

VOWEL CONTRACTION AND VOWEL REDUCTION IN MANKON

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1. Introduction

The Mbam-Nkam languages of the Eastern part of the area (in Cameroon) show nouns with the structure CV(C) or NCV(C), where the homorganic nasal (N) is not syllabic. However, in Bangangté, the most South-Eastern variety of Mbam-Nkam, high nouns may be disyllabic before a pause and end on a H or, in some exceptions cases, on a downstepped H vowel of predictable quality:

- (1) ntáné 'market'
kú?ú 'a certain tuber'²

Nouns in this language have no prefixes except occasionally a non-syllabic homorganic nasal in the singular, the plural or both:

- (2) ndú 'husband' pl. dú
bí 'knife' pl. mbí
ndó 'horn' pl. ndó

¹The Federal University of Yaoundé invited the second author to supervise the first author in writing a paper on the phonology of Mankon. The Netherlands Foundation for the Advancement of Tropical Research (WOTRO) provided a travel grant (WR 39-29) which made it possible for them to work together for some weeks in April 1974. During that period we spotted the theoretical importance of certain phenomena. It was decided that the problem would be jointly studied as part of a research project in the Cameroon Highlands during the summer of 1974, directed by Dr. Larry Hyman. The University of Leiden granted the second author another month in the area. The authors profited greatly from discussions with other linguists working in the project, especially with Dr. Larry Hyman. A preliminary version of this paper was presented at the 6th Annual Conference on African Linguistics, University of Ohio, April 11-13, 1975.

²The vertical accent indicates a downstepped or lowered H tone, after which no higher level is possible.

A two-way tonal distinction in verb stems suggests a simple tonal distinction between H and L tone. This analysis, however, complicates enormously the underlying representation of monosyllabic nouns. These already show in isolation a three-way tonal distinction between L, Mid and H:

- (3) mvèn 'chief'
 kʒ 'spear'
 mɛn 'child'

In most other environments they show a two-way distinction. The Mid tone nouns are in some environments grouped with the H tone ones, in other environments with the L tone ones. In the associative construction a seven-way tonal distinction between monosyllabic nouns is found. These facts are explained in Voorhoeve [1971] by positing an associative marker consisting of a floating L or H tone (concording with the nominal class of the first noun), and by accepting three tones for every monosyllabic noun:

- i. a preceding L tone representing a nominal prefix,
- ii. a L or H tone on the nominal syllable,
- iii. a following L or H tone which is part of the lexical morpheme.

Monosyllabic nominal stems in a Bangangté lexicon should therefore be grouped in four tone classes (the tone between brackets represents the "floating" tone mentioned under iii. above):

- (4) a. L(L) -fèn` 'chief'
 b. L(H) -kʒ' 'spear'
 c. H(L) -mɛn` 'child'
 d. H(H) -zwí' 'wife'

Three of them are tonally different in isolation: a. is realized as L, b. as Mid, but c. and d. are both realized as H. the last two tone classes can be differentiated in some environments, e.g., before a particle lá at the end of a relative clause, where mɛn lá is distinct from zwí lá. A H(H) morpheme ending on a consonant has a vocalic release before pause, as demonstrated in (1), while a H(L) morpheme does not have this. Thus, in isolation, one will find ntáné 'market', but mɛn 'child'.

The associative construction has to admit, if this analysis is accepted, not less than three floating tones between the two syllables of the monosyllabic nouns, like in:

- (5) bon mən 'the children of the child'³
 1-3 3

which has the underlying structure:

- (6) /'bón' + ' + 'mɛn'/.

Voorhoeve [1971] claims that all these "floating" tones are based on internal reconstruction only, although the relation with the tones of Proto-Bantu is obvious.

The most Western member of the Mbam-Nkam group, the Mankon language which forms part of the Ngemba cluster and is spoken around Bamenda, offers good comparative evidence for the reality of these floating tones in Bangangté, and at the same time for the way in which these vowels gradually disappeared, until only a floating tone remained. It had already become evident that the nominal prefixes were segmentally expressed in the more Western part of Mbam-Nkam [Dunstan, 1966]. Mankon offers clear evidence for the reality of the other floating tones too. The associative marker is often segmentally expressed, as in:

- (7) mɪ-sɔŋ mɪ bɪ-ləmɛ 'the teeth of the witches'

In isolation the final tone is also expressed on a vowel of predictable quality:

- (8) mɪ-sɔŋɛ 'teeth'
 bɪ-ləmɛ 'witches'
 ŋ-kɛŋɛ 'cornbeer'
 ø-sɪŋɛ 'bird'

All the floating tones set up for Bangangté are expressed in some way

³In complicated tonal phrases in Bangangté, we cannot rely on normal tone marks. The number system uses 1 as the highest tone.

or other in Mankon, if conditions are favorable. Conditions are not always, as in those cases where the associative marker and the nominal prefix are vocalic. An underlying form like

(9) /ʔ-fənə + f + ʔ-bərə/ 'the locks of the fools'

will result in

(10) [ʔfʔn bərə],

in which the three intermediate vowels have only preserved the H tone, manifested in the rising tone on the preceding vowel. The internal evidence, however, is much clearer in Mankon and confirms the Bangangté analysis.

To appreciate the evidence, it is necessary to present the essentials of the Mankon phonology (in section 2), and of the Mankon noun class system (in section 3). A description and interpretation of the vowel contraction in Mankon will be presented in section 4. A final section 5 will contain a discussion of the gradual loss of vocalic features in a historical perspective.

