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The Phonological Status of Downstep in Bakweri*

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1. Overview

Bakweri is a Bantu language spoken in Cameroon in and about the town of Gbwea. As in many other African tone languages, the sound system of the language makes liberal use of tonal downstep: in numerous environments, there can be a tonal drop (typically about a minor third) between two adjacent high tones, thus redefining a new, lowered pitch level for the second of the two high tones and for ensuing high tones within the current tonal group. Downstep can occur within a single word or across word boundaries. It can arise as a phonological adjustment to the underlying tone sequence High-Low-High; or, for a wide range of grammatical constructions, downstep can be an intrinsic part of the morpho-tonological tone contour which characterizes the construction.

Following a preliminary sketch of Bakweri morphology, Part 5 of this paper will dissect the former, or phonological, type of downstep, noting the heavy morphological and even syntactic restrictions operating on it. Part 6 will then present the various constructions in which the latter, or grammatical, type of downstep figures. Part 8 will propose the reinterpretation of grammatical downstep, at a deeper level, as phonological downstep operating on a floating low tone. Powerful internal motivation for doing this will be presented, with one major disclaimer. Parts 10 & 11 will present two perspectives on how not to view downstep. Finally, the floating-tone reanalysis will be put to work for the purposes of internal reconstruction, to provide a plausible diachronic account of the polar tone of the negative morpheme 'za'.

2. Tones, Downdrift, and Downstep

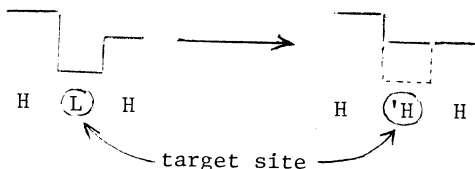
Bakweri has five "basic" tonemes, which it will be useful to present in two notational schemas:

| <u>Tone</u> | <u>Diacritic Notation</u> | <u>Letter Notation</u> |
|---------------|---------------------------|------------------------|
| High | / | H |
| Low | \ | L |
| Falling | ^ | HL |
| Rising | v | LH |
| Downstep-High | /' | 'H |

There are, in addition, several "complex" tones (rising-falling, falling-rising) which are rare and highly constrained; they will be ignored. The downstep tick mark ' specifies the second tone in a sequence H'H as being a downstepped high tone. This should not be thought of as a mid tone; rather, as indicated above, it establishes a new pitch baseline for ensuing high tones. The tones as given here are taxonomic phonemic in intent --- that is,

this is the tonemic inventory required to transcribe what you hear, rather than constituting a deeper tonemic level from which surface tones might be generated by rule. The contour tones bear a much lighter functional load in the language than do the level H and L tones, and usually arise as combinations of underlying H and L tones.

In Bakwéri, as in many other African languages, two high tones in a sequence H-L-H (or H-L-L-H, H-L-L-L-H, etc.) are not on the same pitch; the second is lower. This phenomenon is called downdrift. The overall tone drop in question is roughly that characteristic of a downstep, and in fact downstep often arises from a more basic, underlying H-L-H sequence:



Downstep which arises in this way will be termed phonological downstep. Note that the target site --- the syllable whose surface tone is 'H --- is underlyingly low-toned.

Opposed to this is grammatical downstep, where the target site is underlyingly high-toned. As part of the morphotonological specification of some grammatical construction, this H becomes a downstep-H with respect to a preceding H. Thus, for the root 'kóka' "bite", we can contrast:

| | | |
|---------------------------|------------|--------------------|
| he didn't bite(Yesterday) | a-zí-kok-e | (without downstep) |
| he won't bite | a-za-kok-a | (with downstep). |

Restating the two types schematically:

Phonological Downstep: phonologically derived from downdrift.

Target site is underlyingly L.

Grammatical Downstep: part of the morphotonological definition of a grammatical construction. Target site is H.

In principle, the overall tone drop characteristic of a downstep can appear in three distinct types of bisyllabic sequences:

/ ' / ^ / / \ .

It should be noted at the outset that the above three sequences all exist and are contrastive in surface structure; consider, for example, the minimal tone pair:

| | | | |
|----------------|-----------|---|---------|
| he won't build | a-za-óngá | → | azóngá |
| he won't grow | a-za-óngá | → | azóngá. |

The three sequences do tend to merge phonetically, however, notably in fast speech.

Note that the downstep tick makes sense only in the sequence H'H. In sequences such as H'L or L'H, which may be

generated by the morphotonology, the "downstep" is phonetically meaningless and may be erased and ignored. But the phonetically meaningless downstep can have morphophonological significance, and the issue will require reconsideration --- see sections 8 and 9.

3. Vowel and Tone Blending

Vowel blending across morpheme boundaries is a pervasive phenomenon in Bakweri, not only within a single word but among adjacent words in a sentence. When it applies, vowel blending acts on an underlying configuration $V_1 + V_2$ and either tracelessly deletes V_1 or replaces it with a 1 (roughly) homorganic glide. The tonological concomitant of vowel blending is a very simple tone-blending rule: put both tones on the surviving vowel V_2 . If the tones are different, a contour tone arises. Contour tones usually further simplify to level tones by various tone absorption processes, which will be assumed and invoked in this paper wherever necessary.

