OCCASIONAL PAPERS

in the study of

SUDANESE LANGUAGES

No. 4

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OCCASIONAL PAPERS

IN THE STUDY OF

SUDANESE LANGUAGES

No. 4

Summer Institute of Linguistics

and

Institute of Regional Languages

and

College of Education
University of Juba

1985
A number of institutions and individuals are interested in research on languages in Sudan and research presently being done should be made available to them and others. The purpose of these Occasional Papers is to serve as an outlet for work papers and other useful data which might otherwise remain in private files. We hope that Sudanese and non-Sudanese linguists alike may profit from such a series of papers.

Manuscripts for the series are welcomed. A clear, typewritten copy following the format of the papers in this volume should be sent to the Editor for consideration.

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PREFACE

This fourth volume of *Occasional Papers* consists of phonological sketches of five Sudanese languages representing three language families. Bongo and Baka belong to the Bongo-Bagirmi group of the Central Sudanic family; Otuho (or Lotuho) is a North-eastern Nilotic language of the Eastern Sudanic family. Both Central Sudanic and Eastern Sudanic are part of the larger Nilo-Saharan family. Banda is a member of the Eastern branch of the Adamawa-Eastern group in the Niger-Congo family which is, in turn, part of the larger Niger-Kordofanian family.

The paper on Bongo includes a list of approximately 600 words in order to make more data available on a language which appears to be becoming extinct. The papers on Otuho and Ma'di give considerable attention to application of the analysis to orthography decisions.

In all of the Nilo-Saharan languages described, a set of vowels with advanced tongue root [+ATR] is distinguished from a set with retracted or neutral tongue root [-ATR]. Vowel harmony in relation to these sets is discussed in considerable detail in the paper on Bongo. In the paper on Otuho it is discussed in relation to strong and weak semivowels and consonants. In the paper on Baka, considerable attention is given to vowel elision; and in the one describing Banda phonology, diphthongs are discussed in some detail.

All of the papers are presented as work papers; most of the topics discussed need further research. However, in order to make the research available we are publishing them without further delay.

We wish to thank especially Nancy Bergman, Elise Kull and Veli Voipio who spent long hours processing the manuscripts for publication.

Juba, Sudan
October, 1984

Mary Ruth Wise
Richard L. Watson
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EILEEN KILPATRICK

Summer Institute of Linguistics

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1. INTRODUCTION

1.1. The Language

Bongo is a member of the Chari-Nile branch of the Nilo-Saharan language family. According to Greenberg (1966:109, 164 and 177), the Chari-Nile branch consists of the following groups of languages: Eastern Sudanic, Central Sudanic, Berta and Kunama. Within the Central Sudanic group he lists seven unnamed subgroups, with Bongo in the first.

Tucker and Bryan (1966:159) consider Bongo to be a member of a Bongo-Bagirmi group of non-Bantu languages of North Eastern Africa.

There are two main areas where Bongo is currently spoken. One is south of Wau on the Wau-Tambura road. In 1930 the government resettled a community of Bongo in Bussere, and now the people live scattered along the road, 11 to 36 kilometers south of Wau (Santandrea 1958:62). The other main Bongo area is in the vicinity of Tonj, a town between Wau and Rumbek. This area is bounded in the
north by the Wau-Rumbek road and in the southeast by the Bie1 River; the southern and western boundaries are undetermined. The recognized Bongo center for the area south of Tonj is a small place called Agugo, which has a primary school and is the residence of a Bongo subchief, but Tonj serves as the administrative center.

In 1878, Dr. George Schweinfurth estimated the Bongo population to be 100,000 (Evans-Pritchard, 1929:4). This number has been drastically reduced due partly to invasions by Arabs and later by the Zande (ibid.:5), and also due partly to sickness. Officials in Tonj estimate the 1978 Bongo population at between one and two thousand, based on the figure of 251 men on the tax list in Tonj and a similar figure on the tax list in Wau.

Both Fr. S. Santandrea (1958:61-78) and E.E. Evans-Pritchard (1929:1-62) have done anthropological studies of the Bongo. Fr. Santandrea's Bongo grammer (1963) is the only extensive study of the language I have been able to locate. It includes a brief, nontechnical phonological summary based on the dialect of Bongo spoken at Bussere.

1.2. Scope of This Study

This study of Bongo phonology is a revision of my thesis Preliminary Phonology of the Bongo Language presented in partial fulfillment of the requirements for the Master of Arts degree in Sudanese and African Languages at the Institute of African and Asian Studies of the University of Khartoum, 1979.1 One of the major revisions is the analysis of the vowels according to Advanced and non-Advanced Tongue Root Positions, rather than as close or open sets.

For this phonology I am mainly using the approach described in Pike (1947). As a point of interest I include from the generative approach charts giving a distinctive feature analysis of both consonants and vowels. The treatment of tongue root position LSTR is consistent with that described by Stewart (1967) and Pike (1967) for other African languages, as well as with many subsequent publications on the topic.

The analysis presented here should be considered preliminary; more investigation is necessary, especially in the areas of vowel harmony, prosodic features, and higher level phonology. The analyses of the consonant and vowel phonemes of Bongo are presented in sections 2 and 3, respectively. Distributional and interpretive statements for both consonants and vowels are given in section 4. Vowel harmony in Bongo is described and examples are given to show its extent in section 5. A tonal analysis is given in section 6, and intonation is also briefly discussed in 6.4. The appendices include texts and a word list.

The study is based on word lists, sentences, and texts which my colleague Lynne Callinan and I gathered in the town of Tonj between
May and November of 1978. Our language assistant was Gu Ba Kpuyu who lived on the outskirts of Tonj. His dialect is slightly different from that spoken at Agugo. There are also pronunciation and vocabulary differences between the dialect we studied and the Bussere dialect studied by Santandrea.

2. CONSONANTS

2.1. Consonant Phonemes

The consonant phonemes of Bongo are listed in Chart 1. Points of articulation are listed across the top of the chart and manner of articulation down the left side. Both alveopalatal and palatal consonants are considered to be systemically palatal, since there is no contrast between these two points of articulation.

<table>
<thead>
<tr>
<th>Bilabial</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Labiovelar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>p</td>
<td>t</td>
<td>c</td>
<td>k</td>
<td>kp</td>
</tr>
<tr>
<td>Voiced</td>
<td>b</td>
<td>d</td>
<td>j</td>
<td>g</td>
<td>gb</td>
</tr>
<tr>
<td>Prenasalized</td>
<td>mb</td>
<td>nd</td>
<td>nj</td>
<td>ng</td>
<td>ngb</td>
</tr>
<tr>
<td>Implosive</td>
<td>'b</td>
<td>'d</td>
<td>'j</td>
<td>y</td>
<td>w</td>
</tr>
<tr>
<td>Nasals</td>
<td>m</td>
<td>n</td>
<td>ny</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td></td>
<td></td>
<td></td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>Semivowels</td>
<td>γ</td>
<td></td>
<td></td>
<td>w</td>
<td></td>
</tr>
<tr>
<td>Liquids</td>
<td></td>
<td></td>
<td></td>
<td>r</td>
<td></td>
</tr>
<tr>
<td>Flap</td>
<td></td>
<td></td>
<td></td>
<td>l</td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CHART 1. Consonant Phonemes of Bongo

In Charts 1 and 2 and in phonetic and phonemic transcriptions throughout this study, the symbols [c] and [j] are used to represent the voiceless and voiced grooved alveopalatal affricates [tʃ] or [tʃ], and [dʒ] or [dʒ], respectively. [ˈʃ] represents an implosive grooved alveopalatal affricate [dʒ]. In both phonetic and phonemic transcriptions I have followed Santandrea's use of apostrophe plus consonant to indicate implosives, and also his use of /ny/ for the alveopalatal nasal [ŋ]. The alveolar flap [ɾ] is symbolized throughout as [ɾ]. Labiovelar stops and prenasalized stops are written [kp], [gb], [mb], [nd], [nj], [ng], and [ngb] for convenience.
The system of stops in Bongo includes voiceless, voiced, and prenasalized stops at the bilabial, alveolar, palatal, velar, and labiovelar points of articulation. The voiced implosives are bilabial, alveolar and palatal. Nasals occur at all four major points of articulation: bilabial, alveolar, palatal, and velar. The only phonemic fricative is the voiceless glottal one. There are two semivowels: the palatal /y/ and /w/ which has been listed as a labiovelar since it has both an approximation of the lips, making it a bilabial sound, and of the back of the tongue and the soft palate, making it a velar sound. The system also includes two liquids: an alveolar flap and a lateral.

In Chart 2 consonant phonemes are listed according to articulatory and auditory distinctive features as defined by Chomsky and Halle (1968) and Schane (1973). The distinctive features of consonants and vowels are listed separately since they are dealt with in separate chapters. The number of features for uniquely distinguishing each consonant would not be reduced by combining the charts. In the separate charts the feature [syllabic] -- [+] for consonants and semivowels and [+] for vowels -- is left implicit.

\[
\begin{array}{cccccccccccccccc}
\text{p} & \text{b} & \text{mb} & \dagger \text{b} & \text{m} & \text{t} & \text{d} & \text{nd} & \dagger \text{d} & \text{n} & \text{r} & \text{l} & \text{c} \\
\text{Consonantal} & + & + & + & + & + & + & + & + & + & + & + & + \\
\text{Nasal} & - & - & + & + & - & - & + & + & + & + & + & + & - \\
\text{Lateral} & - & - & - & - & + & + & + & + & + & + & + & + & + \\
\text{Anterior} & + & + & + & + & + & + & + & + & + & + & + & + & + \\
\text{Coronal} & - & - & - & - & - & + & + & + & + & + & + & + & + \\
\text{Voiced} & - & + & + & + & - & + & + & + & + & + & + & + & + \\
\end{array}
\]

\[
\begin{array}{cccccccccccccccc}
\text{j} & \text{n} & \dagger \text{j} & \text{ny} & \text{y} & \text{k} & \text{g} & \text{ng} & \eta & \text{kp} & \text{gb} & \eta \text{gb} & \text{w} & \text{h} \\
\text{Consonantal} & + & + & + & + & - & + & + & + & + & + & - & - & + \\
\text{Sonorant} & - & - & - & + & + & + & + & + & + & + & + & + & + \\
\text{Continuant} & - & - & - & + & + & + & + & + & + & + & + & + & + \\
\text{Coronal} & + & + & + & + & + & + & + & + & + & + & + & + & + \\
\text{Back} & + & - & + & + & + & + & + & + & + & + & + & + & + \\
\text{Voiced} & + & + & + & + & - & + & + & + & + & + & + & + & + \\
\text{Implosion} & + & + & + & + & + & - & + & + & + & + & + & + & + \\
\end{array}
\]

*The most frequent allophones of /p/ and /c/ are fricative, but these consonants are marked as [-continuant], since they are systematically stops.

**CHART 2. Distinctive Features of Consonants**
2.2. Phonetic Description of Consonants

A description of the consonant phonemes with their allophonic variations is given below.

2.2.1. Stops

/p/ [p], an unaspirated voiceless bilabial stop with egressive lung air, occurs in free variation with

/f/, a voiceless labiodental fricative with egressive lung air, and also with

/pp/, an unaspirated voiceless bilabial affricate with egressive lung air:

[pɪrə]-[fɪrə]-[ppɪrə] /pirə/ 'axe'

The predominant allophone is [f].

/b/ [b], a voiced bilabial stop with egressive lung air:

/bó'du]/ /bó'du/ 'wild pig'

/mb/ [mb], a voiced bilabial prenasalized stop with egressive lung air:

[mbá'gà]/ /mbá'gà/ 'mother'

/b/ [b], a voiced bilabial stop with ingressive pharynx air, in free variation word initially in certain words with

[w], a lenis voiced labiovelar approximant with egressive lung air. This allophone is phonetically distinct from the semivowel [u];

[̩bu'lu]-[wu'lu] /bu'lu/ 'mahogany tree'

/t/ [t], an unaspirated voiceless alveolar stop with egressive lung air:

[tu'tu] /tu'tu/ 'groundnut shell'

/d/ [d], a voiced alveolar stop with egressive lung air:

[d̠u'm] /du'm/ 'sorghum porridge'

/nd/ [nd], a voiced alveolar prenasalized stop with egressive lung air:

[nd̠u'du] /nd̠u'du/ 'hedgehog'

/d/ [d], a voiced alveolar stop with ingressive pharynx air:

[mbɔ'do] /mbɔ'do/ 'frog'

/c/ [s], a voiceless alveopalatal grooved fricative with egressive lung air, in free variation with
[s], a voiceless alveolar grooved fricative with egressive lung air, before back or central vowels; and also in free variation with
[c], a voiceless alveopalatal grooved affricate with egressive lung air, before front vowels:
[ʃɔ]-[sa] /ʃɔ/ 'cow'
[ʃi]-[ci] /ʃi/ 'excrement'
The predominant allophone is [ʃ] but /c/ is chosen as the phonemic symbol since the voiced counterpart of this phoneme is /j/.

/j/ [j], a voiced alveopalatal grooved affricate with egressive lung air:
[ji] /ji/ 'hand'
In one word only, in our data, [j] varies freely with [z], a voiced alveolar grooved fricative:
[kazawu]-[kajawu] /kajawu/ 'square'
[z] also occurs in our transcription of [gàmzút] 'beer from honey', but the transcription has not been checked for phonetic accuracy.

/nj/ [nj], a voiced alveopalatal prenasalized grooved affricate with egressive lung air. The prenasalization has alveolar closure:
[njɔmy] /njɔmy/ 'mud'

/d̪]/ ['d̪], a voiced palatalized alveolar stop with ingressive pharynx air, occurring word initially before back and central vowels, in complementary distribution with
['j], a voiced alveopalatal grooved affricate with ingressive pharynx air, occurring in all other environments. Word medially ['j] is in free variation with
[d̪], a voiced palatalized alveolar stop with egressive lung air, and also with
[ź], a voiced alveopalatal grooved fricative with egressive lung air:
[d̪ɔkɔ] /d̪ɔkɔ/ 'teeth'
[ji] /ji/ 'person'
[léjì]-[lézì]-[léd̪y] /léd̪y/ 'beer'

/k/ [k], an unaspirated voiceless velar stop with egressive lung air:
[kɔl] /kɔl/ 'eleusine'

/g/ [g], a voiced velar stop with egressive lung air:
[gɔhì] /gɔhì/ 'cough'
/ŋ/ [ŋ], a voiced velar prenasalized stop with egressive lung air:

[ŋánjá] /ŋánjá/ ‘crocodile’

/kp/ [kp], a voiceless labiovelar stop with egressive lung air:

[kpúlí] /kpúlí/ ‘lion’

/gb/ [gb], a voiced labiovelar stop with egressive lung air:

[gbándá] /gbándá/ ‘cassava’

/ŋgb/ [ŋgb], a voiced labiovelar prenasalized stop with egressive lung air. The prenasalization just has velar closure, rather than both bilabial and velar closure:

[ŋgbáyá] /ŋgbáyá/ ‘corn’

2.2.2. Sonorants and Fricatives

/m/ [m], a voiced bilabial nasal with egressive lung air:

[mònà] /mònà/ (variety of fruit)*

/n/ [n], a voiced alveolar nasal with egressive lung air:

[níí] /níí/ ‘maternal aunt’

/ny/ [ny], a voiced alveopalatal nasal with egressive lung air:

[nyèrè] /nyèrè/ ‘chief’

/ŋ/ [ŋ], a voiced velar nasal with egressive lung air:

[ŋònà] /ŋònà/ (species of fish)

/h/ [h], a voiceless glottal fricative with egressive lung air which takes on the quality of the following vowel. In [hibi] /hibí/ ‘wet season’, the [h] has the quality of a voiceless [I], and in [hàbà] /hàbà/ ‘hippopotamus’, it has the quality of a voiceless [a].

/y/ [y], a voiced palatal semivowel with egressive lung air:

[yáŋgá] /yáŋgá/ ‘spotted rat’

/w/ [u], a voiced labiovelar semivowel with egressive lung air:

[wárá] /wárá/ (species of fish)

/r/ [r], a voiced alveolar flap with egressive lung air:

[ráká] /ráká/ ‘shoe’

[ɾ], the voiced alveolar trill with egressive lung air is used in slow, deliberate speech.

/l/ [l], a voiced alveolar lateral with egressive lung air:
[lábá] /lábá/ 'bridge'

2.2.3. Other Allophones

In addition to the allophones described above, in fast speech consonants may be labialized when they are followed by rounded vowels. That is, the lip-rounding of a rounded vowel becomes labialization of the preceding consonant if: 1) it is an /u/ followed by a vowel, or 2) it is an /u/. In the first case, the entire /u/ becomes /u/. For example:

[túe]–[tŭe] /tŭe/ 'grandfathers, forefathers'
[mui]–[mŭi] /mui/ 'five'

In the second case, the roundedness becomes [u], leaving an unrounded /a/. For example:

[muθɔ]–[muθɔr] /muθɔr/ 'two'
[kɔkɔ]–[kɔkɔl] /kɔkɔl/ (species of bird)

Prenasalized stops are sometimes pronounced as syllabic nasal plus stop in utterance initial position:

[ɱbɛrɛ] /mbɛrɛ/ 'doleib (a species of palm)'

Utterance medially a syllable break may be perceived between the nasal and stop components:

[m̩à nÚ má̂ ná d̩á ná] /má àgú mándá ndáñ/ 'I bought groundnuts today.'

2.3. Consonant Contrasts

In the following sections, the examples of contrasts between consonants are grouped together according to phonetic similarity.

2.3.1. Between Bilabials and Between Bilabials and Other Corresponding Phonemes

In this section bilabial consonant phonemes are contrasted with each other and with the corresponding alveolars. In addition to these, the labiovelar consonants are contrasted with both the bilabial consonants in this section and with the velars in section 2.3.4.

/p/ and /b/:

/pɔˈdù/ 'fire' /bɔˈdù/ 'wild pig'
<table>
<thead>
<tr>
<th>phonemes</th>
<th>gloss</th>
<th>translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p'/ and /b'/</td>
<td>/pádá/'</td>
<td>species of plant</td>
</tr>
<tr>
<td>/'báta/</td>
<td>'hare'</td>
<td></td>
</tr>
<tr>
<td>/ípí/</td>
<td>'to send'</td>
<td></td>
</tr>
<tr>
<td>/'bi/</td>
<td>'to give'</td>
<td></td>
</tr>
<tr>
<td>/p'/ and /m'/</td>
<td>/pírrá/</td>
<td>'axe'</td>
</tr>
<tr>
<td>/mirá/</td>
<td>(variety of yam)</td>
<td></td>
</tr>
<tr>
<td>/ípí/</td>
<td>'to send'</td>
<td></td>
</tr>
<tr>
<td>/ámí/</td>
<td>'to make'</td>
<td></td>
</tr>
<tr>
<td>/p'/ and /kp'/</td>
<td>/púli/</td>
<td>stones around fire</td>
</tr>
<tr>
<td>/kpúlí/</td>
<td>'lion'</td>
<td></td>
</tr>
<tr>
<td>/ípí/</td>
<td>'to send'</td>
<td></td>
</tr>
<tr>
<td>/ákpi/</td>
<td>'to help'</td>
<td></td>
</tr>
<tr>
<td>/p'/ and /gb'/</td>
<td>/pútú/</td>
<td>'heel'</td>
</tr>
<tr>
<td>/gbútú/</td>
<td>(variety of sorghum)</td>
<td></td>
</tr>
<tr>
<td>/ápó'dé/</td>
<td>'to scrape (bark)'</td>
<td></td>
</tr>
<tr>
<td>/ágbódó/</td>
<td>'to gather'</td>
<td></td>
</tr>
<tr>
<td>/p'/ and /w'/</td>
<td>/pílègu/</td>
<td>species of bird</td>
</tr>
<tr>
<td>/mile/</td>
<td>(species of animal)</td>
<td></td>
</tr>
<tr>
<td>/p'/ and /t'/</td>
<td>/pútú/</td>
<td>'heel'</td>
</tr>
<tr>
<td>/tútú/</td>
<td>'groundnut shell'</td>
<td></td>
</tr>
<tr>
<td>/apá/</td>
<td>'sharp'</td>
<td></td>
</tr>
<tr>
<td>/átá/</td>
<td>'to see'</td>
<td></td>
</tr>
<tr>
<td>/b'/ and /'b'/</td>
<td>/bú/</td>
<td>'banana'</td>
</tr>
<tr>
<td>/'bú/</td>
<td>'egg'</td>
<td></td>
</tr>
<tr>
<td>/kúbú/</td>
<td>species of plant</td>
<td></td>
</tr>
<tr>
<td>/tú'bú/</td>
<td>'bushbuck'</td>
<td></td>
</tr>
<tr>
<td>/b'/ and /m'/</td>
<td>/bó'dó/</td>
<td>'wild pig'</td>
</tr>
<tr>
<td>/mú'dó/</td>
<td>'illness'</td>
<td></td>
</tr>
<tr>
<td>/b'/ and /kp'/</td>
<td>/bí/</td>
<td>'hair'</td>
</tr>
<tr>
<td>/kpí/</td>
<td>'still, yet'</td>
<td></td>
</tr>
<tr>
<td>/b'/ and /gb'/</td>
<td>/bákó/</td>
<td>'brother's wife'</td>
</tr>
<tr>
<td>/gbákó/</td>
<td>'cane rat'</td>
<td></td>
</tr>
<tr>
<td>/b'/ and /w'/</td>
<td>/bángá/</td>
<td>'roof'</td>
</tr>
<tr>
<td>/wàná/</td>
<td>(type of poison)</td>
<td></td>
</tr>
<tr>
<td>/ibú/</td>
<td>'to build (house)'</td>
<td></td>
</tr>
<tr>
<td>/iwbù/</td>
<td>'to carry'</td>
<td></td>
</tr>
</tbody>
</table>
/b/ and /d/:

/bökə/ 'brother's wife' /dökə/ 'basket'
/kidə/ 'vein'

/mb/ with /p/, /b/, /m/ and /kp/:

/mbə'də/ 'frog' /pödə/ 'fire'
/bödə/ 'wild pig'
/mödə/ 'illness'
/kpödə/ (species of nut)

/mb/ and /b/:

/nbəra/ (species of tree) /bəra/ 'ribs'

/mb/ and /w/:

/mbarə/ (species of tree) /war/ (species of fish)
/mbaqə/ 'mother' /waŋə/ (type of poison)

/mb/ and /gb/:

/mbele/ (species of fish) /gbelə/ (man's name)

/mb/ and /ngb/:

/kmbə/ (salt substitute) /kŋgbə/ (species of bird)

/kamba/ 'honey' /kanda/ 'tortoise'

/'b/ and /m/:

/'bənə/ 'in front of' /mənə/ 'another'
/'bi/ 'to give' /amə/ 'to make, do'

/'b/ and /kp/:

/'biri/ 'bat' /kpirə/ (type of medicine)
/'bə/ 'to shoot' /akpa/ 'to kick'

/'b/ and /gb/:

/'belə/ 'near' /gbelə/ (man's name)

/'b/ and /w/:

/'bənə/ 'skin' /waŋə/ (type of poison)

/'b/ and /d/:

/'bu/ 'egg' /odu/ 'thigh'
/hibu/ 'oil' /hidu/ 'fish spear'
/m/ and /k/:
/míra/ (variety of yam) /kírâ/ (type of medicine)
/ámé/ 'to do, make' /ákpl/ 'to open'

/m/ and /g/:
/mánda/ 'groundnut' /gbánda/ 'cassava'

/m/ and /w/:
/muí/ 'khasham al banât /múl/ 'wild dog'
/species of fish'

/m/ and /n/:
/múká/ 'war' /núká/ 'maternal uncle'

2.3.2. Between Alveolars and Between Alveolars and Corresponding Palatals

In this section the alveolar consonant phonemes are contrasted with each other and with the corresponding palatals.

/t/ /d/ /l/ and /r/:
/tôtá/ (species of animal) /tôtá/ 'salt'
/tóù/ (liquid of egg or fruit) /tórù/ 'up'

/t/ and /l/:
/tól/ 'grindstone' /dól/ 'grave (noun)'
/tóla/ 'to see' /dólâ/ 'to tie'

/t/ and /n/:
/tôná/ 'hate' /bónâ/ 'skin'

/t/ and /l/:
/túr/ 'foreigner' /tur/ (species of fish)
/kûtú/ 'pot' /kúcû/ (man's name)

/d/ and /'d/:
/dû/ 'for' /dû/ 'thigh'
/kùdá/ 'thirsty' /kùdâ/ 'pool of water'

/d/ and /n/:
/dáká/ 'basket' /náká/ 'maternal uncle'
/d/ and /r/
/dʒ/  'on, place'  /r̩/  'name'

/d/ and /l/
/kàdà/  'sun'  /kālā/  'kob (antelope)'

/d/ and /j/:
/dí/  'cold (weather)'  /jì/  'hand'
/àdʃ/  'to cultivate'  /áj̪ʃ/  'to say, tell'

/d/ and /w/:
/dɔkɔ/  'basket'  /jɔkɔ/  'teeth'
/hèd̪i/  'urine'  /l̪e̞jì/  'beer'

/nd/ with /t/, /l/, /r/, and /n/:
/gbàndà/  'cassava'  /bàtà/  'hare'
/bálà/  'edible leaves'
/bára/  'ribs'
/bànà/  'skin'

/nd/ and /d/:
/kàndà/  'tortoise'  /kàdà/  'sun'

/nd/ and /j/:
/nòò/  'how, how many?'  /nɔ/  'thigh'

/nd/ and /n̪/:
/kàndà/  'tortoise'  /gànjà/  'iron, money'

/d/ and /n̪/:
/mbòdò/  'frog'  /mònà/  (variety of fruit)

/d/ and /l/:
/ðù/  'thigh'  /rùù/  'mud hut, room'

/d/ and /j/:
/'dì/  'what?'  /jì/  'hand'

/d/ and /j/:
/ˈdì/  'what?'  /jì/  'person'
/áˈdù/  'to sleep'  /āˈjù/  'to give birth'

/n/ and /r/:
/ˈbànà/  'skin'  /ˈbárà/  'ribs'
2.3.3. Between Palatais and Between Palatais and Corresponding Velars

In this section the palatal consonant phonemes are contrasted with each other and with the corresponding velars.

'/ri/ and /li/:

'/ri/ 'excrement' /li/ 'hand'

'/ci/ and /li/:

'/ci/ 'excrement' /li/ 'person'

'/ac/ 'to fall' /jìju/ 'to give birth'

'/ceke/ (species of thorny plant) /nyèrè/ 'chief'

'/maca/ 'rhinoceros' /mànya/ (species of buffalo)

'/ceke/ (species of thorny plant) /yèkì/ 'who'

'/ac/ 'to fail' /àyù/ 'to die'
/c/ and /k/:  
/cúr/  (species of fish) /kúr/  'nut'
/acú/  'to fall' /ákú/  'to speak'

/j/ and /j/:  
/jí/  'hand' /'jí/  'person'
/ájé/  'to say, tell' /á'jé/  'to make (net)'

/c/ and /ny/:  
/jeke/  'well, good' /nyéré/  'chief'
/nyákà/  'field'
/dié/  'from (someone)' /hny(̂)/  'scorpion'

/c/ and /y/:  
/jé/  'we' /yé/  'they'
/ngálá/  'girl' /ngbáyá/  'corn'

/c/ and /k/:  
/jóhí/  'a cold' /góhí/  'cough'
/rújù/  'flour' /kúgù/  'laugh'

/n/ with /c/, /k/, and /j/:  
/njí/  'green' /cji/  'excrement'
/jí/  'hand'
/’jí/  'person'

/n/ with /ny/, /y/, and /ngb/:  
/ánjá/  'to throw (net)' /anyá/  'to stop, wait'
/áyá/  'to jump'
/ängbá/  'to hit'

/n/ and /ng/:  
/gánjá/  'iron, money' /kángá/  'ostrich'

/l/ and /ny/:  
/’jala/  (species of white bird) /nyala/  (variety of fruit)

/l/ and /y/:  
/sájù/  'to give birth' /sáyù/  'to die'

/ny/ and /y/:  
/nyákà/  'field' /yakar/  'pumpkin'
2.3.4. Between Velars, Between Labiovelars, and Between Velars and Other Corresponding Phonemes

In this section the velar and labiovelar consonant phonemes are contrasted with each other. Contrasts are also given between /k/ and /h/, /ŋ/ and /n/, and with some bilabial consonants.

/k/ and /g/:

/kèl/  'straw' /gèl/  (species of tree)

/kè/  'to speak' /gè/  'to buy'

/ŋkè/  'sorghum bread' /jìnŋi/  'Dinka'

/kulí/  (species of snake) /kúlí/  'lion'

/rákà/  'shoe' /ákà/  'to sow by scattering'

/kèkè/  'cattle or goat egret' /gbòkè/  'upper leg'

/gbòkà/  'cane rat' /gbògbà/  'windpipe'

/kè/ and /gb/:  

/kàngà/  'ostrich' /wànà/  (type of poison)

/ákù/  'to speak' /ándù/  'to hear'

/kè/ and /ch/:

/kègà/  'leopard' /hègà/  'back (noun)'

/mèkà/  'field' /mèhà/  (species of tree)

/ŋgè/  'neck' /ŋgà/  'baby termite'

/àgà/  'to chop' /ánà/  'to bite'
| /g/ and /kp/ | /girà kàmà/ | 'pupil of eye' | /kpirà/ | (type of medicine) |
| /ágà/ | 'to chop' | /ákpa/ | 'to sow by scattering' |
| /gùtù/ | 'shoulder' | /gbütù/ | (variety of sorghum) |
| /kòngò/ | (species of redheaded bird) | /kôngbù/ | (species of bird) |
| /gù/ | 'hole' | /gün/ | 'brains' |
| /ágù/ | 'to buy' | /ñùntù/ | 'to hear' |
| /ángò/ and /k/ | /ángò/ | 'to write' | /ákɔ/ | 'to sweep' |
| /ńgà/ and /g/ | /ńgà/ | 'grave posts' | /gün/ | 'roots' |
| /ńg/ and /n/ | /ńg/ | (food like honey) | /ńná/ | (animal like hartebeest) |
| /ng/ and /ngb/ | /ng/ | and /ngb/ | /ńgá/ | 'vulture' | /ńgá/ | 'burning' |
| /ń/ and /kp/ | /ńá/ | 'to bite' | /ńkpa/ | 'to sow by scattering' |
| /ńlc/ and /ob/ | /ńlc/ | 'baby termite' | /ńlc/ | 'compound' |
| /ń/ and /w/ | /ńwàńà/ | (type of poison) | /ńwàńà/ | 'gnat' |
| /ń/ and /n/ | /ńnɔnɔ/ | (species of fish) | /ńnɔnɔ/ | 'maternal uncle' |
| /ńgónò/ | 'fly' | /ńgónò/ | 'chicken' |
| /k/ and /ob/ | /k/ | 'owl' | /gba/ | (species of bird) |
| /kúlúlú/ | 'owl' | /kúlúlú/ | 'wild dog' |
/gbe/ and /w/:  
/gbândà/ ‘cassava’ /mènà/ (type of poison)

/nob/ with /m/, /k/, /g/, and /o/:  
/ngbutú/ ‘deafness’ /putú/ ‘heel’
/kutú/ ‘shelter’
/gutú/ ‘shoulder’
/gbutú/ (variety of sorghum)

/nob/ with /k/, /b/, and /n/:  
/angbá/ ‘to hit’ /akpá/ ‘to sow by scattering’
/â’bá/ ‘to create, make pot’
/áñá/ ‘to bite’

/nob/ and /m/:  
/ngbáya/ ‘corn’ /mayá/ (variety of yam)

/nob/ and /b/:  
/langba/ ‘burning’ /labá/ ‘bridge’

/nob/ and /w/:  
/karangba/ (emetic herb) /mangirawa/ ‘monitor’

2.4. Extrasystemic Phonemes

Glottal stop /ʔ/ is considered to be an extrasystemic phoneme in Bongo, since it is significant in only one word. A non-phonemic glottal stop varies freely with silence at the beginning of an utterance that begins with a vowel.

/[áta]-[ʔáta] /áta/ ‘to see’

However, in the word for ‘no’, the presence of the glottal stop intervocally distinguishes it from the word for ‘yes’ and must, therefore, be marked.

/[sí]-[ʔsí] /sí/ ‘yes’
/[ʔsíʔsí]-[síʔsí] /síʔsí/ ‘no’

3. VOWELS

3.1. Vowel Phonemes

Bongo has ten vowels divided between two harmony sets, as shown in Chart 3.
**[+ATR] Vowels**

Front  | Central | Back
---|---|---
High  | ɪ | ʊ
Low   | ə | ̆

**[-ATR] Vowels**

Front  | Central | Back
---|---|---
 ʊ | ʌ
 ə | ə

**CHART 3. Vowel Harmony Sets**

The two harmony sets are labelled as [+ATR] (Advanced Tongue Root) and [-ATR] (non-Advanced Tongue Root), which appears to be the articulatory difference between the sets. 'Open' vowel symbols are used for the [-ATR] set because there is some relative openness but this is not the significant feature. A fuller description of vowel harmony in Bongo is given in section 5, but for the present discussion we can make the following general statements:

1) Vowels of only one set can occur in a morpheme.