2. An Outline of Mankon Phonology

Only those facts are presented which are absolutely necessary to understand the vowel contraction rules. The underlying form of all Mankon morphemes (except some grammatical morphemes like some pronouns, nominal prefixes and concords) is $C_1V_1(C_2)e$. Both vowels (V_1 and e) can show a tonal distinction between L and H. One has therefore four tone classes of nouns:

- | | | | | |
|---------|-----|---------|--------|------------|
| (11) a. | L L | /-kənə/ | [kənə] | 'squirrel' |
| | | /bənə/ | [bən] | 'bag' |
| b. | L H | /-bʔə/ | [bʔə] | 'termite' |
| | | /-dzə/ | [dzə] | 'soup' |

(11) c.	H L	/-dzɔŋə̃/	[dzɔŋə̃]	'thorn'
		/-dãə̃/	[dã]	'house'
d.	H H	/-kámó/	[kámó]	'crab'
		/-kwáá/	[kwáá]	'paste of yams' ⁴

The possibilities of C_1 are not enumerated, because they do not influence the contraction rules. The position of V_1 can be occupied by nine vowels:

(12)	front	central	back	
	i	ɨ	u	close
	e	ə	o	mid
	ɛ	a	ɔ	open
				} non-close

Examples are:

/-dɪʔá/	[dɪʔá]	'place'
/-bɪʔá/	[bɪʔá]	'termite'
/-fúá/	[fúá]	'mouse'
/-kyə̃ə̃/	[kyə̃]	'basket'
/-témə̃/	[témə̃]	'heart'
/-kónə̃/	[kónə̃]	'bean'
/-bébə̃/	[bébə̃]	'he-goat'
/-bànə̃/	[bànə̃]	'bag'
/-kɔ̀bə̃/	[kɔ̀bə̃]	'belt'

In the surface representation, one may find three nasal mid vowels [ẽ], [õ] and [õ̃], which are analyzed as their open counterparts, followed by /nə̃/. This analysis is supported by the comparison of identical morphemes before consonant and before vowel or pause:

(13)	/à-kwènə́ zá-áə̃/	[àkwèn dzá]	'the bone'
	/à-kwènə́/	[àkwě̃]	'bone'
	/à-bànə́ zá-áə̃/	[àbàn dzá]	'the bag'

⁴See the remarks on -yə̃ on the bottom of p. 133.

- | | | | |
|------|----------------|------------|-------------|
| (13) | /à-bànè zâ-âè/ | [àbàn dzâ] | 'the bag' |
| | /à-bànè/ | [àbè] | 'bag' |
| | /à-fònè zâ-âè/ | [àfòn dzâ] | 'the field' |
| | /à-fònè/ | [àfò] | 'field' |

It can be shown in the same way that [kúŋè] is the surface representation of underlying /-kónè/ and [fìŋè] of /-fànè/ 'lock'. Here, however, there is no one to one relation, as will become clear from the following correspondences:

- | | | | |
|------|----------------|-------------------------|--------------------------|
| (14) | /à-fànè zâ-âè/ | [àfàn dzâ] | 'the lock' |
| | /à-fànè/ | [àfìŋè] | 'lock' |
| | /à-bfŋè zâ-âè/ | [à [†] bfŋ zâ] | 'the dance' ⁵ |
| | /à-bfŋè/ | [àbfŋè] | 'dance' |

Informants sometimes hesitate as to what would be the phonetic representation before a consonant in these cases, especially in the associative construction: /mì-dzèhè mf à-bèrè/ 'the urine of the fool' could be realized as [mìdzèhè má bèrè] or as [mìdzìŋè má bèrè], which indicates that informants hesitate between two underlying structures /mì-dzèhè/ or /mì-dzìŋè/, which would have the same realization in isolation.

The position of C₂ can be occupied by seven consonants:

- | | | | | |
|------|-----------|----------|-------|---------|
| (15) | labial | alveolar | velar | glottal |
| | voiceless | | | ? |
| | voiced | b | r | g |
| | nasal | m | n | ŋ |

⁵In Mankon one finds upstep and downstep. In general one could state that the first downstep in a tone phrase is executed by raising the preceding H. Upstep is indicated by † (a vertical upwards pointing arrow). The rules are actually more complicated and involve H tone copying on a L between H tones after downdrift. So here /à-bfŋè zâ-âè/ is converted via the following intermediate steps /à-bfŋé zâè/ → /à-bfŋf zâè/ → /à-bfŋ†f zâè/ → /à-bf†fŋ zâè/ into [à[†]bfŋ zâ].

Examples are:

/à-íá?à/	[àíá?à]	'country', 'village'
/à-bébbè/	[àbébbè]	'he-goat'
/à-bèrè/	[àbèrè]	'fool'
/à-dzùgḙ/	[àdzùgḙ]	'bowl(s)'
/à-íémè/	[àíémè]	'blood'
/à-bàṅḙ/	[àbḙ]	'bag'
/à-fḙṅḙ/	[àfḙṅḙ]	'lock'
/ø-kàṅḙ/	[kàṅḙ]	'squirrel'
/ḙ-bḙṅḙ/	[ḙbḙṅḙ]	'rain'
/à-bfṅḙ/	[àbfṅḙ]	'dance'

Phonologically, the final vowel of a lexical morpheme can show no other vocalic distinction other than tone. This final vowel is realized in several ways; thus, the choice of /ə/ in the underlying structure may seem somewhat arbitrary. The phonetic vowel quality is completely predictable. In sentence-final position (and thus in isolation) the final vowel is realized as [ə] after voiced and nasal consonants:

(16) /ḙ-gúbḙ/	[ḙgúbḙ]	'hen'
/à-íémè/	[àíémè]	'blood'
/à-bèrè/	[àbèrè]	'fool'

The final vowel is also realized as [ə] after glottal stop or when there is no intermediate (C_2) consonant, if the preceding vowel is [+close]:

(17) /ø-búḙḙ/	[búḙḙ]	'chimpanzee'
/ø-fúḙḙ/	[fúḙḙ]	'mouse'

But it is identical with the preceding vowel (after glottal stop or when there is no C_2 consonant) if the preceding vowel is [-close]. Thus, the sequence / V_1 / is realized as V_1V_1 , if V_1 is not close, and the two identical vowels are contracted in the phonetic output. We assume that /ḙ-dáḙ/ has first become ḙ-dáḙ and finally by contraction [ḙdḙ]:

