

**Working Papers  
of the  
Cornell Phonetics  
Laboratory**

No. 6 • October 1991

**The Tonal Phonology of Llogoori:  
A Study of Llogoori Verbs**

**Elizabeth Woon-Yee Leung**

Phonetics Laboratory  
Department of Modern Languages and Linguistics  
Morrill Hall  
Cornell University  
Ithaca, N.Y. 14853-4701  
telephone (607) 255-7394  
fax (607)-255-7491

### Previous Issues

WPCPL No. 1 (December 1983, 90 pp.).....\$5.00  
Mary Beckman, Susan R. Hertz and Osamu Fujimura: SRS Pitch Rules for Japanese  
Susan R. Hertz: The "Morphology" of English Spelling: a Look at the SRS  
Text-Modification Rules for English  
Mary Beckman and Atsuko Shoji: Perception of Voiced /s/ and /sy/ in Japanese:  
the "Segment" Reconsidered  
Stuart Millikin: Vowel Devoicing and Tone Recoverability in Cheyenne  
Katharine Davis and Mary Beckman: Production and Perception of the Voicing  
Contrast in Indian and American English

WPCPL No. 2 (April 1988, 176 pp.): Research in Laboratory  
Phonology.....\$8.00  
G.N. Clements: The Role of the Sonority Cycle in Core Syllabification  
Susan R. Hertz: The Delta Programming Language: an Integrated Approach to  
Nonlinear Phonology, Phonetics, and Speech Synthesis  
John Kingston: Articulatory Binding

WPCPL No. 3 (June 1988, 109 pp.): Stress, Tone and Intonation..... \$7.00  
Susana Sainz: A Noncyclic Analysis of English Word Stress  
Chi-lin Shih: Tone and Intonation in Mandarin

WPCPL No. 4 (December 1990, 262 pp.).....\$9.00  
Rukayyah S. Herzallah: Aspects of Palestinian Arabic Phonology:  
a Nonlinear Approach (1990 Ph.D. dissertation)

WPCPL No. 5 (September 1988, 123 pp.): Phonetic and Phonological  
Studies on Vowel Features..... \$9.00  
Khatatso Evelyn Khabanyane: The Five Phonemic Vowel Heights of  
Southern Sotho: an Acoustic and Phonological Analysis  
G.N. Clements: Vowel Height Assimilation in Bantu Languages  
G.N. Clements: Place of Articulation in Consonants and Vowels: a Unified Theory

#### Research Personnel (listed alphabetically):

Ann Bradlow, Graduate Student in Linguistics  
Abigail Cohn, Assistant Professor of Linguistics  
Nick Clements, Professor of Linguistics and Cognitive Studies  
Beverley Goodman, Graduate Student in Linguistics  
Susan R. Hertz, Senior Research Associate  
Marie Huffman, Visiting Research Associate  
Paul Iverson, Graduate Student in Psychology  
Michael Jessen, Graduate Student in Linguistics  
Allard Jongman, Assistant Professor of Linguistics  
Hyunsoon Kim, Graduate Student in Linguistics  
Annie Riolland, Adjunct Associate Professor (also C.N.R.S., Paris)  
Joan Sereno, Visiting Fellow in Linguistics and Psychology  
David Silva, Graduate Student in Linguistics  
Alice Turk, Graduate Student in Linguistics

#### Technical and Administrative Staff:

Mark Barsamian, Audio-Video Technician  
Joseph DiGioia, Student Audio-Video Technician  
Matt Kangas, Student Technician  
Harsha Khattri, Student Technician  
Luke Kaven, Systems Programmer/Analyst  
Mark Kotik, Student Audio-Video Technician  
Jason Laflamme, Audio Technician  
Marge Leonard, Administrative Aide  
Bruce Wootton, Computer Hardware Technician

This issue of the *Working Papers* was edited by the author. Copies of this report are distributed free of charge to phonetics, phonology and speech laboratories interested in exchanging their own reports with us, and are otherwise available from us for the at-cost price of \$9.00 per issue, surface postage included (inquire for air mail rates to addresses outside the U.S. or Canada).

## Preface

This issue of the Working Papers consists of a single study: Elizabeth Leung's 1986 M.A. thesis, a phonological study of the Llogoori language of Kenya. The reader may ask why this work is being made available to a wider public after a delay of five years.

Elizabeth Leung's study constitutes the first extensive linguistic description of a language whose basic structural features are still unfamiliar to Bantuists and other linguists. Thus, any information that can be made available on this language is of importance to Bantu studies. Beyond this, however, Leung's study goes well beyond the requirements of rudimentary description, consisting not only of a clear and well-exemplified presentation of major phonological (and morphological) features of the language, but of a carefully worked out and internally consistent analysis, one of the first comprehensive treatments of a Bantu language within the framework of an early 1980's model of nonlinear phonology.