2) The [+ATR] set is dominant, so that a word with [-ATR] vowels becomes [+ATR] if a [+ATR] suffix is added, but if a [-ATR] suffix is added, a [+ATR] root does not change.

3) The [+ATR] counterpart for each [-ATR] vowel is the one which is most similar in articulation, i.e., /i/ for /ɪ/, /e/ for /ɛ/, /ʌ/ for /æ/, /u/ for /ʊ/, and /o/ for /ɔ/.

In the following discussion counterpart vowels are often referred to together, e.g. /i/.

In Chart 4 the features which distinguish Bongo vowels are presented. They are [high], [back], [ATR], and [round]. All vowels are [+syllabic], [-consonantal]. Both central and back vowels are marked [+back] since the body of the tongue is retracted from the neutral position for both.

**CHART 4. Distinctive Features of Vowels**

<table>
<thead>
<tr>
<th></th>
<th>ɪ</th>
<th>e</th>
<th>ə</th>
<th>ʊ</th>
<th>ʌ</th>
<th>i</th>
<th>a</th>
<th>u</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Back</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ATR</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Round</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**3.2. Phonetic Description of Vowels**

The five [+ATR] vowels of Bongo with their allophonic variations are described first and then the five [-ATR] vowels.
/i/ [i], a high front unrounded [+ATR] vowel with egressive lung air:
[bǐhi] /bǐhi/ 'dog'
/e/ [e], a mid front unrounded [+ATR] vowel with egressive lung air:
[lele] /lelé/ 'red stone'
/ɪ/ [ɪ], a high central unrounded [+ATR] vowel with egressive lung air. The oral cavity is as narrow in the pronunciation of /ɪ/ as it is for /i/:
[rɪkɔ] /rɔki/ 'sorghum bread'
/u/ [u], a centralized high back rounded [+ATR] vowel with egressive lung air, occurring following /r/ and /j/, in complementary distribution with:
[u], a high back rounded [+ATR] vowel with egressive lung air, occurring elsewhere:
[rújʊ] /rújʊ/ 'flour'
[hɪlʊ] /hɪlʊ/ 'hyena'
/o/ [o], a mid back rounded [+ATR] vowel with egressive lung air:
[mbo'dʊ] /mbɔ'dʊ/ 'frog'
/a/ [a], a high front unrounded [−ATR] vowel with egressive lung air:
[kidɪ] /kidɪ/ 'elephant'
/e/ [a], a mid front unrounded [−ATR] vowel with egressive lung air:
[ketɛ] /ketɛ/ 'waterpot'

The phoneme /a/ has three allophones conditioned by their environments: [a<], [a>], and [a]. There is a fourth allophone of /a/, [A], which varies freely with the other three allophones in certain environments. A description of these allophones of /a/, along with their environments, is given below.

/a/ [a<], a slightly fronted low central unrounded [−ATR] vowel with egressive lung air, occurring contiguous to palatals:
[mə<ya<] /məya/ 'breast'

[a], a slightly backed low central unrounded [−ATR] vowel with egressive lung air, occurring contiguous to velars:
[kə>gə>] /kəgə/ 'tree'
[a], a low central unrounded [-ATR] vowel with egressive lung air, occurring when there is a palatal on one side of the vowel and a velar on the other. This allophone also occurs in all other environments not covered above:

[yáŋá] /yáŋá/ 'spotted rat'
[lábá] /lábá/ 'bridge'

Preceding nasals and in unstressed syllables, the three allophones above vary freely with [a], a slightly raised low unrounded central [-ATR] vowel with egressive lung air:

[ŋáŋjá]-[ŋáŋjá] /ŋáŋjá/ 'crocodile'
[ráká]-[ráká] /ráká/ 'shoe'

[u] /v/, a high back rounded [-ATR] vowel with egressive lung air:
[kútú] /kútú/ 'pot'

[o] /o/, a mid back rounded [-ATR] vowel with egressive lung air:
[kògà] /kògà/ 'leopard'

3.3. Vowel contrasts

3.3.1. Between Front Vowels and Between Front Vowels and Corresponding Central Vowels

/i/ and /i/:
/kídi/ (species of snake) /kídi/ 'elephant'
/kír/ (species of plant) /kír/ 'star'

/i/ and /e/:
/kibí/ 'drum' /kèbí/ 'rope'

/i/ and /e/:
/jí/ 'hand' /jé/ 'we'
/s'bi/ 'to give' /s'bé/ 'to shoot, sting'

/i/ and /e/:
/hílílí/ 'breeze' /hílele/ 'vulture'
/mbúrí/ (variety of yam) /mbúré/ 'giant eland'

/i/ and /e/:
/míndí/ 'dirty' /mendi/ (type of congenital disease)
/shí/ 'inside, belly' /shé/ 'you (pl)'

/hí/
/é/ and /æ/

/méré/ 'to fear' /mbärá/ 'doleib'
/lélá/ 'red stone' /léliá/ 'to cut up (food)

/ɔ/ and /ʌ/:

/'jigí/ 'ointment' /jí́́/ 'Dinka'
/yèki/ 'who' /rikí/ 'sorghum bread'

/ɔ/ and /a/:

/níkí/ (one day removed in time) /rikí/ 'sorghum bread'
/kíčí/ 'hot' /njíčí/ 'slave'

/ɛ/ and /a/:

/'bé/ 'house' /'bá/ 'where'
/bèngé/ (species of fish) /báŋgé/ 'roof'

/ɛ/ and /ɛ/:

/ñáyé/ 'to drink' /ñyé/ 'to jump'
/mbèlè/ (species of fish) /mbélá/ 'arm'

3.3.2. Between Central Vowels and Between Central Vowels and Corresponding Back Vowels

/ɛ/ and /æ/:

/ríki/ 'sorghum bread' /rákí/ 'shoe'
/níčí/ 'slave' /ŋáčí/ (species of tree)

/ɔ/ and /u/:

/tíngí/ (food like honey) /kúngú/ 'baboon'

/ɔ/ and /u/:

/gígi/ 'lizard' /gùgù/ (species of ant)

/æ/ and /o/:

/káŋgá/ 'ostrich' /kóngó/ (species of red-headed bird)

/æ/ and /a/:

/àdà/ 'to count' /àdá/ 'to cultivate'
### Bongo Phonology

<table>
<thead>
<tr>
<th>/ŋɛŋə/</th>
<th>(species of tree)</th>
<th>/ŋʊŋə/</th>
<th>'fly'</th>
</tr>
</thead>
</table>

#### 3.3.3. Between Back Vowels and Between Front Vowels and Corresponding Back Vowels

| /u/ and /o/ |  |
|-------------|  |
| /mùl/ | 'darkness' | /mʊl/ | 'khasham al banăt' (species of fish) |
| /kʊŋû/ | 'baboon' | /kʊŋû/ | 'street' |

| /u/ and /o/ |  |
|-------------|  |
| /kʊtû/ | 'shelter' | /kʊtɑ/ | 'one' |
| /kʊŋû/ | 'baboon' | /kʊŋû/ | (species of red-headed bird) |

| /u/ and /o/ |  |
|-------------|  |
| /kʊtû/ | 'shelter' | /kʊtɑ/ | 'lower back' |

| /u/ and /o/ |  |
|-------------|  |
| /tʊˈbʊ/ | 'bushbuck' | /tɔˈbɔ/ | 'fat' |
| /nʊm/ | 'tomorrow' | /nɔm/ | 'fight' |

| /u/ and /o/ |  |
|-------------|  |
| /gʊ/ | 'hole' | /gɔ/ | 'neck' |
| /kʊr/ | 'nut' | /kɔr/ | 'shea butter tree' |

| /o/ and /o/ |  |
|-------------|  |
| /mɔnɔ/ | (a variety of sour fruit) | /mɔnɔ/ | 'another' |
| /tɔˈbɔ/ | 'fat' | /tɔˈbɔ/ | 'poison' |

| /i/ and /u/ |  |
|-------------|  |
| /tɪtɪ/ | (species of fish) | /tɪtɪ/ | 'groundnut shell' |
| /hɪbɪ/ | 'wet season' | /hɪˈbʊ/ | 'oil' |

| /i/ and /u/ |  |
|-------------|  |
| /kɪr/ | 'star' | /kʊr/ | 'nut' |
| /tɪbɪ/ | 'unripe' | /tʊˈbʊ/ | 'bushbuck' |

| /ɛ/ and /o/ |  |
|-------------|  |
| /kɛbɪ/ | 'rope' | /kɔbɪ/ | 'buffalo' |
| /mlnʊ/ | 'small' | /kɪnʊ/ | 'thorn' |
\( /k\acute{a}t\acute{a}/\) 'waterpot' \( /k\acute{s}\tilde{\acute{t}}\tilde{\acute{s}}/\) 'lower back'

4. DISTRIBUTION OF CONSONANTS AND VOWELS

The distribution of consonants and vowels and the interpretation of ambivalent sequences or segments is presented according to syllable patterns, occurrence in syllable and word positions, and cooccurrence restrictions.

The unambiguous syllable patterns in Bongo are \( V, CV, \) and \( CV\).C

\( V \)
\( /\acute{a}.\tilde{t}\tilde{\acute{a}}/\) 'to see'

\( CV \)
\( /g\acute{\circ}/\) 'neck'

\( CV\).
\( /g\acute{\circ}l/\) (species of tree)

There are no unambiguous consonant clusters within a syllable nor any unambiguous vowel clusters within a syllable in slow speech.

\( V \) syllables occur only word initially while \( CV\).C syllables occur primarily word finally, but can occur word initially or word medially. For example:

\( /'b\acute{i}.l.n\acute{a}/\) (variety of sorghum)

Words can have from one to six syllables. The six syllable words are adjectives which have prefixes and reduplicated stems. Single morpheme words do not exceed four syllables. One, two, and three syllable words are most common.

4.1. Consonants

4.1.1. Distribution in Word and Syllable Positions

All consonants occur initially in a \( CV \) or a \( CV\).C syllable when that syllable is word initial or follows a \( V \) or \( CV \) syllable. Following a \( CV\).C syllable, only nasals or stops occur syllable initially in our data. Only liquids and nasals occur syllable and word finally, i.e., as the second consonant in \( CV\).C syllables. Examples of liquids and nasals word initially, medially, and finally:

<table>
<thead>
<tr>
<th>Initially</th>
<th>Medially</th>
<th>Finally</th>
</tr>
</thead>
<tbody>
<tr>
<td>/l/</td>
<td>/lj\acute{\circ}/</td>
<td>'hoe'</td>
</tr>
<tr>
<td></td>
<td>/k\acute{\circ}l/</td>
<td>'lion'</td>
</tr>
<tr>
<td></td>
<td>/bél/</td>
<td>'walking stick'</td>
</tr>
<tr>
<td>/r/</td>
<td>/r\acute{\circ}l/</td>
<td>'flour'</td>
</tr>
<tr>
<td></td>
<td>/'b\acute{\circ}r\acute{\circ}/</td>
<td>'bat'</td>
</tr>
<tr>
<td></td>
<td>/b\acute{\circ}r/</td>
<td>'swamp'</td>
</tr>
<tr>
<td>/m/</td>
<td>/m\acute{\circ}l/</td>
<td>'meat'</td>
</tr>
<tr>
<td></td>
<td>/h\acute{\circ}m\acute{\circ}/</td>
<td>'nose'</td>
</tr>
<tr>
<td></td>
<td>/d\acute{\circ}m/</td>
<td>'sorghum porridge'</td>
</tr>
</tbody>
</table>
Examples of other consonants word initially and medially:

<table>
<thead>
<tr>
<th>Initially</th>
<th>Medially</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/</td>
<td>/pòdù/</td>
</tr>
<tr>
<td>/b/</td>
<td>/bíhì/</td>
</tr>
<tr>
<td>/mb/</td>
<td>/mbègù/</td>
</tr>
<tr>
<td>/'b/</td>
<td>/'bèrù/</td>
</tr>
<tr>
<td>/t/</td>
<td>/tòbò/</td>
</tr>
<tr>
<td>/d/</td>
<td>/dèlù/</td>
</tr>
<tr>
<td>/nd/</td>
<td>/ndàn/</td>
</tr>
<tr>
<td>/'d/</td>
<td>/'dù/</td>
</tr>
<tr>
<td>/c/</td>
<td>/čì/</td>
</tr>
<tr>
<td>/j/</td>
<td>/jì/</td>
</tr>
<tr>
<td>/nj/</td>
<td>/njìny/</td>
</tr>
<tr>
<td>/'j/</td>
<td>/'jì/</td>
</tr>
<tr>
<td>/y/</td>
<td>/yāngá/</td>
</tr>
<tr>
<td>/k/</td>
<td>/kàgá/</td>
</tr>
<tr>
<td>/g/</td>
<td>/gbù/</td>
</tr>
<tr>
<td>/ŋ/</td>
<td>/ŋànjá/</td>
</tr>
<tr>
<td>/kp/</td>
<td>/kpúlù/</td>
</tr>
<tr>
<td>/gb/</td>
<td>/gbèkè/</td>
</tr>
<tr>
<td>/ŋgb/</td>
<td>/ŋgbèkè/</td>
</tr>
<tr>
<td>/u/</td>
<td>/wàr/</td>
</tr>
<tr>
<td>/h/</td>
<td>/hàmá/</td>
</tr>
</tbody>
</table>

In our data, there are only two occurrences of /'d/ word initially; all other occurrences are word medial.

4.1.2. Distribution with Respect to Vowels

Chart 5 shows which vowels follow the different consonants. An x indicates that there is at least one word in which that vowel follows the consonant in question.
Several of the gaps in the chart are due to the fact that the phonemes involved are not common ones. The vowel /i/ rarely occurs and the consonants /n/, /l/, and /j/ are also rare. There are, however, some significant restrictions in distribution. The consonant /n/ is never followed by a front vowel. /w/ is followed only by high vowels and /e/. /y/ is never followed by a high front vowel. In the basic form of stems, /nj/ is followed only by [-ATR] vowels, and /ngb/ is followed only by low [-ATR] vowels.

<table>
<thead>
<tr>
<th>/i/</th>
<th>/e/</th>
<th>/a/</th>
<th>/o/</th>
<th>/æ/</th>
<th>/u/</th>
<th>/u/</th>
<th>/a/</th>
<th>/ɔ/</th>
<th>/ɔ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
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<td></td>
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<td>/b/</td>
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</tbody>
</table>

CHART 5. Vowels Following Consonants
<table>
<thead>
<tr>
<th>/ɪ/</th>
<th>/ʊ/</th>
<th>/æ/</th>
<th>/ɔ/</th>
<th>/ʌ/</th>
<th>/ɒ/</th>
<th>/ɔ/</th>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>/h/</td>
</tr>
</tbody>
</table>

**Chart 6. Vowels Preceding Consonants**

Chart 6 shows which vowels precede the different consonants. Again, there are several gaps due to the fact that certain consonants are not common word medially. We notice that /ŋ/ follows mostly back vowels and never high vowels. There is only one word in which /ŋ/ is preceded by a front vowel, /aŋə/ 'to sift'. /p/ is never preceded by a front vowel, but that may be because there are not many examples of word medial /p/. The only low vowel that precedes /k/ is
/a/. No back rounded vowels precede /w/. Both /kp/ and /gb/ are rare word medially. In the basic form of stems, /nj/ is preceded only by the [−ATR] vowels /i/ and /a/. Again, in basic forms, the only vowel preceding /mb/ is /a/ and /ngb/ is preceded only by low [−ATR] vowels.

4.1.3. Interpretation of Semivowels and Ambivalent Phonetic Sequences

The semivowels [w] and [y] are interpreted as consonants when they occur syllable initially and are followed by a vowel. In these cases the closure on the [w] and [y] is greater than for the corresponding vowel phones [u] and [i]s:

CV [wá.tá] /wáŋa/ (type of poison) [ye.ge] /yege/ 'locust'
CV [wár] /wár/ (species of fish)

In the examples above, the following vowel phone is quite distinct phonetically from the [w] or [y]. Even when the following vowel is high, the semivowel is more closed than the vowel. For examples:

CVC [wúí] /wúí/ 'wild dog'
VC.CV [i,wú] /i,wú/ 'to carry'

The phonetic affricates in Bongo include: a bilabial affricate [pp], voiceless and voiced alveopalatal grooved affricates [tʃ] and [dʒ], an implosive affricate [dʒ] and a prenasalized affricate [ndʒ]. Since all of the affricate sounds occur word initially where there are no unambiguous consonant clusters, I interpret each as a single unit. They are allophones of the phonemes /p/, /tʃ/, /dʒ/ and /nj/, respectively:

[ppíra] /pirá/ 'axe'
[tʃí] /cʃí/ 'excrement'
[dʒí] /ʃí/ 'hand'
[njá] /njá/ 'not, none'

Likewise, the voiced palatalized alveolar stop [dʒ] and the implosive counterpart [dʒ], occur syllable initially where there are no unambiguous consonant clusters. These phones are, therefore, interpreted as allophones of /j/ and /'j/, respectively:

[ʃe,dʒí] /ʃeʃí/ 'beer'
[dʒsʃ] /'ʃsʃ/ 'teeth'

Similarly, the labiovelar stops [kp] and [gb] are interpreted as single units since they can occur word initially:
[kpúl]  /kpúl/  'lion'
[gbó]  /gbó/  'compound'

Implosives are formed with a glottal closure as initiator for the ingressive pharynx air mechanism, and are ambiguous also. They are interpreted as unit segments because they occur word initially:

[bfó]  /'bfó/  'egg'
[drí]  /'drí/  'what'
[ljí]  /'ljí/  'person'
[djískó]  /'djískó/  'teeth'

Bongo has the following prenasalized stops and affricates: [mb], [nd], [nj], [ng], and [ngb]. These could be interpreted either as single units or as sequences of nasal plus stop. Since they can occur word initially, they are interpreted as single consonants even though this analysis results in five additional consonant phonemes.

However, there is evidence in Bongo for interpreting prenasalized stops as a sequence of nasal plus stop:

1) In words with prenasalized stops word medially, a syllable break is sometimes perceived between the nasal and stop components. Therefore,

[mán.dá]  'groundnut'  could be interpreted as having
[lbol.ná]  (variety of sorghum), namely CVC.CV.

The fact that the nasal phone closes the first syllable agrees with the fact that only liquids and nasals can close syllables and words in Bongo. (See section 4.1.1.)

2) Word initially, following consonant final words or utterance initially, the nasal component of the prenasalized stop is sometimes syllabic. Therefore,

[a.dú]  'language'  could be interpreted as having
[a.lá]  'to get',  namely V.CV.

Furthermore, when a word initial prenasalized stop is preceded by a word ending in a vowel within the same pause group, the nasal component loses its syllabicity and closes the syllable of the preceding word, so that it is phonetically like the word medial prenasalized stops.

/má úkù ̀ndú Bongo/ is phonetically [má kùn.dó Bongo]  
'I speak the Bongo language.'

/má águ  màndá ́ndán/ is phonetically [má gú màn.dán.dán]
'I bought groundnuts today.'
On the other hand, the fact that the tone of a syllabic nasal is the same as the tone of the vowel in the following phonetic syllable is further evidence for the interpretation I have chosen, i.e. the prenasalized stops are unit phonemes.

### 4.2. Vowels

#### 4.2.1. Distribution in Word and Syllable Positions

All ten vowels in Bongo, occur word medially and finally and syllable medially. Examples were found for all vowels except /e/ in word and, therefore, syllable initial position.

<table>
<thead>
<tr>
<th>Word and Syllable</th>
<th>Word Medially</th>
<th>Word and Syllable</th>
<th>Syllable Medially</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initially</td>
<td>Finally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ɪ/ /ɪsɪɪcɪcɪ/</td>
<td>/ˈbɪrʊ/</td>
<td>/dɪp/</td>
<td>/kɪr/</td>
</tr>
<tr>
<td>'only a few'</td>
<td>'bat'</td>
<td>'4m-ænd'</td>
<td>(species of plant)</td>
</tr>
<tr>
<td>/u/ /ɪrɪrɪ/</td>
<td>/bɪnɪ/</td>
<td>/hi/</td>
<td>/ˈbɪlna/</td>
</tr>
<tr>
<td>'heavy'</td>
<td>'goat'</td>
<td>'in'</td>
<td>(variety of sorghum)</td>
</tr>
<tr>
<td>/e/ /kɛbɪ/</td>
<td>/hɪgɛ/</td>
<td></td>
<td>/bɛl/</td>
</tr>
<tr>
<td>'rope'</td>
<td>'rat'</td>
<td>'walking stick'</td>
<td></td>
</tr>
<tr>
<td>/a/ /nɛmɛ/</td>
<td>/plɛɡə/</td>
<td>/kɪrɛ/</td>
<td>/sayɛn/</td>
</tr>
<tr>
<td>'good'</td>
<td>(species of 'arrow' bird)</td>
<td></td>
<td>'to sift'</td>
</tr>
<tr>
<td>/i/ /iɛlɛ/</td>
<td>/rɪkɛ/</td>
<td>/ˈjɪgɪ/</td>
<td>/stiŋɡɪ/</td>
</tr>
<tr>
<td>'to dig'</td>
<td>'sorghum bread'</td>
<td>'ointment'</td>
<td>(food like honey)</td>
</tr>
<tr>
<td>/a/ /alɛ/</td>
<td>/ndɛn/</td>
<td>/bɪnɪɛ/</td>
<td>/wɑr/</td>
</tr>
<tr>
<td>'to get'</td>
<td>'today'</td>
<td>'goat'</td>
<td>(species of fish)</td>
</tr>
<tr>
<td>/u/ /ulɛmɛl/</td>
<td>/kɛpʊl/</td>
<td>/bʊˈdʊ/</td>
<td>/dʊn/</td>
</tr>
<tr>
<td>'very deep'</td>
<td>'lion'</td>
<td>'wild pig'</td>
<td>'sorghum porridge'</td>
</tr>
<tr>
<td>/u/ /uɗɔrɔ/</td>
<td>/bʊˈdɔŋ/</td>
<td>/dɪˈʊ/</td>
<td>/dʊŋ/</td>
</tr>
<tr>
<td>(species of fish)</td>
<td>'husband'</td>
<td>'dikdik'</td>
<td>(species of animal)</td>
</tr>
<tr>
<td>/o/ /ɔʊ bɔrɔ/</td>
<td>/bʊˈdʊn/</td>
<td>/kɪlʊ/</td>
<td>/ndɔ́m/</td>
</tr>
<tr>
<td>(discourse closure)</td>
<td>'wild pig'</td>
<td>(species of bird)</td>
<td>'fight'</td>
</tr>
<tr>
<td>/ɔ/ /ɔ́rɔ/</td>
<td>/dɔr(ɔ/)</td>
<td>/bʊˈdɔŋ/</td>
<td>/kɔr/</td>
</tr>
<tr>
<td>'to cease'</td>
<td>'year'</td>
<td>'husband'</td>
<td>'shea butter tree'</td>
</tr>
</tbody>
</table>
4.2.2. Interpretation of Vowel Clusters and Long Vowels

<table>
<thead>
<tr>
<th>First member of cluster</th>
<th>Second member of cluster or vowel length</th>
</tr>
</thead>
<tbody>
<tr>
<td>i/ɪ</td>
<td>e/ə</td>
</tr>
<tr>
<td>i/ɪ</td>
<td>x</td>
</tr>
<tr>
<td>e/ə</td>
<td>x</td>
</tr>
<tr>
<td>ɪ/a</td>
<td>x</td>
</tr>
<tr>
<td>u/ʊ</td>
<td>x</td>
</tr>
<tr>
<td>o/ɔ</td>
<td>x</td>
</tr>
</tbody>
</table>

**CHART 7. Vowel Clusters and Vowel Length Within a Morpheme**

In Chart 7 the vowel clusters and long vowels which occur within a morpheme are indicated. There are other vowel clusters which occur only across morpheme boundaries. In the examples below, a hyphen indicates a morpheme boundary within a word. (See section 5.2.5 for discussion of the /e-ə/ sequence.)

'/eə/ /njɛ lälé-ɔ/ 'it is not a red stone'
'/eə/ /njæ kætɛ-ɔ/ 'it is not a waterpot'
'/uɛ/ /stú-ɛ/ 'grandfathers'

All vowel clusters within a morpheme in Bongo have a high vowel as the first or second member of the cluster. Chart 7 shows that any vowel can be followed by i/ɪ and u/ʊ. Also, i/ɪ can be followed by e/ə or by ɪ/a.

Usually any vowel followed by i/ɪ or u/ʊ sounds like a phonetic glide, e.g. [a̝] or [a̝u̝]. These might be treated as filling either the complex nucleus of a single syllable (CU), a sequence (CVU), or a vowel plus semivowel (CVC).

When i/ɪ or u/ʊ are followed by another vowel, the two vowels are both syllabic in slow speech and both have tones. Furthermore, there are a few cases of /e/ and /a/ followed by /u/ in which both vowels are syllabic in slow speech. Thus, it might seem best to consider these sequences as belonging to separate syllables. Long vowels also have two tones as if they were sequences of two identical vowels.

However, I interpret all three of the complex vowel types (clusters, glides, and length) as sequences of two vowels in a single syllable (CVU) for the following reasons:

1) All three can have a falling tone which indicates a single syllable not CVU.
2) In fast speech (see 2.2.3) the first member of a 'cluster', a 'glide' or a long vowel may be labialized in the same way, e.g. /tʰɛ/ becomes [tʰɛ], /mɛl/ becomes [mɛl], and /ŋɛs/ becomes [ŋɛs]. This is true even across morpheme boundaries, for example /tú-ɛ/ 'grandfather-PL'.

This interpretation requires the addition of CVV and CVC syllable types, but not CVV or CVVC sequences, which would require both an additional syllable type (VC) and the occurrence of syllables consisting of a single vowel other than word initially.

Examples of the different vowel sequences which occur as 'vowel clusters' are:

/sie/  /sɛiɛ/  'to break'
/lu/  /liu/  (man's name)
/la/  /gɔ/  'roots'
/w/  /mɛmbiriŋ/  'hornet'
/u/  /kulu/  'python'
/u/  /kua/  'madida'
/su/  [gɛ.ɔ]  /gɛu/  'village, town'
/su/  [tɛ.ɔ]  /tɛu/  'clothing'

The following exemplify 'vowel glides':

/si/  /sɛi/  'boat'
/ai/  /anai/  'to come'
/su/  [kpɛ]  /kpɛu/  'all'
/o/  /kuró/  (man's name)
/ou/  /pɛu/  'early'
/ɔ/  /tɛu/  'near'

Examples of vowel length:

/ɪ/  /hiɪ/  'guinea worm'
/ɪ/  /kiɪ/  'ten'
/e/  /lɛɛ/  'paternal aunt'
/e/  /gbɛŋgbɛ/  'sweet potato'
/a/  /dɔɛ/  'water well'
/u/  /tɔuɛ/  'tortoise'
/o/  /tʊu/  'grandfather'
/o/  /toɔ/  (species of thorny plant)
/ɔ/  /tɔɔtɛ/  'different'
When suffixes beginning with a vowel are added to words with a final long vowel, that long vowel is shortened. This is congruent with a seemingly general restriction in Bongo limiting vowel sequences to two vowels. The change in vowel quality in 'grandfather' in the second example below is due to vowel harmony.

/lea/ + /-i/  "/leɪ/  'your maternal uncle'
/stu/ + /-e/  "/stu/  'grandfathers'

Length is significant lexically in a few examples and, therefore, would have to be marked in a practical orthography.

/stu/  (species of animal)  /stu/  'different'
/mi/  'another'  /mi/  'perhaps'

Many monosyllabic words have long vowels in all contexts. Most open syllable monosyllabic words have vowel length when spoken in isolation. In this latter case, the length is nonphonemic. There are also other examples of nonphonemic length. Often the vowels of stressed syllables are slightly lengthened and, as an intonational feature, the vowel in the peak syllable of an utterance is often lengthened.

4.2.3. Vowel Elision

Certain Bongo nouns with open syllables have final vowels which can be elided. In all such nouns the final vowel is an /i/ or /i/ and the preceding consonant is a liquid or a nasal. For example, /léma/ 'sister' can be said with or without the final vowel when combined with the suffix, /-ma/ 'my':

/lema/  or /lema/  'my sister'

With some of these words, such as /min/ 'water', there is a tendency for the form without the final vowel to occur utterance finally and the form with the final vowel to occur nonfinally.

/ma le mi/  'I carry water'
/kɔdɔ mi/  'water calabash'

but
/min na med/  'it's raining'
/min ki/  'cold water'

However, both forms are common in

/min/ njá/  'there is no water'

More investigation is necessary to determine the factors which condition this elision.
The following nouns in our data have final vowels which can slide:

/min(i)/  'water'
/pùr(i)/  'word'
/hùn(i)/  'scorpion'
/dùr(i)/  'year'
/kùn(i)/  (species of animal)
/dìl(i)/  'shadow'
/lùn(i)/  'sister'
/mbùl(i)/  'ear'

The elidable vowel is marked by parentheses, since other nouns with final /i/ and preceding sonorant occur in the non-elided form. For example:

/kpùlì/  'lion'
/kùlì/  (variety of yam)
/hòlì/  'bird'
/pùrì/  'wound'
/mbùrì/  (variety of yam)

5. VOWEL HARMONY

The Bongo vowel harmony system is common to many other Sub-Saharan African languages. That is, all vowels in a given morpheme must belong either to the set of [+ATR] vowels, or to the set of [-ATR] vowels.

5.1. The System

In the data checked for the [ATR] feature, there are no morphemes with a combination of [+ATR] and [-ATR] vowels. This vowel harmony can extend beyond the morpheme, and in some cases beyond the word. (See section 5.2.)

[-ATR] vowels are much more frequent in roots than [+ATR] vowels. However, the [+ATR] vowels prove to be the more dominant set; that is, when vowel harmony is in operation, [-ATR] vowels change to [+ATR] ones, but [+ATR] vowels do not change to [-ATR] ones. For example:

/mbágá/ 'mother' + /-i/ 'your' becomes /mbígá/ 'your mother', but
/gbógá/ 'windpipe' + /-ma/ 'my' stays /gbógbómá/ 'my windpipe'
All examples of vowel harmony across morpheme boundaries are regressive, as can be noticed in the above examples.

5.2. Extent of Vowel Harmony

In Bongo, vowel harmony operates in several different types of constructions and at different grammatical levels, as described below.

5.2.1. Compound and Complex Nouns

In complex and compound words vowel harmony operates regressively to change [-ATR] vowels to their [+ATR] counterparts when the second morpheme has [+ATR] vowels. For example:

/bɔ’dɔ/ 'man' + /jí/ 'hand' join to form the compound /bɔ’dùjì/ 'thumb (man of the hand)'.

/ájì/ 'thing' + /mòny/ 'sorghum' join to form the compound /ájìmòny/ 'food'.

On the other hand, when the first morpheme has [+ATR] vowels, they remain unchanged when joined to a second morpheme, whether the vowels of the second morpheme are [-ATR] or [+ATR]:

/bí/ 'hair' + /dà/ 'head' becomes /bídà/ 'hair on head', and

/bí/ 'hair' + /tàrà/ 'lip' becomes /bítàrà/ 'mustache or beard'.

The derivational prefix */bì/~ 'possessor of a certain quality or thing' can be attached to nouns or adjectives. When attached to a word with [-ATR] vowels, it remains [-ATR], but when it is attached to a word with [+ATR] vowels, its vowel changes to the [+ATR] counterpart.

/kú’jà/ 'prostitution' /bíkú’jà/ 'prostitute'

/tɔ’tɔƀ/ 'poison' /bítɔ’tɔƀ/ 'evil spirit'

/tɔ’tɔ̀/ 'fat' /bítɔ’tɔ̀/ 'fat person'

The prefix /gì/~ 'diminutive' can be attached to nouns indicating persons or animals to specify youth or immaturity. It, too, has a [-ATR] vowel when attached to words with [-ATR] vowels and [+ATR] vowel when attached to words with [+ATR] vowels.

/bù’dù/ 'man' /gìbù’dù/ 'boy'

/mà/ 'child' /gìmà/ 'small child'

/háŋɔ̀/ 'hen or rooster' /gìnɔ̀ŋɔ̀/ 'chick'
5.2.2. Genitive Constructions

The genitive construction for inalienable possession, used primarily with kinship terms and body parts, has the word order possessed plus possessor. Vowel harmony in Bongo extends throughout the construction, whether the possessor is a pronominal suffix or a noun.

