé-ghɔ́ séteŋasáá  'we saw cranes'     sékɔ́ŋ séteŋasáá   'we loved cranes'
      *séghɔ́ séténŋasáá                      *sékɔ́ŋ séténŋasáá

Moreover, the revised iterative spreading rule would incorrectly generate
forms such as *sé-dáɣátí  instead of  sé-dáɣati  '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 applica-
tion 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 Dele-
tion (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)  mpɔŋ              'cow'              mpɔŋ pyɔ  'black cow'
      mpɔŋ pyɔ ajet  'the black cow ran'
      nkû              'dress'            nkú pyɔ̂  'black dress'
      nkú pyɔ́ ádaq  'the black dress tore'

The H tone of  ńkú  (from  ńkû  by Fall Simplification) spreads to the fol-
lowing adjective  pyɔ , and from there to the initial syllable of the verb
adaq.[4]

  If we consider only the sequence of underlying tones and number of sylla-
bles, 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 morpho-
logical and syntactic bracketing, a striking difference between these cases
arises.

(40) a.  $[_S$ $[_{NP}$ $[_N$ nkû $_N]$ $[_A$ pyɔ $_A]$ $_{NP}]$ $[_{VP}$ adaq $_{VP}]$ $_S]$

     b.  $[_{VP}$ $[_V$ sé[kɔt] $_V]$ $[_{NP}$ seteŋasáá $_{NP}]$ $_{VP}]$

---

[4]The noun  ńkû  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  ńkû .

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 ]...          Underlying

$_N$[ nkú` ]...          Fall Simplification

$_N$[ nkú ]...          Free L Deletion

$_{NP}$[ nkú pyɔ̂ ]...          H Spreading

$_{NP}$[ nkú pyɔ́` ]...          Fall Simplification

$_{NP}$[ nkú pyɔ́ ]...          Free L Deletion

$_S$[ nkú pyɔ́ âdaq ]          H Spreading

$_S$[ nkú pyɔ́ á`daq ]          Fall Simplification

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 ]...          Underlying

$_V$[ sé - kû ]...          H Spreading

$_V$[ sé - kú` ]...          Fall Simplification

$_V$[ sé - kú ]...          Free L Deletion

$_{VP}$[ sékú sêteŋasáá ]          H Spreading

$_{VP}$[ sékú sé`teŋasáá ]          Fall Simplification

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-rû        'vegetable'      bé-rû    'vegetables'
      áchwî       'car'            né-bâ    'breast'
      sérêŋ       'shilling'       é-têm    'hut'
      á-sâ        'fish net'       bá-sâ    'fish nets'
      kápâ        'penny'          wîndɔ̂   'window'
      kasárâ      'cassava'        bɔ́kît   'bucket'

There are two conceivable underlying representations for these nouns.  The noun áchwî 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 ( áchwi ), and it undergoes H Spreading.  There is evidence that the latter analysis is the correct analysis in most nouns, including áchwî ; however, for some nouns, including bɔ́kît , the former analysis appears to be correct.

Let us consider the evidence relating to nouns such as áchwî , which includes all of the nouns in (43) except kasárâ and bɔ́kît .  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)  étem échîsɔŋɔ        'the hut is burning'
      ǹku éru é!yú        'I bought vegetables yesterday'
      ǹku áchwi é!yú      'I bought a car yesterday'
      m̀bɔ́ŋ séreŋ é!yú    'I found a shilling yesterday'
      m̀bɔ́ŋ sérêŋ         'I found a shilling'
      ásə áchîsap          'the fishing net is long'
      éru é!pɔ́ɔ́          'the vegetable rotted'

Nouns ending with a falling tone not preceded by H simply change that F to
level H by Fall Simplification, viz. betê 'calabashes', betô bê!pɔ́ɔ 'cala-
bashes 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)  sérén e wa   'my shilling'        *sérén é wa
      étém e kɔ    'new hut'           *étém é kɔ
      érú e kɔ     'new vegetable'      *érú é kɔ

In contrast, nouns with final falling tone which is not preceded by H will
spread their H tone to the following word, as in ǹkû 'frock', ǹkú é kɔ
'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 as-
signed 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 ap-
plication of H Spreading. First, the blockage of H Spreading in (45) is ex-
plained 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)    H L  L L
        | | | |            Input to Postlexical Component
       [etem ekɔ]

        H L  L L
        N | |              H Spreading
       [etem ekɔ]

        H  L L L
        Λ  | |             Fall Simplification
       [etem  ekɔ]

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 ásə in ásə áchísap is before a H tone, Spreading is blocked.

These explanations require application of Spreading in nouns such as

áchwî  to take place in the postlexical component, since the crucial block-
ing H tone in  ásə áchísap  is only available postlexically.  There is one
further anomalous pattern exhibited by these nouns which supports the post-
lexical 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  pyɔ  'black' or a noun serv-
ing 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 disap-
pears.  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 adjec-
tive by H Spreading.  Note also that nouns in classes 1, 4, and 9 do not se-
lect this floating H tone.

(47)   nki         'lion(s)'(Cl.9,10)     nchu           'thatch(es)'(Cl.9,10)

       nki pyɔ     'black lion'(Cl.9)     nkǐ pyɔ̂        'black lions'(Cl.10)

       nchu chu    'red thatch'(Cl.9)     nchǔ chû       'bunches of red thatch'
                                                                        (Cl.10)
       mbaberi     'guard'(Cl.1)          bababeri       'guards'(Cl.2)

       n̄kû         'frock'                kentémé        'hunting'

       n̄kú pyɔ̂     'red frock'            kentémé Támbey  'hunting of Tambey'

       mbaberi Tambey    ͅTambey's guard'(Cl.1)

       bababerǐ Támbey   'Tambey's guards'(Cl.2)

       nki chu Tambey    'Tambey's red lion'(Cl.9)

       nkǐ chǔ Támbey    'Tambey's red lions'(Cl.10)

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

(48)   áchwǐ chû  'red car'               áchwǐ Támbey    'Tambey's car'

       kápǎ Tǐkû  'Tiku's penny'          wǐndɔ̌ Tǐkû      '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  áchwî , blockage of Spreading by this morphosyntactically triggered
floating H tone is not unusual. If the application of H Spreading in  áchwî
were a lexical application, then we would incorrectly exprect the floating H
tone to have no influence òn 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  áchwî  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'. Un-
like the HF pattern  in nouns, the clearly lexically derived HF pattern is
not blocked by a following word which begins with H ( sékú béwǎm 'we have
bought fishhooks') and will spread to a following word by reapplication of H
Spreading ( sékú békpəre  'we have bought wooden plates'—cf. bekpəre 'wood-
en 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  áchwî  or  é-rû , 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  áchwî  or
é-rû  from  áchwi  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  áchwi  and  e-'ru . Although  e-'ru  is morphologically com-
plex, the noun prefix  e-  contributes nothing to satisfying the phonologic-
al requirements of the rule, hence  e-'ru  is an underived form in the rele-
vant 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-

straint), 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-rû .

At the beginning of this section the existence of a second class of nouns
was noted, which in my data includes the nouns  bɔ́kît  'bucket' and  kasárâ
'cassava', as well as the noun  pɔ́brîk  'public works' which exhibits varia-
ble behavior.  These nouns differ from the larger  áchwî  class, which in-
cludes 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)  bɔ́kîr átey˙     'the bucket is broken' ( atey˙  'it is broken')
      bobɔ́kîr bá!téy  'the buckets have broken' ( bá!téy  'they have broken')
      bɔ́kîr é wa      'my bucket'
      kasárá Tîkû     'Tiku's cassava'
      pɔ́brîk é wesé   'our public works'
      pɔ́brîk e wesé   id.

There are two conceivable explanations for these nouns.  The less likely ex-
planation 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  bɔ́kît .  A more likely expla-
nation for this class of nouns then is that they do not involve H Spreading
at all.  Instead, their underlying representations contain two H tones, rath-
er than one H linked to two vowels.  The noun  pɔ́brîk  has two underlying
representations, one with a single H and one with two H's.

(50)    H HL
        | ||
        bɔkit

The postulation of two consecutive identical tones violates the OCP.  How-
ever violation of the OCP is independently motivated for Kenyang (as argued
in Tyhurst [1985] for another dialect).  Some of the nouns requiring OCP vio-
lation for the representation of their root tones are given in (51).[5]

(51)    se-teŋasɑ́ɑ́    'crane'                    LLHH
        ń-súɣúru       'orange'                   HHHL
        é-rókin        'lock'                     HLL
        á-róŋori       'tree sp.'                 HLLL
        me-ŋɔɣɔrí       'laziness'                 LLH
        kpárákpára     'mat for drying cocoa'     HHHL
        ajigijá        'string of beads'          LLLH

Adding nouns like  bɔ́kît  to the list will not complicate the grammar of Ken-
yang in any way and will provide a principled explanation for the contrast-
ing behaviors of  bɔ́kît  and  áchwî .