In addition to its descriptive interest, this work provides new evidence for the nature of tonal representation in Bantu languages. It is known that the languages of this group vary along a scale from pure tonal systems with an underlying contrast between H (high) tone, L (low) tone, and zero tone, to "tonal accent" systems contrasting H tone with its absence. Llogoori appears to lie on a mid-point on this scale. This is suggested by the following table, in which underlying tonal contrasts are given for the subject prefix (SP), tense prefix (TP), object prefix (OP), root,

extensional suffixes, final vowel suffix (FV), and floating tonal suffix in three Bantu languages:

	Kikuyu	Llogoori	SeSotho
SP:	H x L	L	H x Ø
TP:	H x L	H x L x Ø	H x Ø (also L?)
OP:	H x L	H	H
Root:	H x L	H x Ø	H x Ø
Extensions:	Ø	Ø	Ø
FV:	Ø	Ø	Ø
Tonal suffix:	H x L	H x L x Ø	H x Ø

As this chart shows, Kikuyu represents a conservative system preserving lexical tone contrasts in all form classes except the extensions and final vowel, while Sesotho represents an innovative tonal accent system in which the underlying L tone has been almost entirely lost. Llogoori lies in between these two extremes, preserving a contrastive, underlying L tone on tense prefixes and tonal suffixes, but eliminating it elsewhere.

Of particular theoretical interest is the nature of downstep (i.e., tone register lowering) in Llogoori. Some of the earliest work in the formal analysis of downstep suggested that downstep is widely (or even universally) characterized as a floating L tone. In the early 1980's, however, evidence came to light suggesting that phonological downstep could be used to signify a juncture between two *linked* tones as well. In such systems, for instance, two H tones separately linked to two vowels are separated by a

downstep, as shown in the first figure below, while a single H tone spreading across two vowels does not have a medial downstep, as shown in the second figure.



The theoretical significance of this result is that we cannot assume any automatic principle (such as the OCP) collapsing representations of the first type into representations of the second type. Rather, the structural difference shown above must survive into the phonetics, where it triggers distinct patterns of tonal realization. (There are no independent reasons to assume a floating tone or any other sort of "downstep marker" between the H tones of H H sequences in Llogoori.) In this work, Leung provides extensive and convincing documentation of a thorough-going downstep system of this latter type.

Elizabeth Leung was fortunate to be able to work over a period of several years with Margaret Kilibwa, a graduate student in the School of Agriculture whose first language is Llogoori. We gratefully acknowledge Ms. Kilibwa's generous devotion of time and energy to this project, without which these results could not have been obtained. Many features of the language were first worked out in the context of a field methods course, and the full analysis was

worked out over the course of the following year and a half. Aspects of pronunciation that were difficult to grasp aurally, especially those involving details of tonal realization, were carefully checked in the phonetics lab. Leung's study is limited by the fact that further data could not be obtained from other speakers; thus, the nature and extent of cross-speaker variation could not be studied. However, the description presented in this thesis is an accurate characterization of Margaret Kilibwa's speech. The good correspondence between Leung's transcriptions and an earlier wordlist collected by Martin Mould (see Mould 1981) provides independent confirmation of the representativeness of Ms. Kilibwa's speech and of the accuracy of Leung's description.

Initially, Leung intended to revise and reformat this work for submission to a publisher. However, other professional responsibilities kept this project on the sidelines for several years. She has now decided that it is better to make this work available in an unrevised working-paper version than to create further delays. We are glad to be able to publish this study in our Working Papers at this time.

Nick Clements

THE TONAL PHONOLOGY OF LLOGOORI: A STUDY OF LLOGOORI VERBS

A Thesis

Presented to the Faculty of the Graduate School  
of Cornell University

in Partial Fulfillment of the Requirements for the Degree of  
Master of Arts

by

Elizabeth Woon-Yee Leung

August 1986

© Elizabeth Woon-Yee Leung 1986

ALL RIGHTS RESERVED

#### BIOGRAPHICAL SKETCH

Elizabeth Woon-Yee Leung was born in Hong Kong in July, 1959. In 1979, after having completed her first year of college in Hong Kong, she obtained the C. Y. Tung scholarship to represent Hong Kong in the "Semester-at-Sea" program (sponsored by the University of Colorado) through which she travelled around the world, including Kenya. She subsequently transferred to the University of Colorado as a music major. In 1982, she graduated from the University of Colorado with distinction and obtained a B.A. in Linguistics. Since September of 1982, she has been at Cornell, first as a graduate student and then a teaching associate in the Chinese language.

To my parents

who have made academic endeavors a dream  
and reality for me

#### ACKNOWLEDGEMENTS

Although this thesis bears only my name, I alone certainly would not have been able to produce this work.

This thesis owes a lot to my committee chairperson George Nick Clements who was the first to inspire me to study Llogoori and African tones in general, and was there to support my effort during the entire time--part of which was his sabbatical year--it took to write this thesis. It is only with his unfailing patience, zealous involvement, and constant encouragement that I became confident to meet the challenge of this painstaking project. This thesis also benefits from his rigorous scholarship: he spent hours reading and discussing my drafts, pinpointing loopholes in my arguments and exploring alternative analyses with me. His insistence that analyses must be supported by ample data is responsible for the strong data orientation of this work. Among many other valuable sources, he shared with me his own transcriptions of the Llogoori data, and gave me a preprint of his article "Compensatory Lengthening and Consonant Gemination in Luganda" (Clements, 1986) which contributed greatly to my phonological analysis of Llogoori. He also let me borrow the typescript Luragoli Grammar (Anonymous, no date), and the manuscript of the Autosegmental Studies in Bantu Tone (Clements and Goldsmith, 1984) before it was published. The last work mentioned is an important source of reference for this thesis.