When the possessive pronominal suffix /-má/ 'my', containing a [-ATR] vowel, is added to a noun, the vowels of the noun do not change; but the suffix /-i/ 'your', containing a [+ATR] vowel, changes the [-ATR] vowels of a possessed noun to [+ATR].

/mbúli/ 'ear' /mbúli(má) /mbúlí/
/tára/ 'lip' /tára(má) /tirí/
/budù/ 'husband' /budù(má) /budùdú/
/lemi/ 'sister' /lemi(má) /lemí/
/do/ 'head' /dò(má) /dò/ 

The following examples, with the nouns /kù/gá/ 'leopard' and /kùngú/ 'baboon', as possessor show how vowel harmony is in operation in the possessive phrase.

/hùgá kùgá/ 'leopard's back'
/hùgó kùngú/ 'baboon's back'
/mbúli kùgá/ 'leopard's ear'
/mbúli kùngú/ 'baboon's ear'

The other genitive construction in Bongo is the alienably possessed one in which the particle /'bí/ occurs between the possessed item and the possessor. This construction has not been checked for vowel harmony.

5.2.3. Other Noun Phrases

When other noun phrase constructions were checked for vowel harmony, it was found that vowel harmony does not extend over them.

In quantitative noun phrases, both the noun and number retain their original vowels.
In descriptive noun phrases, both the noun and the following adjectives retain their original vowels.

/kidí kíi/ 'ten elephants' /kídí kó tú/ 'one elephant'
/kògò kíi/ 'ten leopards' /kògò kó tú/ 'one leopard'
/kungú kíi/ 'ten baboons' /kungú kó tú/ 'one baboon'

In prepositional phrases, however, vowel harmony is in operation. The [+ATR] vowels of the noun change the [-ATR] vowels of the preposition to [+ATR] ones. Consider the prepositions /dò/ 'on', /hí/ 'in', /nà/ 'with' (used with nouns to mean accompaniment or instrument) and /nó/ 'with' (used with pronouns), in constructions with various nouns and pronouns.

/dò kògò/ 'on a leopard' /dò kungú/ 'on a baboon'
/dò mí/ 'on me' /dòí/ 'on you'
/hí húgá/ 'in a tin can' /hí ruú/ 'in a room'
/nà kíra/ 'with an arrow' /nà bel/ 'with a walking stick'
/nó mí/ 'with me' /nóí/ 'with you'

Note in the following examples that vowel harmony extends through the prepositional phrase, but not back to the noun that the prepositional phrase modifies.

/kungú dò hógò kògò/ 'a baboon on a leopard's back'
/kògò dò hógò kungú/ 'a leopard on a baboon's back'

5.2.4. Verb Plus Object

The word order of a simple transitive clause is subject, predicate, object (SVO). Vowel harmony extends over the verb and object, that is, a direct object with [+ATR] vowels will cause the vowels of a verb with [-ATR] vowels to become [+ATR], for example /á bó/ 'shoot, sting':

/á bó kògò/ ‘to shoot a leopard'
/si bó hédí/ ‘to urinate (lit. shoot urine)'
/gú áta kídí/ ‘Bu (man’s name) sees an elephant.'
/gú îti kungú/ ‘Bu sees a baboon.’
Note in this last part of sentences that vowel harmony does not extend to include the subject. This is even true when the basic form of the verb has [+ATR] vowels, for examples: /č'do/ 'to spear':

/gù č'dů kidi/  'Gù spear an elephant.'
/gù č'dů kúngū/  'Gù spear a baboon.'

Likewise, the vowels of the subject do not act progressively on the vowels of the verb:
/kúngū átí kidi/  'A baboon sees an elephant.'

5.2.5. Negation of a Noun

In the construction, /njá/ + noun + /-dů/, meaning 'It is not a ___', vowel harmony extends regressive from the noun to /njá/. However, the suffix /-dů/ does not operate according to vowel harmony rules, at least as presently understood. First, notice that when /-dů/ is suffixed to a consonant final noun containing [+ATR] vowels, they do not change, but when it is suffixed to a vowel final word, there is assimilation, but not vowel harmony.

/bèr/  'swamp' /njá bèr'dů/  'It is not a swamp.'
/wúl/  'wild dog' /njá wúl'dů/  'It is not a wild dog.'
/bíhú/  'dog' /njá bíhú'dů/  'It is not a dog.'
/kídú/  'elephant' /njá kídú'dů/  'It is not an elephant.'
/léié/  'red stone' /njá léié'dů/  'It is not a red stone.'
/mbèrè/  'doleib' /njá mbèrè'dů/  'It is not a doleib.'
/ríkì/  'sorghum bread' /njá ríkì'dů/  'It is not sorghum bread.'
/hàbù/  'hippopotamus' /njá hàbú'dů/  'It is not a hippopotamus.'
/kúngú/  'baboon' /njá kúngú'dů/  'It is not a baboon.'
/hílù/  'hyena' /njá hílú'dů/  'It is not a hyena.'
/kútú/  'pot' /njá kútú'dů/  'It is not a pot.'
/mbò'dó/  'frog' /njá mbò'dó(dů)/  'It is not a frog.'
/kógó/  'leopard' /njá kógó(dů)/  'It is not a leopard.'

The suffix /-dů/ following a vowel final noun would require a three vowel sequence, which never occurs in Bongo. Therefore, one vowel must be assimilated into another or deleted. Also, one tone must be assimilated. In the case of tones the rule is that if either tone is high, the resulting tone will be high. So, whatever tone the noun final vowel may have had, the high-low tone sequence remains.

The vowel assimilations, however, do not follow a simple rule. Rather we find the following collection of rules:
Front vowels merge with the first /o/, resulting in a low front vowel of the same harmony set, i.e. either /e/ or /a/. Back vowels merge with the first /o/, resulting in a low back vowel of the same harmony set, i.e. /a/ or /o/.\textsuperscript{10} There is a physiological reason for the second /o/ to also become /i/ when following /i/.\textsuperscript{11} It seems surprising, however, that both o's of the suffix /-di/ are replaced by the central vowels /i/ and /e/. Perhaps it can be said that /-di/ is replaced by a central vowel of the same harmony set because the central vowels are most neutral and dominate any vowel assimilation.

5.2.6. Equative Clauses and Conjunctions

In the equative clause construction, pronoun subject plus noun complement, vowel harmony extends regressively from the complement to the pronoun subject, i.e. if the complement contains [+ATR] vowels, the vowels of the pronoun will also be [+ATR].

/\má hàbè/     'I am Hippopotamus (person's name).'
/\má kínjí/     'I am Fish.'
/\má bíhí/      'I am Dog.'
/\má lê'jì/     'I am Beer.'

Vowel harmony was also documented when the conjunction, /ùkpé/ 'then', began a clause beginning with a pronoun subject. A pronoun with a [+ATR] vowel caused the vowels of the conjunction to become [+ATR].

/ùkpé-má.../     'then I ...'
/ùkpé-i.../     'then you...'

Other constructions were not investigated with regard to vowel harmony.
6. TONE AND INTONATION

6.1. Number and Function of Tones

Phonetically on words in isolation, Bongo has three etic level tones: high (\'\'), mid (\"\"), and low (\"\"), as well as falling tone, (\"\"). Phonemically, however, I posit two level tones: high ('/\') and low (/\'), for the reasons stated below.

1) In monosyllabic words, contrasts exist for just high and low tones. Tone contrast in open syllables:

\'/bù/  'hunger'  \'/bù/  'egg'  

Tone contrast in closed syllables:

\'/kèl/  'eleusine'  \'/kèl/  'straw'

This is also true in syllables with long vowels:

\'/tìì/kèl/  'red ants'  \'/tìì/  'pounded sesame'

\'/wùùl/  'wild dog'  \'/wùùl/  'brains'

2) In a tone frame with preceding high tone, the following four etic tone patterns occur in disyllabic nouns: high-high, high-mid, mid-high, and mid-low.

[ájá kásá]  'not a tree'
[ájá fádá]  'not a fáda tree'
[ájá tágá]  'not evening'
[ájá bádá]  'not the sun'

3) In a frame with preceding low tone, the following four etic tone patterns occur on disyllabic nouns: high-high, high-mid, low-high, and low-low.

[ájá kásá]  'on a tree'
[ájá fádá]  'on a fáda tree'
[ájá tágá]  'on the evening'
[ájá bádá]  'on the sun'

4) The tones of a following frame do not affect the tones of the words in a substitution list.

5) On a long vowel, low tone is a falling tone etically when the preceding tone is high, that is, there is a high-mid-low sequence.

[ájá wùúl]  'not a wild dog'
[ájá báñer]  'not a swamp'
Because of the limited distribution of different tone levels and combinations on monosyllabic and disyllabic words, I posit the following two phonemic tones:

/\/, high tone, occurring in all tonal environments.

/\/, mid tone, occurring following a high tone in complementary distribution with

/\/, low tone, occurring elsewhere.

That is, high tone has no allotones. Low tone has two allotones, mid and low, with mid tone occurring after high tone and low tone occurring in all other environments.

Therefore, the above examples of disyllabic nouns and of long vowels in tone frames are written emically as follows:

/njá kágá/ 'not a tree' /dó kágá/ 'on a tree'
/njá pādá/ 'not a fada tree' /dó pādá/ 'on a fada tree'
/njá tāgá/ 'not evening' /dó tāgá/ 'on the evening'
/njá kādá/ 'not the sun' /dó kādá/ 'on the sun'
/njá wūl/ 'not a wild dog' /dó wūl/ 'on a wild dog'
/njá bèr/ 'not a swamp' /dó bèr/ 'on a swamp'

Falling tones occur only on long vowels or on vowel 'glides', i.e., on CV(C) syllables. When the tonal fall is not due to a preceding high tone, as in

/njá bèr/ /njá bèr/ 'not a swamp'

it is analyzed as a high tone followed by a low tone, (\).

[tā]\ /tā/ 'when' [kpa\] /kpa\/ 'all'

6.2. Tonal Contrasts

Contrasts between high and low tones on monosyllabic words are exemplified above. In disyllabic words, contrasts are found for high and low tones on both the first and second syllables.

Contrasts on both first and second syllables:

/kid\/ 'vein' /kid\/ 'cold (adj)' /kid\/ (species of snake)
/hirù/ 'sallva' /hirù/ 'flower' /hirù/ 'liver'
Contrasts on second syllable:

/àdà/ 'to tie' /àdà/ 'to count'
/àtè/ 'to see' /àtè/ 'to put'

Contrast between high-high and low-low:

/màyà/ (species of yam) /màyà/ 'breast'

Contrast between high-low and low-high:

/lìrù/ (species of tree) /lìrù/ (species of bird)

There is one pair of trisyllabic words differing only by tone on the second and third syllables:

/kììngèbà/ 'bone' /kììngèbà/ (species of tree)

Non-minimal contrasts can be found for high and low tones on the first, second, and third syllables.

Contrast on first syllables:

/hili/ 'breeze' /gììgìì/ 'girl'

Contrast on the second syllables:

/mììrììngè/ (species of snake) /bììlììgù/ (species of bird)

Contrast on the third syllables:

/hììlìì/ 'breeze' /hììgùlè/ 'gazelle'

6.3 Tone Patterns

All tone patterns are possible with one and two syllable nouns. With three syllable nouns, examples were found for all possible tone patterns except high-low-high.

Monosyllabic nouns:

High /'bù/ 'hunger'
Low /'bà/ 'egg'

Disyllabic nouns:

High-high /kàkà/ 'tree'
High-low /pàdà/ (species of tree)
Low-high  /təˈgə/  'evening'
Low-low  /kəˈdə/  'sun'

Trisyllabic nouns:
High-high-high  /bʊrʊkə/  'ashes'
High-high-low  /hɪɡʊlə/  'gazelle'
High-low-low  /kɪlɪnba/  (species of tree)
Low-high-high  /mɪɡʊbə/  (species of worm)
Low-high-low  /wɪˈrəŋə/  (species of snake)
Low-low-high  /ɡbərəgba/  'small turtle'
Low-low-low  /pɪləɡə/  (species of bird)

Most verbs in Bongo have the word shapes VCV or VCVCV in isolation, with the initial V being a central vowel. All four two-syllable patterns are possible. Because many of the three-syllable verbs have not been checked for tone, examples are given for only five of the eight possible tone patterns.

Disyllabic verbs:
High-high  /ˈtəbə/  'to shoot'
High-low  /ˈtəbə/  'to give'
Low-high  /ˈədə/  'to tie'
Low-low  /ˈədə/  'to count'

Trisyllabic verbs:
High-high-high  /ˈtənənə/  'to lick'
High-high-low  /ˈtənənə/  'to smell'
High-low-high  /ˈtənənə/  'to kill'
Low-high-high  /ˈtənənə/  'to catch'
Low-high-low  /ˈtənənə/  'to scrape (bark)'

There are fewer examples of the other parts of speech in comparison to nouns and verbs. There do not seem to be any restrictions, however, on what tone patterns different parts of speech can have.

Most adjectives are disyllabic, and all four tone patterns are possible.

High-high  /təˈbə/  'fat'
High-low  /kfdl/  'cold'
Low-high  /mɔnɔ/  'another'
Low-low /ĝba:kə/ 'old'

The following patterns were found on trisyllabic adjectives:

High-high-high /s̪amaː/ 'good'
High-high-low /ti’tiɡə/ 'strong'
Low-high-high /kpingi’i/ 'high'

Most prepositions are one or two syllables.

Monosyllabic prepositions:

High /nə/ 'with'
Low /də/ 'on'

Disyllabic prepositions:

High-high /bɔnɔ/ 'in front of'
High-low /bɔtɔ/ 'across'
Low-high /di’tɔ/ 'from'
Low-low /mɔtɔ/ 'under'

6.4. Intonation

In addition to the tone pattern for each word described in 6.1 to 6.3, certain intonation patterns in Bongo are associated with different grammatical constructions.

Intonation is contrastive in yes-no questions: the only difference between a yes-no question and its positive answer is the intonation. The question has a rising intonation in which the pitch at the end of the question rises above the level of the normal high tone. The answer to a yes-no question has a falling intonation at the end of the utterance. The intonation patterns on the yes-no questions and answers are quite pronounced.

/sə na kə lau/ 'Is this a shirt?'

/sə na kə lau/ 'This is a shirt.'

/skinjə na ’dů bihi nandakanɔ/ 'Is Kinji sleeping now?'

/skinjə na ’dů bihi nandakanɔ/ 'Kinji is sleeping now.'
All statements have a falling intonation, which is less pronounced than for the answers of yes-no questions.

/ма ndэ 'be cug/ 'I am going to the market.'

There is a rising intonation on all but the final item in a list of items. The final item has a falling intonation.

/ма го мэгi, мэндэ, кинji/ 'I bought meat, groundnuts and fish.'

There is a falling intonation before any nonfinal pause in a statement. This falling intonation is less than at the end of the statement.

/ма ka mony kamakádír, tó'bo nercma ra/ 'If I eat a lot, I will become fat.'

WH-questions have a falling intonation.

/ká bá 'dè/ 'What is it like?'

/і dońdí 'bá/ 'Where do you live?'

/ха ndэ тэa/ 'When are you (pl.) going?'

With all of the falling intonations, the words keep their respective tones. Over longer utterances, there is a general downdrift throughout the sentence, beginning at the peak syllable. The high and low tones at the end of the utterance are of lower pitch than the respective high and low tones at the beginning of the utterance. In shorter utterances, the falling intonation is only perceptible at the end of the utterance.
APPENDIX A: BONGO TEXTS

Two short explanatory texts are given below. Under each line of Bongo text is a word for word translation. After each complete text, a free translation is given.

How to Make a Rope

bá andé pó'dê lirù, ka bá mai 'dé nínì he goes scrapes (species of tree) and he comes with it
ka b-o'túkú nê, ka b-óspéhá, ka b-imèr nê and he-plaits it and he-pounds and he twists it
na ka kebí, ka bá mai 'dé nínì, amá d-agú and rope and he comes with it comes sells
né bá gù 'biná, it at town there

"He goes and scrapes the lirù tree. And he comes with it (lirù bark). And he plaits it. And he pounds it out. And he twists it to make a rope. And he comes with it (the rope). He comes and sells it in the town there."

How to Make a Fire

n-andé ãgá ngir dì'bá bongo, kpé yé they-go cut firewood from Bongo place then they
èwá 'dé ngir, ka amá 'dé nínì, kpé yé carry firewood and come with it then they
èkó dô danga, kpé andé álá kèi, kpé sweep place fireplace then go get straw then
andé 'du pò'dô dì 'bôr, kpé agóo ná kō go light fire from inside then gather it mouth
ngir kpé amá ná pò'dô, firewood then come with fire

"They go cut firewood from the Bongo place. Then they carry the firewood and come with it. Then they sweep the fireplace. Then they go get straw. Then they go light the fire from the inside (of the house). Then they put it (lighted straw) together at the mouth of the firewood. Then it is fire."
APPENDIX B: WORD LIST

- A -

'àbà 'to create, make (pot)'
'àbè 'to shut, shoot, sting'
'àbè hédi 'to urinate'
'àbì 'to dry (meat)'
'àbide 'to give'
'àbvì 'to steal'
'àce 'to carve'
'àci 'to beat'
'àcì 'to fall'
'àdà 'to tie'
'àdà 'to count'
'àdakahe 'to tell (story)'
'àdo 'to do'
'àdomolu 'to forget'
'àdò 'to cultivate'
'àdudù 'to make (table)'
'àde 'to pull, extract (teeth)'
'àdú 'to sleep'
'àdu 'to catch fire'
'àdúgbà 'to catch, hold'
'àgà 'to chop, cut'
'àgà 'to stir'
'àguya (nest or bird?)'
'àgu 'to sow in holes'
'àgù 'to buy, sell'
àgbà 'to gather'
'àgbò 'to gather together'
'àhàhò 'to limp'
'àjò 'to tell, say'
'àjì 'thing'
'àjì-móny 'food'
'àjì 'to make (net)'
'àjù 'to give birth'

*akala 'to wash (dishes)'
*àkéke (ha) 'to divide'
*àkèhè 'to talk'
*àkò 'to sweep'
*àkù 'to speak (language)'
*aku 'to make (arrow, spear, hoe)'
*àkpà 'to sow by scattering'
*àkpà 'to kick, stretch'
*àkpi 'to help'
*àkpi 'to open (book)'
*àkpo 'to light (fire)'
*àlá 'to get'
*ala 'to shut'
*alaham 'to make (carton, book)'
*àlángbà 'to burn'
*àlélò (variety of sorghum)
*àlchè 'to show'
*àlèlè 'to cut up (vegetables)'
*àlù taba 'to smoke (tobacco)'
*àlú 'to undress'
*àmà 'to come'
*àmèbè 'to fly'
*àmèdi 'to do, rain'
*àmèminde (species of insect like a fly)
*àmèhi 'to bury'
*àmì 'to like, love'
*àmì 'to do, make'
*àmì-ndèm 'to fight'
*amisì 'to swim'
*amolo 'to run'
*àmony 'to eat'
*amotu 'to learn, understand'
*àmbò 'to milk'
*ànnè 'to lick'
ànyà 'to stop, wait'
ánkha 'to pound out'
ánkùlú 'pain'
*annda'ba 'to return'
andaya (place to buy beer)
ändé 'to go'
*ándëndu 'to light fire with grass'
ändéré 'to walk'
*anndú'jù 'to greet, ask'
*ánjá 'to throw (net)'
ánnà 'to cut, saw'
aafa (species of bird)
*ánñè 'to write'
*àngu 'to call '
*ángul 'pumpkin'
*ángbá 'to hit'
*ángba 'to dress'
*ápal (sharp)
*ápdë 'to scrape'
àpdë'dë 'to scrape (bark)'
*arcc (species of fish)
*arici 'to roast, heat
  (peanuts)'
àta 'to see'
átà 'to put'
*atembébi 'to jump'
atik 'to smash'
atu 'to wash (clothes)'
átün 'to kill'
átúp'ha (to split, divide'
áwù 'to hear'
àyà 'to jump'
àyé 'to drink'
ayëmë 'to make (road)'
ayën 'to sift, shake'
àyù 'to die'
  - I -
*ëbù 'to build (house)'
*ëbi 'to give'
*ëdë 'to break'
*ëdù 'to spear'
ëje 'to pick up, bring'
ëjè 'to marry'
ële 'to say'
ëlé 'to dig (hole)'
*ëmer 'to twist'
ëmérer 'to fear'
*ëndë 'to sit, stay'
ëñjú 'to scoop up (charcoal)'
ëpí 'to send'
ërù 'to sew'
ëte'di 'to pluck (fruit)'
*ëtún 'to smell'
ëmù 'to carry'
  - B -
bá 'he'
*bakida 'there'
*balamundo (species of fish)
búngá 'roof'
*bùngi (variety of red nut)
*bùtù 'brother-in-law'
bùgì (man's name)
bè'jì (species of tree)
bèl 'walking stick'
bèngè (species of fish)
*bede 'over'
bèrè 'swamp'
bì 'hair'
  bì-dō 'hair on head'
  bì-tárà 'beard or mustache'
bìhi 'dog'
bìhi 'down'
bùlùm (species of big wild animal)
bìnyá 'goat'
bò, bò-bù 'father'
bò-dù 'wild pig'
  *bohondo 'behind'
  *boko 'the same'
bòkò 'wife of brother'
  *bonjo kilo 'red pumpkin'
  *bùlamu 'friend'
  *bumbulugu 'sour'
bù 'banana'
bù-dò 'husband'
bù-dú (man's name)
bù-dù 'man'
  bù-dù-jí 'thumb'
bùju (man's name)
bùrúkú 'ashes'
  *buti taba 'to chew tobacco'

- B -
  'bá 'where'
  'ba 'be, at'
  *'baji 'to (person)'
  'bálá (edible green leaves)
  'bán 'there'
  'báná 'skin'
  'bárá 'ribs'
  'bátá 'hare'
  'bè 'house'
  'bè-bè 'home'
  'bìru 'bat'
  'bì- 'possessor'
  'bì-kù 'prostitute'
  'bì-tó 'evil spirit'
  'bì- 'thief'
  *bìlùmá (variety of sorghum)
  *bìná 'here'
  *bìr 'in, inside'
  *botù 'across'
  *botù 'bèlè 'on this side'
  *bò 'on front'
  *bùbù 'waterbuck'
  *bù 'hunger'
  *bù 'egg'
  *bùjì 'lazy, tiredness'
  *bùgù 'thief'
  *bugba 'outside'

- C -
  ca 'cow'
  *can 'bowl'
  cèke (species of thorny plant)
  cìì 'excrement'
  cúr (species of fish)
  cukà 'smoke'

- D -
  dàá 'water well'
  dàŋà (species of fish)
  dàŋá 'side, by side of'
  *dàngara-jì-jì 'lifelines on hand'
  *dàno (man's name)
  *dìn 'shallow'
  dì' 'cold weather'
  *diji 'because'
di'jì 'from (someone)'
dil(i) 'shadow'
dì'ba 'from'
dî'lu 'dikdik'
*dìti (variety of hard nut)
do 'head'
dò'be 'tribe, clan'
dò-gùtú 'top of shoulder'
*dojèda do 'top of head'
*do-komaja 'wrist'
*do-komo 'forehead'
*dobì 'instead of'
do-dili-ji 'spirit'
dohi 'funeral, wake'
*domolu 'to forget'
*domumba 'grave'
dò 'on, top, place'
dìkà laga 'fever'
dìkò 'basket'
*dojì 'crooked'
dòlògò (species of fish)
dòngò (animal like leopard)
dò(ì) 'year'
*duku 'anthill'
dùm 'sorghum porridge, asida'
(dum) mangbata 'kisera'
dùmgùcì 'buttocks'
dù 'for'
dùgò 'grave'
dùl (species of animal)

- 'D -

*dìkì 'daki 'soft'
'dì 'what'
'dù 'thigh'

- 'E -

ôrùkì 'good, well'

- 'G -
gálà 'jackal'
*gàmñút (beer from honey)
gànjá 'money, iron'
gànyá (man's name)
garawa (man's name)
*ğıdù (species of bird)
ğìgè 'lizard'
ğè'dì 'river'
ğèl (species of tree), 'left (hand)'
ğeèrù (species of tree)
ğèù 'town, village'
*gıria (species of fish)
ğì- (diminutive)
ğì-bù'dù 'boy'
ğì-má 'young boy'
ğìlànjá (species of animal)
*ğı-mahile 'baby boy'
ğì-ngájá 'girl'
ğì-ngànà 'small chicken'
ğìà 'tree roots'
ğìbanga 'wild animal'
ğìlànjá (species of animal)
ğìra kàmà 'pupil of eye'
*ğırege (animal like leopard)
ğòhì 'cough'
ğò 'neck'
*ğòbò (species of fish)
ğòbú (variety of yam)
ğùcì 'bottom'
ğùtù 'shoulder'
ğù 'hole'
*gùgùlù 'elbow'
gùgu (species of ant)
*gùndèndè 'goose'
gùrugù (species of fish)
  *guru hinya (species of fish)
  - GB -
  gbàrāgbiru 'small turtle'
  gbàgbà (small black bean)
  *gbagbandiri (species of fish)
  *gbai (man's name)
  gbàndà 'cassava'
    gbàndà mbara (variety of cassava)
  *gbangona (type of poison)
  gbèngbè 'sweet potato'
  gbèlè (man's name)
  *gbègbèti 'duck'
  *gboburo (species of tree)
  gbógbó 'windpipe'
  gbògbò 'big (plural)'
  gbó 'compound'
  gbókì 'upper leg'
  gbókó 'cane rat, hibiscus'
  gbókó 'old'
  gbàndà 'foot, tree trunk'
  gbórò (species of bird)
  gbútù (variety of sorghum)
  *gbubungu (species of bird)
  gbůgbůgů 'species of bird'
  *gbůrůgbůrů (species of tree)
  - H -
  hàbà 'hippopotamus'
  xahangal "crooked"
  *hàngba 'kidney'
  *hau 'yawn'
  hèdì 'urine'
  hě 'you (plural)'
  *hengo 'wedding'
  *hěvù 'four'
  hibí 'wet season'
  hi'bu 'oil'
  *hídù 'to bury'
  hídù 'fish spear'
  hígé 'rat'
  *hificación 'light (weight)'
  híi 'guinea worm'
  híirù 'floor'
  *hijí 'palm of hand'
  hikeri 'side of body'
  *hikor 'after'
  *hikù (species of tree)
  hill 'vulture'
  hílù 'hyena, (species of fish)'
  *himbel 'armpit'
  hítū 'tree stump'
  hí 'in, belly'
  hídà (species of tree)
  *hígu 'be buried'
  hígúlù 'antelope'
  *hígúndà 'arch of foot'
  *híhóo 'nostril'
  hílù 'ground'
  *hipara 'between'
  híjum 'utensils'
  híko 'mouth'
  *hikúlé 'membrane in eggshell'
  *hikpikpir 'upper back'
  híkpoši 'upper back'
  hílù 'snail'
hílíí 'breeze, wind'
híí 'dry season'
hílí (species of tree)
hímu 'relation'
hindo 'night'
hinya 'bow'
hinya (l) 'scorpion'
hírbakpa 'side of head'
híru 'saliva'
híru 'flower'
híru 'liver'
hita 'mulah (a stew)'
hitro 'body'
hói 'bird'
hógò 'back'
hóló 'tail'
hóró 'nose'
*hongapa 'once'
hú 'she'
húgà 'tin can'
*húngbo 'must'
'i 'you (singular)'
*icucu 'only a few'
*ilá 'a few'
*iliila 'wide, fat'
*ilenele 'deep'
*indiro 'ripe'

- L -

inyányá 'bad'
irlí 'heavy'

- J -

jíñí 'Dinka'

jëkë 'well, good'
*jeno (man's name)
jé 'we'
ji 'hand'
jóhí 'a cold'

- J -

jala (species of white bird)
jì 'person'
jígà 'ointment'
*joko 'teeth'
jójá (species of animal)