Within a single word, vowel blending is rigidly governed by verbal or nominal morphophonemics; an example is 'àzóngá' above. Across a word boundary, vowel blending is extremely common, and seems to be largely governed by prosodic factors such as pauses and speed of delivery. For example, for "he is washing" there are both a slow, deliberate citation version and a fast, spontaneous blended version:

\`avé\`li \`azoza \(\rightarrow\) \`avel\`azoza.

Thus for the linguist a transcribed stretch of Bakweri speech is not transparently segmentable into words; the tracelessly deleted vowels must be resupplied.

4. General Noun and Verb Structure

Prior to undertaking the specific morphotonological analysis of downstep, it is necessary to provide some idea of the scope of the notion "verb tense" in Bakweri, and a capsule summary of the rich and highly structured morphology of verbs and nouns in the language. There are a good many simple independent positive verb tenses in Bakweri. But the overall verb system is much richer. As is common in Bantu languages, the negative counterparts of the positive verb tenses count morphologically as independent tenses in their own right. Furthermore, Bakweri has distinct morphological tense forms for a verb as it appears in an independent clause, in a subject-relative clause ("he who VERBs"), and in an object-relative clause ("that which he VERBs"). The dimension of negativity crosscuts this trichotomy, and the further dimension of reflexivity crosscuts the entire system. I present in the table on the next page a summary of the "tenses" of Bakweri; a line (—) indicates that the specified morphological tense form does not exist. For fuller detail cf. Gensler 1980.

To this elaborate inventory of tenses corresponds an elaborate verbal morphology. The verb in Bakweri segments

| | <u>Independent</u> | | <u>Subj Rel-C1</u> | | <u>Obj Rel-C1</u> | |
|----------------|--------------------|-----|--------------------|-----|-------------------|-----|
| | Pos | Neg | Pos | Neg | Pos | Neg |
| Yesterday | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| While-Ago | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Just-Now | ✓ | ✓ | ✓ | ? | ✓ | ✓ |
| Perfect | ✓ | ✓ | — | ✓ | ✓ | ✓ |
| Progressive | ✓ | — | ✓ | — | ✓ | — |
| Present-Future | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Subjunctive | ✓ | ✓ | | | | |
| Narrative-Then | ✓ | ✓ | | | | |
| Before-Past | ✓ | — | | | | |
| When-Future | ✓ | ✓ | | | | |
| Imperative | ✓ | — | | | | |
| Infinitive | ✓ | — | | | | |

naturally into an agglutinative sequence of slots (underlined slots occur obligatorily):

SB - (TNS-NG) - (OB) - (REFL) - ROOT - (EX) - FL .

Here SB and OB are the class prefixes (see below, Nouns) specifying the gender/number of the subject and object NPs; REFL is a special marker -áá- appearing only with reflexive tenses; TNS-NG covers various tense and negative markers, including zero for certain tenses; EX is a valence-changing extension(s) added onto the ROOT; and FL is the final vowel. All of the affixes involved here are monosyllabic. Normally the rule is "One morpheme per slot"; however, the slot EX may hold a sequence of monosyllabic morphemes. A particular verb tense is specified morphologically by applying a characteristic tone contour over the verb, and (for certain tenses only) by choosing a TNS-NG marker and/or changing the FL vowel. The ROOT has lexical tone, as do the prefixes in the four preceding slots; EX and FL are intrinsically toneless, their tone being a function of the particular tense. Examples follow; here and elsewhere in the paper I will be using as "parade examples" the high and low-toned roots 'kóka' "bite" and 'zòza' "wash".

| | SB | TNS-NG | OB | ROOT | FL |
|----------------------------|----|--------|-------|------|----|
| they bit me (Yest) | vá | má | nò | kók | á |
| he didn't bite them (Yest) | à | zí | vá | kók | è |
| he who bit (Yest) | à | má' | - - - | kók | á |
| he has washed | á | má' | - - - | zòz | à |
| he bit (Just-Now) | à | - - - | - - - | kók | ì |

Note in particular that negative tenses are characterized by 'zi' or 'za' in the TNS-NG slot.

The various verb tenses can be represented schematically in abstract "phonological tense matrices". Ignoring for simplicity the REFL, OB, and EX slots, certain of the above tenses would be represented as follows:

| | |
|---|----------------------|
| Positive Yest | SB - ma - ROOT - á |
| Negative Yest | SB - zí - ROOT - è |
| Positive Yest, Subj-Rel-Cl (low-toned SB only) | SB - ma' - ROOT - á. |

In this last case, downstep appears as an integral part of the matrix, an example of grammatical downstep. Note that plugging in the low-toned root 'zòza' will yield here

à - ma' - zòz - á.

As remarked in section 2, the downstep in a sequence H'L is meaningless, so the form becomes the actually occurring

à-ma'-zòzá.

Thus in all cases both high and low-toned roots are encompassed in a single unitary formula for the tense.