- (18) /à-láʔə/ [àláʔà] 'country'
 /ñ-dáə/ [ñdã] 'house'

In preconsonantal position, the final vowel is realized as [i] after voiced and nasal consonants, and also after glottal stop, if the vowel preceding the glottal stop is not close:

- (19) /ñ-gúbə zá-də/ [ñgúbʔi zã] 'the hen'
 /à-bəʔə zá-də/ [àbəʔi zã] 'the fool'
 /à-láʔə zá-də/ [àláʔʔi zã] 'the country'

The final vowel is identical with the preceding vowel directly after a vowel (and the two identical vowels are contracted in the phonetic output), and after glottal stop, if the vowel preceding the glottal stop is close:

- (20) /ø-fúś wú-də/ [fú wã] 'the mouse'
 /ñ-dáə zɸ-də/ [ñdʔã zã] 'the house'
 /ø-búʔś wú-də/ [búʔú wã] 'the chimpanzee'

The final vowel is deleted after a nasal consonant. We assume that /ə/ has first become i before being deleted:

- (21) /à-lémə zá-də/ [àlʔém zã] 'the blood'

Any Mankon lexical morpheme has therefore two surface forms (indicated as form A and form B) according to the environment. The difference is due to the presence or quality of the final vowel /ə/. A summary of all possibilities is presented below:

(22) Morpheme Structure	Example	Form A	Form B	Meaning
1. V ₁ close no C ₂	-bɸə	-bɸe	-bɸi	'hole'
2. V ₁ non-close no C ₂	-kyəə	-kye	-kye	'basket'
3. V ₁ close C ₂ /ʔ/	-búʔś	-buʔə	-buʔu	'gorilla'
4. V ₁ non-close C ₂ /ʔ/	-tsáʔə	-tsaʔa	-tsaʔi	'top'

(22) Morpheme Structure	Example	Form A	Form B	Meaning
5. V_1 any C_2 voiced stop	-kǎbè	-kǎbə	-kǎbi	'belt'
6. V_1 any C_2 nasal cons.	-bfiǎè	-biŋə	-biŋ	'dance'
7. V_1 mid C_2 /n/	-kónè	-kuŋə	-koŋ/-kuŋ	'bean'
8. V_1 open C_2 /n/	-bǎnè	-bǎ	-bǎN	'bag'

We have not indicated any tone markings on forms A and B, since the underlying tones are often subject to further modification by the tone rules of the language. Thus, in the following B forms of /fǐ-ǎ-tǎǎ?ǎ/ 'top',

(23) /fǐ-ǎ-tǎǎ?ǎ ǐ-ǎ-ǎǎ/	[fǐntsǎ?ǐ fǎ]	'my top'
/fǐ-ǎ-tǎǎ?ǎ fǐ-ǎǎ/	[fǐntsǎ?ǐ fǎ]	'the top'

it is noted that the stem tones are realized, respectively, as H-L and H-⁴H.

This table summarizes different processes. Case 1-7 have form A in isolation and before non-close vowel, form B before consonant or close vowel. Case 8 has form A in isolation and before any vowel, form B before consonant. Case 7 has two forms B: [kuŋ] before close vowel and [kuŋ] or [koŋ] before consonant (cf. (14) above and discussion).

Two phonological problems are not explained:

1. /-bfiǎ/ 'goat' should according to the rules be represented as [bfiǎ] in form A and as [bi] in form B. In fact, form A is represented as [byǎ]. There are some of these morphemes, all with the structure -Cǐə or -Cuə.
2. Some morphemes are in sentence-final position followed by [ye]: namely all the morphemes with the structure $C_1V_1ə$, in which V_1 is non-close, and with a tone on $ə$ identical to the tone on V_1 , and some morphemes with the structure $C_1V_1C_2ə$. [ye] follows only in

sentence final position and has the same tone as the preceding vowel, with a few exceptions in the case of $C_1V_1C_2ə$ morphemes:

(24)	/à-kwáé/	[àkwáyé] or [àkwá]	'paste of yams'
	/àn-kárè-/	[àŋkárèyè] or [àŋkárè]	'circle'
	/àn-tòṅè-/	[àntòyè] or [àntò]	'pot'
	/ñ-kwìṅè-/	[ñkwìṅèyè] or [ñkwìṅè]	'mountain'

3. The Concord System of Mankon

Mankon nouns are grouped in six singular and four corresponding plural classes, and in some single classes. Classes are indicated by a class number (corresponding with the Bantu number system) and a concord symbol consisting of a concord consonant and a tone. Where the concord symbols are identical (as in classes 8 and 10), a distinction has been made on the basis of the nominal prefix, characterizing nouns which pair with a different singular class.

(25)	Number	Singular Concord	Number	Plural Concord
	1	w ^ˈ —————	2	b ^ˈ
	3	w ^ˈ ————	6	m ^ˈ
	5	n ^ˈ ————		
	19	f ^ˈ ————		
	7	z ^ˈ ————	8	ts ^ˈ
	9	z ^ˈ ————	10	ts ^ˈ

Broken lines indicate minority genders.