- K -

ka (discourse particle)
kàdà 'sun, day'
kàdíìr 'a lot, very'
Kágà 'tree'
kajawà 'square'
kálá 'kob (antelope)'
*kalakítí (small red bitter fruit)
kálango 'big, a lot'
*kaliki (species of bird)
kàlíkì 'elbow'
kàmà 'ban 'slowly'
*kamakahe 'red'
kamakakpa 'big, tall'
kamakándá 'new'
*kamakàlìté 'black'
kamba 'honey'
*kamba 'story'
kándá 'small turtle'
kángàçì 'for no reason'
kángà 'ostrich'
*karangba (species of herb)
*kari a 'hartebeest'
kàù 'if there is...'
kàgòcí 'mofraka (a hand beater)'
kèbí 'rope'
kèl 'eleusine'
kèl 'straw'
kèndò 'clever'
kerakera 'fast'
kereshi 'quickly'
kètò 'waterpot'
*kìà (man's name)
kìbì 'drum'
kìdí 'vein'
kìdí 'cold (adjective)'
kìndì (species of snake)
*kikire mabarìu (species of bird)
*kìlácíbí 'mountain'
kìlìlì 'charcoal'
kìlò (species of bird)
*kìmítu 'shelter'
*kínà 'leaf apron'
kíndì 'hard sesame'
kínyó 'thorn'
kír (species of plant)
kìcì 'hot'
kìdèrá 'crab'
kìdí 'elephant'
kìhùwà 'porcupine'
kìì 'ten'
kìkà 'broom'
kìlà (species of plant)
kìlìngbá 'bone'
kìlìngbà (species of tree)
*kìlìriv 'giraffe'
kìnjì 'fish'
kìr 'arrow'
kìr 'star'
*kírabodu (species of plant)
kìrànà (species of plant)
kìrànà 'snake'
kòbì 'buffalo'
*kòmbel (side under shoulder blade)
*kony 'white'
kònogò (species of redheaded bird)
*kòre 'onion'
kòtù 'one'
kò 'mouth'
*kòbo 'hollow'
kòdò 'calabash'
*kòdò ndubù 'big calabash'
kògù 'leopard'
kòkì 'cattle or goat egret'
kòkùl (species of bird)
kòkòrò 'fingernail'
*kòkòkù 'short'
kòlò 'vine'
kòmò 'eye'
kòmò kòtò 'spine'
*kòmbò (salt substitute)
kònogò (species of bird)
kòr 'shea butter tree'
kòtò 'lower back'
kòtò 'sterility'
*kògù 'laugh'
kùlì (species of snake)
kùlì (variety of yam)
*kùlòhì 'cucumber'
kùlù 'python'
kùm 'navel'
<table>
<thead>
<tr>
<th>English</th>
<th>Wolof</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>kùmára</em> 'woman'</td>
<td>kpèny 'big &lt;singular&gt;'</td>
</tr>
<tr>
<td><em>kumoti</em> &lt;species of tree&gt;</td>
<td>*kpíi 'still, yet'</td>
</tr>
<tr>
<td><em>kumbotu</em> 'doorway'</td>
<td>kpirà (type of medicine)</td>
</tr>
<tr>
<td><em>kune</em> &lt;song or story?&gt;</td>
<td>kpó'dó &lt;variety of nut&gt;</td>
</tr>
<tr>
<td>kúngú 'baboon'</td>
<td>kpúli 'lion'</td>
</tr>
<tr>
<td>kúngó &lt;species of bird&gt;</td>
<td>kpúliú 'owl'</td>
</tr>
<tr>
<td>kúlú 'shelter'</td>
<td></td>
</tr>
<tr>
<td>kú 'madida'</td>
<td>- L -</td>
</tr>
<tr>
<td>kúbù &lt;species of plant&gt;</td>
<td>*laapo laapo 'song'</td>
</tr>
<tr>
<td>kùcù &lt;rainy season?&gt;</td>
<td>lábá 'bridge'</td>
</tr>
<tr>
<td>kùdá 'thirst'</td>
<td>*landa 'big'</td>
</tr>
<tr>
<td>kù'dá 'water, well'</td>
<td>lándà 'mountain, white stone'</td>
</tr>
<tr>
<td>kùdó 'sap'</td>
<td>*langara 'bed'</td>
</tr>
<tr>
<td>kùjé 'fishhook'</td>
<td>langba 'burning'</td>
</tr>
<tr>
<td>kućka &lt;species of plant&gt;</td>
<td>lâù 'clothing'</td>
</tr>
<tr>
<td>*kùkú &lt;lungs&gt;</td>
<td>léé 'paternal aunt'</td>
</tr>
<tr>
<td>*kùkúhí 'knee'</td>
<td>léjì 'beer'</td>
</tr>
<tr>
<td>*kúlayo &lt;spice or sorghum?&gt;</td>
<td>lólé 'red stone'</td>
</tr>
<tr>
<td>kúlú 'back of head'</td>
<td>lém( ) 'sister'</td>
</tr>
<tr>
<td>kúlú 'heart'</td>
<td>lóvù &lt;species of tree&gt;</td>
</tr>
<tr>
<td>kúlúmé &lt;species of tree&gt;</td>
<td>lìngge 'horn'</td>
</tr>
<tr>
<td>*kùn( ) &lt;species of animal&gt;</td>
<td>lirú &lt;species of bird&gt;</td>
</tr>
<tr>
<td>*kùnyúfu 'arthritis'</td>
<td>lirù &lt;species of plant&gt;</td>
</tr>
<tr>
<td>kúngú 'road'</td>
<td>*liti 'solid'</td>
</tr>
<tr>
<td>kúr 'bean, nut'</td>
<td>liù &lt;man's name&gt;</td>
</tr>
<tr>
<td>*kur jìti &lt;variety of nut&gt;</td>
<td>lumbila 'slingshot'</td>
</tr>
<tr>
<td>*kur káko &lt;food from nuts&gt;</td>
<td>*lóny 'gun'</td>
</tr>
<tr>
<td>kúrúkú 'civet, serval'</td>
<td>lógù 'hoe'</td>
</tr>
<tr>
<td>kùvá 'straining cloth'</td>
<td>lóki 'many'</td>
</tr>
<tr>
<td>kútú 'pot'</td>
<td>lülè &lt;species of large turtle&gt;</td>
</tr>
<tr>
<td></td>
<td>lúndú 'brother'</td>
</tr>
<tr>
<td></td>
<td>lúndú-bò 'paternal uncle'</td>
</tr>
<tr>
<td>kpá 'ail'</td>
<td>lùjú &lt;species of tree&gt;</td>
</tr>
<tr>
<td>kpakpa 'far'</td>
<td>lùlá 'cloud'</td>
</tr>
<tr>
<td>kpàkpàndùr &lt;species of fish&gt;</td>
<td>*lùma 'wife's brother'</td>
</tr>
<tr>
<td>kpèngé lí 'high'</td>
<td>lùmá 'God'</td>
</tr>
</tbody>
</table>
lûr (species of fish)
*lutû (species of fish)
— M —
mâ '1, me'
mabi'ду (species of animal)
*mabongô (species of bird)
*mabuyu kiranya (species of bird)
maka 'rhinoceros'
maccam (species of bird)
*macicuwa (species of bird)
*maciki 'lice, bedbug'
*madidi pala (species of bird)
*madon bane (species of bird)
*madubur 'dream'
*magaraba (eagle?)
*mágógoti (species of black bird)
*magulenji (species of bird)
màgúbà (species of worm)
*magurs (species of bird)
màhá (species of plant)
*mahêngbâla (species of bird)
*mahikude (small black ant)
*mahingbolo (species of bird)
màhilükû (')mosquito'
*makadu 'witch'
*makara 'clean'
*makirâja 'soap'
*makumbulii (species of insect)
*malagata (sweet edible plant)
*mâlîshî (small bat)
*màłumbû (species of fish)
*mambîl mbaha (edible plant)
mambirîù 'hornet'
màndà 'groundnut'
*màndera kpa'ja (species of bird)
*mândîliindi (species of white bird)
*màndujiulu (species of bird)
mànya (species of buffalo)
manga (small monkey)
mangîrawa 'monitor'
*mangulu 'locust, grasshopper'
*màngulubu (species of animal)
*marundu 'spider'
*matî bolu (species of edible plant)
*matûna mbaga (species of poisonous tree)
*matûtu (species of bird)
mawâwara 'gnat'
màyà (variety of yam)
*màyà gubu (variety of yam)
*màyà gbe (yam or milk?)
*màyà mberè (variety of yam)
màyà 'breast'
méhi 'meat, edible animal'
*mekemeke 'shivering'
mesh 'spear'
môndi (congenital disease)
mînyè 'smell'
*mûmûlîmu 'sweet'
mìn(i) 'water'
mîno 'tear (water from eye)'
mîndì 'dirty'
*mîndîndîdi (species of fish)
mîngò 'tribal markings'
mîrà (variety of yam)
*môbuku (species of snake)
mô'dù 'illness'
mô'jû ji 'fingers'
molangaca (species of bird)
mìno (variety of sour fruit)
mìny 'sorghum'
mìny 'right (hand)'
mìto (food like yam)
  *mìto bisi (red yam)
  *mìto kuli (white yam)
mìkò 'war'
mìlò 'under'
mìnì 'another'
mìnì 'perhaps, maybe'
mò (husband?)
mùi 'five'
*mujikala 'forearm muscle'
mukukucu 'tiny insect'
mùl 'darkness'
*mùjìakpile (animal like jackal)
mùl 'kasham al banêt (fish)'
mùnì 'grandmother'
mùndú (large porcupine)
mùnjù 'dried bean'
*munguku (big headed owl)
*munya 'three'
*muyàyà 'tired'
  - MB -
mbààmbà 'little, small'
mbàgà 'mother'
mbàlè 'arm, tree branch'
mbàrá (species of tree)
mbàlà (species of fish)
*mùbèrèdù 'bamboo'
mbùrè 'doeleib (barassus palm)'
mùbìl ('e'ar'
*mùbìlium (species of plant)
mbùrà 'net'
mbùra 'wild cat'
*mbùraka (white sorghum?)
mbòbi (species of plant)
*mbòbo kotu 'twenty'
mbò'dò 'frog'
mbùle 'dust'
*mbùndù (species of rat)
mbùré 'giant eland'
mbùrì (variety of yam)
*mùburum (animal like rat)
  - N -
nà 'to be(?)'
nà 'with'
nèò (negative particle)
nè 'it'
*nìka (demonstrative)
nìnì 'maternal aunt'
nò 'with (occurs with pronouns)'
nòkò 'maternal uncle'
nòkoto 'yesterday'
  - ND -
ndàn 'today'
nandana 'now'
ndàtara 'tongue'
nàndè (species of snake)
ndì 'bò 'chin'
ndòm 'fight'
ndò 'ba 'work'
ndòndà 'morning'
ndù 'language'
ndùdù 'hedgehog'
ndù 'how, how many?'
ndùm 'tomorrow'
ndùm nìkì 'day after tomorrow'
ndùmá 'grass'
ndur (man's name)

- NJ -
njá 'not, none'
*njú 'green'
njúrn 'species of animal'
njóny 'mud'
njúù 'elastic'
njúù (white sweet fruit)

- NY -
nyàkà 'field'
nyala (fruit from tree)
nyàrë 'chief'
nyshì 'moon, month'
nyshyì 'good tasting'
*nngà (dry)

- N -
níč 'slave'
níčì (species of fish)
níù 'baby termite'

- NG -
inga'ba 'cheek'
inga'bi 'jaw'
ingàcà (species of tree)
inga 'race, run'
inga'à 'dance'
*ngalígbó 'rainbow'
ingánjá 'crocodile'
ingánjá (species of tree)
ingàvu 'cane'
*(ngau) leel (species of plant)
*ngalíngási 'little finger'
ngií 'dove'

ngiá 'grave posts'
ngir 'firewood'
ngitíaka 'little'
*ngobú (species of snake)
ngóhó (species of animal)
*ngon (man's name)
ngònì 'chicken'
ngóó 'fly'
ngòì 'two'
*ngòr (v) (species of animal)
*ngòyá 'song'
ngudú 'blindness'
*ngúì (structure over door)
*ngùr maboku (species of fish)

- NGB -
ngbangara (species of big animal)
*ngbangó 'okra'
ngbáyá 'corn'
ngbingbì 'thick'
ngbú ù 'deafness'

- O -
óó bòrò (discourse closure)
*sótúkó 'to plait'

- O -
óó 'yes'
*óó 'no'
òó 'to cease'

- P -
pacà 'a lot (of people)'
páá (species of tree)
pílegù (species of bird)
pimbir 'round'
pirá 'axe'
pirci 'word'
pòdù 'fire'
póù 'early, before'
púli 'fire stone'
púri 'wound'
pútú 'heel'
putuur (species of white fish)

-R-

*raha (species of fish)
ráká 'shoe'
rängà 'vulture'
rèkì 'sorghum bread'
rèmènè (species of animal)
*rìiia 'half'
*rò (continuative)
*robò 'to want'
*ropir 'question'
ró 'name'
rújù 'flour'
rúú 'room, mud hut'
rúga 'twins'

-T-

tàà, tàlà 'when'
*taba 'leprosy'
*taba 'tobacco'
tàgà 'evening'
tànjà 'guinea fowl'
tàrà 'lip'
tìgo (animal like hartebeest)
tìngé 'honey'
tèlè 'swimming'
*tàrìmù (species of bird)
*tìbi 'unripe'
*tìge 'small cucumber'
titì (species of fish)
tìdi 'vomiting'
tò 'pounded sesame'
tì (small red ants)
*tìski 'kidney'
tìngol 'mortar'
tìra 'termite'
tíramá 'blood'
títìgo 'strong'
tògbó 'fat (adjective)'
tò (species of thorny plant)
tò 'poison'
tòdò 'salt'
tòi 'near'
tòkó (species of tree)
tòló gbànda 'Bongo asida'
tótò 'different'
tóto (species of animal)
*tuvdu 'lamentation'
*túmbur (species of plant)
tùr 'foreigner'
tútú 'groundnut shell'
tùbù 'bushbuck'
tútú 'grindstone'
túú 'grandfather'

-U-

*ulumul 'very deep'
*uwui 'boil (sore)'
*udáro (species of fish)

-U-

ùkpà 'then...'
- w -

wàŋà (type of poison)
wár (species of fish)
wícir (animal that stinks)
wíšile (species of animal)
wíríŋę̀ (species of snake)
wóóí 'wild dog'
wóòl 'brain'

- y -

*yakar 'pumpkin'
*yama (m) 'seed'
yáŋgá 'spotted rat'
yége 'locust'
yèki 'who'
yé 'they'
yéli 'canoe, boat'
NOTES

1 I wish to express my appreciation and gratitude to the following people for their help: Dr. James Dahab Babjanda, my thesis advisor; Gu Bą Kpuyu, who provided most of the data in this paper; Lynne Callinan, my colleague, who helped collect and analyze the data; and Dorothea Jeffrey, who helped me with the vowel system. I am also indebted to Mary Ruth Wise and Richard Watson for their editorial help on this present version and to Elise Kull who prepared the manuscript for publication.

2 Here and elsewhere unmarked tone indicates undetermined tone.

3 Tucker and Bryan (1966:62) mention [k] varying freely with [x] in certain words. We only found one example of this in a text given by a man speaking a different dialect of Bongo.

[kágá]←[xágá] /kágá/ 'tree'

4 Here and throughout this study an explanation is given in parentheses if a more precise gloss of a Bongo word is not known.

5 In several words, including this one, the Busseré dialect of Bongo uses an /r/ where the Tonj dialect uses an /l/.

6 Parentheses indicate an elidable vowel. See section 4.2.3.

7 There is more fronting of this allophone to [w], a low open front unrounded vowel, in the one word

[lnyányá] /lnyányá/ 'bad'

8 There is one word with word final /t/ in our unchecked data [ganzút] 'beer from honey'.

9 There is a possible exception, the negative particle [ne3] which contains the unambiguous cluster [eo]. I suspect, however, that it is composed of two morphemes, with [ne] being a demonstrative, plus [3o] negative. See section 5.2.5.

10 Compare Hall and Yokwe (1981:59):

....Bari has a considerable number of suffixes which have +high but do not cause vowel harmony to themselves +ATR

However, these non-vowel-harmony causing morphemes with [+ATR] vowels do cause a phonological shift, but one which is ordered after vowel harmony. The rule which we call Mid-Vowel Raising, is

- high -low ---> [+high] /-+c/ +high +ATR
Gregerson (1976:356) states that when the tongue blade is 
+low
+back e.g. [ɔ], [+ATR] (⁄ɔ/ in this case) is the unmarked form; 
whereas, if + high + front
form.

12 Santandrea posits three phonemic tones based on a single 
contrast:

/tɪ/ 'red ants' /tI/ 'body' /tI/ 'pounded sesame'

However, we could only elicit /hɔtɪrɔ/ for 'body', and recorded 
different vowels for the other two words.

13 Since /cʊɡ/ 'market' is a loanword from Arabic, it does not 
fit the normal patterns of word final distribution of consonants.

14 Words marked with an asterisk have not been rechecked for 
phonetic accuracy. Hence, some of them contain apparent 
contradictions to the vowel harmony rules and other statements 
regarding distribution.

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# Baka Phonology

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Summer Institute of Linguistics

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Appendix

Notes

References
0. INTRODUCTION

Baka is a Central Sudanic language of the Bongo-Bagirmi group, most closely related to Bongo (see Kilpatrick 1979) and the Jur dialect cluster (see Persson 1978 and 1984). It is spoken in the area around Maridi, Sudan, and also in Zaire. Research for this paper was carried out chiefly in Maridi and represents the major dialect of that area.1

Vowel distribution, vowel harmony, and vowel elision are important features of Baka phonology. They are discussed in section 5 following the descriptions of consonants, vowels, tone, and syllable and word structures in sections 1-4. Intonation and ideophones are described in sections 6 and 7. The Appendix gives the phonological transcription of the Swadesh list of 100 basic words.

1. CONSONANTS

Baka has many complex consonant phonemes, as well as many unambiguously single units. These phonetically complex consonants, e.g. prenasalized and labiovelar consonants, are all interpreted as single units because none are unambiguous sequences and because this interpretation supports a simple canonical CV syllable pattern.

In section 1.1, chart 1 presents the consonant phonemes posited for Baka, and chart 2 presents examples of contrasts between the consonant phonemes. Section 1.2 gives further description of the consonants.

1.1. Consonant Phoneme Charts

In chart 1 and throughout this paper the following symbols are used for convenience: /b/, /d/, and /y/ indicate implosives at labial, alveolar, and alveopalatal points of articulation. /r/ is a retroflexed alveopalatal flap. /c/ is an alveopalatal affricate. /tr/, /dr/, and /ndr/ are retroflexed stops. Labiovelars and prenasalized stops are symbolized without ligatures, e.g. /kp/ and /ng/. Labial and labiovelar trills are indicated by a tilde, e.g. /b/. 
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<th>Alveopalatal</th>
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<td>w</td>
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</table>

**Chart 1. Consonant Phonemes**
1.2. Description of Consonants

1.2.1. Stops

The voiceless stop series is the only consonant series which contrasts at all five points of articulation: labial, alveolar, alveopalatal, velar, and labiovelar. The voiceless stops /p/, /t/, and /k/ are aspirated initially and usually are slightly aspirated intervocally. The remaining voiceless stops, /kp/ and /c/, are not aspirated, but they also are phonetically complex. Voiced and prenasalized stops occur at labial, alveolar, velar, and labiovelar points of articulation.
Implosives include /'b/, /'d/, and /'y/. /'y/ differs from the others in that no oral closure occurs; the tongue is in the same position as for /y/. It is a stop because of glottal closure.

1.2.2. Nasals

Nasals contrast at labial, alveolar, alveopalatal, and velar points of articulation. However, the velar nasal /ŋ/ and the prenasalized velar stop /ŋg/ do not contrast consistently. A few words such as /ŋgɒn/ 'chicken' occur only with [ŋg] throughout the Baka community. All other words have alternate pronunciations, e.g.:

[ŋ painstaking] or [ŋg painstaking] /ŋgɒn/ 'fly'

Individual speakers tend to prefer [ŋ] in certain words and [ŋg] in others; however, the list of words with relatively stable use of [ŋ] and the list with relatively stable use of [ŋg] varies from one individual to another. Diachronically, /ŋg/ appears to be merging with /ŋ/. However, there are still a few contrasts; therefore I posit two phonemes: /ŋg/ which represents the invariant [ŋg] and /ŋ/ which represents [ŋ] alternating with [ŋg].

1.2.3. Trills

Baka has a voiced bilabial trill /b/ and a full set of labiovelar trills: voiceless /k/, voiced /g/, and prenasalized /ŋg/. As the symbols imply, the labiovelars consist of a velar stop or prenasalized velar stop onset and a trilled bilabial release. While these trills occur most frequently in ideophones, they are found in other words as well, e.g. /bɔ/ 'two'. The retroflexed trills /tr/, /dr/, and /ndr/ consist of a stop or prenasalized stop onset and a trilled retroflexed release. The retroflex articulation is considered to be systemically alveopalatal.

1.2.4. Fricatives

There are voiceless, voiced, and prenasalized fricatives at labial and alveolar points of articulation. The prenasalized labial fricative /nu/ occurs rarely and is replaced in the speech of some Baka with /nb/, e.g. [mbamba] rather than [nvamva] 'chop'. Furthermore, in the case of a few speakers, [mb] fluctuates with [nu].

[p] and [f] do not contrast consistently; however, I consider them to be separate phonemes, since native speakers react to them as distinctive. Their case is similar to that of /ŋg/ and /ŋ/; that is, a few words such as [fɔfɔ] 'moon' occur exclusively with [f] throughout the Baka speech community. All other words with these phones have alternate pronunciations, although usually individual speakers prefer one or the other in certain words. The invariant [f]
is represented by /f/, but [p] alternating with [f] is represented by
/p/.

1.2.5. Flaps and lateral

Flaps occur at labial, alveolar, and alveopalatal points of
articulation. /r/ has two allophones, an alveolar trill [r] which
occurs only word finally in ideophones (see sections 4.1 and 7), and
an alveolar flap [ɾ] which occurs elsewhere. /ɾ/ is a retroflexed
flap, and /l/ is an alveolar lateral.

1.2.6. Semivowels

The semivowels /ʍ/ and /ɭ/ occur frequently in unambiguous
environments. For example, they contrast with consonants, as shown in
chart 2, and with vowel initial words. The examples below contrast
/ɭ/ with / Subscribe/ and both /ʍ/ and /ʍ/ with an /ɔ/ initial word.

/ɭɛkə/  'gather'
/ɭɨ/    '2nd pers. sg.'
/ɭi/    'person'
/ʍo/    '3rd pers. sg. emphatic object'
/ʍɪɪ/    'bush rat'
/ʍɪ/    'war, fighting'

Furthermore, when /ʍ/ occurs word medially between front vowels and
/ɭ/ between back vowels, they are unambiguously interpreted as
consonants:

/ʍɪɔ/    'he drinks'
/ɭɪɔ/    'he errs'

There are no unambiguous vowel clusters; therefore phonetic long
vowels and vowel sequences within a single morpheme are interpreted
as vowel-semivowel-vowel, even in cases such as the first and second
two examples below, where there is no phonetic increased closure.

[eɪɪ]/    /'dɪɪ]/    he plants'
[ɔɪ]/    /ɔɪ]/    you know'
[ɛɪ]/    /ɛɪ]/    'your'
[ðʊ]/    /ðʊ]/    'child'

This interpretation results in a canonical structure where
syllable nuclei are simple vowels with simple tones.
2. VOWELS

In section 2.1, chart 3 presents the vowel phonemes posited for Baka, and chart 4 presents examples of contrast between these phonemes. Section 2.2 gives further description of the vowels.

2.1. Vowel Phoneme Charts

(+ATR)  [-ATR]
Front  Central  Back  Front  Central  Back

High  i       u  High  u  u
Low  e       a       o  Low  e  a  o

NEUTRAL VOWEL

i

CHART 3. Vowel Phonemes

[cf]  éɛɗ  [c]  ŋkù
'to spear'  'to throw'  'to dig'  'to say'
ɛɗ  ɖkù  ɛké  ɓkɛ
'to sneeze'  'to string'  'to write'  'fight'

ndiɛɗ  ɗkâ  'sickness'  'yet'

kàcf
'after'

CHART 4. Vowel Contrasts

2.2. Description of Vowels

Baka vowels form a two-set vowel harmony system typical of Nilo-Saharan languages. The distinguishing feature in the system is tongue root position: advanced (+ATR) in the marked, dominant set and neutral [-ATR] in the unmarked, recessive set. While tongue root position is the distinguishing feature between the two vowel sets, the [+ATR] vowels are also tense and slightly raised in comparison with the [-ATR] vowels. The tense and lax distinction is more pronounced for the low vowels than the high ones.

The high central vowel /i/ is neutral in regard to tongue root position. It is lax but is not considered to be [-ATR], since it does not participate in the vowel harmony system (cf. section 5.1). /i/ occurs in morphemes which are never stressed such as prefixes and proclitic grammatical particles:
/m+/-  + /tɔŋ/  → /m+tɔŋs/

'nominalizer' 'begin'  'beginning'

/k+/-  'with'

/k+d+/-  'said (speech introducer)'

It usually occurs in the unstressed antepenultimate syllable of stems consisting of more than two syllables:

[b'liʊndʊ]  /bliʊndʊ/  'grandfather'

[mæŋ'kə]  /mæŋkə/  'woman's hoe'

However, there are a few examples in which a vowel other than /i/ occurs in the antepenultimate syllable, e.g. /mbɔliʃ/ 'pigeon' and /gbegeʃ/ 'throat'.

This neutral vowel is phonetically similar to the neutralized transition vowel phone [i] that occurs in vowel elision (see section 5.3). However, it occurs in proclitics even in isolation, i.e. in citation forms, and in connected speech if a pause follows a proclitic, for example, if a speaker pauses momentarily before supplying the word to which the proclitic is attached. It is, therefore, analyzed as a vowel phoneme of limited distribution.7

Phonetically long vowels contrast with short vowels but, as seen in section 1.2, long vowels within a single morpheme are interpreted as vowel-semivowel-vowel, e.g.:

['dɪl]  /dɪl/  'what'

['dɪl]  /dɪl/  'he plants'

(See section 5.3.3 for phonetic vowel length across morpheme boundaries and section 7 for vowel length in ideophones.)

3. TONE

Baka has a two-register tone system. The following are examples of minimal contrasts and of all four possible sequences (high-high, high-low, low-high, low-low):

[ɔɔ]  /ɔɔ/  'you (sg.) are heavy'

[ɔɔ]  /ɔɔ/  'you (sg.) know'

[ɔɔ]  /ɔɔ/  'it is heavy'

[ɔɔ]  /ɔɔ/  'he knows'

[ɛi]  /ɛi/  'your'

[ɛi]  /ɛi/  'thing'

/kɛræ/  'to melt'

/kɛræ/  'pool'
/kàrà/ 'woman'
/sàmà/ 'skin lesion'
/sànà/ 'bow'
/sàmà/ 'blood'

Five morphemes have no inherent tone, but instead dissipilate from the tone of the preceding syllable. These five morphemes are all inalienable possession person markers:*

<table>
<thead>
<tr>
<th></th>
<th>1 sg. /ma/</th>
<th>3 sg. /ne/</th>
<th>proximate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/tàràmà/</td>
<td>/tàràné/</td>
<td></td>
</tr>
<tr>
<td>1 pl. /ze/</td>
<td>/tàràzá/</td>
<td>/sànázà/</td>
<td></td>
</tr>
<tr>
<td>2 pl. /ss/</td>
<td>/tàràsà/</td>
<td>/sànásà/</td>
<td></td>
</tr>
<tr>
<td>3 pl. /yè/</td>
<td>/tàràyè/</td>
<td>/sànàyè/</td>
<td></td>
</tr>
</tbody>
</table>

Baka verb stems are inflected tonally in the definite aspect, the tone of the initial syllable varying according to the person of the subject. Note that tone is the only feature distinguishing second and third person singular, whereas the other persons also have obligatory suffixes or proclitics which indicate person and number.

1 sg. /mà-ògù gà/ 'I came'
2 sg. /ògù gà/ 'you came'
3 sg. /ògù gà/ 'he, she, it came'
1 pl. /ògù-zé gà/ 'we came'
2 pl. /ògù-sè gà/ 'you (pl.) came'
3 pl. /ògù-nì gà/ 'they came'

In the non-definite aspects, and in nominalized verbs, the tone of the initial syllable is invariably high:

/nè ògù/ 'he (future) come'
/zì-à ògù-né/ 'and-he come-he (sequential aspect)'
/mè-ògù/ 'coming'
4. SYLLABLE AND WORD STRUCTURES

4.1. Syllable Types

Baka has two main syllable types:

\[ S_1 = CV \]
\[ S_2 = V \]

These cannot be combined as sub-types of a single syllable because \( S_2 \) occurs only word initially, whereas \( S_1 \) has no distributional limits. Phonetic CVC syllables occur in ideophones, with the final C being restricted to the \( \{f\} \) allophone of /rr/, e.g.,

\[ [s\ell\ell] \quad /s\ell r/ \quad '\text{appearance of a field in which the seeds have just begun to germinate}' \]

Because the final C is restricted to the long allophone of just one phoneme, I analyze the trill as the sequence /rrl/. However, since ideophones commonly display unique phonological features it would be equally tenable to posit a restricted CVC syllable type.

4.2. Phonological Words

4.2.1. Simple Words

The simple phonological word in Baka is:

\[ W_{\text{simple}} = \left( \left( S_1 \right) \right) S_2 \]

That is, the simple word may consist of a single CV syllable (\( S_1 \)) or of two syllables, the initial one being either \( S_1 \) or \( S_2 \), and the final being \( S_2 \). The great majority of Baka words are disyllabic simple words.

4.2.2. Complex Words

Phonologically complex words are of three types.

a. The first type consists of a presyllable plus a simple word. The presyllable may or may not realize a prefix or proclitic. The first two examples below are morphologically complex while the next three are morphologically simple, but all five have the same trisyllabic shape, C+C+C+V. (This suggests the possibility that all of these were historically complex.)

\[ /b\ell r/ + /\ell \ell m\ell/ \quad \rightarrow \quad /b\ell \ell m\ell/ \]

'adjectivizer' 'beauty' 'good'
/mə/- + /tɔnɔ/ → /mətɔnɔ/
'nominalizer' 'begin' 'beginning'

/bilundu/ 'grandfather'
/misilə/ 'road'
/mimbé'ðɛ/ 'liver'

In the examples above, the neutral vowel /i/ occurs in the antepenultimate syllable, i.e., between the first and second constituents of phonologically complex words. Thus, vowel elision obtains at the juncture of the constituents just as it does at clear-cut morpheme boundaries. (See section 5.3 for fuller discussion of vowel elision.)

There are a few examples in which a vowel other than the neutral /i/ occurs in the antepenultimate syllable:

/àngɔbɔ/ 'a place name'
/mbugiʃɔ/ 'pigeon'

These also fit the analysis of complex words by the vowel elision rule which deletes a word final vowel followed by a word initial vowel. That is,

(C)VCV + VCV → (C)VCCV

b. The second type consists of two simple phonological words. The examples below have the quadrisyllabic shape (C)VCV+CVCV, which again suggests the possibility that they were historically complex.

/màngirɔkɔ/ 'women's hoe'
/àrɔgbɔgbɔ/ 'species of bird'

c. The third type is morphologically determined, involving the addition of a syllable realizing a suffix or postclitic to a simple or complex word. Examples of both are given below.

/tərə/ + /-ma/ → /tərəma/
'mouth' '1 sg.' 'my mouth'
/mimbé'ðɛ/ + /-ma/ → /mimbé'dəma/
'liver' '1 sg.' 'my liver'

All of these complex word possibilities are summarized in the following representation:

\[
\begin{cases}
\text{proclitic} \\
\text{prefix} \\
\text{Word}_{\text{simple}}
\end{cases}
\begin{cases}
\text{suffix} \\
\text{postclitic}
\end{cases}
\begin{cases}
\text{Word}_{\text{simple}}
\end{cases}
\]
5. VOWEL DISTRIBUTION AND PHONOLOGICAL PROCESSES

5.1. Vowel Harmony

In Baka the domain of vowel harmony is the phonological word, whether it is morphologically or phonologically simple or complex. All vowels within a word must be from the same vowel set, with the exception of /i/ and certain cases of /a/, as noted below; but no vowel harmony changes take place across word boundaries in slow or careful speech. Even in fast speech it is rare that vowel harmony extends beyond the word level.

Baka vowel harmony is bidirectional: that is, a [+ATR] vowel anywhere within the word, whether in the stem or an affix, causes the entire word to be [+ATR] so that any [-ATR] vowels in the base form are replaced by their corresponding [+ATR] vowels. In the first example below a [+ATR] suffix causes the [-ATR] vowels of the stem to change, in the second the reverse occurs.

\[
\begin{align*}
(\text{lùndɔ})[-\text{ATR}] & + (-y_j)[+\text{ATR}] \rightarrow /\text{lùndɔ}_{y_j}/[+\text{ATR}] \\
\text{’brother’} & \text{ ‘2 sg.’} \quad \text{ ‘your brother’}
\end{align*}
\]

\[
\begin{align*}
(\text{lɛm})[+\text{ATR}] & + (-mɔ_j)[-\text{ATR}] \rightarrow /\text{lɛm}_{mɔ_j}/[+\text{ATR}] \\
\text{’sister’} & \text{ ‘1 sg.’} \quad \text{ ‘my sister’}
\end{align*}
\]

However, the neutral vowel /i/ does not undergo vowel harmony change:

\[
\begin{align*}
(\text{bìlùndɔ})[-\text{ATR}] & + (-y_j)[+\text{ATR}] \rightarrow /\text{bìlùndɔ}_{y_j}/[+\text{ATR}] \\
\text{’grandfather’} & \text{ ‘2 sg.’} \quad \text{ ‘your grandfather’}
\end{align*}
\]

In a few words /a/, indicated as (A) in the base forms, does not change to /o/ in [+ATR] environments:

\[
\begin{align*}
(\text{tɔkɔ})[-\text{ATR}] & + (-y_j)[+\text{ATR}] \rightarrow /\text{tɔkɔ}_{y_j}/[-\text{ATR}, +\text{ATR}] \\
\text{’co-wife’} & \text{ ‘2 sg.’} \quad \text{ ‘your co-wife’}
\end{align*}
\]

Compare the usual case:

\[
\begin{align*}
(\text{tɔrɔ})[-\text{ATR}] & + (-y_j)[+\text{ATR}] \rightarrow /\text{tɔrɔ}_{y_j}/[+\text{ATR}] \\
\text{’mouth’} & \text{ ‘2 sg.’} \quad \text{ ‘your mouth’}
\end{align*}
\]

Thus, the behaviour of (A) is similar to that of vowels in “opaque” morphemes found in other Nilo-Saharan languages except for two important differences. First, in Baka the phenomenon occurs exclusively with one phoneme, /a/. Second, it occurs exclusively in stems, whereas in the languages described in the literature opaque morphemes are all affixes.

5.2. Vowel Distribution within the Word

While there are no discernible restrictions in Baka on consonant distribution, there are with respect to the vowels. The most
significant restriction on vowel distribution is due to vowel harmony on the word level, as described in section 5.1.

The second is vowel identity. The [-ATR] vowels show a marked tendency toward vowel identity; that is, each vowel in the word being identical, e.g. /ləndə/ 'brother'. This tendency is most pronounced in disyllabic words; of the 45 disyllabic [-ATR] words found in the Swadesh word list (see Appendix), all but one have identical vowels. Examples of words with differing [-ATR] vowels are:

/makə/ 'knife'
/slakə/ 'tortoise'

Complete vowel identity can occur also in trisyllabic [-ATR] words, e.g. /dəndənə/ 'tongue'. It is more common, however, for trisyllabic words to have the neutral vowel /ə/ in the initial syllable and identical vowels in the remaining syllables:

/gbəfəfə/ 'measles'
/məmbədə/ 'liver'

In addition, a few words with other vowel combinations occur, e.g.:

/mb51lf5/ 'pigeon'

Four syllable words are rare, but those that do occur have a tendency to have identical vowels in the second half of the word. These differ from those in the first half, i.e. no examples have been found of complete vowel identity in four syllable words:

/ərʒgbəgbi/ 'species of bird'
/məŋgərəkə/ 'women's hoe'

This is, of course, consistent with the analysis of these words as phonologically complex.

In contrast with the tendency to identity in [-ATR] words, three of the [+ATR] vowels—/e/, /a/, and /a/—occur only in combination with other [+ATR] vowels, that is, they never occur twice in a disyllabic word or three times in a trisyllabic word:

/əl/ 'meat' /ndiyə/ 'disease'
/kədə/ 'one' /səyə/ 'sand'
/kələ/ 'millet' /sələ/ 'enter'
/gbəgərl/ 'throat' /gələ/ 'come'
/kəbə/ 'buffalo'

It is not possible, however, to conclude that /e/, /a/, and /a/ are allophones of /e/, /y/, and /a/, conditioned by cooccurrence with /i/ or /u/ for three reasons:

1) There are minimal pairs in monosyllabic words, e.g. /yə/ 'same' and /yə/ '3 pl.'
2) In a word like /kẹ'do/ 'one' neither vowel could be conditioning the other since both belong to the set in which there is not a clear-cut contrast with [-ATR] vowels in disyllabic words.

3) Two parallel sets, five [+ATR] vowels and five [-ATR] vowels give a symmetrical system. However, it is clear that the [+ATR] set has more complete distribution in the high vowels /i/ and /u/ than in the low vowels /e/, /o/, and /a/.