Nouns are far simpler. A noun falls into the general syntagmatic mold
 PREF - STEM,
 where PREF is the Bantu class prefix specifying in portmanteau fashion both number (sg/pl) and gender (noun class); one class has a zero prefix. The STEM can take various lexically determined tone patterns. A few examples are:

| | |
|---------|----------|
| bird | i-nóní |
| chicken | ∅-wuvá |
| water | má-livá. |

5. Phonological Downstep

The salient fact about phonological downstep is that the process of downstep formation (H-L-H → H-'H-H) is in all cases highly constrained grammatically. Within the noun, the environment for phonological downstep does not seem to arise. Within the verb, only low-toned ROOT morphemes may serve as the target site for phonological downstep, which applies there obligatorily. Thus:

| | | |
|------------------------|--------------|----------------|
| he washed him (Yest) | à-ma-mò-zòzá | (no downstep) |
| he washed it(=knife) | à-ma-li-zòzá | → à-má-li-zòzá |
| he hasn't washed | à-zí-zòzí | → à-zí-zòzí |
| they washed (Just-Now) | vá-zòzí | → vá-zòzí. |

Other low-toned morphemes cannot be the target site for downstep. Thus:

| | | |
|----------------------------|------------|-------------------|
| they bite him | vá-mò-kòkà | (OB mò unchanged) |
| they bit (Yest) | vá-má-kòkà | (TNS-NG má ") |
| they didn't bite(Just-Now) | vá-zà-kòkì | (TNS-NG zà "). |

We see here a morphological constraint at work on phonological downstep.

Phonological downstep may also apply across a word boundary, as part of the general phenomenon of inter-word tone sandhi. Here the pattern H-L-H may be distributed over the two words in two ways:

| | | |
|--------------------|-------|--|
| they are eating | H-L#H | vá- <u>vèlì</u> vá-lá → vá- <u>vèlì</u> vá-lá |
| I saw water (Yest) | H#L-H | námèné <u>má</u> lívá → námèné <u>má</u> lívá. |

Inter-word downstep of this sort does not apply across the board to all possible H-L-H sequences, and the precise controlling factors remain to be worked out. Downstep apparently can occur only if the two words are part of a single breath-group, i.e. if they are not separated by a pause. In such circumstances downstep usually occurs intra-clausally, but apparently tends not to occur across an independent-clause sentence boundary. Here, then, the grammatical constraint is not morphological but syntactic.

6. Grammatical Downstep

The cases of grammatical downstep can be subdivided into three groups: verb constructions, noun definiteness, and inter-word floating downstep. I will examine each of these in turn.

a. Verb constructions

There are five different groups of verb tenses characterized by grammatical downstep, covering a somewhat bewildering variety of constructions. The examples will contrast the high-toned root 'kòkà' "bite" and the low-toned 'zòzà' "wash". In the first three groups, the target site is the (underlying H) verb ROOT.

1. The three negative tenses formed with the (polar-tone) TNS-NG morpheme 'za':

| | | | |
|---------------------------|-------------|----|-------------|
| he didn't VERB(While-Ago) | à-zà-kòkèáì | vs | à-zà-zòzèáì |
| he didn't VERB(Just-Now) | à-zà-kòkì | | à-zà-zòzì |
| he won't VERB | à-zà-kòkà | | à-zà-zòzà |

(The morpheme 'za' is said to have polar tone because it is low after a high-toned SB, and high after low. Thus compare the above examples with:

| | | |
|-----------------|------------|---------------|
| they won't VERB | vá-zà-kòkà | vá-zà-zòzà.) |
|-----------------|------------|---------------|

Contrast the grammatical downstep of 'za' with the straightforward behavior of the other TNS-NG negative marker 'zi':

he didn't VERB (Yest) \`a-zí-kóké vs \`a-zí-zòzè.

2. The Positive Yesterday Subject-Relative-Clause tense:

he who VERBed (Yest) \`a-má-kóká \`a-má-zòzá
 they who VERBed (Yest) vá-má-kóká vá-má-zòzá.

Contrast the independent-clause form:

he VERBed (Yest) \`a-má-kóká \`a-má-zòzá.

3. The Narrative-Then tense (used in sequential narrative as the normal storytelling tense):

then he VERBed(isolated) á-kóká á-zòzá
 then he VERBed(context) á-kóká á-zòzá.

Note that in this tense the SB marker is forced to high tone.

4. The Positive Perfect tense:

he has VERBed á-má-kóká á-má-zòzá.

Note that here, too, SB is forced to high tone. The target site for this tense is not the verb ROOT but the high-toned TNS-NG marker 'má'.

5. The entire Reflexive tense series is characterized by a quite unparalleled occurrence of grammatical downstep in the syllable immediately following the ROOT tone. To give only one example:

he VERBed himself (Yest) \`a-má-áá-kóké \`a-má-áá-zòzé.