The nominal prefixes (which all have L tone) are listed in Table 1. The singular prefixes an- (cl. 1) and n- (cl. 3) are preserved in the plural, as well as the nasal after f+ (cl. 19) and after m+ (cl. 6 as plural of cl. 3, 9 or 19). The nasal prefix in classes 1, 9, and 10 has a complementary distribution with a prefix i- before a voiceless fricative:

(26)	/ñ-fḍḍè/	[ɨfḍḍè]	'chief'	cl. 1
	/ñ-sáʔḍè/	[ɨsáʔḍè]	'hook', 'hooks'	cl. 9 and 10

Table 1. Mankon Nominal Prefixes

Number	Nominal Prefix	Example	Meaning
1	∅-	∅-s fŋé	'bird'
	n-	ñ-lómè	'husband'
	an-	àn-gáábè	'antilope'
2	bi-	bí-s fŋé	'birds'
		bí-lómè	'husbands'
		bí-àn-gáábè	'antilopes' ⁶
3	i-	í-kábè	'belt'
	n-	ñ-gàŋé	'root'
5	ni-	ní-bòmé	'egg'
6	mi-	mí-kábè	'belts'
		mí-ñ-gàŋé	'roots'
		mí-bòmé	'eggs'
		mí-kùè	'feet'
		mí-ñ-tsá?è	'tops'
		mí-ñ-dzónè	'thorns'
		mí-lù?è	'palmwine'
		mí-bóè	'hands' ⁷
7	a-	à-túè	'head'
		à-kùè	'foot'
		à-bóè	'hand'
8	i-	í-túè	'heads'
9	n-	ñ-dáè	'house'
		ñ-dzónè	'thorn'
10	n-	ñ-dáè	'houses'
19	fi-	fí-ñ-tsá?è	'top'
		fí-ñ-gwáŋè	'salt'

⁶This is realized as [bàngáábè] by a rule which will be discussed later. Cf. rule (45).

⁷This is realized as [mbô]. The nominal prefix mi- loses its vowel before a labial consonant, if the noun stem is monosyllabic. This rule may apply facultatively if the stem is plurisyllabic. Hence [mbòmé] or [míbòmé] 'eggs'.

The nasal prefix of cl. 3 has not been found before a voiceless fricative, but the existence of a prefix *i-* in class 3 before other consonants does not permit us to regard *i-* as a conditioned variant.

All morphemes dependent on the head noun are preceded by a concord element which shows agreement with the head noun. These concord elements are summarized in Table 2. Column 1 contains concords of object pronoun, independent pronoun, interrogative pronoun, demonstrative pronoun, the numeral pronoun *-fís*, and the relative pronoun. Column 4 is used for numerals and for the concord of "how many".

Where the concord element in Table 2 shows a difference in tone (as in columns 3, 4, 5, 6, 7 and 9), the concords of classes 1 and 9 have L tone, and those of all other classes H tone. There is still a concord-like element *á/ǎ* preceding a class 1 object. */á/* surfaces in the answer to a question about the object:

(27) */ǎ lènǎ kè/* [*ǎ lǐŋǎ kè*] 'what has he looked for?'

which may be:

(28) */ǎ Ø-kǎŋǎ/* [*ǎ kǎŋǎ*] 'a squirrel' or
/ǎ lènǎ á Ø-kǎŋǎ/ [*ǎ lǐŋǎ[↑]kǎŋǎ*] 'He has looked for a squirrel.' (cl. 1)
/ǎ lènǎ bǐ-kǎŋǎ/ [*ǎ lǐŋ bǐkǎŋǎ*] 'He has looked for squirrels.' (cl. 2)

In all columns some vocalic distinctions between concords of different classes becomes evident. If all concords are taken together, four different vowel qualities are observed:

(29) */u/* ~ */i/* ~ */a/* - */ə/* in class 1
/u/ ~ */i/* in class 3
 /i/ ~ */a/* in classes 2, 5, 6, 8, 10, and 19
 /i/ in class 9
 /a/ ~ */ə/* in class 7.

Per column a maximal distinction of three vowel qualities is found:⁸

⁸Column 10 is left out of consideration because of the variations in classes 1, 3, 7 and 9.

Table 2. Concordial Elements

	Adj.	'other'	Num.	Subj. conc.	Subj. pron.	Poss. pron.	'all'	Ass.	'some'	
1	2	3	4	5	6	7	8	9	10	
1	wú-	wùn-	wù ²	ʔ-	ə-	à	ʔwù-	ʔn-	ʔ-	wù-/ʔ-
2	bf-	bà-	bà ²	bf-	f-	bf	ʔbf-	bʔ-	bf-	bà-
3	wú-	wù-	wù ²	f-	f-	f	ʔwú-	ʔ-	f-	wù-/ʔ-
5	nf-	nà-	nà ²	nf-	f-	nf-	ʔnf-	nʔ-	nf-	nà-
6	mf-	mà-	mà ²	mfn-	f-	mf	ʔmf-	mʔ-	mf-	mà-
7	zá-	zà-	zà ²	á-	á-	á	əzá-	ə-	á-	zà-/ə-
8	tsf-	tsà-	tsà ²	f-	f-	tsf	ʔtsf-	ʔ-	f-	tsà
9	zf-	zʔn-	zʔ ²	ʔ-	ʔ-	ʔ	ʔzʔ-	ʔn-	ʔ-	zʔ-/ʔ
10	tsf-	tsà-	tsà ²	f-	f-	tsf	ʔtsf-	ʔ-	f-	tsà-
19	ff-	fà-	fà ²	ff-	f-	ff	ʔff-	fʔ-	ff-	fà-

- (30) /u/, /i/, /a/ in columns 1, 2, 3 and the CV- part of 7,
 /i/, /ə/ in columns 4, 5, 8, 9, and the V- part of 7,
 /i/, /a/ in column 6.

Some variations may be considered as conditioned variants. CV- and V- concords vary (cf. column 10), in which case Cu- varies with i- (classes 1 and 3), and Ca- with ə- (class 7). The a- concords in column 6 are explained by their occurrence in sentence initial position. Thus, Ca- concords vary with a- in sentence initial position and ə- in non-initial position. The display in (29) can therefore be simplified as follows:

- (31) /u/ ~ /a/ in class 1
 /u/ ~ /i/ in class 3
 /i/ ~ /a/ in classes 2, 5, 6, 8, 10 and 19
 /i/ in class 9
 /a/ in class 7.

The vocalic variation in columns 5 and 6 of class 1 and 3 concords should be due to suppletion. The a- and ə- concords are only found in the subject concord and pronoun. The vocalic variation in classes 2, 5, 6, 8, 10 and 19 is due to some unknown amalgamation in columns 2, 3 and 10, where /i/ changes to /a/, although the difference between these two vowels distinguishes classes 7 and 9. This is not the case in class 9, which keeps /i/.