5.3. Vowel Elision

Vowel elision is the term used to describe the deletion or neutralization of final vowels at morpheme (and word) boundaries within the phonological phrase. For example:

/má-lá gá g3/ → [m'lä-g'a-g3]
"I sg-cut tree perf."

/zà-má st3 s'mà-à/ → [z'm's'mà]
"and-I put leave-it"

Vowel elision is summarized by the following general rule:

\[
\begin{array}{c}
\text{V} \\
\text{V} & \rightarrow & \text{i} \\
\text{i} & \rightarrow & \text{phonological pause}
\end{array}
\]

That is, morpheme final vowels are dropped when the following morpheme begins with a vowel, are replaced by a neutralized transition vowel [i] when the following morpheme begins with a consonant, and are retained unchanged before any kind of phonological pause. A hesitation pause can occur between any morphemes or words, but phonological pauses normally coincide with grammatical phrases, clauses, and sentences.

While the above rule expresses Baka vowel elision in general, there are several variations of it which are described in sections 5.3.1-5.3.4 below.

5.3.1. Quality of Transition Vowels

In section 5.3 it was stated that a final vowel is realized as a neutralized transition vowel when the following morpheme is consonant initial and is deleted before a vowel initial morpheme. However, this is entirely true only for some of the vowels; the high front vowel /i/ and all of the back vowels display less neutralization or deletion in some environments.
/i/ before a consonant initial word is realized as a high front transitional vowel [i]:

/ék' lèdrè/ —> [ék' lèdrè]
'write word'

/i/ in monosyllabic words is realized as palatalization before vowel initial morphemes. In polysyllabic words, palatalization alternates freely with deletion as described by the general rule:

/b]/ ènè/ —> [b]/ènè]
'place his'

(èk'è) /èk'è/ —> [èk'è] or [èk'è]
'write-3 sg.'

/u/ before consonant initial morphemes is realized as a high back transition vowel [u]:

/ògù gù/ —> [ògù gù]
'(3 sg.) come perf.'

In addition, in monosyllabic words where the consonant is labial or velar, the back vowels are realized as labialization when the following morpheme is vowel initial:

/*bù ásànì/ —> ['bù ásànì]
'father Hassan'

/*bù́ éyí/ —> ['bù́ éyí]
'hunger thing'

/gù́-à/ —> [gù́]
'neck-3 sg.'

Note in contrast that labialization does not occur in disyllabic words:

/ògù àkù wá/ —> [ògù àkù wá]
'(3 sg.) come yet not' 'he hasn’t come yet'

/ògù-gù —> [ògù-gù]
'chase-3 sg.'

As the following examples illustrate, vowel elision can be recursive, a sequence of three vowels reduces to one vowel or to labialization and one vowel. However, the only time this happens is when the suffix /-a/ '3 sg.' is added to a monosyllabic word and the following word is vowel initial. In the second example below, the stem final vowel elides before the suffix giving ['bù́] [a] then elides preceding a vowel initial word.

/lùnù-à dògù gù —> [lùndògù gù]
'brother-3 sg. come perf.' 'his brother has come'
/ˈbʊ̀-ə́ əɡʊ ɡə/ —> [ˈbʊ̀dʊɡə]
"father-3 sg. come perf." 'his father has come'

5.3.2. Vowel Elision in Monosyllabic Words

In monosyllabic words no elision occurs before consonants. Thus, in the following example the demonstrative /ba/ remains unchanged.

/nə̞ bə̀ ndèrɛ/ —> [nə̞bə̀ndɛrɛ]
'3 sg. this go' 'he will go'

Elision in monosyllabic words before vowels is as expected, as in the case of /bə/ below:

/nə̞ bə̀ əɡʊ/ —> [nə̞bə̀dʊ]
'3 sg. this come' 'he will come'

Monosyllabic body-part nouns differ in vowel elision from both the general rule and from that for other monosyllabic words. Preceding a consonant initial noun, they elide according to the general rule:

/ndɛrɛ́ əɡə̀ dɔ̀ ɬɛndɛ̀/ —> [ndɛrɛ́dɔ̀ɬɛndɛ̀]
'3 sg. go perf. head mountain' 'he went on the mountain'

/rɔ̀ tɔmə́ əwɔ̀ mə̀-əwɔ̀/ —> [rɔ̀tɔmə́əwɔ̀mə̀]
'body Toma hurt nom.-hurt' 'Toma's body really hurts'

However, preceding consonant initial person-marking suffixes, monosyllabic body-part nouns follow the rule for monosyllables, that is, the final vowels are retained. For example:

/rɔ̀-má́ əwɔ̀ mə̀-əwɔ̀/ —> [rɔ̀mə̀wɔ̀mə̀]
'body-1 sg. hurt nom.-hurt' 'my body really hurts'

Finally in elicited data I have occasionally heard exceptions to both cases so we may conclude that either the system is in a state of change with regard to body parts or else there are other nonphonological factors influencing the choice.

5.3.3. Vowel Length in Elision

Noncontrastive compensatory vowel length occurs during vowel elision when the second morpheme is a single-vowel suffix or postclitic:

/yə̀də́-ə/ —> [yə̀də́]
'man-pl.'

/nə̀kə́-ə/ —> [nə̀kə́]
'unle/uncle/nephew-pl.'
(úlù-a) --> /úlù-à/ --> [úlù-à]
'swallow-3 sg.'

Note in contrast that length does not occur when the second morpheme is longer than a single vowel:

/ólió ógù/ --> [óliógù]
'enter come' 'exit'

This noncontrastive vowel length tends to disappear in rapid speech, except where it immediately precedes a phonological pause.

5.3.4. Tone and Vowel Elision

When vowel elision results in the deletion of a vowel, or its replacement by palatalization or labialization, a syllable with its tone is lost. In this case the tone of the remaining syllable is high if either base-form syllable had high tone, and low only if both were low:

/štà /šmà-à/ --> [štšmà-à]
'(2 sg.) put (2 sg.) leave-3 sg.' 'you leave it'

/štò /šmò-à/ --> [štšmò-à]
'(3 sg.) put (3 sg.) leave-3 sg.' 'he leaves it'

The high tone which results from the high-low sequence tends to have a downglide, except between two verb stems.

/kélì /̊àná/ --> [kélí̊áná]
'millet my' 'my millet'

Compare:

/òlió /ògù /gà/ --> [òlogùgà]
'(3 sg.) enter (3 sg.) come perf.' 'he exited'

When the sequence is low-high the resulting tone is simply high:

/štò /šmò-à/ --> [štšmà]
'(2 sg.) put (2 sg.) leave-3 sg.' 'you leave it'

The high-low glide is even more apparent when the juncture occurs between stem and suffix; in this case there is a further tendency for the vowel to lengthen which allows more time for the glide:

/zi-à/ --> [zi-à]
'and-3 sg.' 'and he...'

/lága-à/ --> [läga-à]
'cut-3 sg.' '...cuts it'
In both cases, these are only tendencies, not strict rules. Many exceptions can be found to both, and the length and downglide tend to disappear in rapid speech.

6. INTONATION

6.1. Basic Patterns

Following is a description of the basic intonation patterns of Baka. It does not represent an exhaustive analysis of Baka intonation, but simply a listing of the more obvious forms.

Continuing intonation consists of a gradual rise in pitch at the end of the phonological phrase. It is used for subordination, topicalization, and other low-level pauses.

/niyi ndisi, 'bu 3'd3, kì mbégà 3'd3, zì-yè
3 pl. stay father man and mother man and-3 pl.

ínyì-yè ndere-yè simi ngiti 'bà,
arise-3 pl. go-3 pl. to other home
'The boy's father and mother, they used to go around to other homes.'

One type of subordinate clause (future temporal) has the same contour as the types listed above, except that the entire contour is raised in pitch in relation to the following clause, as seen in the following example.

/mà-ndé'bà ogù gò, máyì ('bì-à zì-yì)/
1 sg. return come perf. 1 sg. give-3 sg. to-2 sg.
'When I return, I will give it to you.'

Statement intonation is a gradual lowering of pitch on the final syllables of the sentence:

/kà, 'dësi ni, bàdrè ndé kà káñë wà./
past before word not past thus not

'In the past it was not like this.'

Question intonation involves a raised level on the entire sentence, with an extra high pitch on the penultimate syllable:

/ogù gà/
3 sg.-come perf.
'Has he come?'

Often the final syllable is not level but ends with an upglide:
Maridi nə bə-ləmə-nə/
Maridi 3 sg. nom-good-3 sg.
'How is Maridi?'

However, when the intensive interrogative particle /yá/ is added to a question, the intonation pattern changes to a generally high pitch with a peak and fall on the last syllable, i.e. on /yá/:

/áyí ndéré yáká yá/ 2 sg. go garden?
'Are you really going to the garden?'

6.2. Patterns Causing Tone Perturbation

Three morphemes cause a drop in the intonation level of the following context. The drop is approximately half of the pitch level difference between high and low. Thus, following high tones are phonetically at a mid level with respect to tones before the drop. Likewise, low tones preceding the drop are phonetically at mid level with respect to the tones following the drop. Two of the morphemes /gá/ 'recent past' and /ká/ 'distant past' carry high tone and seem to trigger an extra high peak before the drop in pitch level. For example:

/má-ndéré gá yáká/ → [mánderégayaka]
'(1 sg.) go recent-past garden'  'I went to the garden'

The other morpheme, /má/ 'nominalizer', has low tone and is only associated with this intonation pattern when it is followed by reduplication of the verb stem, as in the following examples:

/má-šwá/ → [mášwášwá]
'(2 sg.) heavy nom.-heavy'  'you are very heavy'

/má-šwá/  → [mášwášwá]
'(3 sg.) heavy nom.-heavy'  'he's very heavy'
The tones and intonation can be represented separately thus:

/³wɔ mɪ-³wɔ/  'you’re very heavy'
/³wɔ mɪ-³wɔ/  'he’s very heavy'
/laːɡɔ mɪ-laːɡɔ/  'it’s really boiling'

7. IDEOPHONES

Ideophones, not surprisingly, display a number of features that are rare if not absent from the rest of the phonology. These include:

a) A high frequency of occurrence of unusual phonemes, including the only occurrences in the language of the labiovelar triills and of /v/ (see chart 2 for examples).

b) The only occurrence of the [f] allophone of /r/ (see section 4.1).

c) Final syllables are almost always long, often exceeding 2 or 3 moras, especially in monosyllabic but also in disyllabic ideophones:

[/læt(·)]  /læ/  'flat'
[kindl(·)]  /kindl/  'continuously'

d) Reduplication of two or more syllables is common, e.g. /zìzì/  'the sound and appearance of someone having convulsions'.

APPENDIX

Phonemic Transcription of Swadesh 100 Word List
(With a few substitutions and additions)

1  mà  belly  sìnl
thou  yí  neck  gà
we  zé  breast  ūmbɔ́
this  bà  heart  kúrú
that  né  liver  nìmبه'dè
who  ãmbà  drink  ëù
what  'dì  eat  ànù
not  ndà  bite  nánà
<table>
<thead>
<tr>
<th>English</th>
<th>Baka</th>
<th>Baka</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>mbá</td>
<td>see</td>
</tr>
<tr>
<td>many</td>
<td>tú*du</td>
<td>hear</td>
</tr>
<tr>
<td>one</td>
<td>ké*do</td>
<td>know</td>
</tr>
<tr>
<td>two</td>
<td>òë</td>
<td>sleep</td>
</tr>
<tr>
<td>big</td>
<td>monú</td>
<td>die</td>
</tr>
<tr>
<td>long</td>
<td>ñmbargbá</td>
<td>kill</td>
</tr>
<tr>
<td>small</td>
<td>mbíëróë</td>
<td>swim</td>
</tr>
<tr>
<td>woman</td>
<td>kára</td>
<td>fly</td>
</tr>
<tr>
<td>man</td>
<td>ñ*du</td>
<td>go</td>
</tr>
<tr>
<td>person</td>
<td>'yi</td>
<td>come</td>
</tr>
<tr>
<td>father</td>
<td>'bú</td>
<td>lie</td>
</tr>
<tr>
<td>fish</td>
<td>këngë</td>
<td>sit</td>
</tr>
<tr>
<td>snake</td>
<td>kámá</td>
<td>stand</td>
</tr>
<tr>
<td>bird</td>
<td>sòdu</td>
<td>give</td>
</tr>
<tr>
<td>dog</td>
<td>ísi</td>
<td>say</td>
</tr>
<tr>
<td>house</td>
<td>melisíl</td>
<td>sun</td>
</tr>
<tr>
<td>tree</td>
<td>kágá</td>
<td>moon</td>
</tr>
<tr>
<td>seed</td>
<td>kúfu</td>
<td>star</td>
</tr>
<tr>
<td>grass</td>
<td>sòmu</td>
<td>water</td>
</tr>
<tr>
<td>leaf</td>
<td>mbíli</td>
<td>rain</td>
</tr>
<tr>
<td>root</td>
<td>ci</td>
<td>stone</td>
</tr>
<tr>
<td>bark</td>
<td>sòkó</td>
<td>sand</td>
</tr>
<tr>
<td>skin</td>
<td>sámá</td>
<td>earth</td>
</tr>
<tr>
<td>meat</td>
<td>ési</td>
<td>cloud</td>
</tr>
<tr>
<td>blood</td>
<td>sámá</td>
<td>smoke</td>
</tr>
<tr>
<td>bone</td>
<td>cmóy</td>
<td>fire</td>
</tr>
<tr>
<td>grease</td>
<td>sò*bu</td>
<td>ash</td>
</tr>
<tr>
<td>egg</td>
<td>bó</td>
<td>burn</td>
</tr>
<tr>
<td>horn</td>
<td>ngërë</td>
<td>path</td>
</tr>
<tr>
<td>tail</td>
<td>sònó</td>
<td>mountain</td>
</tr>
<tr>
<td>feather</td>
<td>bëyë</td>
<td>red</td>
</tr>
<tr>
<td>hair</td>
<td>bëyë</td>
<td>yellow</td>
</tr>
<tr>
<td>head</td>
<td>dó</td>
<td>white</td>
</tr>
<tr>
<td>ear</td>
<td>mbíli</td>
<td>black</td>
</tr>
<tr>
<td>eye</td>
<td>këmëë</td>
<td>night</td>
</tr>
<tr>
<td>nose</td>
<td>sëmbó</td>
<td>hot</td>
</tr>
</tbody>
</table>
mouth tərə
tooth sɔ
tongue dəndənə
claw səkɔ síli
foot sindí
knee ngəroy sindí
hand 'síli

cold drú
thin sịyọ
new mịkəndà
good ëmè
dry néré
wet bìlsà
name ịrị

NOTES

1 I am indebted to Edward Mandeson, Institute of Regional Languages, Maridi, for sharing with me his preliminary analysis of Baka phonology, and for providing me with examples for some of the less frequently occurring sounds, saving an untold amount of time. Thanks are also due to Wanda Pace, Dorothea Jeffrey, Richard Watson, and Mary Ruth Wise, who made suggestions during the analysis and on earlier drafts of this paper.

2 Tucker and Bryan give as an example of a 'bilabial roll' [çlrw] 'to kindle' (1966:163). This word, however, is currently /cikπl/, with a labiovelar stop. The different final vowels probably do not represent a change; instead, Tucker and Bryan's example most likely represent /cikπl/ + /-ə/ '3 sg.' which is the citation form for transitive verbs.

3 Here and throughout this paper, phonetic transcriptions are given only if they vary significantly from the phonemic transcriptions, or if they are necessary to exemplify the argument.

4 See, for example, Hall, et al (1974).

5 Considering the slim evidence for treating [i] as a phoneme, it is not impossible that a stress rule or a morphophonemic rule could be found to handle [i] as a reduced allophone of some underlying vowel. Even when a proclitic occurs in isolation the [i] may be considered to be a morphologically conditioned reduced form.

6 The remaining members of this set have inherent tone: /-yə/ '2 sg.' and /-ə/ '3 sg. obviative'.

7 Hall, et al define opaque morphemes as 'those with [-ATR] vowels which do not shift harmonic class when contiguous to a dominant morpheme, [i.e., those with [+ATR] vowels]' (1974:246).

8 The subject person enclosed in parentheses e.g. (2 sg) indicates that the subject person indication is solely by means of tonal inflection of the verb stem. The glosses '2 sg.' and '3 sg.' are reserved for instances when there is an overt separate morpheme.
REFERENCES


OTUHO PHONOLOGY AND ORTHOGRAPHY

Heather Coates
Summer Institute of Linguistics

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       3.3.1. 1982
       3.3.2. 1983
       3.3.3. Comments on the Outcome of the Conferences
   3.4. Conclusions

Notes
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1. INTRODUCTION

1.1. The Language

Otuho is spoken in the Eastern Equatoria Region of southern Sudan, by approximately 100,000 people. It is a member of the North-Eastern group of Nilotic languages, a branch of the Eastern Sudanic language family. The area in which the central dialect is spoken is, from the viewpoint of the Lotuho, in the plains between the Lopit Mountain Range in the east, the Lomohid Ranges in the south and the Imator Range in the west. The main town in the area is Torit.

According to the people, who refer to themselves as the Lotuho, the correct name for the language is Otuho. Much of the earlier literature refers to the language as Lotuho or Latuka or Lotuko.

1.2. Current Research

The author studied the central dialect of Otuho as spoken in Loronyo, a large village situated on the Lator Road and beside the River Moss, about 20 miles north of Torit. The research was carried out during a stay there between May and December, 1982, under the auspices of the Summer Institute of Linguistics (SIL) and the Institute of Regional Languages (IRL). In addition, more detailed research was carried out with the help of Massimo Alem, the Otuho language officer of the Institute of Regional Languages, who comes from the Loronyo area, but now lives in Torit.

The research was undertaken in preparation for the planned final revisions of the reading primers by SIL and IRL, during 1983 and 1984. As will become clear, in addition to the phonological questions bearing on the orthography, there are also historical factors; earlier research, carried out over the last 60 years or more, has left a legacy of two or three orthographies. The differences were relatively minor, but the inconsistency inevitably caused problems in the construction of primers for the teaching of reading. It was therefore necessary to seek to stabilise the orthography in order for progress to be made in literacy among the Lotuho people.

The purpose of this paper is to draw together the phonological and historical factors influencing decisions concerning the orthography. It also presents the conclusions drawn as a result of this most recent research and discussion as to the orthography most likely to be acceptable to all concerned.
2. PHONOLOGY

In Otuho there are 'strong' and 'weak' contrasts in both consonants and vowels which interact in various phonological processes, described in section 2.3. Consonants and vowels are described in some detail in sections 2.1 and 2.2, respectively, as background for the discussion of 'strong' and 'weak' phoneme sets.

2.1. Consonants

2.1.1. Phonetic and Phonemic Charts

The consonant phones of Otuho are displayed in Chart 1.2

<table>
<thead>
<tr>
<th>Bilabial</th>
<th>Labio-Postal</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>v / p</td>
<td>t</td>
<td>k</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>u / b</td>
<td>d</td>
<td>j</td>
<td>g</td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td>v / f</td>
<td>s</td>
<td>x</td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>flat</td>
<td>u / θ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grooved</td>
<td>u / θ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>v / c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flap</td>
<td>v / z</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tongue</td>
<td>v / θ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-tip</td>
<td>v / θ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tongue-blade</td>
<td>v / θ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trill</td>
<td>v / r</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td>v / ɾ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>short</td>
<td>v / l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>long</td>
<td>v / ɾ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>v / m</td>
<td>v / n</td>
<td>v / ŋ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>short</td>
<td>v / m</td>
<td>v / n</td>
<td>v / ŋ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>long</td>
<td>v / m</td>
<td>v / n</td>
<td>v / ŋ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-vowel</td>
<td>v / w</td>
<td>v</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>weak</td>
<td>v / w</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>strong</td>
<td>v / w</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CHART 1. Consonant Phones

In chart 2 the consonant phonemes posited are displayed and the distinctive points and modes of articulation are indicated.3
2.1.2. Contrasts and Variants

Contrasts and allophonic variants of consonants are presented in this section according to the phonetic modes of articulation shown in chart 1.

Stops

The voiceless bilabial stop /p/ contrasts with the voiced bilabial stop /b/.

/p/ /ąpɛɾ/4 bicycle
/b/ /ąbɛɾ/ afraid

The phoneme /p/ is relatively rare in occurrence.

The voiceless post-dental stop /t/ contrasts with the voiced alveolar stop /d/.

/t/ /tɔdɔɾa/ to kill
/d/ /tɔdarə/ (the sun) is setting

The voiced palatal stop /ʒ/ contrasts with the voiced alveolar stop /d/.

/ʒ/ /iʃɛɾa/ be straight!
/d/ /iʃɛɾa/ to fly away
The voiceless velar stop /k/ contrasts with the voiced velar stop /g/.

/k/ /äkär/ sheep (sg)
/g/ /äsägär/ small stool

In word final position the glottal stop /ʔ/ contrasts with the voiceless velar stop /k/,

/ʔ/ /sũũšʔ/ a name
/k/ /sũũũrũk/ to catch red-handed
(also used as a name)

with /t/,

/ʔ/ /sũũʔtʔ/ name
/t/ /sũũtũt/ a generous person

and with its absence following both long and short vowels.

/ʔ/ /aːlãʔ/ teeth
/ɲː/ /aːlã/ drying
/ʔ/ /svãʔ/ to swell
/ɲː/ /svãt/ dead
/ʔ/ /aːlã/ man

(See also below for comment regarding the relationship between glottal stop and the velar/glottal fricative and section 2.2.3 for discussion of glottal stop in relation to vowels.)

Fricatives

The voiceless bilabial fricative [ɸ], the voiced bilabial fricative [β], the voiceless labio-dental fricative [f], and the voiced labio-dental fricative [v] fluctuate freely. For convenience, /f/ is chosen to represent these fluctuating phones, although the bilabial fricatives are in fact more common.

[ɸ]~[β] [ãːbũl]:~[ãːbũl]: /ãːbũl/ groundnuts
(collective term)
[β]~[f] [ãːbũnũk]:~[ãːbũnũk]: /ãːbũnũk/ wooden container
for pounding
[f]~[v] [ãːfũ]:~[ãːvũ]: /ãːfũ/ yes

The labial fricative /ʃ/ contrasts with the labial stops /p/ and /b/.

/ʃ/ /ãːʃũzũ/ spear
/p/ /ãːpũrũ/ bicycle
/ʃ/ /ãːʃãrãl:ũ/ axe
/b/ /ãːbãlã/ a game

The voiceless grooved fricative /s/ contrasts with /t/.
/s/ /ëpwâz̥/ to swing from side to side
/t/ /ifwi:ti/ you go (pl)

The voiceless alveolar flat fricative /θ/ contrasts with /s/ in all positions,

/θ/ /ëθ̃ən/ cow or bull (general name)
/s/ /esən/ cattle

and with /t/ except in word final position (see section 2.3.1)

/θ/ /aθəz̥iʔ/ a variety of dura
/t/ /aṭəz̥iʔ/ night

The voiceless velar fricative [x], the voiced velar fricative [ɣ], the voiceless glottal fricative [h], and the voiced glottal fricative [ŋ] fluctuate freely. /h/ will be taken to represent these fluctuating phones.

[x]-[h] [axən̥]-[aθ̃ən̥] /áθ̃ən̥/ homestead
[x]-[ɣ] [akaxa]-[akɔyɔ] /akɔyɔ/ today
[ɣ]-[h] [aθɔyɔ]-[aθɔhɔŋɔ] /aθɔhɔŋɔ/ he returns
[h]-[ŋ] [aθɔn̥]-[aθɔŋu] /aθɔŋu/ let us cover ourselves

/h/ contrasts with /k/ except word finally (see section 2.3.1),

/h/ /áθ̃ən̥/ birds
/k/ /akɔr̥/ sheep (sg)

and with /g/.

/g/ /aŋuŋu/ let us cover ourselves

The allophones of /h/ are in complementary distribution with /ʔ/. /ʔ/ only occurs word finally, whereas /h/ only occurs in initial and medial positions. Nevertheless, /ʔ/ is not analyzed as an allophone of /h/ since /k/ is the 'strong' counterpart of /h/ (see section 2.3.) and /ʔ/ seems to be more closely related to the vowels and suprasegmental phenomena than to consonants.

Affricate

The voiceless palatal grooved affricate /c/ contrasts with the voiced palatal stop /j/.

/c/ /acrɔhɔŋɔ/ it comes back
/j/ /aθɔŋɔ/ (1) sleep

and with /θ/.

/c/ /acəhə/ (he) returns
/θ/ /aθəhə/ (the pot) is on the fire
Flaps

There are two flaps, /ɬ/ and /ʃ/. They are both alveolar, /ɬ/ being articulated with the tongue tip and /ʃ/ with the tongue blade.

The voiced alveolar tongue-blade flap /ɬ/ contrasts with /d/ except in word-final position (see section 2.3.1),

/d/ /koʊɪk/ swallowed
/ʃ/ /odzik/ cloudy, about to rain
/ʃ/ /odzik/ slowness in preparing one’s self

with /θ/,

/d/ /koʊɪ̯l̪/ swallowed
/θ/ /koʊɪ̯l̪/ digging stick

and with /j/.

/d/ /dʒl̪/ I am red
/j/ /dʒ3l̪/ (I) sleep

The voiced alveolar tongue-tip flap /ʃ/ contrasts with /θ/,

/ʃ/ /ʃəra/ antique ornament
/θ/ /θəra/ tree with balloon-like fruit and milky sap

and with /d/.

/ʃ/ /θərə/ to inherit
/ʃ/ /θərə/ to pluck something for someone
/ʃ/ /θərə/ pulled a goat on a leash, or pulled someone by the hand
/ʃ/ /θərə/ heavy clouds (looks likely to rain)

The phonemes /d/, /θ/ and /ʃ/ are often difficult for the non-native speaker to distinguish.

Trill

The voiced alveolar trill /r/ contrasts with /l/, except in word final position (see section 2.3.1),

/r/ /ɾəri/ maize
/l/ /ɾəzi/ small brown rat with white stripes all over the body

with /θ/, with which it can be confused by non-native speakers,

/r/ /ɾəθərə/ brown with white speckles
/θ/ /ɾəθəθı/ hole in a tree in which bees have made a hive

and with /t/.

/r/ /ɾət̪ək̪/ to fall on the knees
/t/ /ɾət̪ək̪/ to bar the way
Laterals

The voiced laterals /l:/ and /l/ are in contrast.

/1:/ /á1èʔ/ milk
/1:/ /á1lèʔ/ man

/l:/ contrasts with /r/,

/r:/ /á1lèk/ a line or circle of hunters
/r:/ /árèk/ to prepare or make a drum

and /l/ with /z/.

/l/ /zèʔ/ milk
/z/ /záʔ/ water

Nasals

All five nasals, /m/ /n/ /n:/ /ŋ/ and /ŋ/, contrast with one another.

/m:/ /máːnɛ̃ː/ distant
/n:/ /náːnɛ̃ː/ field
/n:/ /áːnɛ̃ː/ field
/n:/ /ítwiːnːɛ̃ː/ come (3rd pl)

/n:/ /šuːnɛ̃ː/ they transfer grain from one container to another taking a handful of the goods e.g. groundnuts

/ŋ:/ /šuːnɛ̃ː/ blow your noses!

/ŋ:/ /ɔŋi/ son
/ŋ: [oŋiː] /ŋiːyː/ (he) is eating
/n:/ /ɛháːnɛ̃ː/ today
/ŋ:/ /ɛpáːnɛ̃ː/ to prepare mud

Semivowels

The semivowels /wː/, /yː/, /w/, /y/ are in contrast:

/wː:/ /èwːøːk/ to carry (something) on the head
/yː:/ /èyːøːk/ ear
/w/: /èwøːk/ to take/scoop (water)
/y/: /èyøːk/ glowing coals
/wː:/ /iwːùhù ëyːɛ/ have you carried it on your head?
/wː:/ /iwːùhù ëyːɛ/ have you scooped (some water)?
/y/: /éŷiólóː/ species of black-faced, yellow bird which eats sorghum
/y/: /áŷóx̂óː/ large white ant

2.1.3. Distribution

In consonant clusters

The only consonant clusters permitted in native Otuho syllables are C+V (semivowel). There appears to be no restriction on the cooccurrence of consonants and semivowels; all consonants may be followed by /w/, /u/, /y/ and /y/, except /ʔ/ which does not pattern with the consonants (see 2.2.3.). Examples with consonants at the four distinctive positions of articulation follow.

Consonant /w/ /u/ /y/ /ʔ/
Labial: /á̝mňáːk/ to reserve /á̝má̝ňá̝/ to complain of receiving an unfair share
Alveolar: /á̝w̌áː/ a funeral /á̝m̌íŷíʔ̃ʔ̃/) morning
Palatal: /á̝ĵw̌á̝ː/ a ritual cleansing /á̝ŷíá̝ː/ you say/speak(sg)
Velar: /á̝kw̌íá̝ːʔ̃ʔ̃/) to fall down /á̝ǩíá̝ː/ wrestling
/á̝gw̌á̝ː/ to consider /á̝ǧíá̝ː/ working

Consonant clusters in borrowed words are usually separated by a vowel, for example:

kursi (Arabic: 'chair') ----→ /á̝ǩúžáː/ (Otuho: 'chair')

Within the word

Word initially

All consonants may occur word initially, since one form of the noun drops the initial vowel leaving the consonant unchanged. For example:

/á̝má̝ňá̝/ ----→ /m̌á̝ňá̝/ field

Some words, namely kinship terms, time words, the greeting, and quantifiers have an initial consonant even in their citation form. Consonants occurring word initially in these forms are limited to the following: /m̌/, /ň/, /ŷ/, /ť/, /ď/, /θ̌/ and /ʔ̃/. Examples:

/m̌óː/ the greeting
/ňó̝ňíːʔ̃/) yesterday
/ďáː/ all
The vowel prefix /a/ in nouns is a remnant of the class markers /la-/ and /na-/. Occasionally the old form of the word is still used, /l/ and /n/ thus occurring word initially. They are also still used when gender or size is emphasised: /la-/- for masculine or small, /na-/- for feminine or large. For example:

/námáːná/ big field
/lámáːná/ small field

Word medially

All consonants may occur word medially between vowels. However, only weak and neutral consonants may occur stem finally preceding a suffix (see section 2.3.1). As has been described, the only word-medial consonant clusters are consonant plus semivowel.

Word finally

All consonants may occur word finally except the following:

(i) Weak consonants: /θ/, /ð/, /s/, /n/, /l/, /h/.

(ii) /p/, /ç/ and /g/ have not been found word finally in words of Otuno origin. Borrowed words ending in /g/ tend to be pronounced in Otuno with a /k/.

(For distribution of the semivowels see consonant clusters above and section 2.3.3.)

2.2. Vowels

2.2.1 Phonemic Chart

The vowel phonemes are displayed in Chart 3. Note that vowel length is also contrastive.

\[ \text{+ATR} \quad \text{u} \quad \text{u} \quad \text{\text{-ATR}} \]
\[ \text{e} \quad \text{e} \quad \text{a} \]

\[ \text{CHART 3. Vowel Phonemes} \]

2.2.2. Contrasts

As will be noted in Chart 3, Otuno vowels are arranged in two groups, [+ATR] (Advanced Tongue Root) and [-ATR]. The latter tend to sound more creaky than the [+ATR]. Contrast exists between [+ATR] and
[-ATR] vowels of the same tongue body position, including some examples of contrast between /ʌ/ [+ATR] and /a/ [-ATR], a contrast which is not considered to be important by native speakers. The symbols used here for convenience reflect the traditional IPA close-open phonetic quality rather than the [ATR] quality.

**ATR contrast**

/i/ /dék/ cloudy, about to rain
/i/ /dēk/ to endure
/e/ /émēzi/ bell
/e/ /émē2i/ gum
/a/ /kwa’i/ a part of a dance
/a/ /kwa/ to remove a thorn
/o/ /kūd/ to bend
/o/ /kūd/ to surround
/u/ /mūhū/ let us cover ourselves
/u/ /mūhū2/ a species of bird

**Height contrast**

**–ATR**

/i/ /imiz/ government
/e/ /emē2i/ bell
/e/ /oku:zi/ nickname for a fox
/a/ /ōkwa/ a part of a dance
/o/ /ōkva/ a part of a dance
/o/ [ōrTbökūiːʔiʔ] /ōrʔ Tbökūiːʔiʔ something belonging to hyenas
/o/ /ogīʔ/ they are difficult, strong
/u/ /ogūʔ/ they turn

**+ATR**

/i/ /ētise/ stirring rod
/o/ /ēmēzi/ gum
/e/ /ahēʔ/ birds
/a/ /ahēm/ fishes
/o/ /ēban/ afraid
/o/ /ābar/ whitish
/o/ /ējir/ to pass close by
/u/ /ējur/ to suck
Other contrasts

/e/  /ðyː̥ːlɛ/  a whirlwind
/a/  /ˈʃʰɔːt/  to eat something soft off a bone or out of a hard shell
/u/  /ˈʃʰuːt/  they blow or they point

2.2.3. Length, Glottal Stop, and Phonetic Vowel Sequences

Long and short vowels contrast in Otuho as shown in the examples below.