Note the REFL marker 'áá' and the characteristic FL vowel 'é'. Most especially note the occurrence of phonological downstep with the low-toned root 'zòzá'. Contrast the non-reflexive form:

he VERBed (Yest) \`a-má-kóká \`a-má-zòzá.

b. Noun definiteness

For most noun classes, the indefinite form ("a NOUN") is specified morphologically by a low-toned class prefix, while the definite form ("the NOUN") has a high-toned class prefix with following downstep. (The exceptions are Classes 1 & 9, which form the definite by prefixing 'è-'.) Thus:

mò-lélí "food" lí-òfá "door"
 mò-lélí "the food" lí-òfá "the door".

I am not certain, however, whether we are dealing here with a downstep or a falling tone on the prefix. As remarked in

section 2, the sequences /' / and ^ / can be hard to distinguish; and with definite noun forms, the initial tone sometimes sounds like a downstep, sometimes like a falling tone. If the downstep analysis is the correct one, then noun definiteness should be counted as an instance of grammatical downstep.

c. Inter-word floating downstep

Noun classes 1 and 9 were alluded to above in connection with their exceptional definite form. In these same classes, the indefinite form participates in a special type of inter-word grammatical downstep. Consider the words for "a man" (Class 1) and "a pawpaw" (Class 9):
 múnýaná "man" fɔ́fɔ́ "pawpaw".

So the words appear in isolation. However, following a verb form such as

námakóká "I bit",

and indeed after any H tone, a downstep mysteriously crops up:

I bit a man/a pawpaw námakóká múnýaná námakóká fɔ́fɔ́ .

Contrast an indefinite noun from another noun class, 'mɔ́lɛ́ngu' "sheep" (initial high tone due to vowel blending):

I bit a sheep námakóká mɔ́lɛ́ngu .

This type of downstep stands somewhat apart from the phonological/grammatical dichotomy. I class it as grammatical downstep chiefly because the target site is underlyingly high. But the downstep hardly seems linked to any grammatical construction --- the mere fact of belonging to Class 1 or 9, or of occurring in context after a H tone, hardly counts as a "grammatical construction". It seems reasonable in the present case to ascribe the downstep not to any grammatical construction but to the noun itself. We are thus led to set up the indefinite form of all H-tone-initial Class 1 and 9 nouns with a preceding "floating downstep", thus: 'múnýaná.

The constructions given in this section may be summarized schematically using the matrix notation presented in section 4:

a. Verb constructions

- | | |
|-----------------------------|------------------------------|
| 1. Neg While-Ago | SB - zá' - ROOT - éai |
| Neg Just-Now | SB - zá' - ROOT - i |
| Neg Future | SB - zá' - ROOT - a |
| 2. Pos Yest Subj-Rel-C1 | SB - ma' - ROOT - a |
| 3. Narrative-Then | SB - ROOT - a, SB - ROOT - a |
| 4. Pos Perfect | SB - ma' - ROOT - a |
| 5. Certain Reflexive tenses | X - aa' - ROOT - X |

b. Noun definiteness PREF - STEM

c. Inter-word floating downstep X #' STEM

A note: In many of these cases it might be argued that grammatical downstep should not be seen as a "global" phenomenon, i.e. as part of the overall tone contour specifying the tense, but rather as a local phenomenon, as part of the lexical specification of (say) the affix 'za'. This approach seems to me inadvisable, on two counts:

1. It cannot apply to cases like the Narrative-Then tense or the Reflexive tenses, where there is no special affix to associate the downstep with.
2. The tone on the affix 'za' is not fixed, but is sensitive to (part of) the overall tone contour, specifically to the SB tone: 'za' exhibits polar tone. Thus the grammatical downstep of 'za', occurring only with high-toned 'zá' after low-toned SB, is itself dependent on the overall tone contour.

7. The Incompatibility Problem

In section 6, alongside the forms with H-toned target sites which are subject to grammatical downstep, I made a point of also presenting in the right-hand column the forms which appear when the target site is underlyingly not H but L. Here a very curious correlation emerges: grammatical downstep is incompatible with phonological downstep at the same target site! That is, if for a H-toned target \acute{X}_2 we have grammatical downstep in a particular construction

$$\acute{X}_1 \acute{X}_2 \acute{X}_3 ,$$

then for a L-toned target \grave{X}_2 in the same construction, phonological downstep will be blocked:

$$\acute{X}_1 \grave{X}_2 \acute{X}_3 \quad \not\longrightarrow \quad \acute{X}_1 \acute{X}_2 \acute{X}_3 .$$

Consider by way of example the Neg Future tense in 'za', subject to grammatical downstep, in contradistinction to the Neg Perfect in 'zi' with no downstep:

| | | |
|-------------|----------------------|---|
| Neg Future | \`a-za-kóka (gramm.) | \`a-za-zóza $\not\longrightarrow$ a-za-zóza |
| Neg Perfect | \`a-zi-kóki | \`a-zi-zózi \longrightarrow a-zi-zózi. |

With the low-toned verb root 'zóza', the Future form is parallel tone-for-tone to the Perfect form; the environment is precisely right for phonological downstep on the low-toned ROOT target site; but only with the Perfect form does it occur. Indeed, if there were to turn up a downstepped Future form

$$\grave{a}-za-zóza ,$$

it would be naturally taken as grammatical downstep on a hypothetical H-toned root 'zóza'.