Professor Robert Ladd, during his brief (one semester) stay at Cornell, had contributed a great deal to this thesis. For the months during Professor Clements' absence, he alone assumed all the advising responsibilities with no complaints but enthusiasm and patience. He spent hours out of his busy teaching schedule to discuss various issues with me. He was always able to bring fresh ideas to difficult problems, and his insights into the phonological analysis of tonal downstep in Llogoori were most illuminating and thought provoking.

This thesis also owes its existence to Miss Margaret Kilibwa, the native Llogoori speaker whose speech is the primary source of my Llogoori data. I am most grateful to her readiness to sacrifice a lot of her own valuable study time to meet with me, going over countless details of the language. She was always patient and cheerful even when asked to make the most tedious repetitions of utterances. Her outgoing personality and active interest in the project have made the research for this thesis a very pleasant task.

I also thank my husband Thomas Lane deeply for his patience and sympathy displayed when I felt most pressured, and constant encouragement when I felt overwhelmed. He also endured a lot of interruptions to his own work to help me with the technical details involved in the production of the thesis.

I would also like to thank the numerous individuals who have shared their valuable opinions on various fragments of my work. Among them are John Goldsmith, David Odden, Mary Clark, and William Leben.

I also thank the Cornell Phonetics Laboratory Staff for their assistance in recording the Llogoori tapes and helping me in using the facilities.

I would also like to extend my gratitude to the fellow graduate students at Cornell University who showed tremendous encouragement towards my work. Among these individuals are Denise Schnittman, Ellen Heavener, and Chu-Ren Huang.

Finally, I thank my parents and the Cornell Graduate School who together had made attending graduate school a financially viable undertaking.

## TABLE OF CONTENTS

BIOGRAPHICAL SKETCH . . . . .	iii
DEDICATION . . . . .	iv
ACKNOWLEDGEMENTS . . . . .	v

### PART I -- Preliminaries

INTRODUCTION . . . . .	2
Llogoori and its Speakers . . . . .	2
Llogoori in Bantu Linguistics . . . . .	2
1. INTRODUCTION . . . . .	7
General Introduction . . . . .	7
Aim and Scope . . . . .	7
Biographical and Linguistic Information on Speaker . . . . .	9
Organization of the Thesis . . . . .	10
Transcriptional Conventions . . . . .	10
Autosegmental Model of Linguistic Analysis . . . . .	11
Basic Assumption . . . . .	11
Formalism . . . . .	14
Tonal Association . . . . .	16
Well-Formedness Condition (WFC) . . . . .	19
2. MORPHOLOGICAL AND PHONOLOGICAL SKETCH . . . . .	21
Morphology . . . . .	21
Nouns--Noun Classes . . . . .	21
Segmental Morphology . . . . .	26
Phonology . . . . .	33
Surface Phonetic Segments . . . . .	34
Phonetic Information . . . . .	35
Distribution of Phones & General Phonological Rules . . . . .	36
Consonants . . . . .	36
Vowels . . . . .	79
Phoneme Inventory . . . . .	84
CV Tier and Syllable Structure . . . . .	86
CV Tier . . . . .	86
Syllable Structure . . . . .	109

PART II -- Verb Tones

3. INTRODUCTION TO LLOGOORI TONES . . . . .	121
Surface Tones . . . . .	121
Downstep . . . . .	121
Introduction . . . . .	121
Alternative Analysis . . . . .	126
Declination . . . . .	128
Phrase Final Lowering . . . . .	135
Summary . . . . .	140
Tone Assignment . . . . .	141
4. VERB TONES . . . . .	145
Organization of the Discussion of the Verb Tenses . . . . .	145
Infinitives . . . . .	147
Infinitives without Object Prefix . . . . .	148
Surface Tone Melodies . . . . .	148
Underlying Tonal Structure . . . . .	149
Infinitives with Extended Verb Stems . . . . .	164
Infinitives with Object Prefix . . . . .	168
Near Future Tense . . . . .	174
Near Future Tense Forms without Object Prefix . . . . .	174
Near Future Tense Forms with Object Prefix . . . . .	183
Perfect Tense . . . . .	190
Perfect Tense Forms without Object Prefix . . . . .	191
Perfect Tense Forms with Object Prefix . . . . .	199
Perfect Tense Forms with 1st sg. Object Prefix . . . . .	200
Far Future Tense . . . . .	204
Far Future Tense Forms without Object Prefix . . . . .	204
Far Future Tense Forms with Object Prefix . . . . .	207
Near Past Tense . . . . .	208
Near Past Tense Forms without Object Prefix . . . . .	208
Near Past Tense Forms with Object Prefix . . . . .	212
Imperative . . . . .	213
Imperative Forms without Object Prefix . . . . .	213
Imperative Forms with Object Prefix . . . . .	223
Present Continuous Tense . . . . .	233
Present Continuous Tense Forms without Object Prefix . . . . .	233
Plain PCT Forms with Type A $y_n$ -initial Roots . . . . .	247
Present Continuous Tense Forms with Object Prefix . . . . .	251
PCT Forms with O.P. that Have Toneless Type A $y_n$ -initial Roots . . . . .	256
PCT H Suffix Deletion . . . . .	257
Middle Past Tense . . . . .	258
Middle Past Tense Forms without Object Prefix . . . . .	258
Middle Past Tense Forms with Object Prefix . . . . .	266
MPT Forms with Toneless $y_n$ -initial Roots . . . . .	271
MPT H Suffix Deletion . . . . .	271
Indefinite Future Tense . . . . .	273
Indefinite Future Tense Forms without Object Prefix . . . . .	273
Indefinite Future Tense Forms with Object Prefix . . . . .	282
IFT H Suffix Deletion . . . . .	284