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[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).
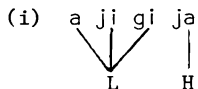
(i)    a ji gi ja
        \ \ /   |
         V      |
         L      H

As argued above, lexical tone melodies are not linked to root vowels in un-
derlying 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 se-
quence.  Furthermore, prelinking of tones cannot account for nouns like
ń súɣúru , whose underlying representation is (ii).

(ii)    n - su ɣu ru
                |
        H      H  H  L
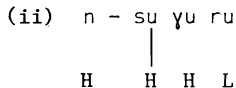
The presence of a free H tone before a linked H is in clear violation of the
OCP: lexical linking of tone does not provide an alternative to violating
the OCP.  It seems to be the case that the OCP plays no role in Kenyang to-
nology.

## 5. Summary

To summarize, a wide range of alternations in Kenyang have been account-
ed for here primarily by the action of two general phonological rules, H
Spreading and Fall Simplification, in conjunction with the treatment of syl-
lable-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 postcyclical-
ly and that in the postcyclic component, rules apply cyclically with the do-
main of the cycle being defined by syntactic bracketing.

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CONSONANT GRADATION IN FULA SUFFIXES:
THE UGLY TRUTH*

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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 ex-
tra complications that are characteristic of suffixes being
due to the existence of further rules that apply only in suf-
fixes.  With the exception of Marantz [n.d.], subsequent re-
searchers have adopted (some "tentatively") this aspect of
Skousen's analysis (cf. Anderson [1976], Lieber [1984]), al-
though none accept the rules themselves in the form presented
by Skousen.  In this paper, I will argue that Skousen's ac-
count 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 conso-
nants [Churma 1986b], require a fairly extensive use of mor-
phophonological 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 Klingenheben [1963],

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*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
Klingenheben's description.

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

Table 1:   *Consonant gradation alternations*

| Consonant alternations | | | | | | | | Grade |
|---|---|---|---|---|---|---|---|---|
| f | s | h | r | y | y | w | w | continuant |
| p | sh | k | d | j | g | b | g | stop |
| p | sh | k | nd | nj | ng | mb | ng | (pre)nasal |

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

　　[1]The terms "continuant", etc., are used here as cover terms.  The sym-
bol  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 alveo-
palatal affricate.

which vowel follows, the y/j/nj alternation occurs only before the back vowels a , o , and u , whereas the y/g/ng alternation is found only be-fore 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-regulari-ties. 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-ini-tial consonant and the allomorphy of the 25 class suffixes in Gombe are ba-sically 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

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[2]In addition to these consonants, there are a number of consonants that never alternate. These include the simple nasals ( m , n , ny , ŋ ), the glottalized consonants ( ɓ , ɗ , 'y ) , glottal stop ( ' ) , t , and l . Glottalized ɗ is actually involved in an apparently related alternation in a number of suffixes (see below for the details); stem-initial ɗ 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 dia-lects, 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*
          (after Arnott [1970:88] and Lieber [1984:330])

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

(C = continuant-initial, S = stop-initial, N = prenasal-initial)

'zero grade'), in the second row.[4]   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 illus-
trating this complex system of gradation are given in Table 3 on the follow-
ing page, where the parenthesized grade information indicates the grade of
the suffix that the stem in question triggers.[5]

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

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[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  -ɓe  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 dis-
cussion 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 accident-
al one, given the paucity of consonant-final Grade B stems (he mentions on-
ly three in the entire book).  This gap is sufficiently surprising that Lie-
ber [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 re-
fer exclusively to human beings in Gombe.

Table 3:   *Noun Paradigms*

| Class | | wor–<br>'man'<br>(stop) | | waa–<br>'monkey'<br>(nasal) | | hufine–<br>'cap'<br>(continuant) | | daag–<br>'sleeping mat'<br>(zero) |
|---|---|---|---|---|---|---|---|---|
| Class | 1 | gor–ɗo | 11 | waa–ndu | 9 | hufinee–re | 14 | daag–o |
| | 2 | wor–ɓe | 25 | baa–ɗi | 24 | kufinee–je | 24 | daag–el |
| | 3 | gor–gel | 3 | baa–ngel | 3 | kufine–yel | 3 | daag–el |
| | 5 | gor–gum | 5 | baa–ngum | 5 | kufine–yum | 5 | daag–um |
| | 6 | ngor–kon | 6 | mbaa–kon | 6 | kufine–hon | 6 | ndaag–on |
| | 7 | ngor–ga | 7 | mbaa–nga | 7 | kufine–wa | 7 | ndaag–a |
| | 8 | ngor–go | 8 | mbaa–ko | 8 | kufine–ho | 8 | ndaag–o |

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, how-
ever, do not exist.  The asymmetry concerning which kinds of "partially var-
iable" stems are found is of some importance in determining which of the al-
ternants is basic (cf. section 2.1).

     Although it seems clear that Skousen is right that the system of conso-
nant 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 $\emptyset$/j/ɗ/ƈ alternation in the Class 1 and Classes 22-25 suffixes (cf. Ta-
ble 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
Klingenheben'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 inter-
ested 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 Klingenheben,
Stennes, and Arnott, the continuant grade alternant in stems is taken as ba-
sic 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 alter-
nant 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.[6] 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 conso-
nants have an "archisegmental" representation, i.e. they are lexically "un-
derspecified" with respect to (at least) the features involved in the grada-
tion system.

2.2. Rules. On Skousen's account, only those stems which are marked lexi-
cally 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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[6]Anderson 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 dia-
critic feature, see Churma [1986b:sec.2.2].

grade.  The required rules would have the following form (p. 92).[7]

(1)  [+cons,-cont,+vcd]  →  [+nasal] /[__X]$_{stem}$ + [+AN]$_{suffix}$

(2)  [+cons,-cont]  →  [+cont] /[__X]$_{stem}$ + [+AC]$_{suffix}$

If the suffix has neither of these diacritics, or if the stem does not have
the feature [+A], no rules will be applicable, and the stem-initial conso-
nant 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 dia-
critics [+AN] and [+AC], which would also be part of the lexical representa-
tions 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 corres-
pondences 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

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[7]I 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.

[8]Note that, although the rules for suffix alternations and the corres-
ponding 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 diacrit-ically marked grade properties of stems will produce the relevant alterna-tions.

My own approach [Churma 1986b] is a sort of cross between Skousen's and Anderson's: continuant-basic representations are affected by diacritic-sen-sitive 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- (cf. Table 3) is that it requires that any suf-fix 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 al-ternations.[9]

(3)  [C,+s]  →  [-cont] /+__

(4)  [C,+n]  →  (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 -yel combine, the former will contain the diacritic [+s] and hence undergo rule (3), whereas the lat-ter will receive the feature [+n] from the stem and so undergo (4) (cf. Ta-ble 3). When waa- combines with -wa , which carries the lexical informa-tion that stems to which it attaches receive the diacritic [+n], on the oth-er hand, the stem-initial consonant will undergo rule (4) and surface appro-priately with a prenasalized stop, as will the suffix-initial consonant.

The autosegmental approaches, roughly, make use of floating autoseg-ments which supply the features involved in gradation by means of associa-tion of the features on the different autosegmental tiers.[10]  For example,

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[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 auto-
segment, 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 $j/\mathrm{d}/\mathrm{d}$ 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 suf-
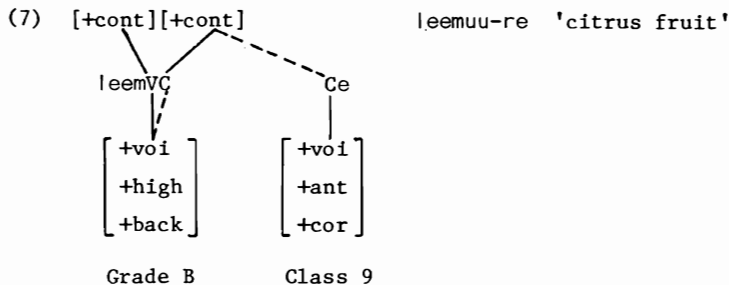fixes.

3.1.  The zero grade.  As both Arnott and Skousen note, stems that take suf-
fixes 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)  [-cons,-syll]  →  Ø /[-syll] + __

This rule is restricted so as to affect only glides (including  h  for Skou-
sen), in view of the fact that suffixes with initial  ɓ  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,

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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 dis-
cussion.