This "incompatibility problem" can arise at all only for some of the cases of grammatical downstep presented in section 6.

Others are excluded in principle. There are two structural requirements which must be met:

1. The grammatical downstep must be embedded in the specific context H'HH and not H'HL.
2. The target-site syllable must be capable of switching to L tone without compromising the grammatical identity of the construction.

The Neg-While-Ago, Neg-Just-Now, and Narrative-Then (isolation) tenses are excluded because their downstep is embedded in the context H'HL. The Perfect tense is excluded because the target site 'má' cannot switch to a low-toned 'mà' without destroying the identity of the tense. The Reflexive forms look suspicious because the low-toned root 'zòza' does undergo phonological downstep. But the target site for this phonological downstep, viz. a low-toned root syllable, is not the same as the target site for grammatical downstep with reflexives, viz. the syllable following a high-toned root; contrast

$\overset{\backslash}{a}\text{-}\overset{\backslash}{m}\overset{\backslash}{a}\text{-}\overset{\backslash}{a}\overset{\backslash}{a}\text{-}\overset{\backslash}{z}\overset{\backslash}{o}\overset{\backslash}{z}\overset{\backslash}{\epsilon}$
 $\overset{\backslash}{a}\text{-}\overset{\backslash}{m}\overset{\backslash}{a}\text{-}\overset{\backslash}{a}\overset{\backslash}{a}\text{-}\overset{\backslash}{k}\overset{\backslash}{o}\overset{\backslash}{k}\overset{\backslash}{\epsilon}$.

And a switch to low at this post-root target site could not occur without destroying the tonal identity of the tense. Hence Reflexive forms too are excluded from consideration.

For the remaining cases, the target site is the initial syllable of the verb ROOT or the noun STEM --- precisely the position which permits lexical tone, either low or high, to be plugged in freely. And every one of these cases exhibits the incompatibility problem: grammatical downstep occurs with high-toned targets, but low-toned targets are immune to phonological downstep. What we have, then, is no sporadic accident, but a quite general property of grammatical downstep. Why should this be so?

A plausible explanation which comes to mind immediately has to do with the avoidance of ambiguity. There are in Bakweri minimal tone pairs such as

$\overset{\backslash}{k}\overset{\backslash}{o}\overset{\backslash}{k}\overset{\backslash}{a}$ "bite"
 $\overset{\backslash}{k}\overset{\backslash}{o}\overset{\backslash}{k}\overset{\backslash}{a}$ "be big" .

These have the distinct Neg Future forms

$\overset{\backslash}{a}\text{-}\overset{\backslash}{z}\overset{\backslash}{a}\text{-}\overset{\backslash}{k}\overset{\backslash}{o}\overset{\backslash}{k}\overset{\backslash}{a}$
 $\overset{\backslash}{a}\text{-}\overset{\backslash}{z}\overset{\backslash}{a}\text{-}\overset{\backslash}{k}\overset{\backslash}{o}\overset{\backslash}{k}\overset{\backslash}{a}$.

Were the latter form subject to phonological downstep, the two forms would merge into a single ambiguous form. To avoid this situation, the argument goes, phonological downstep does not apply. The problem with this explanation is that there are other processes in the morphotonology which have no compunction about creating just this sort of ambiguity. We may consider, for example, the Positive Yesterday forms of the minimal tone pair presented in section 2:

$\overset{\backslash}{o}\overset{\backslash}{n}\overset{\backslash}{g}\overset{\backslash}{a}$ "build"
 $\overset{\backslash}{o}\overset{\backslash}{n}\overset{\backslash}{g}\overset{\backslash}{a}$ "grow" .

Similarly, the floating downstep preceding Class 1 and 9 nouns is now recast as a floating low tone; thus:

I bit a man $\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{u}}\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{y}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{u}}\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{y}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}$.

For the low-toned root 'zòza', phonological downstep does not occur because no environment for it exists; there are two low tones intervening between highs, not just one! Thus:

$\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}}$
 $\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{a}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{n}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{a}}$.

Schematically, $\overset{\backslash}{\underset{\backslash}{X}} - \overset{\backslash}{\underset{\backslash}{X}} \overset{\backslash}{\underset{\backslash}{X}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{X}} - \overset{\backslash}{\underset{\backslash}{X}} \overset{\backslash}{\underset{\backslash}{X}}$.

Thus the incompatibility problem is transformed from a puzzle to a natural byproduct of the analysis.

What I have done here is to replace one theoretical construct by another. Grammatical downstep, a theoretical construct closely tied to the surface, is replaced by the more abstract theoretical construct of floating tones. The justification for this increase in abstraction is the immediate demystification of the incompatibility problem. (And it should be noted that we already have some precedent for the use of floating tones in the tonology, viz. the "floating downstep" preceding the indefinite form of Class 1 and 9 nouns.) The notion of grammatical downstep, to be sure, will remain useful as a descriptive heuristic and label for the phenomena presented in section 6. But it no longer has the status of a theoretical construct.