The most important conclusion is that we can reconstruct four different vowel qualities in concords: /u/ (in classes 1 and 3), /a/ (in class 7 and the suppletive concord of class 1), /i/ (in class 9 and the suppletive concord of class 3), and an undefined vowel which surfaces as /a/ or /i/ (in classes 2, 5, 6, 8, 10 and 19). Further,

⁹If there would be an exact parallel between Cu- and Ca- concords, we would expect the subject pronoun of classes 1 and 3 to be u-. We find instead a- in class 1 and i- in class 3. These will be regarded as replacive concords, if in sentence-initial position.

that these vowel qualities are reduced to a distinction between [+close] and [-close] in some environments (cf. columns 4, 5, 7, 8, 9 and 10 in Table 2). The actual quality of these reduced vowels is difficult to ascertain, because they never surface, but only their feature [close] is used in the vowel contraction rules.

The difference between CV- and V- concords can best be shown after a noun of the form $/-C_1V_1nə/$, like $/\grave{a}-b\grave{a}n\grave{e}/$ 'bag' (cl. 7). This noun changes to $[\grave{a}b\grave{e}]$ before a vowel. The numbers indicate the concord columns:

(32) 1.	$/\grave{a}-b\grave{a}n\grave{e} z\acute{a}-\acute{a}\grave{e}/$	$[\grave{a}b\grave{a}n dz\acute{a}]$	'the bag'
	$/\grave{a}-b\grave{a}n\grave{e} z\acute{a}-f\acute{s}+\acute{s}-m\grave{o}?\acute{s}-/$	$[\grave{a}b\grave{a}n dzf\acute{s}^{\dagger}m\acute{o}?\acute{s}\gamma\acute{e}]$	'one bag'
2.	$/\grave{a}-b\grave{a}n\grave{e} z\grave{a}-b\grave{a}n\grave{e}n\acute{s}/$	$[\grave{a}b\grave{a}n dz\grave{a}b\grave{a}n\grave{e}n\acute{s}]$	'a red bag'
3.	$/\grave{a}-b\grave{a}n\grave{e} z\grave{a}-m\grave{o}?\acute{s}-/$	$[\grave{a}b\grave{a}n dz\grave{a}^{\dagger}m\acute{o}?\acute{s}\gamma\acute{e}]$	'another bag'
4.	$/\grave{a}-b\grave{a}n\grave{e} \acute{s}-m\grave{o}?\acute{s}-/$	$[\grave{a}b\grave{e}^{\dagger}m\acute{o}?\acute{s}\gamma\acute{e}]$	'one bag'
5.	$/\grave{a}-b\grave{a}n\grave{e} \acute{s}-b\grave{a}n\grave{e}/$	$[\grave{a}b\grave{e} b\acute{a}n\grave{e}]$	'the bag is red.'
7.	$/\grave{a}-b\grave{a}n\grave{e} \grave{e}-z\acute{a}-\grave{a}n\grave{e}/$	$[\grave{a}b\grave{e} z\acute{e}]$	'my bag'
8.	$/\grave{a}-b\grave{a}n\grave{e} \grave{e}-ts\grave{u}m\grave{e}/$	$[\grave{a}b\grave{e} ts\grave{u}m\grave{e}]$	'all the bag'
9.	$/\grave{a}-b\grave{a}n\grave{e} \acute{s} \emptyset k\acute{a}n\grave{e}/$	$[\grave{a}b\grave{e} k\acute{a}n\grave{e}]$	'the bag of the squirrel'
10.	$/\grave{a}-b\grave{a}n\grave{e} z\grave{a}-ts\acute{e}\acute{s}/$	$[\grave{a}b\grave{a}n dz\grave{a}ts\acute{e}\acute{s}\gamma\acute{e}]$	'some bag'
	$/\grave{a}-b\grave{a}n\grave{e} \grave{e}-ts\acute{e}\acute{s}/$	$[\grave{a}b\grave{e} ts\acute{e}\acute{s}\gamma\acute{e}]$	'some bag'

The quality of the vocalic concord can be ascertained by applying the rules for vowel contraction; see below. One will find nouns of the form A (cf. (12)) before a [-close] vocalic concord element, and B before a [+close] vocalic concord element or before a consonant initial concord element. Examples of different concords (numbered according to the columns in Table 2) for different classes are:

(33) 1.	$/\emptyset-f\acute{u}\acute{s} w\acute{u}-\acute{a}\grave{e}/$	$[f\acute{u} w\acute{a}]$	'the mouse' (cl. 1)
	$/\grave{t}-b\grave{a}n\grave{e} tsf-f\acute{s}+f-s\acute{e},\acute{s}/$	$[\grave{t}b\grave{a}n tsf\acute{s}\acute{e}?\acute{s}]$	'how many bags?' (cl. 8)
2.	$/\grave{h}-t\acute{s}m\grave{e} w\grave{u}-b\grave{a}n\grave{e}n\acute{s}/$	$[\grave{h}t\acute{s}m\grave{e} w\grave{u}b\grave{a}n\grave{e}n\acute{s}]$	'a red heart' (cl. 3)

- (33) 3. /à-tìé zà-mòʔé-/ [àtì zâ^hmóʔóyé] 'another tree' (cl. 7)
 4. /i-bànè f-séʔé/ [ibè séʔé] 'how many bags?'
 5. /ø-bìʔé è-bàḡê/ [bìʔé bàḡê] 'the termite is red.'
 /n-bíà ì-bàḡê/ [mbí bàḡê] 'the goat is red.'
 /n-bíè f-bàḡê/ [n^hbí báḡè] 'the goats are red.'
 6. /à bàḡê/ [àbàḡê] 'it (cl. 1) is red.'
 /f bàḡê/ [f^hbáḡè] 'it (cl. 3) is red.'
 7. /à-bùʔè è-zá-ànè/ [àbùʔè zâ] 'my slave' (cl. 7)
 /n-jùʔé ʔ-zì-ànè/ [n^hjùʔú zè] 'my compound' (cl. 9)
 8. /n-gyèné ìn-tsumè/ [n^hgyè n^htsumè] 'all the grass' (cl. 9)
 9. /ø-kwàḡè ì ø-kàḡè/ [kwàḡè kàḡè] 'the scabies of the squirrel' (cl. 1)
 10. /ø-fúé wù-tséé/ [fú wútséyé] 'some mouse' (cl. 1)
 /ø-fúé ì-tséé/ [fú tséyé] 'some mouse' (cl. 1)
 /à-tìé zà-tséé/ [àtì zâtséyé] 'some tree' (cl. 7)
 /à-tìé è-tséé/ [àtìè tséyé] 'some tree' (cl. 7)