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.
$$\begin{bmatrix} -\text{cont} \\ +\text{nas} \end{bmatrix}$$
dim-el
'free man'

diC          el

$$\begin{bmatrix} +\text{voi} \\ +\text{ant} \\ -\text{cor} \end{bmatrix} \begin{bmatrix} +\text{voi} \\ -\text{ant} \\ -\text{cor} \end{bmatrix}$$

Grade A   Class 3

b.   [+cont]
leemu-yel
'citrus fruit'

leemuC          el

$$\begin{bmatrix} +\text{voi} \\ -\text{ant} \\ -\text{cor} \end{bmatrix}$$

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  ɓ . 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 con-
vention"). The treatment of such suffixes is illustrated in (7):

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



```
        leemVC              Ce
          |                  |
      ┌ +voi ┐          ┌ +voi ┐
      │ +high │          │ +ant │
      └ +back ┘          └ +cor ┘

      Grade B            Class 9
```

Here the suffix-initial C slot is associated, apparently by means of a lan-
guage-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)).[11]

     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/ɗ/ɗ  alternation. Skousen, noting (pp. 81, 85) that the ex-
pected  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  y . Having this ab-

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[11]Deletion-based accounts of the zero grade would presumably also re-
quire a special rule to account for such lengthening, which also occurs be-
fore  j-initial suffixes in Gombe. Skousen [1972:90n] formulates a strict-
ly phonological rule to account for the latter but does not mention the ex-
istence of the former phenomenon. It is actually impossible to tell from
Klingenheben's grammar whether there is pre-r  lengthening in his Adamawa
dialect, since all of the stems he gives that take  r-initial suffixes eith-
er have underlying long vowels or are not given in their diminutive or aug-
mentative 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-ini-
tial suffix in the plural and hence undergo lengthening in both the un-
marked singular and plural). In the variety of Adamawa described by Sten-
nes, the lengthening facts are radically different (cf. section 3.2 for dis-
cussion.)

stract segment would appear to allow one to explain a number of otherwise puzzling facts. First, of course, it would explain why the initial conso- nant 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 ɗ as input, at least more so than j , which is not even a con- tinuant. 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 al- veolar continuant in the language and which is derived from d (cf. rule (2)). It would also require a rule that would "... make a stop [and, event- ually, 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 thouroughly ad hoc.

Anderson, on the other hand, "... prefer[s] simply to differentiate mor- phologically between the behavior of j/ɟ in suffixes and that of j or ɟ in stems" (p. 104). How exactly this would be done is not made clear. Presumably he would need to ammend 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 ɟ 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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[12]All of the o:-final stems that Skousen gives are agentives. Arnott (p. 124) in fact describes the allomorphy in question in terms of the agent- ive suffix.

[13]Due 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 ).[14]  All of these rules would be morphologic-
ally 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

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tion rule precedes gradation in a continuant-basic account).  We need only
distinguish  ɓ  and  r  from those consonants that are deletable, viz. j ,
y , w , and  h .  Since the latter are all [-ant], while the former are
[+ant], the class in question is simply those segments that are [-syll,-ant].
In view of the small size of the entire class of Grade B suffix-initial con-
sonants, 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 impermis-
sible 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 [cont] and [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. -ɓe/-'en in the case of Class 1/2 nouns, or a singular form, e.g. r/d/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

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[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.[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 en-
tail 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 al-
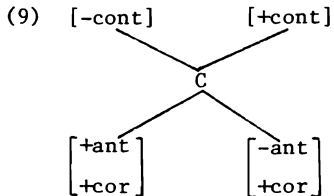ternations and the suffixes themselves.

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 ac-
count depends partially on analyzing  ɗ  as being "doubly articulated" and

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[16]Fula is not unique in presenting a problem of this nature.  For exam-
ple, 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 leni-
tion).  It is difficult to see how an autosegmental account could handle all
three of these in terms of a single template or floating autosegment.  Lie-
ber [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 Lie-
ber'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 re-
ported 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  l/ɗ/n  alternation, and the former also has  ɓ/ɓ/m
and  'y/'y/ny  alternations; these latter are cognate with  w̃/ɓ/m  and
ỹ/'y/ny  alternations in Basari.  It is hard to see how such alternation
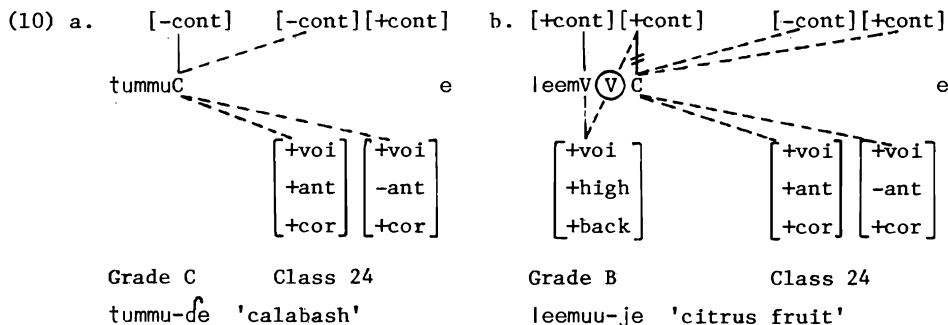patterns could be characterized in terms of a single set of floating augo-
segments.

thus represented as in (8):

(8)  [-cont]          [-cont]
         \            /
             C
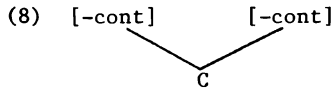
Given that there is no evidence that implosives are in fact phonetically
doubly articulated in the way that this representation suggests (the two
closures for glottalized consonants at the glottis and in the oral cavity
are simultaneous, not in sequence), this is somewhat suspicious.  Further-
more, 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 se-
quence of identical melody elements is attached *to a single CV-tier slot*.
Equally suspicious is his highly abstract representation of the   j   that al-
ternates with  ɗ  (other   j's are, roughly, palatal stops), which is as in
(9):

(9)  [-cont]          [+cont]
         \          /
          \       /
            X
           C
         /     \
    ⎡+ant⎤    ⎡-ant⎤
    ⎣+cor⎦    ⎣+cor⎦

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 be-
tween the "two kinds of  j's", that the kind of  j  represented in (9) oc-
curs only in suffixes, and that the single phonetic  [ʄ]  described by Ar-
nott [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  ɗ .  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 preat-
tached to [-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):

(10) a.    [-cont]    [-cont][+cont]     b. [+cont][+cont]      [-cont][+cont]

tummuC                        e        leemV Ⓥ C                        e

$$\begin{bmatrix} +voi \\ +ant \\ +cor \end{bmatrix} \begin{bmatrix} +voi \\ -ant \\ +cor \end{bmatrix} \qquad \begin{bmatrix} +voi \\ +high \\ +back \end{bmatrix} \qquad \begin{bmatrix} +voi \\ +ant \\ +cor \end{bmatrix} \begin{bmatrix} +voi \\ -ant \\ +cor \end{bmatrix}$$

Grade C        Class 24           Grade B              Class 24
tummu-ɗe  'calabash'             leemuu-je  'citrus fruit'

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.
ɗ . 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  [ʝ] , and the circled V slot is inserted by an unspec-
ified 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 lan-
guage-specific "markedness convention" mentioned above, and the required un-
stated, and apparently language-specific, association rules, this analysis
does appear to account for the data considered as well as the phenomena dis-
cussed 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  j  (precisely the five suffixes that exhibit the  j/ɗ/ɗ alterna-
tion would have the representation in (9)), and a way of representing glot-
talized consonants that should probably be universally disallowed.  This
kind of account, like that of Lieber, will also encounter a redundancy prob-
lem:  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

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[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  j-
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/ɗ/ƴ  alternation.
Even more problematic, if anything, are the facts about lengthening for
Stennes' Adamawa speakers.  Basically, underlying short vowels "are long un-
less the [following morpheme] begins with a semivowel or faucal  y , 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 Ma-
rantz, 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  -ɓe ], 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

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[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].

ʈumm- , 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 Ma-
rantz's analysis of such stems is accepted, there will be an extremely odd
distribution of (phonetically) stem-final short vowels in such stems.  More-
over, 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.[20]  In order to maintain an analysis in which the alleg-
edly anaptyctic vowel is present underlyingly in such cases, an additional
rule or rules would be needed in order to adjust the vowel quality appropri-
ately.

Marantz does not say why he departed from Arnott's account, but it ap-
pears 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:
ʈumm[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-

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[20]It is not possible to find analogous noun stems, since (roughly—see
below) the rule that deletes suffix-initial (Grade B) consonants effective-
ly bleeds anaptyxis, except when the suffix-initial consonant is  ɓ  or  r .
Since the former is present only in Class 2, which is the plural that cor-
responds 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 va-
rieties 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 under-
lying /y/ would allow one to "state the facts about the alternation of y
as follows: underlying /y/ becomes [ĵ] in the stop grade and [n͡ĵ] in
the nasal grade before back vowels in roots; otherwise, /y/ becomes [g]
in the stop grade and [n͡g] 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 rep-
resentations.

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 con-
sonant-final Grade B stems. Although there are only a few such stems (see

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[21]This would be another counterexample to Marantz's claim about the non-
existence of morphologically triggered phonological rules (cf. note 18).

(11) below for a list of all that are known to me), the fact that they ex-
ist 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 proper-
ty 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 dia-
critic [-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 fea-
tures 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 ap-
proach, such stems would instead subcategorize for taking suffixes that
have this feature, and the deletion rule would then be blocked when the in-
put 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-in-
duced clusters, requires extensive use of some variety of the diacritic ap-
proach.