9. Counterevidence: the Reflexive

It remains to consider a subtle piece of counterevidence to the floating-tone analysis. Recall the Reflexive form built on the low-toned root 'zòza':

$\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}}$.

As explained in section 7, this occurrence of phonological downstep was not a problem in a framework where grammatical downstep was a primary construct --- the target sites were not the same. But it is a problem for a floating-tone analysis. The Reflexive tenses in question were represented by the matrix:

$\overset{\backslash}{\underset{\backslash}{X}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \text{ROOT} - \overset{\backslash}{\underset{\backslash}{X}}$,

which now becomes

$\overset{\backslash}{\underset{\backslash}{X}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \text{ROOT} - \overset{\backslash}{\underset{\backslash}{X}}$.

Plugging in our two standard root-examples, we get

$\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}} - \overset{\backslash}{\underset{\backslash}{\xi}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{k}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{k}} - \overset{\backslash}{\underset{\backslash}{\xi}}$
 $\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}} - \overset{\backslash}{\underset{\backslash}{\xi}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{m}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{a}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}} - \overset{\backslash}{\underset{\backslash}{\xi}} (!)$.

We may compare this last form with the Negative Future

$\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}}$ \longrightarrow $\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}} - \overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{o}}\overset{\backslash}{\underset{\backslash}{z}}\overset{\backslash}{\underset{\backslash}{a}}$,

already mentioned above. In both cases with 'zoza', we have two lows intervening between two highs; the floating low is paired with its left neighbor in the former case, with its right neighbor in the latter. In both cases, the sequence of two lows should block phonological downstep. But in the reflexive forms, phonological downstep occurs anyway!

I have no good explanation for this anomaly, which calls in question the whole floating-tone approach. It seems to me both ad hoc and bizarre to have recourse to a "principle" which "explains" these cases on the basis of which of the two successive low tones is a floating tone. Nowhere else in Bakweri does the sequence HLLH yield a downstep. There is, to be sure, a restricted set of "short" possessive kin terms such as

múnyení 'her husband'

which might be seen as derived from the fuller equivalent

múnyána wení.

But any such "derivation", by virtue of excising substantially more material than in the normal sort of vowel blending (see section 3), would be highly irregular. I prefer to think of these kin terms as an exceptional closed set, lexicalized and learned as such --- rather like the English set

men/oxen/children/brethren.

I reiterate: nowhere in Bakweri does the sequence HLLH yield a downstep.

Faced with this problem, I can only fall back on an appeal to "guilt by association". Grammatical downstep as manifested in the reflexive tense series has already been seen to be "different" in at least two ways. First, the target site is the syllable after the root:

$$X - \overset{\prime}{aa} - \text{ROOT} - \overset{\prime}{X} = X - \overset{\prime}{aa} - \text{ROOT} - \overset{\prime}{X}.$$

Secondly, grammatical downstep applies not to any specific reflexive tense but rather across the board to all reflexive tenses whose non-reflexive counterparts have the matrix

$$X - \text{ROOT} - \overset{\prime}{X}.$$

What I propose to do, then, is to treat reflexives as a "series apart" in yet a third way, and suggest that the representation

$$X - \overset{\prime}{aa} - \text{ROOT} - \overset{\prime}{X}$$

holds only for high-toned roots. Low-toned roots will have a matrix which lacks the floating low tone. This would break the basic unity of the matrix characterization of the tense (see section 4); two different matrices must be invoked, one for high-toned roots and one for low-toned. (There is some precedent for representing a single tense with two different matrices, for example the case of the negative tenses built with the polar-tone

NEG morpheme 'za', as discussed in sections 6,12.) This approach works; for low-toned roots, the matrix

$$X - \overset{\prime\prime}{aa} - \text{ROOT} - \overset{\prime}{X}$$

offers no barrier to the formation of phonological downstep. This does not make the approach any less ad hoc. I see no other option, however, short of rejecting the entire floating-tone analysis and thereby remystifying the incompatibility problem.

10. One Way Not to Look at Downstep

In this and the following section, I wish to clear up two possible misconceptions regarding downstep in Bakweri. First of all, we cannot make the generalization: Grammatical downstep arises when a low-toned morpheme preceding the target site is raised to high for grammatical purposes, according to the schema

$$L-H \longrightarrow H-'H .$$

In principle such an approach is perfectly reasonable, and has been successfully applied (e.g.) to the Chadic language Ga'anda (cf. Newman 1971). But for Bakweri (contra Kingston 1979:160) it is not a useful descriptive procedure. Of the cases of grammatical downstep assembled in section 6, only two clearly belong here (numbering below as in section 6):

- a2. Positive Yesterday Subj-Rel-Cl tense: Raise the independent-clause 'ma' to high-toned 'ma' with following downstep, thus:

$$\overset{\backslash}{a} - \overset{\backslash}{ma} - \overset{\prime}{koka} \longrightarrow \overset{\backslash}{a} - \overset{\prime}{ma} - \overset{\prime}{koka} .$$

- b. Noun definiteness: Raise the basic low-toned class prefix to high with following downstep.