/a/  /ˈʃələ/  a game  /ˈsɛlə/  drying
/æ/  /ˈʃələ/  but  /ˈsɛlə/  people
/ɛ/  /ˈʃəmə/  sorghum  /ˈsɛmə/  fire
/ɑ/  /ˈʃəʊsɔ/  to beat lightly  /ˈʃɔːsɔ/  blood
/æ/  /ˈʃələ/  man  /ˈsɛlə/  dead

The glottal stop occurs only word finally but in that position /ʔ/ contrasts with its absence after both long and short vowels and with /t/ and /k/ (see section 2.1.2). Although many native speakers react to /t/ as /t/, some of them are aware of the contrast. It usually occurs in syllables on which there is a low tone on the vowel and is probably historically related to tone. However, since the analysis of tone is incomplete, /ʔ/ is tentatively posited as a phoneme with limited distribution which is more closely related to the vowels and suprasegmental phenomena than to the consonant system. The close relation between glottal stop and the vowels is seen in vowel elision between words. When [Erəʔ] in /Erəʔ Thoːʔsɔn/ 'something belonging to hyenas' is pronounced in isolation, there is a word final glottal stop but when the phrase is pronounced rapidly the final vowel and the glottal stops are both elided. Such elision does not occur in the the case of a vowel and any other consonant.

Combinations of non-high vowels are generally regarded by native speakers of Otuho as two syllables, with an intervocalic /y/, if the first vowel is long. For example:

[nɛːz-əl] oil is regarded as /nɛyəl/.

Combinations of a phonetically long high vowel followed by a non-high vowel are also regarded as /yv/. For example:

[ɒnǐːɔ] eating (3rd sg) is regarded as /ɒnɪyɔ/.

However, combinations of a phonetically short high vowel followed by a non-high vowel within a single stem morpheme are interpreted as /Vu/. For example:

/ˈʃəwɔːlɛ/  a funeral
Combinations of short high vowels and short non-high vowels across morpheme boundaries or in a suffix are usually interpreted as a vowel cluster. For example:

/ʌpɛr-i/  
/ʌnɒz-ô-i/  

fruit-sg.  
string of beads-pl, i.e. strings of beads

Muratorii (1999) lists 16 diphthongs, but they all contain a high vowel (/i/, /u/, /v/ or /u/) as the second element of the diphthong and occur word finally. Since most other diphthongs have been ruled out by the C+S pattern (see 2.1.3), and by the V+S+V pattern above, I interpret word final high vowels following another vowel within the same morpheme as consonants. There are further reasons for this, as outlined in section 2.3.3.

2.2.4. Distribution

A vowel harmony system operates in Oluho, in which each word usually contains only [+ATR] vowels or [-ATR] vowels, although there are exceptions, especially in final syllables. (This will be further described in the section 2.3.3.) Each vowel may occur word initially, word medially and word finally.

2.3. Phonological Processes

2.3.1. Consonant Neutralisation

Neutralisation occurs word finally between strong and weak consonants, except for strong and weak semivowels (c.f. 2.2.3). The strong consonants are /t/, /d/, /k/, /n/, /l/ and /r/. In the case of /t/ and /k/, their counterparts are the corresponding fricatives, /θ/ and /h/. For /d/, /n/, /l/ and /r/ the counterparts are the short phonemes /d/, /n/, /l/ and /r/. As has been demonstrated, there is contrast between the weak and strong counterparts word medially; this contrast does not occur word finally. In a situation where the weak phoneme might be expected word finally, the strong counterpart occurs. Examples follow:

/t/ /θ/ /έσαβλη/ /έσαβλ io/  
/k/ /h/ /έμάκι/ /έμακι/  
/d/ /d/ /έμυδε/ /έμυδε/  
/n/ /n/ /έμοανε/ /έμοανε/  
/l/ /l/ /έκσι/ /έκσι/  
/r/ /r/ /άνερ/ /άνερ/  

week/weeks  
wanted(3rd sg)/(they) want  
roasted/roasting  
in-laws/in-law  
gate/gates of stable  
fruits/fruit

Comparison of these examples with others given by Muratorii shows that, in fact, it is stem-final strong and weak consonants which are neutralised. The strong consonants occur when no suffixes are added, while only weak consonants occur before a suffix. Thus, strong and weak consonants contrast word (and stem) initially, but they contrast word medially only if the position is also stem medial. Neutral consonants, of course, can occur in all positions except as indicated in section 2.1.3.
2.3.2. Vowel Harmony

Just as in the consonants, so in the vowels there is a double system. The [+ATR] vowel phonemes are 'strong' or 'heavy'; the [-ATR] are 'weak' or 'light' (These are the terms used by native speakers to describe the different vowel qualities.) The two groups of vowels do not generally occur together in the same word. That is, each word usually contains strong vowels, or weak vowels, but not both.

**STRONG  [+ATR]  WEAK  [-ATR]**

/ɛmɛzi/ bell /ɛmɛziʔ/ gum
/okuyi/ part of a dance /okuy/ to remove a thorn
/okud/ to bend /okud/ to surround

The [ATR] feature often seems to be neutralised word initially, since it is difficult, for native speaker and linguist alike, to state in which group the vowels occurring word initially belong, i.e. whether they are 'strong' or 'weak'. The native speakers also claim that there is little or no difference between the low vowels /a/ and /a/, although a clear phonetic difference exists. This is most pronounced when /a/ or /a/ follow a semivowel.

When affixes are added to a root, the whole word, root and affix, generally contains vowels from only one set.

/ænɔzɔ/ a string of beads
/ænɔzo-ʔ/ strings of beads

Muratori (1938), sets out tables of noun and verb prefixes. The vowels in the prefix are determined by the vowels in the stem; in the case of the verbs, he claims that it is the vowel after the first consonant which determines the prefix. Thus, vowels of the other set may occur later in the word. He cites, for example:

\[\begin{array}{ll}
  \enspace & \enspace \ensace \end{array} \]

However, on checking with present day speakers, it would seem that the vowels in the first word of the second example above are consistently [+ATR], that is,

/izúhétó tày/

(This example can also mean 'you have injected'.)

Clearly, a more detailed analysis of the vowel harmony system is necessary.

The fact that 50 years ago Muratori was able to distinguish between 'strong' and 'weak' vowels word initially suggests that Otuhō could be in the process of changing in this area. It has already been
noted that /ʌ/ and /a/ are not easily distinguished by native
speakers. In his paper on Niger Congo, Kwa, John Stewart (1971:203)
claims that the low vowels in a vowel harmony system are often the
first to be neutralised in this way. However, Yokwe and Hail suggest
that this neutralisation 'is not based on physiological mechanics but
is the result of the interaction of phonological rules, which result

2.3.3. Semivowel Harmony

As has been seen in section 2.1.2, there are strong and weak
semivowels. Their distribution seems to be strongly influenced by the
vowel harmony system, as follows:

**Intervocalic position**

Both strong and weak semivowel phonemes occur between [+ATR]
vowels, and contrast in this position.

/\m/ /\m\i\h\u i\y\i\e/ have you carried it on your head?

/\w/ /\w\a\h\u i\y\i\e/ have you scooped some <water>?

No examples have yet been found of /\m/ or /\i/ occurring
between [-ATR] vowels. This would seem to confirm Muratori's claim
that the strong semivowels occur almost exclusively with strong
vowels.

**Following consonants**

Following consonants it is very clear that the strength of the
semivowel is determined by the vowel which follows it. That is, a
semivowel preceding a [+ATR] vowel is always strong, while preceding
a [-ATR] vowel it is always weak. In this position it is interpreted
as the second element of a consonant cluster.

/\m\u\i\a/ a part of a dance
/\w\a/ to remove a thorn
/\h\i\n\a\n\a/ closed
/\h\y\a\n\a/ to read
/\h\a\i\a\i/ ill
/\h\m\a\y/ mooing of cows

It will be noted that the strong semivowels /\m/ and /\i/, and
some weak semivowels carry a tone mark when they occur after another
consonant. This draws attention to the fact that in this position the
strong semivowel has a more vowel-like quality than the weak
semivowel. The vowel following the weak semivowel sometimes has a
gliding tone. This might suggest that the sequence C+S+U (strong) is
two syllables, but on testing this hypothesis against native-speaker
intuition, it does not seem to be the case.
Word final position

If the semivowels were to conform to the consonant system, it would be expected that only the strong phoneme could occur in word final position. This is not the case. In this position the weak semivowels usually follow [−ATR] vowels, and the strong semivowels usually follow [+ATR] vowels.

/ðŋlɪŋ/  ill
/ɜŋweɪ/  mooing of cows

In this respect, the semivowels function more like vowels. However, the fact that occasionally a weak semivowel may occur word finally following a [+ATR] vowel seems to confirm the decision to regard semivowels primarily as consonants, because they are independent of the vowel system in this position.

/ɜkɪˈmʌlɪ/  to wrestle

To summarise, while the semivowels function primarily as consonants, in some positions they are conditioned by the [ATR] value of the vowel which follows. In all positions the strong semivowel is conditioned, in that it only occurs with [+ATR] vowels. The weak semivowel is conditioned only when it follows a consonant; in other positions it is independent of the vowel system, occurring with both [+ATR] and [−ATR] vowels.

2.3.4. Palatal Nasal Perception

It had been thought that there was contrast between a weak and a strong /n/, i.e., between /ɲ/ and /ŋ/. If indeed there are two phones, [ɲ] and [ŋ], they are entirely conditioned by the vowels, [ɲ:] occurring with [+ATR] vowels and [ŋ] occurring with [−ATR] vowels. However, on investigation, there seems to be no phonetic difference between the phones occurring in each situation. This may be a case of native speaker perception of neutral consonants which will be discussed in the comments on the Torit Conferences (section 3.3.3). If so, it is further complicated in this case by the apparent conditioning by the vowels, an interaction of at least two phonological processes.

2.3.5. Summary Charts of Strong and Weak Phonemes

The sets of strong, weak, and neutral consonants are summarised in Chart 4 and the strong and weak vowels in Chart 5. Neutral consonants seem to be more closely related to the strong consonants than the weak consonants; native speakers often wish to write a double letter for them on analogy to the orthographic convention of double letters for the strong consonants.
### Consonants

<table>
<thead>
<tr>
<th>Strong Consonants</th>
<th>Weak Consonants</th>
<th>Neutral Consonants</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>k</td>
<td>θ</td>
</tr>
<tr>
<td>d</td>
<td>θ</td>
<td>h</td>
</tr>
<tr>
<td>r</td>
<td>r</td>
<td>p</td>
</tr>
<tr>
<td>w:</td>
<td>y:</td>
<td>c</td>
</tr>
<tr>
<td>s</td>
<td>n:</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>u:</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td>y</td>
<td>j</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>g</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>f</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s</td>
</tr>
</tbody>
</table>

**CHART 4. Consonants**

<table>
<thead>
<tr>
<th>Strong vowels</th>
<th>Weak vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>e</td>
<td>o</td>
</tr>
<tr>
<td>n</td>
<td>a</td>
</tr>
</tbody>
</table>

**CHART 5. Vowels**

#### 2.4. Stress and Tone

Stress in Otuho is very indistinct, and many words do not have a stressed syllable. A strong consonant often gives greater stress to the syllable in which it occurs. A neutral consonant may be strongly articulated when the word in which it occurs is being emphasised, producing the same phonetic result as a strong consonant, i.e. a stressed syllable.

Muratori gives an example of what he claims to be a stress contrast, but on further investigation it would seem that tone is the most significant feature in the contrast and that stress is not phonemic.

\[
\begin{align*}
\text{‘ojo} & \quad \text{said} & = & \quad /\text{bỳjì}/ \\
\text{o’jo} & \quad \text{with} & = & \quad /\text{bỳjì}/
\end{align*}
\]

Tone, on the other hand, is phonemic, and has both lexical and grammatical functions. A full investigation and analysis has not yet been completed, but some examples are given below of tone contrasts in identical or analogous environments.

There are three or four level tones, and several glides which may be either rising or falling. Here the level tones marked are high ", mid ", and low ". High falling " and mid falling " are also marked.
2.5. Syllable Structure

The maximum expanded syllable pattern in Otuho is C(S) V (C) or (C) (S) V (S) where C is consonant, V is vowel (either long or short) and S is semivowel. The minimum syllable V is only found word initially; in monosyllabic words the minimum is CV. SV is a permitted syllable but not in monosyllabic words.

Examples of monosyllabic words:

CV /ni/ I
CVC /daŋ/ all
CSV /bw:i:o/ then, with, if, and
SVC /w:i:n/ come! (sg)
CSVC /kwak/ quick

In elided forms a VC monosyllable, e.g. /al/ ‘when’ also occurs. The full form is /al:ə/.

Polysyllabic words

Since the only consonant clusters occurring in native Otuho words are C+S, combinations of syllables are also restricted. Words containing up to six syllables exist. The pattern may be formulated as follows:

\[
\begin{array}{cccc}
\text{C(S)} & \text{C(S)} & \text{(V)}, & \text{V} & \text{V} & \text{C(S)} \\
\text{S} & \text{S} & \text{S} & \text{S} & \text{S} & \text{S}
\end{array}
\]
In the above representation, n is any number 0-4. (V) and V can be short or long, and a word final V can be short or long with or without a following glottal stop. Examples:

2 syllables /áhan/ homestead
3 syllables /áhanâ/ today
4 syllables /áhâxjâ/ chicken
4 syllables /hâljaõleô/ yesterday
5 syllables /ôhûhûyûên/ a group of squirrels
6 syllables /ôôbôõôçôyô/ a species of snake

3. ORTHOGRAPHY

3.1. Suggestions for a Phonetically Accurate Orthography

The following is a suggested orthography which would seem to be consistent with the phonology:

<table>
<thead>
<tr>
<th>Strong Consonants</th>
<th>Phoneme</th>
<th>t</th>
<th>d</th>
<th>r</th>
<th>n</th>
<th>l</th>
<th>k</th>
<th>w</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grapheme</td>
<td>tt</td>
<td>dd</td>
<td>rr</td>
<td>nn</td>
<td>ll</td>
<td>kk</td>
<td>uu</td>
<td>yy</td>
</tr>
</tbody>
</table>

| Weak Consonants   | Phoneme | h | n | l | h | w | y |
|                   | Grapheme | t | d | r | n | l | k | w | y |

| Neutral Consonants| Phoneme | p | b | m | c | j | f | s | ŋ | ŋ |
|                   | Grapheme | p | b | m | c | j | f | s | ŋ | ŋ |

| Strong Vowels     | Phoneme | A | e | i | o | u |
|                   | Grapheme | A | e | i | o | u |

| Weak Vowels       | Phoneme | a | e | i | o | u |
|                   | Grapheme | a | e | i | o | u |

| Long Vowels       | Grapheme | double vowels |

| Glottal Stop      | Grapheme |
|                   | (occurs only following word final vowel) |

Notes

a) Traditionally /k/ has been written as ⟨kk⟩ or ⟨k⟩ or and /h/ as ⟨x⟩ or ⟨h⟩.

b) For the sake of consistency, strong consonants should always be written ⟨tt⟩ etc. (See, however, note c) below.) In earlier orthographies three forms had been used: ⟨t⟩ word initially, ⟨tt⟩ word medially and ⟨t⟩ word finally.

c) A diacritic is probably the most economical method of distinguishing between the weak and strong vowels. It would also be
more economical to mark the [-ATR] vowels, since they are probably less frequent in occurrence in texts. If tone is also to be marked, a superscript diacritic for both tone and [-ATR] would be difficult to read. In Dinka, a subscript period marks vowel quality; this is also a possibility for Otuho.

d) Although tone has still not been fully analysed, it would seem likely that it should be marked. Marking high tone ('), low tone ('), and possibly the high-low glide ('), should suffice to distinguish otherwise identical words, even though other tones exist.

e) Morphophonemics:

Consonants. It should be possible to write one form, a ‘neutral’ form, of the strong and weak consonants word or stem finally. This has, in fact, been the effect of using a single letter to represent the strong consonant word finally.

Vowels. Where the addition of a suffix triggers a vowel-harmony change, it might be best if the base form of the word were still written, one form for each morpheme being the ideal. However, this would need to be tested thoroughly.

3.2. History of the Otuho Orthography

Present day recommendations concerning the orthography cannot be made without reference to earlier work. It is over 100 years since the first words of Otuho were written; in 1867 Samuel Baker published his book *The Albert N'yanza* in which some Otuho words appeared in a comparison of words from several of the local languages. From this time until the 1920’s, various attempts were made to begin study of the language by British administrators or by Italian missionaries at the Catholic Mission in Torit. Some of the earliest works were as follows:

1870 Emin Pasha - vocabulary and grammatical observations
1901 Bishop Roveggio - vocabulary and phrases

3.2.1. The Rejaf Language Conference, 1928

The foundations for the orthographies of the languages of Southern Sudan were laid at the Rejaf Language Conference of 1928.

The aims of the conference were to draw up a classified list of the languages of Southern Sudan, and discuss their use in education. To this end a significant part of the time was spent in considering the orthographies, for which the goal was a unified system. Otuho was one of the major languages under consideration at the conference, being spoken by 35,000 people at that time, and being chosen as one of the main languages to be used in education.
In his opening statement, the Chairman, Mr. J.G. Matthews, Secretary for Education, Health etc., said that the aim of the conference was not to produce an orthography 'which will be scientifically perfect from the point of view of phonetics, but one which will fulfill the practical needs of the teachers and speakers of the vernaculars.' He admitted that much work had already been done in the preceding 20 years to reduce the languages to writing, but even so, 'by far the biggest portion of this task lay ahead.' With this in mind, he said that they should not hesitate to jettison some of the good work already done for the sake of the larger interests involved.

He continued: 'I think that we would all agree that we must use one letter for one phoneme and employ the Roman characters as the basis of our alphabet. The problem that remains is how to write the phonemes that are not accurately represented by any letter of the Roman alphabet.'

Professor Westermann, of the International Institute of African Languages and Cultures, was asked to give a statement on orthography. He pointed out that it was important to remember that the orthography was primarily for the use of Africans, not Europeans. 'To neglect an essential vowel quality is not making reading or writing easier; it makes it more difficult... The script must be simple, but simplicity does not mean neglecting distinctions felt by the Africans to be important.'

The best way to make up for the lack of symbols, claimed Professor Westermann, was to introduce new ones, and not use diacritics; he referred to the Memorandum on Orthography of the International Institute of African Languages and Cultures, which gave reasons for this choice, and said that his own personal experience confirmed the preference.

He admitted that a common script for all the languages under discussion was necessarily a compromise. But he emphasised that it was important to aim at coming to conclusions that would promise to be permanent; he believed this to be necessary, and quite possible.

A number of general questions were discussed in full session of the conference, after which committees met to consider the orthography of each language. The committee which discussed the Bari and Otuho languages decided upon the following alphabet for Otuho:

\[ a e i o u w y b c d j g k l m n p r s t v x y \]

The letters were to have the same values as in the memorandum of the IAALC, or as recommended by Professor Westermann. Length in either consonants or vowels was to be marked by doubling the letter in question. No note is made of the form this is to take word initially; in later orthographies at least, the consonants here referred to as 'long' are not written as a double letter word initially. Tone was only to be marked where it is necessary to distinguish meaning in otherwise identical words.
In the proposed alphabet there are only five vowels. However, in the summary of alphabets for all the languages at the end of the report of the Conference, Otudo, along with all the other languages, is said to have adopted a further three, e, o, and e. There is no comment on this discrepancy, but it seems likely that the alphabet in the summary is the one finally adopted.

It should also be noted that the phoneme here represented by ⟨x⟩ had previously been written as ⟨h⟩ or ⟨kh⟩.

3.2.2. Italian Research

As has already been noted, much of the early work on the Otudo language was carried out by the Italian fathers. This continued after the Rejaf conference. The most important work of this period was Muratori's Grammatica Lotuko, 1938. Although it was published only 10 years after the Rejaf conference, there are already some differences in the orthography used. In fact, Muratori uses two orthographies, one for the purpose of his grammar, and one for general use.

Fr. Muratori gives examples of ten vowels, although he claims that the 'open' and 'close' /a/ vowels (/a/ and /A/ respectively in this paper) can only be distinguished in minimal pairs. He uses the symbol ⟨$⟩ for the 'close' /A/ in the grammar, but he does not consider it necessary to use it in the orthography for general use; in this orthography, he only distinguishes nine vowels.

Also in the grammar, he distinguishes between 'strong' and 'weak' consonants, doubling ⟨t⟩, ⟨w⟩, ⟨y⟩, ⟨d⟩, ⟨l⟩, ⟨n⟩, ⟨r⟩ and ⟨s⟩ for the 'strong' phonemes. In the orthography for general use, he considers it necessary to double only ⟨t⟩ and ⟨y⟩. Note that the 'strong' consonants are listed as ⟨‘t⟩, etc. This is the form to be used word-initially, while between vowels the consonant letter is simply doubled. The letters ⟨c⟩, ⟨g⟩, ⟨m⟩ and ⟨p⟩ may also be doubled to indicate a stronger articulation, although Muratori does not claim that this represents a different phoneme. These do not have a word-initial form, i.e. they may only occur as a single letter word-initially.

The orthographies are as follows:

For the grammar:

\[ \_
\] a b c d e f g j i x y y k x l m n n y n o c p r s s t s t u u v w w

For general use:

\[ \_
\] a b c d e f g j i i y y k x l m n n y n o c p r s s t s t u u v w
On the subject of the vowels at least there were several schools of thought even within the Italian mission. Later, Fr. Spagnola, while he admitted to the existence of nine vowels, maintained that it was only necessary to use five in the orthography.

Muratori would have liked to introduce the symbol ⟨n⟩ instead of using ⟨ny⟩ since the problems caused by the latter symbol were clear to him.

3.2.3. The Work of the Voluntary Service Group (VSG)

The work of VSG on the Oturo language began in 1952, when Martha Hughell came to Sudan. She learned Oturo at Opari, and after about a year began to do some translation of the New Testament.

By this time, it seems that the orthography used by the Catholic Mission for their Oturo publications employed only five vowels. Further amendments were made to the orthography in consultation with Dr. A. Tucker, in about 1965. Particular attention was paid at this time to the double letters, both consonants and vowels. (No mention was made in earlier orthographies of the fact that vowels were often lengthened, although provision for this occurrence was made at the Rejaif conference.) It was decided that the consonant letters ⟨c⟩, ⟨q⟩, ⟨m⟩ and ⟨p⟩, which are only doubled between vowels in the earlier orthography, should no longer be doubled.

The New Testament was published in 1969 by the United Bible Societies, using the following alphabet:

a b c d e f g h i j k l m n n y o p r s t u w y

The following consonants may be doubled, with a corresponding apostrophe form:

d l n r t w y (‘d, ‘l, etc.)

The palatal nasal ⟨ny⟩ also has a strong form, ⟨nyy⟩. Note that ⟨h⟩ had once again replaced ⟨x⟩ as the velar/glottal fricative.

3.2.4. The Work of SIL/IRL

SIL conducted a language survey in 1974–75 at the invitation of the Southern Regional Ministry of Education. An agreement was signed in January, 1976, with the RHDE, to commence formal education in the Southern Region through initial literacy in the mother tongue and classes in Arabic and English as second languages. The work is carried out as a joint literacy project of the SIL and the IRL. One of the principal aspects of the project is the production of primers and reading material for nine languages selected for use as a medium of instruction in the lower grades.

Oturo was one of the languages selected. Primers have been produced and are being used in the schools. The orthography used in
the primers has, up to now, been essentially the same as that in the New Testament. Due to some uncertainty about the accuracy of the orthography, however, the current research was undertaken before the planned final revision of the primers was to take place in 1983 and 1984.

It would be helpful at this point to draw together the different orthographies which have been used. As can be seen from the following chart, there has been much inconsistency which has made the teaching of reading more difficult than necessary. The orthographies resulting from the Torit conferences are included also.

### Summary of alphabets

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>1 2 3 4 5</th>
<th>6 7 8 9 10 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested Grapheme</td>
<td>a a b c d d e e f g</td>
<td>k h</td>
</tr>
<tr>
<td>Rejaf</td>
<td>a a b c d d e e f g x</td>
<td></td>
</tr>
<tr>
<td>Muratori</td>
<td>a a b c c c c d d e e f u v g g g g g x</td>
<td></td>
</tr>
<tr>
<td>USG</td>
<td>a a b c d d d d d d e e e f g h</td>
<td></td>
</tr>
<tr>
<td>Torit 1982</td>
<td>a a b c d d d d d d e e e f g h</td>
<td></td>
</tr>
<tr>
<td>Torit 1983</td>
<td>a a b c d d d d d d e e e f g h</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Phoneme | 12 13 14 15 16 17 18 19 20 |
|---------|-----------------|-----------------|
| Suggested Grapheme | i i j k l l m n n |
| Rejaf | i i j k l l m n n |
| Muratori | i i j k l l m n n |
| (General use) | USG | i i j jy k l l m n n |
| Torit 1982 | i i j (jy) k l l m n n |
| Torit 1983 | i i j k l l m n n |</p>
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<tr>
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<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
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<td>η</td>
<td>η</td>
<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>Rejaf</td>
<td>ny</td>
<td>η</td>
<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
<td>s</td>
</tr>
<tr>
<td>Muratori</td>
<td>ny</td>
<td>η</td>
<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
<td>r</td>
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<tr>
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<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>Torit '82</td>
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<td>o</td>
<td>p</td>
<td>r</td>
<td>r</td>
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<tr>
<td>Torit '83</td>
<td>nyy/nyi</td>
<td>η</td>
<td>o</td>
<td>o</td>
<td>p</td>
<td>r</td>
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<td>t</td>
<td>u</td>
<td>y</td>
<td>w</td>
</tr>
<tr>
<td>Rejaf</td>
<td>t</td>
<td>t</td>
<td>u</td>
<td>o</td>
<td>w</td>
</tr>
<tr>
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<td>-tt-</td>
<td>t</td>
<td>u</td>
<td>u</td>
<td>w</td>
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<td>t</td>
<td>u</td>
<td>u</td>
<td>w</td>
</tr>
<tr>
<td>Torit '82</td>
<td>-tt- -t</td>
<td>t</td>
<td>u</td>
<td>u</td>
<td>w</td>
</tr>
<tr>
<td>Torit '83</td>
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<td>t</td>
<td>u</td>
<td>u</td>
<td>w</td>
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<th>36</th>
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<tbody>
<tr>
<td>Phoneme</td>
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</tr>
<tr>
<td>Suggested Grapheme</td>
<td>yy</td>
</tr>
<tr>
<td>Rejaf</td>
<td>y</td>
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<td>-yy-</td>
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<tr>
<td>(General use) VSG</td>
<td>-yy-</td>
</tr>
<tr>
<td>Torit '82</td>
<td>-yy- C</td>
</tr>
<tr>
<td>Torit '83</td>
<td>-yy- C</td>
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</table>
3.3. The Torit Orthography Conferences

3.3.1. 1982

During the course of my research carried out under the auspices of the SIL in 1982, it became clear that before further literature could be published in the Otuo language, some agreement had to be reached. It was felt that the main problem was how many vowels should be written. Representatives of the Italian mission, VSG and IRL assembled to discuss the issues involved, at a conference held in November 1982, at the Catholic Mission in Torit. Linguistic and literacy specialists from SIL were also present.

The agenda of the conference was as follows:

**VOWELS**

a) How many different vowels should be written?
b) What, if any, marks should be used if more than five vowels are to be written?
c) Should there be any doubling of vowels?
d) Use of (w) and (y), (ww) and (yy) and their relationship to the vowel system.

**CONSONANTS**

a) How and when should doubled letters be used?
b) Stabilisation of forms of (tt), (dd), etc., (cf, (’t), (t)). Word final weak letters.
c) Does (nyy) need to be written?
d) Possible use of (’t) for final glottal, elision...
e) (f) and (v) case.

**SPELLINGS OF WORDS**

a) Function words: (ottono) ‘the one with’, (li), etc., and (i–), (n–) prefixes.
b) (ny) words.
c) Any other problems.

**ANY OTHER BUSINESS**

a) Tone.
b) Syntactic problems relating to the orthography.

The above agenda was drawn up by Massimino Allam, the Otuo Language Officer, who presided as Chairman of the Conference.

Discussion at the Conference was lengthy, and many different perspectives and opinions were expressed. The significance of some of these will be outlined in section 3.3.3. At this point, there follows a brief summary of the decisions taken at the conference. References to phonemes being written 'as at present' are referring to the VSG orthography used by SIL and IRL in the primers.
Summary of decisions

a) PASSED that nine vowels should be written, corresponding to the four strong vowels: /a/, /i/, /o/, /u/; four weak vowels: /e/, /i/, /o/, /u/; and one neutral: /a/.

b) PASSED that the strong vowels and one neutral vowel be written as at present, ⟨a⟩, ⟨e⟩, ⟨i⟩, ⟨o⟩, ⟨u⟩, and the four weak vowels be written with a 'cap': ⟨è⟩, ⟨ï⟩, ⟨ö⟩, ⟨û⟩.

c) PASSED that the semi-vowels be written as follows:
   Semi-vowels /w/ /y/ weak after consonant ⟨u⟩ ⟨i⟩
   strong after consonant ⟨y⟩ ⟨j⟩
   weak word finally ⟨u⟩ ⟨i⟩
   strong word finally ⟨u⟩ ⟨i⟩
   weak between vowels ⟨w⟩ ⟨y⟩
   strong between vowels ⟨uw⟩ ⟨yy⟩

d) PASSED that neutral consonants (e.g., /s/, /b/) may be written singly or doubled, according to individual preference, since this will settle down in time, especially if and when a dictionary is published.

e) PASSED that the established double letters ⟨lt⟩, ⟨dd⟩, ⟨rr⟩, ⟨ll⟩, ⟨nn⟩ be written as at present, that is, ⟨t⟩ word initially, ⟨tt⟩ word medially, and ⟨t⟩ word finally.

f) PASSED that ⟨ny⟩ and ⟨nyy⟩ be written as at present, ⟨ny⟩ occurring with weak vowels and ⟨nyy⟩ occurring with strong vowels.

g) PASSED that no glottal stop is to be written.

h) PASSED that elision should not be allowed in formal writing.

i) PASSED that only ⟨f⟩ and not ⟨v⟩ be used.

j) PASSED that function words be written as separate words.

k) PASSED that the usual form of the noun is without the prefix. The prefixes may be used: ⟨n–⟩ to specify a feminine or a large version of the object to which the noun refers, ⟨t–⟩ to specify a masculine or a small version of the object to which the noun refers.

l) PASSED that the second person singular pronoun be written as ⟨iywe⟩.

m) PASSED that tone does not need to be marked in Otuho.

n) PASSED that it is not necessary to write a question mark at the beginning of a question.

3.3.2: 1983

At the end of the 1982 Conference, it was agreed that a second conference should be held to discuss the problems again, and the solutions which had been suggested as a result of this conference. In the meantime, those who were directly involved with literacy work were asked to investigate the acceptability of the proposed new orthography. The second conference was held in April, 1983.

The agenda consisted of a discussion of the minutes of the last conference.
Summary of further decisions made at 1983 conference:

a) It was unanimously agreed that it is sometimes necessary to double a vowel letter, to signify a long vowel.
b) PASSED that ⟨j⟩ should not be followed by ⟨y⟩.
c) PASSED that none but the established double consonants are to be doubled (cf. 1982 motion d).
d) PASSED that ⟨ny⟩ and ⟨ny⟩ be written as follows:
   ⟨ny⟩ occurs with weak vowels
   ⟨ny⟩ occurs with strong vowels
   where ⟨ny⟩ is followed by ⟨i⟩, the second ⟨y⟩ is dropped
   (cf. 1982 motion f).
e) PASSED that in some cases a final vowel followed by a glottal stop may be written as a double vowel, if the word concerned may be confused with the word without the final glottal (cf. 1982 motion g).
f) PASSED that ⟨u⟩ should also remain in the orthography, to be used as necessary (cf. 1982 motion i).
g) Rewording of 1982 motion j: PASSED that prepositions such as ⟨li⟩, ⟨to te⟩, ⟨i⟩, ⟨ta⟩, ⟨otto uno⟩ should be written separately.