4. Vowel Contraction in Mankon

Every noun in Mankon ends on a vowel of predictable quality and unpredictable tone (cf. discussion relative to (16)-(21) above). We shall not present tone rules in this paper, but shall rather concentrate on vowel quality. A noun can be followed by a concord element, which is often vocalic (see e.g. column 5 in Table 2). These vocalic concord elements cannot surface after a noun, because there is a phonetic constraint against long vowels and diphthongs. The vocalic concord elements can only show a distinction in the features [tone] and [close]. In the preceding section we have shown that all other vocalic distinctions are lost as soon as the concord element changes from CV- to V- and the V- does not occur in the sentence initial position. An original four-way distinction in vocalic quality is in that case reduced to a distinction between [+close] and [-close]. In the associative construction (column 9 in Table 2) this concord element might be followed by the vocalic nominal prefix of the following noun. This nominal prefix is always L, and shows in initial position a distinction between

+ - and a -. One may therefore find in the underlying structure sequences of three vowels, the first one of which does not show a vocalic distinction, and the last two only distinguish between [+close] and [-close]. These three vowels are contracted, the result being a form A or B of the first noun (see (22)). The forms A or B differ in the feature [close] of their final vowel only. Form A is in any case used in the sentence final position, form B before consonant in the underlying structure. The distribution of forms A and B before an underlying vowel will be studied hereafter.

We start with examples of morphemes the C_2 of which is a nasal (cf. case 5 in (22)), where the difference between the two forms is expressed in one or two syllables and therefore very obvious:

- (34) /ã-fìŋè + é + ì-bèrè/ [ãfìŋ bèrè] 'the locks of the fools'
 /ì-fìŋè + f + ì-bèrè/ [ìfìŋ bèrè] 'the locks of the fools'
 /ã-fìŋè + é + à-bèrè/ [ãfìŋé bèrè] 'the lock of the fool'
 /ì-fìŋè + f + à-bèrè/ [ìfìŋé bèrè] 'the locks of the fool'

This set of examples shows that the quality of the associative marker has no influence, only the quality of the nominal prefix of the second noun. We therefore suppose that the feature [close] of the last vowel to be contracted determines the feature of the contracted vowel. This rule is confirmed by associative constructions in which the last noun has a zero prefix, and the closeness of the associative marker should therefore be important:

- (35) /à-fìŋè + é + ø-kàŋè/ [ãfìŋè káŋè] 'the lock of the squirrel'
 /ì-fìŋè + f + ø-kàŋè/ [ìfìŋ káŋè] 'the locks of the squirrel'

Here the associative marker is the last vowel to be contracted and determines accordingly the closeness of the contracted vowel.

Up till now we have assumed that the vocalic quality of the associative marker is known, and that the lexicon of the native speakers contains Table 2. A vocalic associative marker never surfaces. We

have in fact deduced the underlying vocalic quality from the rules for vowel contraction. The application of the rules mentioned above has forced us to set up a vocalic associative marker with [+close] or [-close] quality. The surface forms are:

- (36)
- | | | |
|----------|--------------|--------------------------------|
| class 1 | [kàŋ kàŋè] | 'the squirrel of the squirrel' |
| class 3 | [mbǎŋ kǎŋè] | 'the nut of the squirrel' |
| class 7 | [ǎfǐŋè kǎŋè] | 'the lock of the squirrel' |
| class 8 | [ǐfǐŋ kǎŋè] | 'the locks of the squirrel' |
| class 9 | [ññàm kàŋè] | 'the animal of the squirrel' |
| class 10 | [ññàm kǎŋè] | 'the animals of the squirrel' |

We deduced from these examples that the associative markers of classes 1 and 9 have L tone (and therefore do not show a tonal influence on the LL stem kàŋè), and that the markers of all other classes have H tone. Further, that the associative marker of class 7 is [-close] (giving rise to form A), while all the other associative markers are [+close] (giving rise to form B). We therefore set up the underlying associative markers as:

- (37)
- | | | | |
|----------|-----|----|--------------|
| class 1 | /ǐ/ | or | [+close, -H] |
| class 3 | /f/ | or | [+close, +H] |
| class 7 | /ǎ/ | or | [-close, +H] |
| class 8 | /f/ | or | [+close, +H] |
| class 9 | /ǐ/ | or | [+close, -H] |
| class 10 | /f/ | or | [+close, +H] |

The exact vocalic quality of the vocalic marker has been chosen rather arbitrarily as /ǐ/ or /ǎ/. The feature specification in (37) seems more exact.

The schema in (22) distinguishes several nominal structures. We illustrated only case 6 with final nasal consonant. Here we will illustrate also the other cases with an associative marker of class 1 /ǐ/ opposed to one of class 7 /ǎ/.