With strain, two other cases could be brought under this heading:

- a1. Negative tenses with 'za': The polar-tone 'za' might be seen as basically low-toned, but grammatically raised to high with following downstep after a low SB marker --- as if

$$\overset{\prime}{va} - \overset{\backslash}{za} - \overset{\prime}{koka} \longrightarrow \overset{\prime}{a} - \overset{\prime}{za} - \overset{\prime}{koka} .$$

- a3. Narrative-Then tense: The Narrative-Then tense (for past narration) might be seen as derived from the Present-Future by raising the SB to high with following downstep (Kingston 1979:160):

$$\overset{\backslash}{a}-\overset{\backslash}{koka}(\text{Pres-Fut}) \longrightarrow \overset{\prime}{a}-\overset{\prime}{koka} (\text{Narr-Then})$$

Note, though, that the same Narrative-Then tonal pattern holds just as well for an underlying high-toned SB marker such as 'va',

$$\overset{\prime}{va}-\overset{\prime}{koka},$$

where there can be no question of raising a low tone to high.

Cases a4 and a5 do not fit into the proposed generalization at all. Note that in the case of a4 there are two markers which

would have to be raised (low-toned SB and TNS-NG 'ma') if one were to attempt to derive the Perfect from the Yesterday tense,

\a-ma-kóka → á-ma-kóka.

Finally, there are several tenses in Bakweri where a low-toned morpheme might just as naturally be seen as "raised to high for grammatical purposes" without engendering downstep:

1. Subjunctive, from the Future:

á-kókè ←———— á-kóka.

2. Narrative-Then Just-Now form, from normal Just-Now tense:

á-kóki ←———— á-kóki.

3. Object-Rel-Cl forms, from corresponding independent-clause forms, for example with the While-Ago tense:

á-kokeai ←———— á-kokeai.

11. Downstep and Vowel Blending

Downstep and vowel blending (section 3) are distinct processes in Bakweri. My focus on examples like

\a - zá - kóka,

where vowel blending does not occur, has been deliberate, and demonstrates that downstep in principle has nothing to do with vowel blending. The two can, of course, interact. Parallel to

he won't bite \a - zá - kóka

we have

he won't build \a - zá - onga → azonga,

which sets the pattern for the behavior of downstep under vowel blending. The blending rule for downstep is:

\V₁' V₂' → \V₂' ;

that is, relocate the downstep after the surviving vowel. The above examples pertain to grammatical downstep with the high-toned roots 'kóka, onga'; but the rule applies just as well to low-toned roots with phonological downstep. Parallel to

he hasn't washed \a-zí-zózi → \a-zí-zózi

we have

he hasn't grown \a-zí-ongi → \a-zí-ongi → azongi.

Downstep formation applies first in this derivation, at a fairly deep level; vowel blending subsequently applies much closer to the surface.

The reverse order of application

*he hasn't grown a - z^í - o^{ngí} → a^zo^{ngí} → a^zo^{ngí}

would not only be hard to motivate in any positive sense, but would be tonologically at odds with the derivation given in section 2:

he won't grow a - za - o^{ngá} → a^zo^{ngá} → a^zo^{ngá}

A contour tone in the sequences \wedge/\vee and $/\vee$ is under no tonological compulsion to become a downstep, but rather resists such a change. This is in sharp distinction to the floating-tone case treated in section 8, where phonological downstep is required to apply to the sequence $\begin{smallmatrix} \wedge & \vee \\ \bar{X} & - & \bar{X} \end{smallmatrix}$. Thus the sequences $\begin{smallmatrix} \wedge & \vee \\ \bar{X} & - & \bar{X} \end{smallmatrix}$ and $\begin{smallmatrix} \wedge & \vee \\ \bar{X} & - & \bar{X} \end{smallmatrix}$,

though identical in terms of overall tone movement, are tonologically very different.

12. An Internal Reconstruction of 'za'

Often an abstract underlying form is only the synchronic image of a concrete reality from an earlier stage of the language. In this concluding section, I will attempt to apply the abstract floating-tone analysis of grammatical downstep so as to illuminate the peculiar polar-tone behavior of the NEG morpheme 'za'. Far from being disconnected quirks, polar tonality and grammatical downstep with 'za' arose together from an earlier and simpler state of affairs.