Middle Future Tense . . . . .	285
Middle Future Tense Forms without Object Prefix . . . . .	285
Middle Future Tense Forms with Object Prefix . . . . .	310
Far Past Tense . . . . .	323
Far Past Tense Forms without Object Prefix . . . . .	323
Far Past Tense Forms with Object Prefix . . . . .	339
Other Tenses . . . . .	352
CONCLUSIONS . . . . .	362
BIBLIOGRAPHY . . . . .	365

LIST OF TABLES

1. Llogoori Noun Classes . . . . .	24
2. Noun Class Prefixes: Summary . . . . .	25
3. Derivations of Underlying Nasal-Consonant Sequences . . . . .	78
4a. Summary of Phonological Rules . . . . .	116
4b. Summary of Crucial Rule Orderings (Phonological Rules) . . .	120
5a. Summary of Tone Rules . . . . .	353
5b. Summary of Crucial Rule Orderings (Tone Rules) . . . . .	360
6. Llogoori Verb Tenses: Summary of Morphological Features . . .	361

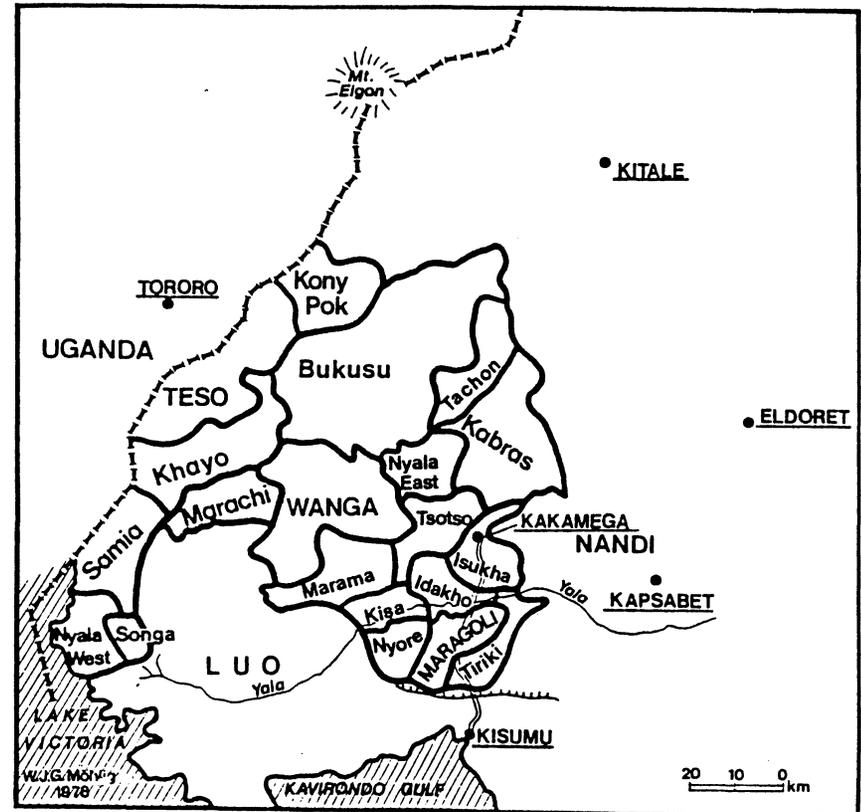
PART I  
PRELIMINARIES

## INTRODUCTION

### LLOGOORI AND ITS SPEAKERS

Llogoori [llogo:ri] (Maragoli, Ragoli, Lugoli) is a Bantu language spoken in western Kenya. Speakers are centered around the Kisumu-Kakamega road in the north up to the escarpment towards the Kavirondo gulf in the south (map 1). The estimated number of speakers is 160,000 (Heine & Mohlig 1980:32).

As in many other linguistic groups in Africa, the use of a second or third language is common among Llogoori speakers. English, for example, is the official language of Kenya. It is the language of government, administration, and education. Swahili, on the other hand, is Kenya's national language. It is the most important medium of communication among the different ethnic groups.