3.3.3. Comments on the Outcome of the Conferences

Much may be learned from the conferences, in particular from the native speaker reactions to the suggestions concerning the orthography arising from the phonological analysis. It has been demonstrated that there is a double system running through both the consonants and vowels, in that there are pairs of each distinguished principally by the feature which may receive the notation [±STRONG]. In the case of the vowels, this designation was used by native speakers at the 1982 conference; [±STRONG] corresponds to [±ATR] while [−STRONG] corresponds to [−ATR]. (Section 2.2.)

Consonants

The lack of agreement about whether the neutral consonants should be doubled may be explained in terms of the influence of the [±STRONG] feature. It would seem that the underlying awareness of the feature [±STRONG] causes the native speaker to feel that all consonants are part of a pair, one being [±STRONG], the other being [−STRONG]. Where this feature does not exist, agreement cannot be reached on whether or not they are [±STRONG].

Phonetically there does not seem to be any difference between the articulation of words by native speakers who wish to write the neutral consonant as a double letter, and by those who prefer the single letter in that position.

Examples given at the conference in the course of the discussion are as follows:

ässå - 'like this' ässå - 'it has rained' /æsɔ/  
äbor - 'antelope' abbor - 'it has broken' /abɔr/  
[æbɔr]  
össö - 'it is like' össö - 'do it at once' /ɔssɔ/
The words on the far right are the correct phonological transcription of the second members of the pairs. As can be seen, in all cases there is a tone difference between the two words in each pair, and in one case it is the vowel length which contrasts, rather than the consonants. Often, however, a word may be emphasized by a heavier, longer articulation, causing a neutral consonant to sound stronger.

Conversely, it is possible that the language has been in the process of change in the years since Muratori included <ss> in the orthography he used in his grammar and said that occasionally other letters, such as <n> and <c>, could be doubled.

The problems encountered over whether both <f> and <v> should be used, or only one, could also be a result of one of the above processes. It was claimed at the conference that <v> had been found to be a very rare phoneme, occurring in about 4 or 5 words. If the Roman alphabet had not readily supplied two symbols, it seems that the problem would not have arisen. Similarly, the [1STRONG] relationship between /k/ and /h/ has not been recognised until now, because of the use of different symbols. In the case of /t/ and /th/, the symbols ⟨tt⟩ and ⟨t⟩ have been used, thus highlighting the relationship between them.

The decision to continue to write the strong consonants, (except /k/) with an apostrophe word initially instead of in the double letter form, maintains the use of more graphemes than necessary. Apparently, however, it does not present any problem in teaching or for the fluent reader; and, as all native speakers resisted a change, no change was made.

In many cases, the presence of a glottal stop word finally seems to some natives speaker to signify a lengthened vowel. Hence the decision to use this notation in the 1983 conference, although vowel length and vowel plus glottal stop contrast in some words.

**Vowels**

Although it was agreed by most native speakers that there are ten vowels in the system, the distinction between /æ/ and /ʌ/ did not seem sufficiently important to be marked. For native speakers, the difference was easy to hear in the high vowels, and rather more difficult to hear in the mid vowels. The distinction seems to be most important to the native speaker in the high vowels, especially since they correspond to the semivowels, which also display the [1STRONG] feature in the same way as the vowels.

The implications of vowel harmony for the orthography were not discussed, except in that it was decided that all the vowels in the word were to be marked with ^, whereas only one need be marked to show that all the vowels in the word are [1-ATRI]. If only one were to be marked, it should ideally be the first vowel of the root, rather than the prefix. On the other hand, final /y/ is written as ⟨i⟩ and is independent of vowel harmony. Furthermore, the addition of a
suffix often, but not always, changes the vowels in the root to harmonize with it and not all [-ATR] suffixes are changed to [+ATR] following [+ATR] stems. Thus the decision of the conference may be the best solution. If the orthography is consistently phonemic, it will of course write each realization of each morpheme according to its surface structure. For example:

\text{anôôô} \quad \text{string of beads} \quad \text{anoroi} \quad \text{strings of beads}

However, it should be possible to write each morpheme consistently, one form for each morpheme, even though some realizations the vowels will be different in the surface structure. This has not been tested, but the results of such testing would contribute considerably to our understanding of the phonology, as well as to the development of the orthography.

Semivowels, \text{<ny>, and <jy>}

Although intervocally and word finally the two forms of /\text{w}/ and /\text{y}/ are independent of the vowels, and /\text{w}/ contrasts with /\text{w}/ (etc.), the semivowels occurring as the second element of a consonant cluster are entirely conditioned by the vowel which follows. It would therefore be more consistent with the phonology to use one form only in this position. However, native speaker reaction to this indicates that the different realizations of the semivowel, caused by this conditioning, are easily recognized. In the case of the semivowel followed by /\text{a}/ or /\text{A}/, to the native speaker, it is the semivowel itself which provides the contrast; in some cases, between minimal pairs. It seemed, therefore, that the underlying conditioning, in the mind of the native speaker, is the reverse of that which my data lead me to posit.

It was thus very difficult to maintain the position that only one form should be used for the semivowel following a consonant. In fact, in that one symbol \text{<a>} is to be used to cover /\text{a}/ and /\text{A}/, if the semivowel is not marked differently in its different realizations, some minimal pairs will be indistinguishable.

The decision to use /\text{w}/, /\text{û}/, /\text{i}/ and /\text{î}/ reflects the fact that the strong semivowel following a consonant sounds very vocalic, and carries a tone; the weak semivowels, /\text{w}/ and /\text{y}/ could still have been written with a \text{<w>} and \text{<y>}, but the conference preferred the system as presented in the summary. This may indicate that the analysis of the semivowels in this position as consonants is inaccurate, as far as native speaker intuition is concerned.

There is no doubt, however, that the semivowels function as consonants intervocally, and in this position the orthography follows the convention for strong and weak consonants; this also applies to word initial forms. Word finally the conference decided to use vowel symbols; this may cause problems, since conditioning by the vowels does not always apply in this position.

The case of \text{<jy>} and \text{<ny>} caused much discussion and disagreement. The introduction of \text{<jy>} and \text{<ny>} into the VBD
alphabets suggests that in the environment of strong vowels, strong forms of /j/ and /p/ occur. This has been tested, and no contrast is found. The move to eliminate (jy) at the second conference is more consistent with the phonology. However, it is possible that words which were written with (jy), in fact, contain sequences of /j+y/. There is still considerable over-differentiation in writing /p/ in three different ways.

The results of the conferences have therefore been to increase the amount of differentiation in the orthography. Only in the case of /a/ and /A/ and tone does under-differentiation still exist. Over differentiation has been increased in that not only do the strong consonants have several different forms, but now the semivowels in all positions and /p/. In view of the tradition of the Otuho orthography, it may never now be possible to eliminate the surplus forms. It obviously causes little or no problem for the fluent reader, and only means that extra lessons need to be included in the primers.

3.4. Conclusions

It will be clear by this stage that the forces influencing the orthography of Otuho come from various sources. The ideal would be to devise an orthography on the basis of the phonology, with only a cursory glance at the orthographic tradition of Otuho and other southern Sudanese languages. Nevertheless, the Torit conferences; above all, have demonstrated that this is not possible; sociolinguistic factors must be considered. Although literature in the language is not abundant, it is obvious that there is already a tradition, which has sufficiently influenced the native speaker's perception of his own language to make any major changes ill-advised.

Even so, the Otuho orthography is still growing and developing. It is hoped that this current research has been a contribution to that development, and that the discussion begun at the Torit conferences will continue. It is of the utmost importance that the community of Otuho speakers continue to be involved in this way. Although tension exists between the 'folk linguistics' of the native speaker and the analysis of the linguist, native speaker intuition can provide valuable insight for the linguist. But if, in the necessary compromises, some strict phonological accuracy is lost, so be it. The most accurate orthography is valueless if it is not being used in the everyday life of the speakers of the language, and an orthography which is in use can allow some inconsistency.

It is therefore the development of a reading community that is both the means to, and the end of, the development of the Otuho orthography. The more accurate the orthography, the easier it will be for the Otuho speaker to learn to read. The more acceptable the orthography, the more it will be used, providing literature for the newly literate. The task of those concerned is thus to encourage and train writers in the production of literature, and to use this literature in the Otuho community.
NOTES

1 I wish to express my gratitude to Massimino Allam, without whose specialised language help this paper would not have been possible. It is my sincere hope that the results of our research during 1982-83 will be of great help in his work with the Institute of Regional Languages (IRL) on behalf of the Lotuho people.

My thanks should also be recorded to Wanda Pace and to other members of SIL for their valuable suggestions. I should also like to thank Karl Johann Lundstrom of CDP (Communication for Development Programme) for his encouragement and practical assistance in the Otukuri language project, and for his help in reading the Italian of Muratori's Grammatica Lotuxo.

2 The symbols [æ] and [d] appear to be out of place on this chart. There is no obvious symbol for a voiced tongue-blade flap, apart from [z] which I have used for the voiced tongue-tip flap. The symbol /ð/ has been chosen because of the relationship between [d] and [d] which will be shown in the course of the paper.

The symbol suggested by Chapman in his modified IPA chart of symbols (1971:89) for the voiceless alveolar flat fricative is [ɬ]. This has been rejected in view of its complexity, and its failure to reflect the fact that /ɬ/ bears a close relationship to /t/.

[ɬ], which is usually used to signify a palatal stop, is here used to represent the affricate [ʃ].

A dotted line encircling phones indicates that they fluctuate freely with one another.

See section 2.3.4 for a discussion of the palatal nasal.

3 Since ⟨h⟩ has been chosen as the orthographic symbol it is used also in phonemic transcriptions throughout the paper, rather than /x/.

4 Phonetic transcriptions are given only where they differ from the phonemic.

5 Editor's note: since drafting this paper, the author has expressed a preference for interpreting the word final semivowels as vowels. Such an interpretation would eliminate the anomaly of word final contrast between the weak and strong 'consonants' /w/ and /y/ versus /ũ/ and /ũː/ following weak vowels. There are already clear cases of [-ATR] suffixes which do not become [+ATR] following [+ATR] stems. For example:

/wũːmənənWA:/ to fall down

Thus in cases like /õkymanaya/, that is /õkymanay:/ 'wrestling' no additional vowel harmony rules would be required. Furthermore, interpreting the word final semivowels as vowels would probably eliminate the necessity of positing tone glides. Each vowel would
have one level tone. The fact that, with few exceptions, high-low tone glides have been written only on long vowels or sequences of vowel-semivowel supports this analysis also. It would be necessary, however, to posit the occurrence of V syllables in other than word initial position or to posit CVV syllables.

REFERENCES


0. Introduction

This study is a preliminary report on the phonology of the Lokai dialect of Ma’di spoken in Sudan. Ma’di is classified as a Central Sudanic language of the Moru-Ma’di group. Ma’di Lokai is the dominant dialect among the Ma’di of Uganda where the New Testament was translated and literacy materials produced. My study of the sound system of Ma’di Lokai was undertaken because the Ma’di people in Sudan, including those speaking Ma’di Lokai, find it difficult to read the materials written in the dialect of Uganda.1

1. CONSONANTS

1.1. Consonant System

The consonant system of Ma’di Lokai is summarized in the following chart:
The Lokai dialect of Ma'di in Uganda also has the reflexed phonemes /tr/, /dr/, and /ndr/. The Lokai speakers in Sudan do not pronounce with retroflexion the words in which these phonemes occur in the Uganda dialect, but I have heard some of those words pronounced with alveolar rather than dental plosives. However, I have found no contrasts between [t] and [t], [g] and [d], nor [ng] and [nd] and do not, at this stage, consider these alveolar phones to be separate phonemes.²

1.2. Phonetic Descriptions

Phonetic descriptions of the consonant phonemes and examples are given below.

**Labial Consonants**

/p/ [p] voiceless unaspirated bilabial plosive with egressive lung air:

/pá/ [pá] 'foot, leg'
/spe/ [spe] 'clean (fingernails)'

/b/ [b] voiced bilabial plosive with egressive lung air:

/bá/ [bá] 'breast'
/baba/ [baba] 'be ready'

/mb/ [mb] voiced bilabial prenasalized plosive with egressive lung air:
/mba/ [mba] 'keep safe'
/amba-amba/ [amba-amba] 'very much'

/ʔb/ [b̚] voiced bilabial implosive:
/ʔbà/ [b̚à] 'home'
/ʔbī/ [b̚i̯] 'fish'

/m/ [m] voiced bilabial nasal with egressive lung air:
/maa/ [maa] 'I'
/ama/ [ama] 'we'

/f/ [f̚] voiceless labiodental fricative with egressive lung air:
/fe-ka/ [f̚e-ka] 'to fly'
/ʃfʊ/ [ʃfʊ] 'flower'

/v/ [v̚] voiced labiodental fricative with egressive lung air:
/vɔyí/ [vɔyí] 'bamboo house'
/avɔ/ [avɔ] 'after'

/mv/ [mv̚] voiced labiodental prenasalized fricative with egressive lung air:
/mvʊ-kà/ [mvʊ-k̚a] 'to drink'
/ɔmvʊ/ [ɔmvʊ] 'nose'

Dental and Alveolar Consonants

/t/ [t̚] voiceless unaspirated dental plosive with egressive lung air:
/ta/ [t̚a] 'thing'
/átà/ [át̚a] 'father'

/d/ [d̚] voiced dental plosive with egressive lung air:
/dàrā/ [d̚ar̚a] 'wasp'
/àdʊ/ [àdʊ] 'oil'

/nd/ [ŋd̚] voiced dental prenasalized plosive with egressive lung air:
/ndʊ/ [ŋdʊ] 'look for'
/gbándà/ [ɡb̚àŋd̚a] 'wooden stirrer (mufraʃa)'
/\d/ [d] voiced alveolar implosive:
\d\n [di] 'dig'
/g\d\n [g\d\n] 'dura'
/n/ [n] voiced alveolar nasal with egressive lung air:
/\n [\n] 'that'
/\n\n [\n\n] 'snake'
/s/ [s] voiceless grooved alveolar fricative with egressive lung air:
/s\n [s\n] 'four'
/s\n\n [s\n\n] 'vein'
/z/ [z] voiced alveolar grooved fricative with egressive lung air:
/z\n\n [z\n\n] 'under'
/a\n\n [a\n\n] 'roast (in shell)'
/l/ [l] voiced alveolar lateral with egressive lung air:
/l\n [l\n] 'read, count'
/v\n\n [v\n\n] 'flank'
/r/ [\r] voiced alveolar trill with egressive lung air:
/r\n [\r\n] 'body, name'
/s\n\n [s\n\n] 'python'

Palatal Consonants
\c/ [\c\c\c] voiceless palatal affricate with egressive lung air. The tongue is fairly flat for this sound. The tongue blade is touching just behind the alveolar ridge with the tongue tip touching just behind the lower teeth:
\c\c\c\c [\c\c\c\c\c] 'to braid'
/\c\c\c [\c\c\c\c\c\c] 'arrive'

/j/ [\j\j\j] voiced palatal affricate with egressive lung air. The tongue is in the same position as for /\c/.
/j\j\j [j\j\j\j\j] 'wash'
/a\j\j [a\j\j\j\j\j] 'smell'

/n\j/ [n\j\j\j] voiced prenasalized palatal affricate with egressive lung air:
/nju/  [n̥ju]  'suck'
/anjo/  [an̥jo]  'happiness'

/qd'/ [q̥d'] voiced preglottalized palatalized alveolar plosive with egressive lung air:
/qd'a/  [q̥d'a]  'shake'
/qd'a/  [q̥d'a]  'knee'

/p/  [p̥] voiced palatal nasal with egressive lung air.
/pa/  [pa]  'eat'
/ap̥a/  [apa]  'bitter'

/y/  [y̥] voiced palatal semivowel with egressive lung air:
/yu-ka/  [yu-ka]  'to warm'
/kayata/  [kàyata]  'sweet potato'

Velar Consonants

/k/  [k̥] voiceless unaspirated velar plosive with egressive lung air:
/k̥k̥/  [k̥k̥]  'soon'
/ö̊k̥/  [ö̊k̥]  'tortoise'

/g/  [g̥] voiced velar plosive with egressive lung air:
/ga/  [ga]  'chop'
/ga/  [ga]  'chest'

/ng/  [ŋg̥] voiced prenasalized velar plosive with egressive lung air:
/nga/  [ŋga]  'time'
/kilinga/  [kilinga]  'species of plant'

Labiovelar Consonants

/kp/  [kp̥] voiceless labiovelar plosive with egressive lung air:
/kp̥p̥/  [kp̥p̥]  'all'
/kp̥p̥/  [kp̥p̥]  'stiff (hide)'

/gb/  [gb̥] voiced labiovelar plosive with egressive lung air:
/gb̥b̥åp̥/  [gb̥b̥åp̥]  'cassava'
/egb̥u-ka/  [egb̥u-ka]  'to bark'
/ŋmb/ [ŋmb] voiced prenasalized labiovelar plosive with egressive lung air:

'/ŋmbă-kă/ [ŋmbă-kă] 'open'
'/fyongbi/ [fyongbi] 'heel'

'/?w/ [ʔw] voiced preglottalized labiovelar semivowel with egressive lung air:

'/ʔaʔwı/ [ʔaʔwı] 'dry'.
(I have no example of word initial /ʔw/.)

'/w/ [w] voiced labiovelar semivowel with egressive lung air:

'/wålú/ [wålú] 'crane'
'/ułuwe/ [ułuwe] 'scar from wound'

Glottal Consonants

'/ʔ/ [ʔ] glottal plosive:

'/ʔaʔı/ [ʔaʔı] 'believe'

'/h/ [h] voiceless glottal fricative with egressive lung air. There is only one example to date of /h/, in a word based on an ideophone:

'/gbəɾ connect/ [gbəɾ connect] 'windpipe'
(lit. 'throat breath')

Labialization

In Ma'di Lokai there is contrastive labialization of the following consonants: /m/, /ɡ/, /t/, /d/, /nd/, /k/, /ɡ/, and /ŋ/. These labialized phones are tentatively interpreted as /ɔw/. Examples:

'/mwa/ /mwa/ [mwa] 'become rotten'
'/ɡbwa/ /ɡbwa/ [ɡbwa] 'pluck (many things)'
'/twa do/ /twa do/ [twa do] 'completely'
'/aɡwa/ /aɡwa/ [aɡwa] 'maternal uncle'
'/ndwe/ /ndwe/ [ndwe] 'west'
'/kwa/ /kwa/ [kwa] 'bone'
'/ɡwa/ /ɡwa/ [ɡwa] 'blue duiker'
'/ŋwa/ /ŋwa/ [ŋwa] 'where?'
Palatalization

The only example of palatalization in my data is [kʰe] 'third person pronoun'. It is tentatively interpreted as a sequence of /k/ plus /y/.

1.3. Consonant Contrasts

Contrasts between labial consonants and labiovelar consonants and labials plus /w/:

/pá/  'foot, leg' /kpa-ka/  'to become sour'
/bá/  'breast' /gba/  'people'
/mba-ka/  'to keep safe' /mmba-ka/  'to beat (with stick)'
/ba/  'home' /wa-ka/  'to paint, plaster'
/maa/  'l' /gmba-ka/  'to pluck (many things)'
/ua-ka/  'to dig (with claws)'
/mwa-ka/  'to throw (down)' /mwa-ka/  'to become rotten'

Since /f/ and /w/ are rare, good contrasts were not found for these phonemes with all other labial consonants. However, the following contrasts were found:

/s̪̃i/:

/s̪i-ka/  'turn over /s̪i-ka/  'twist'
(soil)'

/vi-ka/  'to throw' /bi-ka/  'to mold (clay)'
/gbvi-ka/  'to weave' /gbv/  'hair, feather'

/ʃ̃i/:

/ʃ̃i-ka/  'to dry' /ʃ̃i-bi/  'buttocks'
/ʃu ʃvi-ka/  'to turn around' /ʃu ʃbi/  'fish'
/ʃbi-ka/  'to fetch (water)'

/äi/:

/äi-ka/  'dry' /äbi/  'grandfather'

/aw̃i ka/  'to open'

Contrasts between alveolar consonants and palatal consonants, and between alveolars plus /w/:

/ʃ̃a/:

/ʃa/  'thing' /ʃa-ka/  'to braid'
/da-ka/  'to die' /ʃakalora/  'species of vegetable'
/na-ka/ 'to dodge' /pa-ka/ 'to eat'
/sa/ 'also' /nja/ 'big'
/la-ka/ 'to read' /d'ya-ka/ 'to shake'
/ra-ka/ 'to think' /ya/ (Interrogative marker)
/twa do/ 'completely'

/ni/
/ti-ka/ 'to give birth' /ti-ka/ 'pluck (fruit)'
/di-ka/ 'to hit' /pi/ 'you (sg.)'
/ʔdi-ka/ 'to dig, kill' /si/ 'kill'
/nj-ka/ 'to know' /n-ka/ 'to wipe'
/si-ka/ 'to pound in mortar' /s-ka/ 'to sit'
/li-ka/ 'to cut' /c-ka/ 'to bite'
/nji-ka/ 'to carry'

/a a/
/ata/ 'father' /aja/ 'pressed together'
/aanda/ 'to correct, straighten' /ʔaʔa/ 'knee'
/aza-ka/ 'to roast' /adw/ 'maternal uncle'
/arə/ 'python'

/a i/
/ati-ka/ 'to put (log) against tree' /an/ 'charcoal piece'
/andi/ 'father of wife' /asi-ka/ 'to split'
/asi-ka/ 'to roast (coffee)' /ari-ka/ 'to save'
/azi-ka/ 'to sell' /ac/ 'fire'
/aali/ 'deep' /ayt/ 'bush'
/ac/ 'journey' /apt/ 'you (pl.)'
/aji/ 'smell'
/i/ /i/ (water) well/ /iz/ woman
/id/ paste/ /i/ knife
/in/ snake/ /iri/ tilled soil

Contrasts between velar, labiovelar, and glottal consonants are given below.

/\a/
/ka/ ripen/ /kpa-ka/ to become sour
/ga-ka/ chop/ /gba do/ truly
/nga-ka/ get up/ /ngmga-ka/ to beat (with stick)
/kwa/ bone/ /\a-ka/ to breathe
/gwa-ka/ to suffer from hunger
/ngwa/ son of

/o/ /o/
/\k\u-ka/ to finish/ /\k\p\o/ stiff (hide)
/\g\j\u/ liver/ /\g\a\\a\c\h/ windpipe
/\k\u-ka/ to cry

/\u/
/\u\u\u-ka/ to dry/ /\k\u-ka/ to enter

2. VOWELS

2.1. Vowel System

Ma'di has nine vowels. These vowels can be categorized according to tongue root position. Four of the vowels, /i/, /e/, /o/ and /u/, are pronounced with the tongue root advanced [+ATR]. The remaining five vowels are pronounced without advancement of the tongue root [-ATR]. They are /i/, /e/, /a/, /o/, and /u/. (See section 2.4 for the vowel harmony cooccurrence restrictions within a word.)

2.2. Phonetic Descriptions

Phonetic descriptions of the vowels are given below.

/i/ (i) high front vowel with egressive lung air and advanced tongue root:

/in/ /\i\n/ 'snake'
/i/ [ɪ] high front vowel with egressive lung air and retracted tongue root:

/ɪrɪ/ [ɪʔɪ] 'tilled soil'

/e/ [ɛ] mid front vowel with egressive lung air and advanced tongue root:

/ɛʔbí/ [ɛ́bí] 'fish'
/ɛˈɛ/ [ɛˈɛ] 'egg'

/e/ [ɛ] mid front vowel with egressive lung air and retracted tongue root:

/ɛkpa/ [ɛkpa] 'large'
/ɛzɛ/ [ɛzɛ] 'under'

/a/ [a] low central vowel with egressive lung air and retracted tongue root in free fluctuation with [ɛ], a mid central vowel, in the environment of high [+ATR] vowels /i/ and /u/.

/ti-ka/ [t̚i-ka] 'to give birth'
/mu-ka/ [mu-ka] 'to drink'
/aza-ka/ [aza-ka] 'to roast in shell'

/u/ [u] high back rounded vowel with egressive lung air and advanced tongue root:

/vulú/ [vulú] 'flank'
/su/ [su] 'four'

/v/ [v] high back rounded vowel with egressive lung air and retracted tongue root:

/ùbá/ [ùbá] 'jackal'
/àdú/ [àdú] 'oil'

/o/ [o] mid back rounded vowel with egressive lung air and retracted tongue root:

/ósù/ [ósù] 'bow'
/ódó/ [ódó] 'colobus monkey'

/u/ [u] low back rounded vowel with egressive lung air and retracted tongue root:

/ùbù/ [ùbù] 'flower'
/kókó/ [kókó] 'soon'
In addition Ma'di Lokai vowels are nasalized immediately following the nasal consonants /m/, /n/, and /ŋ/.

/maa/ [məɡ] '1'
/pə-ka/ [pə-kə] 'to eat'
/nə/ [nə] 'that'

2.3. Vowel Contrasts

Eight of the nine vowel phonemes contrast in the same environment:

/ti-ka/ 'to give birth' /ta/ 'thing'
/ti-ka/ 'to pluck fruit' /tu-ka/ 'to climb'
/te-ka/ 'to wait for' /to-ka/ 'to stomp'
/tə-ka/ 'to swallow' /tə/ 'also'

The back vowel phonemes also contrast in the same environment:

/okə/ 'women' /skə/ 'caught'
/økə/ 'tortoise' /eko/ 'pulled'

2.4. Vowel Harmony

Vowel harmony in Ma'di Lokai operates -- according to data gathered to date -- not as morphophonemic changes of vowels but as cooccurrence restrictions on the vowels within the word. The four vowels with the advanced tongue root quality, /i/, /e/, /o/ and /u/, belong to the [+ATR] set. The four vowels, /I/, /ɛ/, /u/ and /ɔ/, belong to the [-ATR] set and never cooccur in the same word with the advanced tongue root vowels. The remaining vowel, /a/, can occur with vowels of either set. This results in the following two sets of vowels:

+ATR /i, e, u, o, a/
-ATR /I, ɛ, u, ɔ, a/

The following examples illustrate the possible vowel combinations. The first column has vowels from the [+ATR] set, and the second column has vowels from the [-ATR] set.

/itó/ 'sun' /bilɔ/ 'sheep'
/ɛ?bī/ 'fish' /IPA/ 'earth'
/adupi/ 'brother' /?e?u-ka/ 'to dry'
There are three level tones; high, mid, and low.

/ti/ "cow"  /tI/ "give birth"  /tI/ "mouth"

There are also downglides and upglides on phonetically long vowels.4

4. CANONICAL PATTERNS

Words can have from one to four syllables. All syllables in Ma'di Lokai are open. Unambiguous patterns are: V and CV. Labialized consonants and [k̂] are tentatively interpreted as consonant plus semivowel in syllable initial position so that CV/V syllables are also posited.

The only vowel clusters in my data involve /I/ and /a/:

/a/ /aI/ [aI]  'variety of cassava'

These examples are tentatively interpreted as being two syllable words, i.e. CVV is also tentatively posited as a syllable type.

5. DIALECT DIFFERENCES

The two Ma'di men who worked with me were able to supply words in both the Lokai and 'Burulu dialects. For most words the two dialects have either the same words or close cognates. In the data, there are about eight words that are significantly different.

Ma'di 'Burulu has the phonemes /p/ and /η/ which correspond to /p/ in Ma'di Lokai. That is, for any word with /p/ in Ma'di Lokai, 'Burulu has either /p/ or /η/.

Lokai  'Burulu
/pa-ka/  'eat'  /pa-ka/  'eat'
/a/  'anger'  /a/  'anger'

Some words with /s/ in Ma'di Lokai have /c/ in 'Burulu and vice versa:
Lokai "Burulc
/cl-ka/ 'to bite' /si-ka/ 'to bite'
/so-ka/ 'to pour' /co-ka/ 'to pour'

Some words with /z/ in Lokai have /jw/ in 'Burulc. Similarly, consonant plus /w/ occurs in 'Burulc in some words where the Lokai cognate omits either the /w/ or the consonant.

Lokai 'Burulc
/o-wa-ka/ 'to cry' /ojwa-ka/ 'to cry'
(of buffalo)
/kΩKo/ 'soon' /kvkw/ 'soon'
/sa-ka/ 'clean (teeth)' /swa-ka/ 'clean (teeth)'

Sometimes there is a vowel change between the two dialects:

Lokai 'Burulc
/ko/ 'man' /ko/ 'man'
/si-ka/ 'turn over soil' /se-ka/ 'turn over soil'

Sometimes occurrences of /j/ in Lokai correspond to [g̩] in 'Burulc.
/ji/ 'rhinoceros' /gi̯gi/ 'rhinoceros'
/je-ka/ 'to buy' /ge-ka/ 'to buy'

Sometimes an initial /l/ is found in 'Burulc in words that begin with a vowel in Lokai.
/lowi-ka/ 'peel (cassava)' /luwi-ka/ 'peel (cassava)'
/ass-ka/ 'split' /latwi-ka/ 'split'

Other cognates differ by tone but are not included, since tone has not been adequately studied.

6. ORTHOGRAPHY SUGGESTIONS

Standard symbols can be used for most of the consonants. As in the Ma'di New Testament, implosives and preglottalized sounds can be indicated by apostrophes plus the letter. Apostrophe can also be used for glottal stop. 6

"b" for /?b/: 'ba' 'home'
"d" for /?d/: 'di' 'dig'
"j" for /?d̪/: 'ja' 'shake'
"w" for /?w/: 'awu' 'dry'
"u" for /?u/: 'a'u or (a'u) 'chicken'
Initial glottal stop on words having glottal stop as the second consonant may not need to be marked.

Prenasalized plosives or fricatives can be written with digraphs or trigraphs. <mgb> rather than <ngb> is suggested for /mgb/ since the /m/ is more pronounced than the /ŋ/.

<mgb> for /mgb/ 'beat'
<ng> for /ng/ 'time'

The letter <w> is used after a consonant to indicate labialization, i.e. consonant plus /w/.

Palatal nasal can be written as <ny>.

<n> for /n/ 'eat'

For vowels, two alternatives are suggested:

1) Put a dot under +ATR vowels.

Phonemes: i iy e e a a u u o o
Graphemes: i iy e e a a y y u u o o

2) Put a colon in front of words with +ATR vowels.

<:vúló> 'flank'

Tone should be marked: high (')
mid (" or '")
low ('"

<table>
<thead>
<tr>
<th>Tone</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>&lt;jó&gt; 'house'</td>
</tr>
<tr>
<td>mid</td>
<td>&lt;zô&gt; or &lt;zó&gt; 'root'</td>
</tr>
<tr>
<td>low</td>
<td>&lt;bá&gt; 'breast'</td>
</tr>
</tbody>
</table>

NOTES

1This report is based on data collected March 1-13, 1982 and also March 15-30, 1985 in Juba, Sudan. Because of the short time devoted to field work all conclusions are necessarily tentative.

2Torben Andersen (private communication) reports contrasts between the dental and alveolar plosives.

3Ma'di 'Burullu also has [g'] (See section 5).

4I did not have time to investigate vowel length. There might be contrastive vowel length in Ma'di Lokal.

5Orthographic suggestions are enclosed in angle brackets.
A PRELIMINARY PHONOLOGICAL OVERVIEW OF BANDE-TANGBAGO

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Summer Institute of Linguistics

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0. INTRODUCTION

The Banda people live mostly in the Central African Republic (CAR), but a good number of them have been living in Sudan now for several decades. In Sudan they are concentrated in the Raga area of Bahr al Ghazal Province. The total number of Banda speakers has been estimated to be around 400,000 (Cloarec-Heiss 1975:11) with maybe 10,000 in Sudan.

Greenberg classifies Banda in the eastern branch of the Adamawa-Eastern language family (1970:9). Banda includes numerous dialects, some of which are mutually unintelligible. There are eleven main dialects represented in Sudan.

The most recent work on Banda has been done on the Linda dialect (Cloarec-Heiss: 1969 etc.). The aim of this paper is to sketch the phonology of the Tangbago dialect, which seems to be one of the largest in Sudan, and is also a major dialect in CAR. Data for this paper were gathered between October 1981 and March 1983 in the Sudanese town of Sopo, which is predominantly Banda. All eleven of the Banda dialects in Sudan are represented in Sopo, which has a population of about 4,000.

1. CONSONANTS

1.1. Inventory

Banda-Tangbago has 33 consonants, listed in chart 1. At one point in the study, a consonant count from the lexical file showed the following order of frequency, from most common to most rare: /k, k/, t, /k/, d, /g/, y, m, b, w, /d/, s, n, /g/, /p/, /p/, /t/, /t/, /k/, /k/, /l/, /l/, v, /v/, /v/, /v/, /v/, /v/, /v/.

Word-initial contrasts are shown in chart 2, and word-medial contrasts in chart 3.