Depending on the SB tone, 'za' occurs in two different tonal matrices:

$$\begin{array}{l} \begin{smallmatrix} \backslash \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} / \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} / \\ \text{ROOT} \end{smallmatrix} = \begin{smallmatrix} \backslash \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} / \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{ROOT} \end{smallmatrix} \\ \begin{smallmatrix} / \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{ROOT} \end{smallmatrix} \end{array}$$

What is common to these two is that the span 'SB-za-', taken as a unit, ends in a H-L sequence in both cases. That is, H-L spreads over these syllables as best it can, squeezed to the right in the case of a low-toned SB. I suggest that, at an earlier stage of the language, 'za' was associated in some way with a H-L tone sequence --- perhaps as a falling tone 'z^á', perhaps as a blended combination 'z^í-à', perhaps realized in yet another way. A diachronic change occurred, and the H-L sequence became localized leftwards and rightwards, after a H and L-toned SB marker, respectively:

$$\begin{array}{l} \begin{smallmatrix} \backslash \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} / \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} / \\ \text{ROOT} \end{smallmatrix} \longrightarrow \begin{smallmatrix} / \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{ROOT} \end{smallmatrix} \\ \begin{smallmatrix} / \\ \text{SB} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{za} \end{smallmatrix} - \begin{smallmatrix} \backslash \\ \text{ROOT} \end{smallmatrix} \end{array}$$

The latter case is our schema for grammatical downstep; in the former, the floating H tone is absorbed by tone grounding; looking at both together, we see that the morpheme 'za' has "acquired" polar tone. The weakness of this approach lies in the unmotivated leftwards and rightwards localization of H-L,

which I have no good account for. The alternatives are:

1. SB - za - ROOT
- ✓ 2. SB - za - ROOT
- ✓ 3. SB - za - ROOT
4. SB - za - ROOT.

With a low-toned SB, alternative #1 above would create a floating high tone, something unprecedented elsewhere in Bakweri, in just the environment $\begin{matrix} \backslash & / & \backslash \\ X & - & X \end{matrix}$ where it could not easily undergo tone

grounding --- there is no upside-down, high-toned equivalent to downstep formation. No such problem would arise with #2. Regarding #3 and #4, the only suggestion I can make is that the H on the SB marker "absorbed" the now redundant H in the H-L sequence associated with 'za', leaving only a low tone on 'zà', while preserving the overall H-L sequence. (NB: We cannot approach case #3 via the normal tone-absorption rule for falling tones in Bakweri; the tone-absorption rule is

$$\underline{HL} L \longrightarrow H L,$$

while here the tonal sequence of interest is not $\underline{HL} L$ but $H \underline{HL}$.) Flaws and all, however, the present internal reconstruction does provide a unified account of grammatical downstep and polar tone on 'za', confirming the usefulness of the floating-tone approach to downstep.

13. Conclusion

On balance, the merger of phonological and grammatical downstep has been seen to solve more problems than it creates. On the plus side of the ledger we can list the very fact of a unification of downstep, the demystification of the incompatibility problem, and a plausible diachronic account of the polar tone of 'za'; on the minus side, some increase in abstraction, and the conspicuous unsolved difficulty with the reflexive tense series. Moreover, the extension of phonological downstep to grammatical downstep involved no jarring discontinuities or conceptual leaps in the analysis. There was already precedent for the grammatical use of floating tones, in the "floating downstep" which was posited for Class 1 and 9 nouns. In the environment of such a floating low tone, phonological downstep was constrained to apply obligatorily --- and here too there was precedent, for phonological downstep was already highly constrained by quite specific morphological, syntactic, and prosodic factors. As remarked in section 8, none of this invalidates the notion of grammatical downstep as a useful descriptive term. But in a theoretical account of Bakweri morphotonemics, it must give way to the floating-tone analysis.

* This paper focuses on one aspect of my 1980 Master's thesis, and significantly extends the treatment presented therein. My thanks to John Kingston for much fruitful give-and-take spanning several years, and above all to my language informant and friend, Eposi (Mary) Ngomba-Westbrook.

Will Leben, in discussion at the conference, was kind enough to bring to my attention the references Armstrong 1968 and Leben 1971, where a phenomenon in Yala(Ikom) is discussed which is a very close parallel to the incompatibility problem in Bakweri. There the "phonetically meaningless downstep" in the sequence H'L blocks the normal process of Tone Glide Formation,

H L -----> H HL ;

the process applies only to the sequence H-L, not to H'L. This fact becomes comprehensible only if downstep is regarded as an underlying low tone. See the two references cited for details.

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1

I am aware of one case of noun definitization where downstep does occur, indeed appears obligatory. This involves the Class 19 noun for "pot":

j̀nǵ (indef) j̀nǵ (def).

Presumably the underlying forms are respectively

i-̀nǵ j̀-̀nǵ ,

or something similar.

Bibliography

- Armstrong, Robert G. 1968. Yala(Ikom): A Terraced-Level Language with Three Tones. *Journal of West African Languages*, V:1:49-58.
- Gensler, Orin D. 1980. Verbal Morphotonemics of Bakweri. Unpublished UC Berkeley Master's thesis.
- Hyman, Larry M. 1979. A Reanalysis of Tonal Downstep. *Journal of African Languages and Linguistics*, 1:9-29.
- Kingston, John. 1979. Temporal Relations in Bakweri Oral Narratives. *BLS* 5:159-179.
- Leben, William R. 1971. Suprasegmentals and Segmental Representation of Tone. *Studies in African Linguistics*, Volume 2, Supplement 2.
- Newman, Roxana Ma. 1971. Downstep in Ga'anda. *Journal of African Languages*. X: Part 1:15-27.