Map 1: The Luhya Languages  
(Adapted from Heine & Mohlig, 1980)

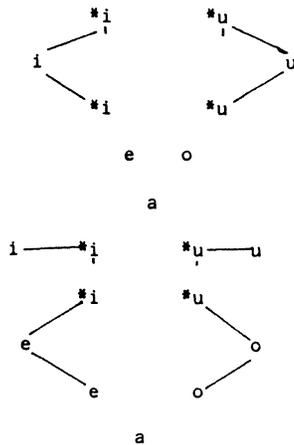
### LLOGOORI IN BANTU LINGUISTICS

Llogoori is among the Bantu languages on which no detailed synchronic studies have been done.<sup>1</sup> Previous studies that make reference to the language are mainly historical in orientation and examine the language only vis-a-vis other Bantu languages for comparative purposes (Guthrie 1967-71; Bennett 1973; Mould 1981).

<sup>1</sup> The only exception is a typescript Luragoli grammar (Anonymous, no date) which was made available to me by Patrick Bennett through G. N. Clements.

The historical affiliation of Llogoori has been a subject of controversy. In Comparative Bantu (Guthrie 1967-71), Llogoori is classified under E40 which consists also of the East Nyanza languages of Kuria and Gusii. Guthrie's classification was justified primarily by the fact that Llogoori has not undergone the spirantization of Proto-Bantu \*p, t, k and b, d, g, and the associated shift of the Bantu seven-vowel system to a five-vowel system. In this regard, Llogoori resembles the East Nyanza dialects and differs from the Luhya (Luyia) dialects in which Proto-Bantu high vowels are mostly merged.<sup>2</sup> Guthrie's view is consistent with that of other scholars like Tucker & Bryan (1957) and Whiteley (1974).

<sup>2</sup> In most Luhya languages, the Proto-Bantu high vowels merged in either one of the 2 ways:



The alternative view proposes that Llogoori is related to the Luhya group. Bennett (1973) classifies Llogoori under the southern subdivision of "North East Victoria Bantu", a term with which he refers to Llogoori and the Luhya languages which are all members of Guthrie's E30. Heine & Mohlig (1980) classify Llogoori as "North Eastern I", the dialect branch which in their classification consists of the major Luhya languages. Finally, Mould (1981) groups Llogoori under "Greater Luyia", the term which he uses to embrace all the Luhya languages including Llogoori and Southern Luhya. Mould's view is based in part on the observation that in lexicostatistic terms, Llogoori has a higher percentage of cognation with other representative Luhya dialects than it does with Gusii.<sup>3</sup> The phonological observation that Llogoori does not attest spirantization and vowel merger, on the other hand, is dismissed as a criterion for historical classification as "shared retentions cannot prove genetic relationships since such retentions can happen independently" (Mould 1981 pp:187).

It is not in the writer's interest to further pursue the question of Llogoori's historical affiliation, as this is not a theme of the present study. Indeed, it would be futile to try to answer the many historical questions about the language while so little is known even of its synchronic structure. While providing a complete grammar of the language in one volume would be an unrealistic goal, it is the

<sup>3</sup> Based on his lexicostatistic study that uses a 200 basic word list as the basis of computation, Mould (1981) finds that the percentage of cognation between Llogoori and the representative Luhya dialects averages to 68 percent, whereas its percentage of cognation with Gusii is only 47. Moreover, the average percentage of cognation between the representative Luhya dialects and Gusii is also relatively low, viz. 44.5 percent.

purpose of this study to investigate in depth one aspect of the synchronic grammar of Llogoori, namely, its tonal phonology, with the focus being on the verbs.

## Chapter 1

### INTRODUCTION

#### 1.1 GENERAL INTRODUCTION

##### 1.1.1 Aim and Scope

The main goal of this thesis consists in the description and analysis of tones in Llogoori verbs from the theoretical perspective of autosegmental phonology. The motivation for such a study is threefold. Firstly, as pointed out in the previous sections, Llogoori is a language of which no detailed synchronic description has been written before. A serious study on any aspect of Llogoori grammar can serve as a point of departure for future research. Secondly, one of the most intriguing aspects of Bantu languages has been their tonal phonology. Aside from the fact that the tonal systems of individual African languages are generally highly complex, the typological variety that these languages exhibit--from being fully tonal (e.g. Kikuyu), accentual (e.g. Tonga), to non-tonal (e.g. Swahili)--are most instructive to the formulation of the general theory of tone. A detailed description of Llogoori verb tones will enrich the data base from which further exploration of Bantu tone and accent systems may proceed. Last but not least, in adopting the autosegmental model as the framework of analysis, the study puts into application one of the most current approaches towards tonal description and analysis, adding a reference to the growing body of literature in autosegmental phonology.

This thesis suffers from the following limitations. First of all, the study is based on the speech of only one single speaker of the language. Consequently, it is not always possible to discriminate idiosyncratic traits from the more general characteristics of the language. Secondly, the present study adopts only one view point, viz., that of autosegmental phonology. As divergent methodologies and approaches have been used in other Bantu tonal studies and can potentially be employed here, this study represents only one possible way of characterizing Llogoori verb tones. Thirdly, due to the scarcity of literature directly related to the subject,<sup>1</sup> much of the interpretation of data is based on the writer's subjective judgement. Fortunately, with the aid of a pitch analyzer<sup>2</sup> at the Phonetics Laboratory of Cornell University, some of the ambiguities in pitch interpretation have been resolved. Finally, this study examines in detail the tones of only one syntactic category, namely, the verbs,<sup>3</sup> and deals primarily with word-level phonology. In view of these limitations, the present study can claim to be no more than a preliminary survey of selected features of the Llogoori tonal system.