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 as-
sociation. The only difference between ordinary Grade B stems and those un-
der 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, giv-
en that there are stems that end phonetically in a sequence of two conso-
nants, e.g. dept- 'book','yulɓ- '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 ap-
pear 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 Klingenheben. 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 exam-
ine 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.  yakaṭab-wo/yakaṭab-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 (ultimate-
ly from Enlgish, 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  miqaṣṣ  (Mohamad Abd-Rabbo, 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 diction-
aries and lexica I have consulted contain any of these words, with the ex-
ception 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 con-
sonant 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 addi-
tion to deletion of the suffix-initial consonant.[22]  Since it would be help-
ful 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 condi-
tioned, and since it is not always possible to tell with certainty from Ar-
nott's discussion the nature of the processes in question, I will make lib-
eral 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 con-
text 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 uncom-
fortably large number.  Decisions about the nature of a given process, then,

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[22]For purposes of discussion, I will presuppose that suffixes begin
with fully-specified continuants at the stage of the derivation that is rel-
evant 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-ɓe  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 l-
initial, especially in the case of the latter two classes—cf. Arnott [1970:
124-126].

There are also two tokens of tk , three for tg , and one for tɗ , 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 clus-
ters involving d and possible suffix-initial consonants are impermissible
on strictly phonological grounds.

g-initial clusters in the chart include those with d , ɗ , and r ,
with three tokens of the first type, and one each of the other two.  No pre-
nasalized 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 prena-
sal-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-simplifica-
tion 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 con-
cerned, p does occur as the first member of a relevant cluster, pk , al-
though 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 conso-
nants appear to cluster fairly freely, with four tokens each of ɓg and
ɗg in the chart, fifteen of ɓr , and eight of ɓɗ , although in Gombe

(pp. 52, 114), at least one final ɗ (on Arnott's analysis) assimilates to-
tally to a following ɓ . The chart shows no ɗr ,[24] and no '-initial clus-
ters (see below). Unfortunately, 'y has merged with ' in the speech of
Stennes' informants, so there is of course no information in his chart con-
cerning 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 glot-
tals), aside from the latter, which will be treated below, it is hard to gen-
eralize. Some potential suffixation-induced clusters are instanced in Sten-
nes' chart while others are not, with little in the way of a relevant pat-
tern 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 bor-
rowings.

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 , lr , or nr clusters. The class of con-
sonants that do not appear to cluster with the following r is sufficiently
homogeneous that it is likely that a genuine phonotactic constraint is in-
volved 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 presum-
ably be immune to the effects of anaptyxis and deletion of the suffix-initial
consonant by virtue of some version of the "geminate inalterability" con-
straint (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 con-
cerning 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 Ar-
nott, 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]. Other-
wise, 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 glot-
tal closure,[26] and  ny  is denasalized. In at least one stem (p. 111),
woot-  'one, single, the same', the final  t  is deleted before  r-initial
suffixes, although anaptyxis applies before  -ɓe  in the Class 2 form.  The
final  w  of Grade A (for Arnott)  rew-  'female' also appears to be deleted
before stem-initial  y , w , and  h , but not  ɓ , r , or  j  (pp. 95, 113).
Arnott treats the behavior of this stem (p. 113) as being the result of nor-
mal behavior of the suffix, but with the stem exhibiting extensive allomor-
phy (cf. Class 1  debb-o , Class 2  rew-ɓe , 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 ex-
amples is the same as the initial consonant of the Grade B allomorph of the

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

[26]If pre-consonantal glottals are treated as having the point of articu-
lation of the preceding vowel, then this latter process could be considered
as being part of the same process as glottal 'deletion'. What would be go-
ing on in the case of deletion would be, under this approach, simply loss
of the glottal constriction (together with voicing of the resulting voice-
less 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 bleeding 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

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[27]Note 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 .[28]  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]

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[28]Class 15  pucc-u  'horse' (pp. 50, 112) would be an exception to this
generalization, since the Grade B allomorph of the Class 15 suffix is  w-ini-
tial.   The only way of accounting for this form within the approach being
presented would be to posit radical stem allomorphy along the lines of Ar-
nott's approach (cf. the diminutive  push-el , where  cc  is regularly the
geminate version of  sh , at least for most Gombe speakers).   The plural,
pucc-i , behaves as expected, and may well have been the basis for reanaly-
sis of the singular, if what I have to say is correct.   Interestingly, how-
ever, 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, original-
ly 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 new-
ly-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 dia-
lect described by Labouret is the stem for 'female'  rew-  seen above plus
the Class 15 suffix:  ndewu .   Apparently, this class is the one used for
horses!   The reassignment in question could not have been very recent, giv-
en 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 ex-
ception (see note 29 for discussion).

[29]There 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  /hotol-/  'cotton'
is  kotol-al , whereas the unmarked singular form is Class 20  hottoll-o

If we put thses two analyses together, we predict the occurrence of
stems which, on Arnott's account, show an alternation between a final contin-
uant grade consonant and the corresponding geminate stop grade consonant:
the stop-formation rule alluded to above will convert the underlying continu-
ant 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).[30] Such stems will be doubly marked diacritically, as trig-
gering both stop-formation and j-assimilation. If this analysis is accept-
ed, then there is yet another process that may affect a cluster, viz. dele-
tion of stem-final w , but once again not all such consonants will be sub-
ject to the deletion rule (cf. ɓow- '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 conso-
nants is not fully phonological in nature is the existence of what on Ar-
nott's account is an "atypical" allomorph of the Grade A Class 12 suffix,

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(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 ini-
tial consonant for certain stems in certain classes". It is tempting to
treat this particular case in terms of a "gemination prosody" (in the Firth-
ian 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 accompany-
ing 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" ( |el-wa/|el|-i 'ga-zelle', mbee-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 ). Ar nott treats this allomorph as being on a par with the other atypical suffix-al 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 ( -ɓe/-'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 ap-peal will have to be made to rules triggered by arbitrary diacritics. In the case of the first of the above forms, the stem |el- would be marked as failing to trigger deletion of the suffix-initial consonant and as trigger-ing 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 dele-tion 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,

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[31]Actually, 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, |el-el ) 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 suf-fixes 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 ɓow .

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 ɓ . Similarly, for those speakers who break up kɓ 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 be-
havior 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 identifi-
able, 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 prop-
erty.

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 au-
tomatic 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 dia-
critics. 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

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[32]It 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]

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[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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MAJANG NOMINAL PLURALS, WITH COMPARATIVE NOTES[*]

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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 lan-
guages. Tiersma's [1982] theory of "Local Markedness"
is shown to provide an explanation for singulative mark-
ing 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 with-
in the Eastern Sudanic phylum, a member of the Surma group [Bender 1983a].
Fleming [1983:533] groups all Surma langauges except Majang into Southern
Surma, placing Majang in a crucial position for the reconstruction of Proto-

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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 taamekək . 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 taŋ/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

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[1]In Majang, Bender [1983b:116-117] described [s] , [š] , [sʸ] , 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.

Tucker [1933:894].

2.1. <u>Suppletive stems between singular and plural</u>. For three words in my data, plurals are shown by suppletive stems, viz. ŋaai 'woman' ŋon 'women', taŋ 'cow' ţogi 'cattle', and idiţ '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 *itaŋ as Proto-Nilotic 'cow', cognate to the singular in Majang and several other Surma languages. The Majang plural form ţogi is very similar to the Gaam plural ţɔg [Bender and Malik 1988: 151] and also to the Proto-Nilotic *dhɔk [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. <u>Singulative suffixes</u>. 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'
     ŋɛţiŋ          ŋɛţi      'louse'

A few nouns are marked with singulative -ţ , such as kɛɛţ 'tree'[3] and

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[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.

[3]The Proto-Surma forms must have been *kɛɛ+ţ 'tree' and *kɛɛ+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

kɛɛn '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*
      piiŋon         piiŋok      'leaf'
      ŋiidan         ŋiidan      'tooth'
      waikun         waikuk      'seed'
      marion         mariok      'star'
      gopan          gopak       'path'

2.3.  <u>Plural suffixation</u>.  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 Su-
danic pattern of  r  for animate plural.  There is a wide variety of plural
suffixes, with twelve clearly attested types identified thus far, most in-
volving either a final vowel, -r , or  -k .

(3)  *suffix*       *singular*      *plural*
     -n/-k       tutuka+n       tutuka+k       'egg'
     -k          dʕane         dʕane+k        'beehive'

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1979:Appendix 1, p.4].  Tucker and Bryan [1962:160] with more opportunity
to study phonetic detail, give the Kalenjin "primary" singular as  kɛ́:t , 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 wheth-
er the Kalenjin languages are descended from a stage where a singulative
suffix  -t  was interpreted as part of the root.

| -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'          |
| -Vr   | uguI     | uguI+er    | 'crocodile'     |
| -ter  | kaadʃa   | kaadʃa+ter | 'tongue'        |
| -i    | atiiŋ    | atiiŋ+i    | 'bachelor'      |
| -e    | tuusi    | tussi+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)  kɛkɛti      'snake'          kɛkɛtie     'snakes'
     tʊltʊl      'root'           tʊltʊle     'roots'
     bʃolbʃolt   'burrow'         bʃolbʃole   'burrows'
     polpol      'finger/toe'     polpole     'fingers/toes'
     siilsil     'lizard (sp.)'   siilsile    '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*
     dʃowarkan       dʃowarkanak      'hunter'
     ibaalkan        ibaalkanak       'dancer'
     ñonkan          ñonkanak         'liar'
     laaltan         laaltanak        'crack' (n)

| agaḷtan | agaḷtanak | 'loot' (n) |
| jambulon | jambulonak | 'teacher' |

The form  mukṭan  'marriage song', appears to be a derived noun formed with
the product suffix  -ṭan , but I have found no root  muk- .  Its plural is
mukṭanak , but this may be by analogy with the many other (derived) nouns
which end in  -ṭan .