(38) Associative marker of class 1:

- [kàŋ kàŋè] 'the squirrel of the squirrel'
 [fú kàŋè] 'the mouse of the squirrel' (V_1 close, no C_2)
 [àŋgwè kàŋè] 'the split-bamboo of the squirrel' (V_1 non close, no C_2)
 [búʔú kàŋè] 'the chimpanzee of the squirrel' (V_1 close, C_2 /ʔ/)
 [šwàʔʔ kàŋè] 'the blade of the squirrel' (V_1 non close, C_2 /ʔ/)
 [fùʔʔ kàŋè] 'the sack of the squirrel' (V_1 any, C_2 voiced stop)

(39) Associative marker of class 7:

- [àfìŋè káŋè] 'the lock of the squirrel'
 [àbìè káŋè] 'the profit of the squirrel' (V_1 close, no C_2)
 [àʔtsé káŋè] 'the lineage of the squirrel' (V_1 non close, no C_2)
 [àbùʔè káŋè] 'the slave of the squirrel' (V_1 close, C_2 /ʔ/)
 [àʔlášà káŋè] 'the country of the squirrel' (V_1 non close, C_2 /ʔ/)
 [àdzù é káŋè] 'the bowls of the squirrel' (V_1 any, C_2 voiced stop)

The rules required to produce these results can be relatively simple, but pose some interesting problems. We informally formulated a rule on p.141 as

(40) The feature close of the last vowel to be contracted determines the closeness of the contracted vowel.

This rule can be formulated in different ways. One can assimilate a sequence of vowels to the closeness feature of the last one before the vowels are contracted. Or one can delete all preceding vowels. In both formalizations one runs into difficulties if the preceding morpheme is of the type $/C_1V_1ə/$. To give one example:

(41) /à-bìè + é + ø-kàŋè/ 'the profit of the squirrel'

should not become *[àbè káŋè] (via /à-bèè + é + ø-kàŋè/ or directly by deletion), but [àbìè káŋè]. The assimilation or deletion should be stopped before it attacks V_1 (the stemvowel). The only difference between V_1 and the final vowel $ə$ (given the fact that one does not want

to use final word boundary here) seems to be the reduced nature of the final vowel. If the deletion applies only to reduced vowels, one first needs a rule which reduces all vowels following a reduced one:

- (42)
$$V \rightarrow [+reduced] / [+reduced] \overset{V}{\text{_____}} C$$

 (to apply from left to right),

where the ad hoc feature [+reduced] destroys all vocalic features except [tone] and [close].

This rule can explain many phenomena in Mankon. The nominal prefix of class 7 is à- (e.g. à-bàrè). If this noun follows another morpheme (e.g. in the associative construction), the feature [+open] of the nominal prefix is lost, so that the prefix in fact becomes something like è- (cf. the two last examples in (34)). The same phenomenon is observed in Table 2, where all a- prefixes in class 1 (suppletive concord) and 7 vary with è- prefixes. The feature [+open] is only preserved after a consonant (e.g. za-) or where no preceding morpheme is found (in column 6), to wit in all positions where a preceding reduced vowel cannot intervene. The rule finds strong motivation if it would explain the vocalic variation in Table 2. Rule (42) would in fact destroy the features [low] and [back] of all vowels following a reduced vowel and would therefore leave [-close] in the place of /a/ and [+close] in the place of /i/ and /u/. The only problem is the subject pronoun (column 6) of class 3, which should be *u, because no reduced vowel precedes. If we accept in this case also a replacive concord i- (like the replacive concord of class 1), the problem seems to be solved. The four vowels enumerated in (29) could now be stated (given the existence of rule (42) as:

- (43) /u/ or replacive /a/ (columns 5 and 6) in class 1
 /u/ or replacive /i/ (columns 5 and 6) in class 3
 /i/ in class 9
 /a/ in class 7
 /i/? in classes 2, 5, 6, 8,
 10 and 19.

The last vowel /ɪ/ is problematic. It is obvious that a distinction should be made between this vowel and the vowel of class 9: the vowel of class 9 is always the same, while the vowel of classes 2, 5, 8, 10 and 19 changes to /a/ in columns 2, 3 and 10 of Table 2. We hope to address ourselves to this problem in a later paper.

The contraction rule should be formalized as:

- (44)
$$\begin{array}{c} V \\ [+reduced] \end{array} \rightarrow \emptyset / \begin{array}{c} V \\ [+reduced] \end{array} C$$

 (to be applied from right to left).

Here again we run into a problem: /mɪ-dzènè + mɪ + à-bèrè/ 'the urine of the fool' is realized as [mɪdzèm mábèrè]. Rule (42) has not applied, and therefore the feature [+low] of the prefix à- has not been destroyed. But the same kind of deletion applies: [-reduced] vowels are also deleted before a [-reduced] vowel. One should therefore generalize rule (44) in the following way:

- (45)
$$\begin{array}{c} V \\ [\alpha \text{ reduced}] \end{array} \rightarrow \emptyset / \begin{array}{c} V \\ [\alpha \text{ reduced}] \end{array} C.$$

The other rules need less discussion and are more straightforward. One should have a rule which makes the reduced final vowel of a morpheme [+close] if immediately followed by a consonant:

- (46)
$$\begin{array}{c} V \\ [+reduced] \end{array} \rightarrow [+close] / V (C) \text{ ______ } C.$$

This rule converts /h-zámé + zɪ-áà/ 'the axe' into /h-zámɪ + zɪ-áà/ and finally into [hɪdzám zâ] (form B of (22)). We use here a rule which deletes a [+close] vowel after a nasal consonant, a rule not formalized in this paper.

Then there should be a rule which creates identical vowels (V_1) after vowel or glottal stop, if the closure features are identical:

- (47)
$$\begin{array}{c} V \\ [\alpha \text{ close}] \end{array} \rightarrow V_1 / \begin{array}{c} V \\ [\alpha \text{ close}] \end{array} (?) \text{ ______ } C.$$

This rule converts /à-bìè + á + ɪ-bèrè/ 'the profit of the fools' into

[àbĩ b̄àr̄è]. The phonetic constraint against long vowels reduces ǐĩ to ǐ. This rule produces in one case the wrong result, to wit in the case of [-close] [+close], where the last vowel also develops into an identical vowel, but not by rule (47). So we will finally need one more rule which will not be formalized in this paper.