---

<sup>1</sup> Among the sources cited in Bennett (1973), which include a bible translation published in 1951, a Luragoli-English Vocabulary published by the Friends Africa Mission Press, and an abridged collection of extracts from a Luragoli Grammar (Anonymous, no date), presumably from the same source, only the last source named has been available to me.

<sup>2</sup> The pitch analyzer is a product of Voice Identification, Inc. which runs programs PM 100 and PM 200.

<sup>3</sup> Verbs are chosen to be the subject of investigation mainly because of their agglutinative nature and morphological complexity which facilitate the investigation of morphotonology and many interesting tonal phenomena associated with tonal mobility.

#### 1.1.2 Biographical and Linguistic Information on Speaker

Miss Margaret Kilibwa, the Llogoori speaker whose speech the present study is based upon, was born in 1959 in Rosengeli, a town in the Kakamega area (map 1). She was educated in her home town until she was 14. She then attended secondary school in Eldoret (map 1). From 1979 to 1980, she worked in Nairobi as a high school teacher, a broadcaster for the Voice of Kenya, and a government official. In December of 1980, she left for the U.S. to attend the Wilmington College in Ohio, receiving a B.S. in Agriculture and Chemistry in June, 1983. Since September of 1983 she has been at Cornell University for her graduate work in Agronomy and Food Science. Data utilized in this thesis were collected from Miss Kilibwa for about a year's period, from fall of 1983 through fall of 1984 at Cornell University and amplified in 1984-1985.

Miss Kilibwa is a Llogoori-Swahili-English trilingual. While her father is a native Llogoori, her mother is a Bunyore and speaks that language. Miss Kilibwa grew up speaking both Llogoori and Swahili, and had studied English at school since she was seven years old. While Miss Kilibwa was living in Kenya, she used Llogoori within her family and tribal area only. Swahili was the language she used most in her contacts with people outside of the Llogoori area. English was used heavily at school and at work.

From the brief biographical sketch of Miss Kilibwa given above, one may wonder how far her competence in Llogoori has been affected by her exposure to many other languages. Note also that she was born and raised outside of the Llogoori speaking area proper. Her competence

in the language is assumed, however, based on the observation that there is great consistency between the data elicited from her and those presented in Mould (1981) and the typescript Luragoli grammar (Anonymous, no date) mentioned in footnote (1).

1.1.3 Organization of the Thesis

An overview of the relevant aspects of the autosegmental theory will be given in section 1.2. Chapter 2 provides a sketch of Llogoori segmental morphology and phonology. Chapter 3 begins Part II of this thesis by introducing the general characteristics of Llogoori tonal phonology. Chapter 4 constitutes the main body of the thesis in which the various verb tenses are described and analysed with ample data for illustration.

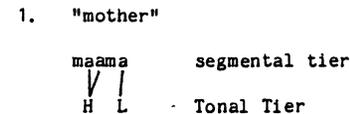
1.1.4 Transcriptional Conventions

This study follows the conventions of tonal marking used in Bantu studies: / for high tones, abbreviated "H", and \ for low tones, abbreviated "L". Contour tones are analyzed as tautosyllabic sequences of H and L tones--a falling tone as a high-low sequence represented as ^, abbreviated "H L", and rising tones a low-high sequence, symbolized V and abbreviated "L H". In the case of "long vowels", which in this study are represented orthographically as a sequence of identical vowels, tone marks will be written in such a way that they extend over both members of the sequence.

1.2 AUTOSEGMENTAL MODEL OF LINGUISTIC ANALYSIS

1.2.1 Basic Assumptions

The autosegmental model of phonological analysis conceives phonological organization as a multilinear construct of independent sequences (or tiers) of ordered autonomous segments (or autosegments), each of which is specified for a certain subset of phonological features (Goldsmith (1975; 1976; 1977), Haraguchi (1977), Clements and Ford (1979), Clements and Goldsmith (1984)). Consider the following display:

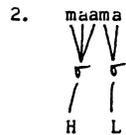


In the display of the Llogoori form "mother" maama above, each autosegment on the segmental tier represents a segmental feature matrix while each autosegment on the tonal tier represents a subset of tonal features.

While autosegments on the separate tiers are autonomous in the sense that they can be independently affected by various phonological processes without necessarily interfering with each other, they stand in a relation of formal association with each other. This association determines the manner in which they are coarticulated in speech production. The associations between segments on the separate tiers are established by association lines, for example, the lines linking the vowels and tones in (1). The associations expressed by the association lines in (1) indicate that in speech production, the long vowel

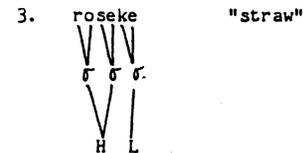
[aa] is pronounced with H tone and the short vowel [a] is pronounced with L tone.