2.4.  Double plurals.  Double plurals are those where a language adds a plu-
ral 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  mooṭak  and the plural  mooṭakok .  The singular
seems to end with the common plural suffix  -ak .  Since the word most com-
monly 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'  dʕumuṭun/dʕumuṭunak .  The  -ṭun
at the end of the singular is probably an example of the plural suffix
-ṭun , as in  waar/waarṭun  'dog'dogs', aṭo/aṭoṭun  'mouth/mouths', kooli/
kooliṭun  'tail/tails'.  This suggests an earlier singular form  dumu  for
'flying termite'.  The plural of this earlier singular  dumu  was  dumuṭun .
Later, the plural suffix  -ak  was added to  dumuṭun .  What had been a plu-
ral 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 plu-
rals", 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 demonstrat-
ed 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  nɛɛk , possession of a plural object is marked by
gɛɛŋk .  This is shown below with the countable noun 'bull'.

(6)  jɛgoy nɛɛk        'his bull'
     jɛgoyir gɛɛŋk      '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)  ɛrce gɛɛŋk         'his milk'
     mooe gɛɛŋk         'his coffee'
     maaw gɛɛŋk         'his water'
     ogol gɛɛŋk         'his honey mead'
     toyo gɛɛŋk         'his urine'
     ñotu gɛɛŋk         'his faeces'
     paitankak gɛɛŋk    'his vomit'

The last example is based on the verb root  pai-  'vomit'.  It has the pro-
duct 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 Ben-
der's [1983b:129] one exceptional liquid 'blood'.  Again, the use of a pos-
sessive frame indicates a noun's singular status.

(8)  yɛrum nɛɛk         'his blood'
     caayi nɛɛk         'his tea'
     tajan nɛɛk         'his beer'

Fleming [1983:544] has pointed out that 'blood' yɛrum is from Omotic,
found in the Majoid languages, Majang being adjacent to the Majoid language
Sheko.  'Tea' is obviously from Amharic  šay .  The use of the singular with
tajan  'beer' is more interesting.  It appears to be borrowed from the Am-
haric  t?əj  'honey mead'.[4]  A Majang man told us that it is better to say
tajan nɛɛk  rather than  tajan gɛɛŋk  because beer is sold by the bottle and
*counted* to calculate cost.

Liquids also show themselves to be plural in some other syntactic con-
structions.  For example, liquids can trigger plural markers in subject suf-
fixes of verbs:

(9)  ku+ɛr+ko     moor+it              'it did not boil'
     NEG+3pl+PST  boil+NEG

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

(10)  ?utaako ogol cigo mɪntan+a+ŋoŋk    'I drank good mead'
      I-drank mead REL  good+PL+ADJ      ('I drank mead which is good')

      dʕamaako tar  ci  mɪntan+ŋoŋk      'I ate good meat'
      I-ate    meat REL good+ADJ

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)  ŋaaka mooe+k+ɔŋk                   'aroma of coffee'
      arome coffee+PC+GEN

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

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[4]The phonological correspondences are as follows:  glottalized conso-
nants lose their glottalization when borrowed into Majang, and the Amharic
"first order" vowel (a fronted schwa) is pronounced as a short  /a/ .

stituents as demonstratives, possessive pronouns, case markings, and rela-
tive 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 in-
transitive 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' obii , which becomes bobɛr for plural, re-
taining a Proto-Surma process of stem reduplication for plural [Unseth
forthcoming b].

(14)  co    mɪntan+ŋ+ɔŋk           cigo  mɪntan+a+ŋ+ɔŋk
      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 sin-
gular 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)  gabʕ+aa mooyi taŋ+a           gabʕ+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 tapadʕ+ɔŋk               togi tapa+a+k+ɔŋk
      cows chief+GEN                cows chief+PL+PC+GEN

      'cows of a chief'             'cows of chiefs'

komoi kɪbɪt+ɔŋk          komoi mooe+k+ɔŋk
color pot+GEN            color coffee+PC+GEN

'color of a pot'        'color of coffee'

Possessive pronouns show number for both the possessors and the possessed
objects [Bender 1983b:129], a pattern found in other Surma and Eastern Su-
danic languages, e.g. Didinga [Odden 1983:168], Murle [Arensen 1982:98],
Mursi [Turton & Bender 1976:531], Me'en [Will forthcoming], Anyuak [Lusted
1976:499].

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 Ma-
jang 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 exam-
ple, 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 sub-
stratum 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

cini     'this'              cigi     'these'

(17)  Locative demonstratives

cinene   'in this'           cigege   'in these'

(18)  Noun plurals when marked for case

gabʕ+aa mooyi taŋ+a          gabʕ+aa mooyi togi+k+a
give+1s salt  cow+OBL        give+1s salt  cows+PC+OBL

'I give salt to the cow'     'I give salt to the cows'

(19)  Relative markers

co   (singular)              cigo   (plural)   (see (12) above)

(20)  Possessive pronouns

    taŋ naak   'my cow'       togi gaaŋk    'my cows'

    toon naak  'my child'     toomok gaaŋk 'my children'

(21)  Number suffixes

| *singular* | *plural* | |
| tutukan | tutukak | 'egg' |
| gopan | gopak | 'path' |
| piilan | piilak | 'eyelash' |
| dʕomon | dʕomok | 'leopard' |
| lijan | lijak | 'bracelet' |

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)  mɛl+k+i+ko      wodʕ      mɛl+k+ir+ko    wodʕ+ak
      come+LOC+3s+PAST who?    come+LOC+3p+PAST who?+PL

      'who (sg) came?'      'who (pl) came?'

      bʕokot+u+ko  jik      bʕokot+u+ko  jik+onak
      kill+3s+PAST what?      kill+3s+PAST what?+PL

      'what (sg) did he kill?'  'what (pl) did he kill?'

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

(23)  kɛt+ɛ  keɛt wo+n      kɛt+ɛ  keɛn  wo+g
      chop+3s tree which?+SG    chop+3s trees which?+PL

      'which tree did he chop?'  'which trees did he chop?'

## 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 dem-
onstrates 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 Ma-
jang (see 2.3) closely parallels the Murle suffix  -ok  for plurals of de-
rived nouns [Arensen 1982:87] and also the suffix  -k  for derived nominals
in Didinga [Nicky De Jong, p.c.].

(22)          *singular*        *plural*

    Murle    paay+in         paay+in+ak        'judgement' [Arensen 1982:87]

            keeb+in+ɛt      keeb+in+ok        'reading'

    Didinga  igor+ya+hit     ogor+ya+k         'thief'     [De Jong, p.c.]

            ben+yo+hit      ben+yo+k          'singer'

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.  <u>Singulative suffixes</u>.  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 [Tur-
ton & Bender 1976:544].  Many of the same nouns that are marked for singu-
lative in Majang are also marked for singulative in other Surma languages.
The following are only a few of the many examples:

(23)                *Majang*    *Murle*    *Didinga*      *Me'en*

    'tree'    sg.   keɛt      keɛt      xeet         kɛt

          pl.   keɛn      keɛn      xeenA        kɛna

    'egg'     sg.   tutukan   buurnet   buurryanit   mulac

          pl.   tutukak   buuro     burru        mula

| 'seed' | sg. | waikun |        | xiñomooc | du?uṭ |
|--------|-----|--------|--------|----------|-------|
|        | pl. | waikuk |        | xiñomo   | du?u  |
| 'leaf' | sg. | piiŋon | bolotoṭ |          | salic |
|        | pl. | piiŋok | bolɔk  |          | saalaa |

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].[5] 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 for 'seed/s', xiñomooc/xiñomo , 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,

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[5]Greenberg [1970:114] had earlier recognized the same principle at work in many Nilo-Saharan languages, observing that singulative suffixes are often affixed to a noun which is "a single particle of an extended or collective entity".

the Surma singulative suffix and the general principles of its use are car-
ried 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  kɛɛt  '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  iŋáac  '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 lar-
gest 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 Zabor-
ski states, they are reflexes of an Afroasiatic morpheme, they are not aber-
rant 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 pat-
tern, 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' (taŋ/
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 sup-
pletive stems for the singular and plural of 'person'  (eet/ɔl)  and 'cow'

(taŋ/tiin) .