<table>
<thead>
<tr>
<th>Stop</th>
<th>Labial</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Labio-velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>voiceless</td>
<td>p</td>
<td>t</td>
<td>c</td>
<td>k</td>
<td>kp</td>
<td>?</td>
</tr>
<tr>
<td>voiced</td>
<td>b</td>
<td>d</td>
<td>j</td>
<td>g</td>
<td>gb</td>
<td></td>
</tr>
<tr>
<td>prenasalized</td>
<td>m</td>
<td>n</td>
<td>y</td>
<td>ng</td>
<td>ng</td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>voiceless</td>
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<td>s</td>
<td>s</td>
<td>h</td>
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</tr>
<tr>
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<td>y</td>
<td>z</td>
<td>z</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prenasalized</td>
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<td>ñ</td>
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</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td>ñ</td>
<td></td>
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<td>Liquid</td>
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<tr>
<td>lateral</td>
<td>l</td>
<td></td>
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<tr>
<td>flap</td>
<td>ñ</td>
<td>ñ</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Approximant</td>
<td>y</td>
<td>w</td>
<td></td>
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CHART 1. Consonant Phonemes
<table>
<thead>
<tr>
<th>pākā</th>
<th>tāmā</th>
<th>ča</th>
<th>kāgā</th>
<th>Kpātā</th>
<th>Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>'wildcat'</td>
<td>'shoe'</td>
<td>'resemble'</td>
<td>'rock'</td>
<td>'stew'</td>
<td>'open'</td>
</tr>
<tr>
<td>bādā</td>
<td>dāmbā</td>
<td>Jámā</td>
<td>gālā</td>
<td>gālā</td>
<td>gālā</td>
</tr>
<tr>
<td>'ground'</td>
<td>'tail'</td>
<td>'green'</td>
<td>'year'</td>
<td>'wheel'</td>
<td>'wheel'</td>
</tr>
<tr>
<td>squirel'</td>
<td>'monkey'</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>gābā</td>
<td>gāmbē</td>
<td>Tāmā</td>
<td>gāpō</td>
<td>gāpō</td>
<td>Ṣbāgru</td>
</tr>
<tr>
<td>'stool'</td>
<td>'rabbit'</td>
<td>'gap'</td>
<td>'monk'</td>
<td>'dry season'</td>
<td></td>
</tr>
<tr>
<td>fāgū</td>
<td>sābā</td>
<td>Ša</td>
<td>hāwū</td>
<td>hāwū</td>
<td>hāwū</td>
</tr>
<tr>
<td>'gruel'</td>
<td>'Sudan'</td>
<td>'turn aside'</td>
<td></td>
<td>'in vain'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Šu</td>
<td></td>
<td></td>
<td>Šu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>'be bitter'</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>vāné</td>
<td>za</td>
<td>xu</td>
<td>Ŝu</td>
<td>Ŝu</td>
<td>Ŝu</td>
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<td>'give'</td>
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<td>'burn'</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>'birth'</td>
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<tr>
<td>vā</td>
<td>vāgoa</td>
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<tr>
<td>'apart'</td>
<td>'jackal'</td>
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<tr>
<td>mā'ǔdā</td>
<td>ma</td>
<td>ũkākā</td>
<td></td>
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</tr>
<tr>
<td>'door'</td>
<td>'go'</td>
<td>'disobedience'</td>
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<tr>
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</tr>
<tr>
<td>lāsū</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>vā</td>
<td>rājā</td>
<td></td>
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</tr>
<tr>
<td>'fight'</td>
<td>'Raja'</td>
<td></td>
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</tr>
<tr>
<td>yāgā</td>
<td>Wāsā</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>'roan antelope'</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>'tamarind'</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**CHART 2. Word-initial Contrasts of Consonant Phonemes**

In addition to the contrasts shown in the chart, word-initial /h/ contrasts with its absence: /hājone/ 'long ago'; /jə/ 'sleep'. Word-initial /ʔ/ also contrasts with its absence: /ʔwə/ 'we (excl. will...'); /ə/ 'not'.
<table>
<thead>
<tr>
<th>Word</th>
<th>Phoneme</th>
<th>Word</th>
<th>Phoneme</th>
<th>Word</th>
<th>Phoneme</th>
</tr>
</thead>
<tbody>
<tr>
<td>'wildcats'</td>
<td>'báta'</td>
<td>'fast'</td>
<td>'káča'</td>
<td>'remainder'</td>
<td>'dákpa'</td>
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<td>'báda'</td>
<td>'wheel'</td>
<td>'gbájá'</td>
<td>'rock'</td>
<td>'ágba'</td>
</tr>
<tr>
<td>'porridge'</td>
<td>'gbáfa'</td>
<td>'boat'</td>
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<td>'boat'</td>
<td></td>
</tr>
<tr>
<td>'squirrel'</td>
<td>'kámba'</td>
<td>'boat'</td>
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<td>'boat'</td>
<td></td>
</tr>
<tr>
<td>'knife'</td>
<td>'kásá'</td>
<td>'friend'</td>
<td>'bóga'</td>
<td>'friend'</td>
<td>'ámgbá'</td>
</tr>
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<td>'house'</td>
<td>'kásá'</td>
<td>'club'</td>
<td></td>
<td>'club'</td>
<td></td>
</tr>
<tr>
<td>'cooking'</td>
<td>'kásá'</td>
<td>'club'</td>
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<td>'club'</td>
<td></td>
</tr>
<tr>
<td>'tamarind'</td>
<td>'kásá'</td>
<td>'club'</td>
<td></td>
<td>'club'</td>
<td></td>
</tr>
<tr>
<td>'wok'</td>
<td>'kásá'</td>
<td>'club'</td>
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<td>'club'</td>
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<tr>
<td>'bullfrog'</td>
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<tr>
<td>'ant species'</td>
<td>'December'</td>
<td>'burning'</td>
<td>'bózú'</td>
<td>'December'</td>
<td>'burning'</td>
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<td>'December'</td>
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<td>'burning'</td>
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<td>'bózú'</td>
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<td>'burning'</td>
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<td>'burning'</td>
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<td>'mouth'</td>
<td>'ána'</td>
<td>'hand'</td>
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<td>'hand'</td>
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<tr>
<td>'year'</td>
<td>'galá'</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>'wall plate'</td>
<td>'gap'</td>
<td>'path'</td>
<td>'áwá'</td>
<td>'path'</td>
<td></td>
</tr>
<tr>
<td>'gap'</td>
<td>'áwá'</td>
<td>'path'</td>
<td></td>
<td>'path'</td>
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</tr>
<tr>
<td>'fighting'</td>
<td>'áwá'</td>
<td>'path'</td>
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</tr>
<tr>
<td>'name'</td>
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</tr>
<tr>
<td>'birds'</td>
<td>'áwá'</td>
<td>'path'</td>
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<td>'path'</td>
<td></td>
</tr>
<tr>
<td>'rope'</td>
<td>'áwá'</td>
<td>'path'</td>
<td></td>
<td>'path'</td>
<td></td>
</tr>
</tbody>
</table>

CHART 3. Word-medial Contrasts of Consonant Phonemes

Note: /á/ does not occur word medially in my data
1.2. Description

There are six contrastive points of articulation: labial, alveolar, palatal, velar, labiovelar, and glottal.

Etically, the labials are divided into bilabials and labiodentals, depending on the manner of articulation (see below): the nasal and the stops are bilabial, and the flap and the fricatives are labiodental.

Similarly, the palatales are etically divided into the alveopalatal stops and fricatives, and the palatal approximant. The palatal stops are affricated.

There are five basic manners of articulation. However, the stops and the fricatives are each emically divided into three groups according to voicing and prenasalization, and the liquids are divided into two groups (lateral and flap). This gives a total of ten manners of articulation.

The voiceless stops (except /ʔ/) are aspirated in careful speech, but in fast speech the aspiration is often lost, and they become quite lenis, and may even gain some voicing.

The etic realization of /d/ varies freely between [nd] and [nt] except in utterance-initial position. The etic realization of /ɡ/ varies freely between [nɡ] and [ŋ].

/ɛ/ is normally retroflexed [l], but some speakers, perhaps due to Arabic influence, pronounce it as an unretroflexed [l]. /ʃ/ can be either flapped or trilled, depending on the individual speaker.

The velar stops are labialized before high and mid back vowels:

/ægʊ/ [e'gwo] 'land'
/ækʊ/ [e'kwu] 'sore'

The labiovelar stops are palatalized before front vowels:

/kəli/ [k'yli] 'to be sour'
/kᵠₐŋbe/ [ndɔ'ŋbye] 'rabbit'

The approximants are generally weakly articulated.

1.3. Distribution in the Word

In a CVCV-type stem, there are no restrictions on consonant co-occurrence within the word. For both consonants to be identical, however, is relatively rare, and when they are, the vowels are usually identical, too; e.g.:

/ʃɛʃa/ 'to confuse'
/ʃiʃi/ 'species of plant'

The only exception to this found to date is /kako/ 'leaf'.

In stems of three or more syllables, if two contiguous syllables contain identical consonants, the vowels of those syllables are always identical; e.g.:

/kɔpʃiʃi/ 'January'
/ʃiʃiʃi/ 'straight'
/ʃeʃaʃa/ 'to finger'
2. VOWELS

2.1. Inventory

Tangbaro has ten vowels; these are listed in chart 4 and contrasted in chart 5.

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Central</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td>a</td>
<td>o</td>
</tr>
<tr>
<td>Low simple</td>
<td>a</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>glided</td>
<td>a</td>
<td>o a</td>
<td></td>
</tr>
</tbody>
</table>

CHART 4. Vowel Phonemes

<table>
<thead>
<tr>
<th></th>
<th>ki</th>
<th>ki</th>
<th>ku</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>'sharp'</td>
<td>'cry'</td>
<td>'spit'</td>
</tr>
<tr>
<td>?i</td>
<td>'tie'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke</td>
<td>ko</td>
<td>ko</td>
<td></td>
</tr>
<tr>
<td>?e</td>
<td>'shave'</td>
<td>'be'</td>
<td>'take'</td>
</tr>
<tr>
<td>'call'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ka</td>
<td>ko</td>
<td>ko</td>
<td></td>
</tr>
<tr>
<td>?a</td>
<td>'stop'</td>
<td>'return'</td>
<td>'open'</td>
</tr>
<tr>
<td>?ga</td>
<td>ák?á</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g?a</td>
<td>'species of fish'</td>
<td>g?a</td>
<td>'grasp'</td>
</tr>
<tr>
<td>'stir'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CHART 5. Vowel Contrasts

The glides (diphthongs) are comparatively rare. Perhaps they are a vestige of a previous tongue root phenomenon. Their phonemic status was questionable at first, due to the possibility that they might be vowel clusters or even vowel-approximant-vowel (VSV) sequences /eya/ and /owa/. This latter possibility was attractive due to the fact that the approximants are generally weakly articulated. Contrast is shown, however, by /m?u/ 'to be soft', and /méya/ 'tree parasite'. Such clear examples are rare, but several other facts also support the interpretation of phonetic vowel clusters as diphthongs:
1. Speakers who will break words down into syllables will not break up the diphthongs.

2. When whistled, the timing of a syllable containing a diphthong, although slightly longer than a syllable containing a simple vowel, is shorter than a two-syllable sequence, even if the second syllable begins with an approximant.

3. Whereas all nine possible tone sequences contrast in /VSV/ sequences, in diphthongs they do not. In diphthongs neither high-mid nor mid-low tone sequences contrast with high-low. Nor do low-mid nor mid-high tone sequences contrast with low-high. Thus, these diphthongs carry only five tone sequences, which correspond to the five erotic tones (cf. section 3.1).

4. The second element of the diphthong always receives more prominence than the first, whereas in VSV sequences, the particular tone pattern determines which vowel receives prominence.

5. Between dialects, all of which have these diphthongs, sometimes a word will differ only by a vowel; e.g., 'to send' in Tangbago is /əwə/; in some other dialects it is /əwə/. 'To see' in Tangbago is /wu/; in some other dialects it is /wi/. This kind of interdialectal alternation occurs between simple vowels and diphthongs, too: In Tangbago, 'to return' is /əwə/; in some other dialects it is /kəa/. 'Grimm's Duiker' in Tangbago is /kpalə/; in some other dialects it is /kpalə/. There are no unambiguous examples, however, of cognates losing or adding syllables between dialects.

6. Banda has only one-, two-, and three-syllable verbs. There are no univalent four- and five-syllable verbs. Therefore, /baʃənə/ 'to make mud' must be only three syllables, so that the phonetic vowel clusters should be interpreted as diphthongs.

7. When a verb reduplicates, it reduplicates only the first syllable; e.g., /ga/ 'to be good' reduplicates as /gəgə/; /təmu/ 'to wipe', as /tutumə/; /kəfəta/ 'to jump down', as /kukəfəta/. /gəa/ 'to grasp' reduplicates as /gəagəa/. Therefore, it must be a one-syllable verb, and the phonetic vowel clusters should be considered as diphthongs.

Cloarec-Heiss has four diphthongs for Banda-Linda: /əa/, /oə/, /æ/, /ia/. The last two of these are not found in Tangbago.

2.2. Description

/ə/ is a high, front, unrounded vowel, varying freely between close [i] and open [I].

/e/ is a mid, front, unrounded vowel, varying freely between close [e] and open [e]. Before nasals and prenasalized stops it varies between [I] and [ɛ]: /mɛnə/ [mɛna] ‘species of turtle’.

/ə/ is a low, front, glided vowel, gliding from a front, mid, unrounded position to a low, central, unrounded position, the latter being the more prominent: [ɛ].

/æ/ is a low, central, unrounded vowel, varying freely between open [a] and close [ɪ]. Following /gə/, /gə, y/ it is realized as a low, front, open [a] or close [æ], which closely approximates the open variant of /ə/:

/gəbi/ [gəbi] 'bone'
/mgəvi/ [mgəvi] 'green'
/yənu/ [yənu] 'bird'
/a/ is a mid, central, unrounded vowel. Etically it is very prone to approximating the quality of surrounding vowels in the word, or it may be glided. This is especially true when it occurs word initially:

/æpi/ [æ<pi] or [æɔpi] 'beer'
/ælɛ/ [ælɛ] or [æɔlɛ] 'fruit'
/æku/ [æɔku] or [æɔku] 'sore'
/æmɪ/ [æɔmi] or [æɔmi] 'crocodile'
/ægɔ/ [æɔgɔ] or [æɔgɔ] 'hunger'

Otherwise, /a/ varies between close [a] and open [ʌ]:

/ ámba/ [ ámba] ~ [ ámba] 'you (singular)'

/a/ is a high, central, unrounded vowel, normally varying between a close [i] and an open [ɪ], but occasionally backed to [ɨ] when emphasized.
/a/ is a high, back, rounded vowel, varying freely between close [u] and open [ʊ]. Following palatals, it is fronted:

/ɔkʊ/ [ɔku] 'bitter'
/ɛɨ/ [ɛɨ] 'to die'

/o/ is a mid, back, rounded vowel, varying freely between close [o] and open [ŋ]. In weak syllables it is realized as [ə], and before nasals and prenasalized stops it varies between [ʊ] and [o]:

/akɔpə/ [akɔpə] 'peanuts'
/kɔŋŋa/ [kɔŋŋa] ~ [kɔŋŋa] 'mat'

/ɔ/ is a low, back, rounded vowel, varying between close [ɔ] and open [o].
/ə/ is a low, back, glided vowel, gliding from a back, mid, rounded position to a low, central, unrounded position, the latter being the more prominent: [ə].

The open variant of /i/ closely approximates the close variant of /æ/.

The same is true for the corresponding variants of /u/ and /o/ and also /o/ and /ɔ/.

2.3. Distribution

2.3.1. In the Syllable

/i/ and /e/ never occur following /s, z, ŋz/, except in loan words; e.g. /sɪtə/ 'seven' (from Arabic).
/i/ and /a/ never occur following /s, z, ŋ, j, ŋj/.
Only /a/ and /a/ occur in a V syllable.

2.3.2. In the Word

/a/ never occurs in a V syllable (word initially) if the word-final vowel is low (simple or glided).

In word stems, the occurrence of front vowels and back vowels in contiguous syllables is relatively infrequent. For example, at one point in
the study, front and back vowels co-occurred in only 18 (6.8%) of the 264 CVCV words filed in the lexicon.

CVCV words tend to contain identical vowels. Of the 264 words, 124 (47%) contained identical vowels. Of these 124, in 46 (37%) the vowels were /a/. This was 17% of the total 264, making CaCa the most common CVCV word shape.

If the first vowel of a CVCV word is /ɔ/, the second one is always identical, with one exception: /kɔbɔ/ 'sibling or parallel cousin of the opposite sex'.

Also, in word stems, only /ɛ/, /æ/, /a/, and /o/ can occur in weak syllables (see 4.2) if the vowel of the strong syllable is /a/ or /ɔ/. If the vowel of the strong syllable is /ɔ/, however, only /o/ can occur in the weak syllable. My data do not reveal occurrences of /a/ in a strong syllable preceded by a weak syllable.

/ąjękɛ̃/ [ajɛka] 'true'
/balɛkɛ̃a/ [balɛka] > /balaʃɛka/ [balɛka] 'to make mud'
/yɔko/ [yecho] > /yɔyɔko/ [yɛyɛko] 'to be slippery'
/kaka/ [kaʃka] > /kakaʃka/ [kaʃka] 'to open'
/ąkoʃa/ [aʃka] 'peanuts'
/gala/ [gaʃa] 'year'

3. TONE

3.1. Inventory and Description

There are five emic tones in Tangbago:

- High (H)
- Mid (M)
- Low (L)
- Falling (F)
- Rising (R)

Falling tone glides from high pitch to low pitch. Rising tone glides from low pitch to high pitch. Low tone, when occurring utterance final, often glides from low pitch to extra low pitch. Contrasts are shown in the following words:

/zɛ/ 'eat (perfective)'
/zɛ/ 'eat (subjunctive)'
/zɛ/ 'eat (imperative)'
/zɔ/ 'be cold (perfective)'
/ʃɛ/ 'in vain'

3.2. Distribution

3.2.1. In the Syllable

All five tones occur in CV syllables. V syllables, however, can carry only H, M, and L.
3.2.2. In the Word

a. Nouns

Nouns usually contain only H, M, or L. Exceptions are rare. Some examples:

/kpâ/ 'scout'
/dâ/ 'white-tailed hornbill'
/dâ'gô/ 'rabbit'
/dɔbâ/ 'species of tree'
/tɔyɛlɔ/ 'species of animal'
/gâl'ɔkɔ/ 'African fish eagle'

All nine combinations of level tones are found for two-syllable words:

/ˈmuˈmʊ/ /ˈkâkɔ/ /ˈkɔnɔ/ 'leopard' 'leaf' 'hippopotamus'
/ˈyâgə/ /ˈkɔsə/ /ˈvənə/ 'roan antelope' 'man' 'four'
/ˈlɔba/ /ˈbiʒə/ /ˈkəmbə/ 'cloth' 'two' 'knife'

All 27 combinations of level tones are found for three-syllable words, too.

b. Verbs

Verbs contain H, M, L, and F, but never R. (See 3.1 for examples.)

c. Adjectives

R and F tones never occur in adjectives. Only H, M, L occur, and usually all syllables carry identical tone. Exceptions are:

/tɔlɔˈkɔpɔ/ 'solid'
/pərəˈmɔpɔ/ 'narrow-mouthed'
/tɔfɔ/ 'new'

d. Adverbs and Particles

Adverbs and particles can carry all five tones:

/wɔ/ 'toward (prep)'
/wâ/ 'in vain (adv)'
/kɛ/ 'perfective'
/si/ 'to (prep)'
/nɔ/ 'the'
3.3. **Functional Load**

Tone has lexical function in all word classes, with many minimally contrastive word pairs, triplets, and even quadruplets and quintuplets:

/šk3/ 'epilepsy' /dk3/ 'gambling'
/šk3/ 'termite' /šk3/ 'husband'
/šk3/ 'my goodness'!

In verbs and pronouns it has, in addition, grammatical function. Verb aspect and mood are signaled by tone changes in both the verb /wʊ/ and the pronoun /sə/:

/sə wʊ/ 'he saw (perfective)'
/sə wʊ/ 'let him see (imperative)'
/sə wʊ/ 'he will see (imperfective)'

It is therefore easy to conclude that tone carries a heavy functional load in Banda. Indeed this is confirmed by the use of whistle-talk. If the tones did not carry much of the meaning, then whistle-talk would be impossible. The important functional load of tone should be borne in mind when establishing an orthography for Banda.

4. **SYLLABLES**

4.1. **Configurations**

Excepting loan words, there are two syllable configurations in Banda—Tangbago: V and CV.
CV syllables can occur in any position in the word.
V syllables can occur only word initially.
Every syllable carries a tone.

Loan words can end in consonants, giving a third syllable configuration, CVC. A consonant can occur etically only pause group finally; so pause group medially, an etic transition vowel is added to the word if the following word begins with a consonant. At least some speakers interpret CVC syllables CVCc, in which the /ə/ elides pause group finally (see 7).

4.2. **Strong and Weak**

CV syllables composed of a liquid and a low vowel are termed strong syllables. CV syllables composed of a nonliquid and a simple vowel are termed weak syllables when they precede strong syllables. Occurrence of vowels in weak syllables is very restricted, as is discussed in section 2.3.2. Those that do occur are shortened and altered in quality.
5. WORDS

5.1. Word Shapes

The following word shapes are found in Tangbago:

V /á/ 'not'
CV /na/ 'to go'
VCV /ábá/ 'porridge'
CVVCV /gúsú/ 'grass'
VCVCV /ágbóló/ 'child'
CVVCVCV /bámáká/ 'lion'
VCVCVCV /áhákipá/ 'star'
CVVCVCVCV /mádzírágbá/ 'rhino'
VCVCVCVCV /áfádákógbó/ 'bush babies'
CVVCVCVCV /gígágánábúvi/ 'marabou stork'
CVVCVCVCVCV /áwázágbógóó/ 'December'

Nouns take all shapes except V. CV is very rare.
Adjectives take VCV, CVVCV, VCVCV, CVVCVCV, and CVVCVCVCV. VCVVCVCV does not occur in my data.
Verb roots and adverbs take CV, CVVCV, and CVVCVCV.
Functors take V, CV, VCV, and CVVCV.

5.2. Stress

Stress is noncontrastive on the word level; it is governed by tone and word shape. Phonetically, stress is only a greater degree of amplitude relative to unstressed syllables. In two-syllable words, each syllable is stressed equally, regardless of tone. In three-syllable words, the penultimate syllable usually takes less stress than the other two, but will take more stress if it carries the only high tone in the word. The stress can be perturbed in the context of a longer utterance, but this has not been studied in detail.

6. WORD BOUNDARY: VOWEL ELISION AND ASSIMILATION

6.1. Prose

Although there seems to be no vowel elision at word boundaries in prose, vowel assimilation does occur. Obligatory assimilation is rather limited, however. Mostly it is optional, depending on the rapidity of speech and the individual speaker. In slow speech, virtually no optional assimilation occurs, but in rapid speech, there is more. Yet there is no regularity of optional assimilation even within one stretch of speech spoken at a consistent rate. That is, the same two vowels may come together in the same way twice in the same string of speech, and in one case one will assimilate, and in the other case, it will not. In any case, the tones remain the same.
The obligatory rules are:

1. /a/ assimilates to a following /a/:
   /tô åwâ/ [tâwâ] 'on the way'
   /më å nà mâ/ [mâänâ] 'I didn't go'

2. /o/ never assimilates.

The optional rules are:

3. /a/ may assimilate to a preceding /o/.
   /pà ångâ/ [pângâ] 'suck at the breast'

4. /a/ may assimilate to any other vowel. In the case of /ea, oα/, this means that /a/ assimilates to the final element of the glide.
   /tô ångû/ [tângû] 'get water'
   /gâ åmâ sëyë/ [gâmâsëyë] 'grab this thing'

5. Low vowels may assimilate to /a/.
   /bî ålà sâ/ [bâlâs] 'close your eyes'

6.2. Song

Song has not been studied yet, but from songs recorded in folktales it has been noted that vowel elision may occur. In this case, the tone is elided with the vowel. In all examples so far, however, it is a vestigial noun prefix /-e/ or /-a-/ that has been elided, which indicates that this phenomenon may not be phonological, but grammatical. In the following example, elided vowels are bracketed:

   têtëkà kpe [âjwâ [â]bë å sâ] [â]bë
   Etere fled fear riki-grass and was in earth
   'Etere avoided the riki grass and was in the earth,'

7. PAUSE GROUP

A pause group beginning with a vowel is often initiated with an etic glottal stop /ʔ/. This glottal stop is lost medially in the pause group, in contrast to an enclitic one, which is retained in both positions. Note the morphemes /ʔa/ ‘we, our’ and /âɗâ/ ‘house’ in the following examples:

   /âɗâ nâ ʔa kâ ʔe/ [ʔândànâʔakâkë] 'This is our house'
   /ʔa wû âɗâ nà yë kâ/ [ʔowândânâyëkë] 'We have seen his house'

A pause-group final /a/ is elided regularly along with its tone:

   /mâ sâ gû tâ/ [mâsâgût] 'I'm coming back'
   /âɗâ nâ më/ [ândânëm] 'my house'

Other pause-group final vowels are also elided following a voiceless fricative preceded by an identical vowel:

   /mâkôfâ/ [mâkô] 'ten'
   /biːʃ/ [biːʃ] 'two'
Otherwise, a pause group may be terminated with an optional etic voiceless glottal fricative [h]:

\[ /sə sə má lə à'də/ [səsəmələdədə] - [səsəmələdədə] \]

'he is in the house'

8. INTONATION

The communicator's intent (to command, to convey information, to query for information, to reprimand, etc.) or attitude (e.g., astonishment, apathy, etc.) can be signaled both in the grammar and the phonology. The grammatical signals are the aspectual conjugations of the verbs and various particles. The phonological signals are the intonation patterns.

There are three main intonation patterns; possible variations have not been studied yet. The main three are described as 'normal', 'high', and 'low', referring to the pitch of the stream of speech, normally the sentence.

The normal pattern maintains a constant 'normal' level. If the level drops at the end, it does so only slightly. It looks like this:

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Statements and mild imperatives usually take this pattern. However, at the end of a paragraph, they take low intonation, which begins at normal level, but drifts downward, like this:

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At the beginning of a paragraph, statements take high intonation, which begins on a high pitch, but gradually settles to a normal pitch, and blends into a normal pattern again. The high pattern looks like this:

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Queries for information, astonishment, and reprimands normally take a high intonation pattern. The high pitch in these cases is maintained throughout the domain of the communicator's attitude or intent being signaled.
Unless coupled with something like astonishment or reprimand, question intonation is only one (or at most, two) steps above normal statement intonation. That is, a mid tone in statement intonation will be on the same pitch as a low tone in a query for information:

\[
\begin{array}{cccccccc}
\text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} \\
\text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} \\
\text{/bə sə nà mà tə Rājā yā} & \text{mā sə nà mà tə Rājā} \\
\text{‘Are you going to Raga?’} & \text{‘I’m going to Raga.’} \\
\end{array}
\]

\[
\begin{array}{cccccccc}
\text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} \\
\text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} & \text{---} \\
\text{/bə sə gù ágòk} & \text{mā sə gū ámbi} \\
\text{‘When are you coming?’} & \text{‘I’m coming tomorrow.’} \\
\end{array}
\]

The exact pitch level for such attitudes and intents as reprimand and astonishment varies, depending on the intensity of the feelings involved. But they always take a high intonation.
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<th>English</th>
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<td>brother (cf. sister)</td>
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<td>e. of male</td>
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<td>of female</td>
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<td>English</td>
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<td>fog</td>
<td>ò'dé'ó</td>
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<td>foot</td>
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<td>k̓p̓í</td>
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<td>fur</td>
<td>òsù (giyà)</td>
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<td>give, to = to take</td>
<td>man</td>
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<td>(sing, obj)</td>
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<td>(pl, obj)</td>
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<td>grass</td>
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<td>gūsù</td>
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<td>s̓èt̓á</td>
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<td>= to be warm</td>
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<td>k̓ì; d̓ó</td>
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<td>I</td>
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<td>if</td>
<td>(ò) k̓à (òài)</td>
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<td>lie down, to</td>
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<td>lip</td>
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<td>= animal</td>
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<td>= flesh</td>
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<td>milk = breast</td>
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<td>yìpì</td>
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<td>òyì</td>
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<td>mountain = stone</td>
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<td>name</td>
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<td>navel</td>
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<td>t̓àp̓ò</td>
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<td>t̓àp̓ò</td>
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<td>s̓ùj̓àb̓ù</td>
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<td>nose</td>
<td>òwù; màwù</td>
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<td>(lâ)... nà</td>
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<td>oil</td>
<td>òm̓ì</td>
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<td>old</td>
<td>(thing)</td>
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<td>(people)</td>
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<td>other</td>
<td>òtà</td>
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<td>path = road</td>
<td>òwà</td>
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<td>person</td>
<td>òzù</td>
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<td>penetrate, to</td>
<td>su</td>
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<td>= to sew</td>
<td>ma kòltàkà</td>
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<td>play, to</td>
<td>g̓òsò</td>
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<td>pull</td>
<td>push</td>
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<td>rain = cloud</td>
<td>òwàb̓̄sí</td>
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<tr>
<td>red</td>
<td>òwàb̓̄sí</td>
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<tr>
<td>red, to be</td>
<td>dòko</td>
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<td>right = correct</td>
<td>òjè̄p̓á</td>
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<td>right side</td>
<td>kùmù</td>
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<tr>
<td>ripen, to</td>
<td>më; dòko</td>
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</table>
river
road = path
root
rope
rotten
rotten, to be
round
rub, to
salt
saliva
sand
say, to
scratch, to
sea
see
seed
seven
sew, to
= to pierce
sharp
sharp, to be
shoot, to
short
short, to be
sing, to
sister (cf. brother)
e. of female
y. of female
of male
sit, to
(sing. subj.)
(pl. subj.)
skin
sky
sleep, to
small
small, to be
smell, to
smoke
smooth
snake
snow = hail
some
spear
spit, to
spit, to
squeeze, to
stab
stand, to
star
stick
stone = mountain
straight
suck, to
sun = day
swell, to
swim, to
tail
take, to = to give
(ting. obj.)
(pl. obj.)
ten
that
there
they
thick
thick, to be
thin
think, to
this
thou
three
throw, to
tie, to
tongue
tooth
front
back
tree
turn, to
twenty
two
up
vomit, to
walk to
warm = hot
warm, to be
= to be hot
wash, to
water
we
(excl.)
(incl.)
we
what?
when?
where?
white
### APPENDIX B

#### Numbers

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<table>
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<td>2</td>
<td>bîši</td>
</tr>
<tr>
<td>3</td>
<td>vôtâ</td>
</tr>
<tr>
<td>4</td>
<td>vânâ</td>
</tr>
<tr>
<td>5</td>
<td>mîndû</td>
</tr>
<tr>
<td>6</td>
<td>mîndû àmâ nà bâlê</td>
</tr>
<tr>
<td>10</td>
<td>môrîfô</td>
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<td>11</td>
<td>môrîfô àmâ nà bâlê</td>
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<tr>
<td>15</td>
<td>gîrivôtâ</td>
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<tr>
<td>19</td>
<td>gîrivôtâ àmâ nà vânâ</td>
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<tr>
<td>20</td>
<td>zâzu bâlê</td>
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<td>21</td>
<td>zâzu bâlê àmâ nà bâlê</td>
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<td>25</td>
<td>zâzu bâlê àmâ nà mîndû</td>
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<td>26</td>
<td>zâzu bâlê àmâ nà mîndû 4 mî ô cî nà bâlê</td>
</tr>
<tr>
<td>39</td>
<td>zâzu bâlê àmâ nà gîrivôtâ 4 mî ô cî nà vânâ</td>
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<td>40</td>
<td>zâzu bîši</td>
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<tr>
<td>100</td>
<td>zâzu mîndû</td>
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</table>

It is possible to count beyond 100 in Banda, but in actual fact, most Bendas in Sudan use Arabic for numbers beyond 10, and the younger generation does not even know the Banda numbers beyond 20.

### NOTES

1. This is true among the eleven dialects represented in Sudan, so it is almost certainly true of the many more dialects in CAR, too.

2. I wish to express my appreciation to Joseph Waka, a native speaker of the Tangbago dialect, who spent many hours assisting me in his spare time.

3. Verbs are cited without the tones marked, since the verb tones are grammatical, and vary with the aspect of the verb. Pronouns are usually cited in their independent form.
ABBREVIATIONS

C consonant
CAR Central African Republic
e elder
excl exclusive
F falling
H high
impf imperfective
incl inclusive
indep independent
intr intransitive
L low
M mid
nonnf nonimperfective
nonref nonreflexive
obj object(ive)
pl plural
R rising
refl reflexive
S approximant
sing singular
subj subjective
trans transitive
V vowel
γ younger

REFERENCES