As one may have already noticed, in (1), the vowels are directly associated with tones. It should be pointed out that segmental elements are in fact linked to tonal elements through the mediation of higher levels of prosodic structure like the mora or the syllable, depending on the language. The unit of prosodic structure to which tones are directly associated is called the tone-bearing unit. As we will see later, Llogoori is a "syllable language" in the sense that the "syllable" is the basic tone-bearing unit. Furthermore, the surface syllable structure of the language is (C)V(V). Given this information, a full display of maama should show the following association relations:



But for the sake of simplicity, a display like (2) is usually abbreviated by leaving out the syllable tier as long as this level of structure is not crucially involved in the understanding of the tonal analysis in question. In the short-hand notation, association lines are shown to link tones to only the vocalic portion of the syllable. (This is because tones are generally coarticulated with vocalic segments. It is not uncommon, however, to find that certain consonantal elements like nasals and liquids may also have tones. In Llogoori, for example, both nasals and the lateral liquid are tonal when they form syllable peaks.)

In the example maama above, the association between the tones and the tone-bearing units is one-to-one, with the first tone associated with the first tone-bearing unit, and the second tone with the second tone-bearing unit. However, within the autosegmental framework of tonal analysis, other types of mapping relations are also possible. For example, two adjacent tone-bearing units may be found to share the same tone. This phenomenon is expressed as a one-to-many mapping relation between tones and tone-bearing units:



In (3), the first two syllables are mapped to the same H tone.

Conversely, a contour tone is expressed as a many-to-one mapping relation between the tones and the tone-bearing units:



In (4), the first syllable is associated with a sequence of H and L tones, resulting in a surface falling tone.

Lastly, it is also possible to have tonal elements that are not associated with any segmental elements on the surface. Such elements are termed floating tones, and are motivated by various African languages like Kikuyu (Clements 1982, Clements and Ford 1979).

1.2.2 Formalism

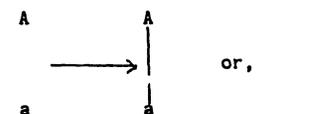
This section discusses the formal apparatus with which the model characterizes phonological processes.

Phonological rules in the autosegmental model consists of a structural description (SD) that specifies the input and conditions for the operation of a phonological process, and a structural change (SC), that specifies the process.

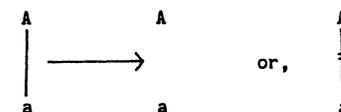
In this model, the structural description may be a linear expression, or a multilinear structure having the form of a display as exemplified in the previous sections. Structural descriptions may consist of constant and variable elements. Constant elements are segments that are fully specified for features occurring on any single tier. An example is a "H" on the tonal tier which represents the bundle of features that uniquely defines the high tone of the language. Variable elements may be totally unspecified for features, in which case, they are "free" variables, represented as ".....", or they can be only partially specified, in which case, they are "restricted" variables. An example of a restricted variable is "T" on the tonal tier which has no unique designation but merely means "any tone". Other elements that may exist in a structural description are the null elements  $\emptyset$  and association lines.

The structural change of a rule specifies one or more elementary operations, represented as the following:

5. a) Association



b) Dissociation



c) Deletion



d) Insertion



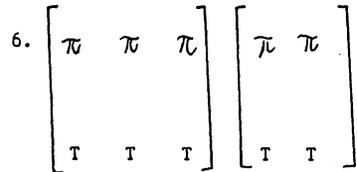
e) Substitution



The alternative notations given in the right hand column for examples (6a) and (6b) above are "abbreviations" of the corresponding expressions with the arrow. Abbreviated notations like these will be used in the rest of the study wherever possible.

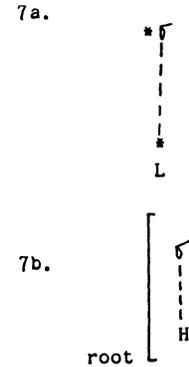
### 1.2.3 Tonal Association

In this section, I examine in more detail the manner in which tones and tone-bearing units come to be associated with each other, assuming that in the underlying representation (UR) tones and tone-bearing units are typically unassociated. With this assumption, the display of the UR of a given form will consist of arrays of tonal and non-tonal elements, with no formal associations relating them. Following Clements and Ford (1979), the UR of a given phonological form may be represented as the following:



Here each  $\pi$  denotes a tone-bearing unit and T a tone. Brackets demarcate morphologically defined domains. The processes by which elements on these tiers are associated are expressed by association rules and conventions.

The association rules first to apply to an underlying representation are called Initial Tone Association Rules (ITAR's). ITAR's typically enter associations between single tones and single tone-bearing units (Haraguchi 1977). They are language specific rules which assign a designated tone of a tonal string to a specific tone-bearing unit that satisfies certain conditions. Both the designated tone and the specifications for the tone-bearing unit to which the tone is assigned are stated in the SD of the ITAR. For example:



In (7a) and (7b) above, the designated tones are L and H respectively. In (7a), the tone-bearing unit to be assigned the designated tone is the one that bears the "asterisk", accentual information that is specified underlyingly in the word. Rule (7a) provides this asterisk a tonal interpretation by mapping to it a L tone. A rule like this is typical of so-called pitch accent systems. In (7b), the tone-bearing unit to be assigned the designated tone is the first root syllable. Rules like this are found in a system in which the assignment of the designated tone is largely predictable.