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 com-
paring Majang data with that of other Surma languages, shown in (24)  below:

(24)           *singular*     *plural*

    Murle   ibaa        ibaati          'arm'

    Majang  baadʕi      baadʕiak        'bicep'

    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  *baaDi , (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.[6]  Tiersma [1982:834, 835] specifi-
cally 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 sin-
gular and plural was found in Majang, it is also common in other Surma lan-
guages, marking number on some of the same constructions, such as interro-
gative 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 plu-
ral, then removed the final syllable -ti  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 there-
fore a candidate for double plural affixation.  Secondly, -ti , the final
syllable of the Murle plural  ibaati , is a normal Murle plural suffix for
body parts [Arensen 1982:36], so this also suggests that  ibaa  was the ori-
ginal 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.

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SIZE AND SHAPE IDEOPHONES IN NEMBE:
A PHONOSEMANTIC ANALYSIS

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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 alveo-
lars as well as vowels in the narrow set are used for small-
ness, 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 ex-
istence of hierarchies of phonosemantic suggestiveness where-
by certain phonosemantic units displace others away from
their legitimate values, leading to both the ability of oth-
erwise opposing psychomorphs to get into construction and the
ability of simultaneous multiple field representation by id-
eophones.

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 as-
sumption 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 al-
veolars and dentals refer to smallness while velars refer to largeness
(Mathews [1970]; Crockett [1970]).

These more popular positions are, however, contradicted by some observa-
tions 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 al-
ternation holds between [u] and [o] , etc. In all cases, according to
Kim, what is involved is a vertical movement down on the Korean vowel tri-
angle. 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 (= ɩ ) 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, straight-
ness 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 Kaliai'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.[1]  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 , k͡p , g͡b , w .

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

|        | i | ɩ (= ɩ ) | e | e̲ (= ɛ ) | a | o̲ (= ɔ ) | o | u̲ (= ɷ ) | u |
|--------|---|-----|---|-----|---|-----|---|-----|---|
| high   | + | +   | - | -   | - | -   | - | +   | + |
| low    | - | -   | - | -   | + | -   | - | -   | - |
| back   | - | -   | - | -   | - | +   | + | +   | + |
| wide   | + | -   | + | -   | - | -   | + | -   | + |

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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[1]I 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 se-
quence 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)     $C_1V_2C_3V_4V_5$:  dúrée

(ii)    $C_1V_2C_3V_4 + C_1V_2C_3V_4$:  buruburú , ɓoloɓoló

(iii)   $C_1V_2C_3V_4C_5V_6V_6$:  ɓagiríi   ɓogolóo

(iv)    $C_1V_2C_3V_4C_5V_6 + C_1V_2C_3V_4C_5V_6$:  kokoríkokori , kpokorokpokoró

Two proximate vowels are assigned to different syllables.

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

4.2.1.  Consonant melodies.  For consonant patterns in 4-syllable (reduplicat-
ed) forms, nothing absolute can be said except that there is a very high ten-
dency for $C_3$ to be alveolar.  Patterns in 6-syllable forms are slightly more
constrained as it appears that only grave sounds  [g͡b , k͡p , g , k , ɓ] 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 simultane-
ously acceptable in $C_1$ , $C_2$ , and $C_3$ positions.

4.2.2.  Vowel melodies.  Statistically, a great number of ideophones are ho-
mogenous 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 po-
larized. When homogenous, the vowels marked [-high] (e , e̱ , a , o̱ , 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 differ-
ent. 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 , i̱ , u , u̱) .

4.2.3. <u>Tone melodies</u>. There are seven basic tone melodies superimposed on
the cononical patterns identified above:

(i)     $L_QH$:  buruburú , kpokorokpokoró

(ii)    $L_Q$:  ɓogoloɓogolo , mo̱go̱lo̱mo̱go̱lo̱

(iii)   $L_QHL_Q$:  kagulúkagulu , kadigíkadigi

(iv)    $L_QHL$:  ɓagiríi , gbogolóo

(v)     $(HL)_Q$:  gbódoróo , ké̱tuké̱tu̱

(vi)    $(HL_Q)_Q$:  ɓákalaɓákala

(vii)   $(LHL)_Q$:  girísigirísi

   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. <u>Size Ideophones</u>
   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 id-
eophones 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)'

       garakíi     '(standing) strong and erect'

       garakíi     '(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 phar-
ynx (classified [−wide]) refer to smaller size.  If we adopt the following
formal feature representation,

       large, larger  =   [+LARGE(R)]
       smaller        =   [−LARGE(R)]

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

(2)       V      →    [αLARGE(R)]
      [αwide]

5.2.  Absolute size.  Absolute size ideophones are fundamentally designed to
describe size, but occasionally other subsidiary fields such as shape are al-
so represented.  Phonosemantic description of absolute size is more complicat-
ed than was seen in the area of relative size as consonants also make contri-
butions in addition to the existence of certain restrictions based on a hier-

archical 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                      "
      ɗureɗuré          'unexpectedly small (of many things)'
      gorogoró          'skinny, thin'
      kutekuté          'tiny'
      kétukétu          'dwarfish'
      nikonikó          'thin, slender, emaciated (person)'
      yegeyegé          'very large (artificial object)'
      ɓoloɓoló          '(eyes) large and rounded, (writing) bold'
      ɓogoloɓogolo      '(of grain, writing, etc.) bold, big, large'
      ɓogolóo                       "
      gbodogbodó        '(figures) bold'
      gbokogbokó        '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  →  [-LARGE]
      e  →  [-LARGE] (exceptions:  when $C_3$ =  g )
      o  →  [-LARGE] (exceptions:  when $C_3$ =  k , g )
      u  →  [-LARGE]

(5)   a  →  ∅  (i.e. has no phonosemantic value)

(6)  i   →  [+LARGE] (exceptions:  when $C_3$ =  r )

     e   →  [+LARGE] (exceptions:  when $C_3$ =  r )

     o   →  [+LARGE]

     u   →  [+LARGE] (exceptions:  when $C_3$ =  r )

(7)  $r_3$  →  [−LARGE] (exceptions:  when V =  o )

     $t_3$  →  [−LARGE] (exceptions:  when V =  o )

     $d_3$  →  [−LARGE] (exceptions:  when V =  o )

     $ɗ_1$  →  [−LARGE]

(8)  $l_3$  →  ∅  (i.e. has no phonosemantic value for size)

(9)  $k_3$  →  [+LARGE] (exceptions:  when $C_1$ = ɗ or V = i̱ )

     $g_3$  →  [+LARGE] (exceptions:  when V = i̱ )

     $ɓ_1$  →  [+LARGE]

     $gb_1$ →  [+LARGE] (exceptions:  when $C_3$ =  r )

     $s_1$  →  [+LARGE]

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    →  [αLARGE]
                [αwide]

(11)              $C_3$  →  [αLARGE]
                $\begin{bmatrix} -\alpha lv \\ \alpha vel \end{bmatrix}$

(12)              $C_1$  →  [αLARGE]
                [αgrave]

5.2.2.  <u>Phonosemantic hierarchy for size</u>.  Rather than present the case as above, with exceptions to rules, we can isolate a system of hierarchical or-ganization inherent in the presentation.  This is done below, with higher values for $n$ representing a higher level on the hierarchy.  Elements on high-er 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.

Level n  :   o  = LARGE; $\underline{i}$ = SMALL

Level n-1:   $\text{b}$  = LARGE: $g_3$  = LARGE; $r_3$  = SMALL

Level n-2:   $\widehat{gb}_1$  = LARGE; $d_1$  = SMALL; $\underline{e}$  = SMALL

Level n-3:   $k_3$  = LARGE

Level n-4:                        $\underline{o}$  = 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 pho-
nosemantic values we can explain the meanings of Nembe size ideophones.  The
following are a sampling from the list, with appropriate comments in paren-
theses:

(13)    lekeleké      'thin, lean'  ( $\underline{e}$  displaces  $k_3$ )

        gbokogbokó    'very tall or long'  ( $k_3$  displaces  $\underline{o}$ )

        nikonikó      'thin, slender, emaciated'  ( $\underline{i}$  displaces  $k_3$ )

        kutekuté      'tiny'  (harmony, no displacements)

        purupurú      'fine, small'  (harmony, no displacements)

        yegeyegé      'very large'  ( $g_3$  displaces  $\underline{e}$ )

        sokosokó      'tall or high'  (harmony, no displacements)

        sorosoró      'bulgy, swollen' ( o  displaces  $r_3$ )

        kpotokpotó    'bold, well-marked'  ( o  displaces  $t_3$ )

        yikayiká      'enormous, very large'  (harmony, no displacements)

        kiríkiri      'shallow, not deep'  ( $r_3$  displaces  i )

        yagiyagí      'tiny, bony'  ( $\underline{i}$  displaces  $g_3$ )

From the foregoing, we can safely conclude that the vowel and the $C_m$ con-
sonant together are most responsible for conveying size.  However, the ques-
tion 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 id-
eophone  sorosoró  'bulgy, swollen'.  The following can roughly be said to
represent the displacement process:

| | Phonosemantic unit | Context | Size Designation | Shape Designation |
|---|---|---|---|---|
| (a) | $V = o$ | 1. In isolation | LARGE | ? $\emptyset$ |
| | | 2. In construction with $r_3$ | LARGE | ? $\emptyset$ |
| (b) | $C_3 = r$ | 1. In isolation | SMALL | ? $\emptyset$ |
| | | 2. In construction with $o$ | $\emptyset$ | ROUNDED,BLUNT |