One final example should be sufficient to demonstrate the derivation. Reduced vowels are underlined:

(48)	/ø-sĩŋé	wú-íé	+ ǐ-m̄ɔʔóǵé/	'one bird'
			<u>ǐ</u>	after rule 42
	<u>ĩ</u>			after rule 46
	ø ø			after rule 45
	ø			non-formalized (see p.145)
			ǐ	after rule 47
	[sĩŋ	wĩ	m̄ɔʔóǵé]	finally

5. Discussion

The rules proposed in the preceding section certainly have wider application than just in the concord system. The verb system has not been explored systematically, but we observed the following facts:

(49)	[bé mà zê dzòŋé]	'I can steal a giant'
	[bé mà zê dzòŋ]	'Can I steal a giant?'
	[bé mà zé bĩʔé]	'I can steal a termite'
	[bé mà zé bĩʔé]	'Can I steal a termite?'

The difference can only be explained if one accepts a vocalic question marker with the feature [+close] at the end of a question. The other vocalic qualities cannot be recovered as far as we know. This question marker is the first item to enter the Mankon lexicon as an underspecified vowel and would prove that other vocalic features than [tone] can lead a floating existence.¹⁰

¹⁰This is an important observation in the debate about suprasegmental phonology. One of the arguments of Will Leben is that tone should be handled differently from other vocalic features, because it is the only feature which can "float".

In the case of vocalic concord markers, it is less clear. It seems quite possible that the speakers have by analogy some idea about the original vocalic quality of the concord element. The replacive concord in class 1, however, makes analogical reasoning difficult. Compare the following concords of class 1:

(50) Associative marker	[+close, -H]	(column 9)
Subject concord	[-close, -H]	(column 5)
Object concord	[-close, +H]	

Analogy with the object pronoun /à/ and the object concord in sentence initial position /á/ (cf. 28) may help the speakers to guess the underlying vocalic quality. They should know in this case that the associative marker keeps the 'original' concord, while the others use replacive concords.

The comparison between Mankon and more Eastern Mbam-Nkam languages is interesting (cf. section 1). The great number of floating tones in, e. g., Bangangté can be traced back to Mankon vowels and vocalic morphemes. The final vowel of Mankon lexical morphemes is in most cases realized (although on a vowel of predicatable quality). In Bangangté it is only realized before a pause if the vowel is H and preceded by a consonant. In other Eastern languages it is never realized. Its tone is preserved in Mankon and Bangangté, but not in all other dialects. The complex set of nominal prefixes in Mankon (cf. Table 1) is reduced to a simple homorganic nasal in Bangangté, but the L tone of these prefixes is preserved as a floating tone. Even the zero prefix of Mankon (in part of class 1) is matched by the absence of a floating L tone in some Eastern languages.¹¹

The comparison of Mbam-Nkam languages shows a process of vowel reduction. The features [tone] and [close] are the most resistant to total

¹¹This has been shown by Gabriel Nissim in his contribution "Les classes nominales dans quelques parlers bamiléké", to appear in Larry M. Hyman and Jan Voorhoeve (eds.), Noun Classes in Grasslands Bantu. Paris: S.E.L.A.F. (forthcoming).

deletion in this order. Mankon already shows an intermediate stage in which the feature [close] may already float. The quality of the underlying vowel is hardly recoverable, and the closeness distinction has already become lost in the final vowel of the lexical morpheme.¹²

Vowel reduction is not a completely new phenomenon in Mbam-Nkam languages. Lexical morphemes in Proto Bantu (PB) use seven vowels /i e ε a ɔ o u/, while concord elements only use four /i e a u/. Nominal prefixes in PB lost their tonal distinction and are always L. In Mankon, lexical morphemes use nine vowels (cf. (12)). It is very difficult to distinguish the vowels of concord elements. We recovered four vowel distinctions (cf. 29 and 31), which have rather arbitrarily been set up in (43) as /u ɪ ɪ a/. Their correspondence to PB concords is not always clear:

(51)	Class	PB	Mankon
	1	jo, a	wu, a
	2	ba	bɪ
	3	go	wu, ɪ
	5	de/di	nɪ
	6	ga/ma	mɪ
	7	ke	za
	8	bi	tsɪ
	9	je	zɪ
	10	di	tsɪ
	19	pi	fɪ

In setting up the PB concords, we already assumed that the close vowel of the class 5 nominal prefix and the nasal of the class 6 nominal prefix is found in the concord (which is a derivation from the PB situation).

¹²One could argue that this final vowel is always [-close] in the underlying representation. One takes in that case the isolated form as being closest to the underlying form. But one could as well start from a [+close] final vowel and have a rule which changes this feature into [-close] before pause or a [-close] vowel. I really do not think that the underlying feature [close] is recoverable. It would always be an arbitrary choice between [+close] or [-close].

If this assumption is accepted, PB a and i correspond to Mankon ɪ (except in the replacive vocalic concord of class 1), PB e to Mankon ɛ or a, and PB o to Mankon u. The Mankon class 7 concord za poses a problem. The PB concords of classes 7 and 9 (*ke and *je) show the same vowel and different consonants, the corresponding concords in Mankon (za and zɪ) show the same consonant and different vowels. We cannot explain this anomaly. Mankon concords only use a distinction between u and ɪ (often neutralized to ɪ, cf. Table 2), except in class 7 and in the replacive concord of class 1. One could therefore state that the range of vocalic possibilities in Mankon lexical morphemes is widened, but reduced in Mankon concords.

REFERENCES

- Dunstan, M. E. 1966. Tone and Concord Systems in Ngwe Nominals. Unpublished thesis, University of London.
- Nissim, G. Forthcoming. "Les classes nominales dans quelques parlers bamileke," in L. M. Hyman and J. Voorhoeve (eds.), Noun Classes in Grasslands Bantu, Paris: S. E. L. A. F.
- Voorhoeve, J. 1971. "Tonology of the Bamileke Noun." Journal of African Languages 10:44-53.