As a phonosemantic process this can be represented thus:

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

In the same way, native speaker interviews show that $[k_3]$ in 4-syllable id-
eophonic forms when displaced from its primitive value LARGE (by $[\underline{i}]$ and
$[\underline{e}]$) refers to angular, thin, sharp-ended shape as opposed to the blunt-end-
ed, 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 re-
fer to balls, pellets, and other rounded or oval shapes. Therefore the fol-
lowing adjusted rule for $[k_3]$ seems to be well-motivated:

(15)  $k_3 \rightarrow \begin{cases} [+\text{LARGE}] \\ [+\text{ANGULAR}] \; / \; \begin{matrix} V \\ \begin{bmatrix} -\text{low} \\ -\text{wide} \\ -\text{back} \end{bmatrix} \end{matrix} \; --- \; \begin{matrix} V \\ \begin{bmatrix} -\text{low} \\ -\text{wide} \\ -\text{back} \end{bmatrix} \end{matrix} \end{cases}$

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, twisted-
ness, roundedness—in other words, to regular or irregular geometrical config-
urations. The following are a sample of shape ideophones (see Appendix, C
for a fuller list):

(16) ɓaguluɓagulu       'flexuous, undulating'

ɓaguluɓagulu       (same as ɓaguluɓagulu , but of a smaller object)

ɓagulúu            'flexuous, crooked'

ɓagulúu            (same as ɓagulúu , but of a smaller object)

ɓekeléɓekele       'tisted, uneven'

ɓákalaɓákala       'sinuous, tortuous, crooked'

ɓogoloɓogolo       'bold, big, large'

gbolológbololo     'straight (and wide/neutral)'

gborórogboróro          "

gorórogoróro            "

gororógororo       'straight and narrow'

feleléfelele       'straight'

téletéle           'scattered'

salasalá                "

yarayará           'sharp and pointed'

yoroyoró                "

## 6.1. Phonosemantic rules for shape.

We may now proceed to formulate phono-semantic 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) $a_2\text{-}a_4\text{-}i_6$ → $\begin{bmatrix} +\text{CROOKED} \\ -\text{LARGE(R)} \end{bmatrix}$

$a_2\text{-}i_4\text{-}i_6$ → $\begin{bmatrix} +\text{CROOKED} \\ -\text{LARGE(R)} \end{bmatrix}$

$a_2\text{-}u_4\text{-}u_6$ → $\begin{bmatrix} +\text{CROOKED} \\ -\text{LARGE(R)} \end{bmatrix}$

$a_2\text{-}a_4\text{-}i_6$ → $\begin{bmatrix} +\text{CROOKED} \\ +\text{LARGE(R)} \end{bmatrix}$

$a_2\text{-}i_4\text{-}i_6$ → $\begin{bmatrix} +\text{CROOKED} \\ +\text{LARGE(R)} \end{bmatrix}$

$$a_2\text{-}u_4\text{-}u_6 \quad \rightarrow \quad \begin{bmatrix} \text{+CROOKED} \\ \text{+LARGE(R)} \end{bmatrix}$$

(18)  $a_2\text{-}a_4\text{-}a_6 \quad \rightarrow \quad \emptyset$  (i.e. has no phonosemantic value)

(19)  $e_2\text{-}e_4\text{-}e_6 \quad \rightarrow \quad \begin{bmatrix} \text{-CROOKED} \\ \text{+LARGE(R)} \end{bmatrix}$  (exceptions:  $C_3 \neq = C_5$)

$$o_2\text{-}o_4\text{-}o_6 \quad \rightarrow \quad \begin{bmatrix} \text{-CROOKED} \\ \text{+LARGE(R)} \end{bmatrix}$$

(20)  $\unicode{x253}_1\text{-}g_3\text{-}l_5 \quad \rightarrow \quad [\text{+CROOKED}]$  (exceptions:  V = o )

$\unicode{x253}_1\text{-}k_3\text{-}l_5 \quad \rightarrow \quad [\text{+CROOKED}]$

$gb_1\text{-}l_3\text{-}g_5 \quad \rightarrow \quad [\text{+CROOKED}]$

$k_1\text{-}d_3\text{-}g_5 \quad \rightarrow \quad [\text{+CROOKED}]$

$k_1\text{-}g_3\text{-}l_5 \quad \rightarrow \quad [\text{+CROOKED}]$

(21)  $f_1\text{-}l_3\text{-}l_5 \quad \rightarrow \quad [\text{-CROOKED}]$

$gb_1\text{-}l_3\text{-}l_5 \quad \rightarrow \quad [\text{-CROOKED}]$

$gb_1\text{-}r_3\text{-}r_5 \quad \rightarrow \quad [\text{-CROOKED}]$

$g_1\text{-}r_3\text{-}r_5 \quad \rightarrow \quad [\text{-CROOKED}]$

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　　→　$\left[\begin{array}{c}\text{+CROOKED} \\ \alpha\text{LARGE(R)}\end{array}\right]$

　　　　$\left[\begin{array}{c}\text{+apophony} \\ \alpha\text{wide}\end{array}\right]$

　　b.　　V-Melody　　→　$\left[\begin{array}{c}\text{-CROOKED} \\ \alpha\text{LARGE(R)}\end{array}\right]$

　　　　$\left[\begin{array}{c}\text{-apophony} \\ \text{-low} \\ \alpha\text{wide} \\ \beta\text{round}\end{array}\right]$

　　　　exceptions: when C-Melody = [+assonance] and β = - .

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

　　c.　　V-Melody　　→　$\left[\begin{array}{c}\alpha\text{CROOKED} \\ \beta\text{LARGE(R)}\end{array}\right]$

　　　　$\left[\begin{array}{c}\alpha\text{apophony} \\ \beta\text{wide}\end{array}\right]$

(23)　　　C-Melody　　→　$[\alpha\text{CROOKED}]$

　　　　[αassonance]

## 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　　= STRAIGHT + αLARGE;　　C-Melody　　= CROOKED

$\left[\begin{array}{c}\text{-apophony} \\ \text{-low} \\ \text{+round} \\ \alpha\text{wide}\end{array}\right]$ 　　　　　　　　[+assonance]

Level n-1:　　V-Melody　　= CROOKED + αLARGE;　　C-Melody　　= STRAIGHT

$\left[\begin{array}{c}\text{+apophony} \\ \alpha\text{wide}\end{array}\right]$ 　　　　　　　　[+assonance]

Level n-2:　　V-Melody　　= STRAIGHT + αLARGE

$\left[\begin{array}{c}\text{-apophony} \\ \text{-high} \\ \text{-low} \\ \text{-round} \\ \alpha\text{wide}\end{array}\right]$

On the basis of the foregoing, the meanings of the following ideophones

can be justified:

(24)  ɓekeléɓekele     'twisted, uneven'  ( ɓ-k-l  displaces  e-e-e )
      ɓákalaɓákala     'crooked'  ( ɓ-k-l  only takes meaning)
      gororógororo     'straight and narrow'  (harmony, no displacements)
      gbororógbororo   'straight (and wide/neutral)'  (harmony)
      kadigíkadigi     'twisted (and large/neutral)'  (harmony)
      feleléfelele     'straight'  (harmony)
      ɓogoloɓogolo     'bold, big, large'  ( o-o-o  displaces  ɓ-g-l )
      mũgurúmũguru     'plump'  ( u-u-u  displaces  m-g-r )
      kpokorokpokoró   '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 $C_3$ and $C_5$ positions, are directly in opposition, none higher in status than the other.  They therefore cancel each other out, leaving as residue the other value $\alpha$LARGE(R) conveyed by the vowel.  A detailed investigation using native-speakers indicates that forms satisfying the two conflicting conditions (such as  kpokorokpokoró , ɓogoloɓogolo , 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    →    ⎧  ⎡ −CROOKED ⎤          ⎫
                          ⎪  ⎣ $\alpha$LARGE(R) ⎦          ⎪
      ⎡ −apophony ⎤       ⎨                          ⎬
      ⎢ −low      ⎥       ⎪  [$\alpha$ROUND] /   C-Melody  ⎪
      ⎢ +round    ⎥       ⎩              [+assonance]  ⎭
      ⎣ $\alpha$wide     ⎦

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

[$\alpha$LARGE(R) + $\alpha$ROUND]

This, in addition to the suggestion made by $C_1$, will constitute the full meaning of the appropriate ideophone.  As stated earlier, $C_1$ values are often difficult to fathom.  However, with the entries in (26),

(26) $m_1 \rightarrow$ [+SOFT]

$\widehat{kp}_1 \rightarrow$ [+WELL–MARKED]

$\widehat{gb}_1 \rightarrow$ [+WELL–MARKED]

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

(27) kpokorokpokoró   LARGE(R) *and* ROUND *and* WELL–MARKED

gbódoróo        LARGE(R) *and* ROUND *and* WELL–MARKED

mõgolomõgolo    SOFT *and* SMALL *and* THIN

mũgurúmũguru    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:

scattered                         =   [+SCATTERED]

straight, sharp and pointed, etc. =   [–SCATTERED]

(28)     $C_3 \rightarrow [\alpha\text{SCATTERED}]$

$\begin{bmatrix} \alpha\text{lateral} \\ +\text{liquid} \end{bmatrix}$

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

(29) teletelé   'sporadic, scattered'

kúlakúla   'strewn, scattered'

salasalá   'protruding, scattered'

karákara   'straight, without curve, vertical, upright'

yoroyoró   'sharp and pointed'

yarayará         "

7.   Conclusions

In Nembe ideophones, size and shape descriptions are very closely inter-
connected probably owing to the affinity existing between these two sub-
fields.  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 ($C_3$) conso-
nants) also make contributions in addition to vowels seen in the case of rela-
tive 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 construc-
tion.  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  $[g_3]$  (for largeness) and  $[r_3]$  (for smallness)
and perhaps also  $[ɓ_1]$  (for largeness), and so on.  Least clear or relevant
contributions to meaning are in general those made by $C_1$ (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 melo-
dies, as opposed to lone segments, make relevant contributions.  Consonant
melodies involving assonance or polarization in the $C_3$ and $C_5$ positions sug-
gest crookedness, while those not involving polarization, i.e. with identical
$C_3$ and $C_5$ consonants, suggest straightness.  In the same vein, vowel melodies
involving apophony or polarization suggest crookedness, while those not in-
volving polarization, suggest straightness.  The two processes can really be
viewed as one ontological phenomenon representable by the following rule:

(30)   Prosodic Melody  →  [αCROOKED]
      [αpolarized]

Once again, however, a system of hierarchy controls ultimate phonosemantic 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 $C_3-C_5$ consonant sequence (for crookedness). The other meaning-bearing melodies exist at a lower level. As is not clearly evident for size ideophones, it is seen that in addition to pure displacement interactions, 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 fundamental 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 inventory 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 elucidation of phonosemantic phenomena.

APPENDIX

A.  Ideophones of relative size

    dégerée           'not too low (house)'

    dégerée           'low (house)'

    garakíi           '(standing) strong and erect'

    garakíi                 "          (but of smaller object)

    gororóo           'straight (and wide)'

    gororóo           'straight and narrow'

    gbalagígbalagi   'coiling, winding, twisting'

    gbalagígbalagi         "          (but of smaller object)

    kagulúkagulu   'crooked'

    kagulúkagulu     "   (but less emphatic or smaller in size)

    kágulúu          'twisted, rugged'

    kágulúu              "          (but of smaller object)

B.  Ideophones of absolute size

    buruburú         'dusty, finely powdered (like dust)'

    buruburú               "

    búrẽbúrẽ        'not thick, scanty (of hair or brush)'

    ɗokoɗokó        'slim, narrower at base'

    ɗureɗure       'unexpectedly small (of many things)'

    ɗúrée           'unexpectedly small'

    girísigirísi     'gritty'

    gorogoró        'skinny, thin'

    gburugburú      'sedimentary'

    gbugburúu      'unexpectedly small'

    kelukelú       'dwarfish, stunted (esp. mangrove)'

    kétukétu       'dwarfish'

    kiríkiri       'shallow, not deep'

    kokorikokori    'not deep (not fleshy)'

    kokorókokoro    'shallow'

    kutekuté       'tiny'

    mõgolomõgolo   'willowy, thin'

    nikonikó       'thin, slender, emaciated'

| | |
|---|---|
| ỹẽgiỹẽgí | 'very fine and small (writing)' |
| petepeté | 'tiny, very small' |
| purepuré | 'fragmentary' |
| purupurú | 'fine, small (grains), fragmentary' |
| wenewené | 'fine, thin, tiny (sand)' |
| yaglyagí | 'tiny and bony (fish)' |
| lekeleké | 'thin, lean' |
| ɓagiríi | 'robust, big' |
| ɓogoloɓogolo | 'bold, big, large (grain, writing, etc.)' |
| ɓógolóo | " |
| ɓoloɓoló | 'large and rounded (eyes), bold (writing)' |
| ɓuleɓulé | 'bulgy (eyes)' |
| ɓúlelée | " |
| ɓuleɓulé | " |
| gódogbóo | 'huge, very large, stout' |
| gbodogbodó | 'bold (figures)' |
| gbódogóo | 'extraordinarily large' |
| gbódoróo | 'bold, well-marked (writing, wound)' |
| gbógboróo | 'thick, muscular' |
| gbogolóo | 'noticeably large' |
| gbokogbokó | 'very tall or long' |
| kpokorokpokoró | 'bold, well-marked (numerous)' |
| kpókoróo | 'bold, well-marked (single), stout' |
| kpotokpotó | 'bold, well-marked' |
| mũgurúmũguru | 'plump' |
| sokosokó | 'tall or high' |
| solosoló | 'long' |
| sorosoró | 'bulgy, swollen' |
| wolowoló | 'large (meshes), very wide' |
| wokowokó | 'very high and full (spring tide)' |
| yikayiká | 'enormous, very large' |
| yegeyegé | 'very large' |

C.  <u>Ideophones of Shape</u>

| | |
|---|---|
| ɓagu̱lu̱ɓagu̱lu̱ | 'flexuous, undulating (stick, road, rope, etc.)' |
| ɓagu̱lu̱ɓagu̱lu̱ | (same as ɓagu̱lu̱ɓagu̱lu̱ , but of a smaller object) |
| ɓagu̱lúu | 'flexuous, crooked (stick, road, *rope)' |
| ɓagu̱lúu | (same as ɓagu̱lúu , but of a smaller object) |
| ɓákalaɓákala | 'sinuous, tortuous, crooked (road, stick)' |
| ɓakaláa | 'twisted (road, stick, *rope)' |
| ɓekeléɓekele | 'twisted, uneven' |
| gbalagígbalagi | 'coiling, winding, twisting' |
| gbalagígbalagi̱ | (same as gbalagígbalagi , but of a smaller object) |
| kadigíkadigi | 'twisted, covered with protuberances' |
| kadigíkadigi̱ | (same as kadigíkadigi , but of a smaller object) |
| kagu̱lúkagu̱lu | 'very uneven, crooked (road, wood surface)' |
| kagu̱lúkagu̱lu̱ | (same as kagu̱lúkagu̱lu , but of a smaller object) |
| kágu̱lúu | 'twisted, rugged' |
| kágu̱lúu̱ | (same as kágu̱lúu , but of a smaller object) |
| yakayaká | 'ripply' |
| kúlakúla | 'strewn, scattered' |
| téletéle | 'sporadic, scattered, fallen wide apart' |
| salasalá | 'protruding, scattered (bones)' |
| ỹ̌egeỹ̌egé | 'distended' |
| feleléfelele | 'straight (road)' |
| feleĺée | " |
| gbolológbololo | 'straight (and wide/neutral)' |
| gbololóo | " |
| gbórórogbóróro | " |
| gbororóo | " |
| gorórogoróro | " |
| gororóo | " |
| gororógororo | 'straight and narrow (stick, legs)' |
| gororóo | " |
| yarayará | 'sharp and pointed' |
| yoroyoró | " |
| karákara | 'straight, without curve, vertical, upright' |

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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 LAClTO'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                          TONE 1

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"

P. Bancel, P. Dupont, J.M. Hombert, A.M. Mortier & G. Puech, "An expert
     system for comparative linguistics:  application to Bantu languages"

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

Michele Emanatian, "Chagga relative tense and grammatical polysemy"

C. De.Bose and N. Faraclas, "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  bɪn , fɔ  &  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"

R.M.R. Hall & E.Y. Abend, "The Nilotic numeral system:  a historical survey"

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  saì  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 relexification:
    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 plan-
    ning 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-trajector
    SVCS in Gɛ̃gbě"

Richard Campbell, "Case & word-order in Akan serial verbs"

Caroline Isukul, "Serial verb construction in Ogbia"

Ann Biersteker, " Hìvyo , ndìvyo - "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  /?/  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

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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 Eyamba G. Bokamba
20th Annual Conference on African Linguistics
Department of Linguistics
707 South Mathews Ave.
University of Illinois
Urbana, IL 61801
USA
Tel:  (217) 333-3563

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 accomodate 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
        ITALY

SOCIETE FRANCAISE POUR LES ETUDES ETHIOPIENNES

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.

The Society is administered by a Committee and was registered in the French Republic Gazette (Journal Officiel de la République Française) of July 10th 1982. It is managed by a Board assisted by the Committee. The Board for 1988 is compounded of: Jean Jeclant, Président; André Caquot, Jean Dorst, Henri Labrousse, and Maxime Rodinson, Vice-Presidents; Mlle. Béatrice Peltier, Secrétaire; and Henri Labrousse, Trésorier.

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> FRANCE

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