As these rules enter associations between only single tones and single tone-bearing units, after their application, usually there are still other tones and tone-bearing units that remain unassociated. So given two forms like the following:

8a. "smoke" (Tonga (Goldsmith 1984))

\*  
ibusi

\*  
H L

8b. "to bite" (Llogoori)

kU } rUma  
|  
H  
root

if rule (7a) applies in (8a) and rule (7b) in (8b), the result of the application of these two ITAR's would be the following association relations:

9a. ibusi  
|  
H L

9b. kUrUma  
|  
H

In both cases, there are tone-bearing units left unassociated. Displays like these are "ill-formed" according to the Well-formedness Condition (WFC), to which we will now turn.

1.2.4 Well-Formedness Condition (WFC)

WFC is a set of principles which govern representations that are ill-formed, and have the effect of making them well-formed through the minimal addition or deletion of association lines. These principles, as originally formulated by Goldsmith are the following:

- 10. (a) Every tone is associated with at least one tone-bearing unit.
- (b) Every tone-bearing unit is associated with at least one tone
- (c) Association lines do not cross.

Condition (a) above has been called to question by the fact that in many languages, tones that are not associated with any segmental elements are allowed in the surface representation (SR), constituting "floating tones".

Considering clause (b) alone, both displays in (9) are ill-formed, since in each one, there are tone-bearing units that are not associated with tones. Mechanisms used to correct an ill-formed display so as to satisfy the WFC are called the Association Conventions by Haraguchi (1977) and other writers. These mechanisms have the function of effecting a set of unique associations between free tones and tone-bearing units by adding or deleting association lines. It has been suggested that these mechanisms are universal, that is, invariant from language to language. Readers are referred to Goldsmith (1979), Clements and Ford (1979), Haraguchi (1977), Yip (1980), Pulleyblank (1983), among others, for different versions of these conventions. As far as Llogoori verbs are concerned, the following association convention is found to be relevant:

11. Association Convention (Informal Statement)

Associate free (unassociated) tones to free tone-bearing unit in a one-to-one fashion from left to right, skipping no eligible segments.

As we will see, in Llogoori, tones are assigned almost exclusively by ITAR's. Furthermore, multiple linkages of tones and tone-bearing units are not automatic and universal, but rather, come about by language-specific tone spread rules. (These rules will be motivated in Chapter 4.) The convention in (11) thus plays only a very insignificant role in the language. (I will return to this point in Chapter 3.)

Chapter 2

MORPHOLOGICAL AND PHONOLOGICAL SKETCH

2.1 MORPHOLOGY

2.1.1 Nouns--Noun classes

Llogoori noun forms can be analyzed as consisting of a prefix and a stem. Each prefix marks a different noun class which governs a different set of concords in the various parts of speech, including the attributives (ATTR), possessives (POSS), demonstratives (DEM), numerals (NUM), and the verbs. Ordinarily, each noun stem occurs with either of two of these prefixes to form the singular and plural forms of the noun. For example, the noun stem /-tabu/<sup>1</sup> "book" occurs with the prefix /kI-/ in the singular and /vi-/ in the plural; thus, kItabu /kI+tabu/ "book" and vitabu /vi+tabu/ "books". In this study, Llogoori noun classes, like those of other Bantu languages, are numbered in such a way that the singular and plural classes to which a given noun stem belongs constitute two consecutively numbered classes: for example, the noun class marked by /kI-/ (c.f. kItabu "book") is class 7, and the plural class marked by /vi-/ (c.f. vitabu "books") is class 8. Generally speaking, odd numbers refer to singular classes, and

-----  
<sup>1</sup> Here and below, slants are used to enclose underlying representations whereas brackets ([ ]) are used to designate a "sound". For example, "[k]" simply refers to "the sound k"; the brackets are a notational device that have no bearing on the underlying status of the segment k.

even numbers plural.<sup>2</sup> When occurring in verbs, class concords are subject and object prefixes (abbreviated "S.P." and "O.P." respectively).

In Table 1 below, I give examples of individual noun classes, illustrating the different concords that each class governs in the various parts of speech except the verbs. (Examples of concords in verbs will be given later in the section on verb morphology.) Surface phonological variations of most class concords in Table 1 are derivable by general phonological rules of the language to be introduced in the section on phonology and therefore do not concern us now. Table 2 lists the class concords seen in Table 1 as well as the verbal concords of the various classes. For most concords, only the preconsonantal forms--which in this study are considered the underlying forms--are listed. Exceptions are those whose preconsonantal and prevocalic alternants are not predictable by general phonological rules. In these cases, both the preconsonantal and prevocalic forms are listed, with the first being the preconsonantal form, and the second prevocalic. In these tables, class numbering is consistent with the conventional numbering of Bantu noun classes except for classes 1a, 2a, 9a, and 10a, which are established specifically to accommodate certain data in Llogoori: Nouns that belong to classes 1a, 2a, 9a, and 10a govern the same agreement concords as classes 1, 2, 9, and 10 respectively in all parts of speech, and differ only in the noun pre-

<sup>2</sup> Each singular/plural pair of noun classes has also been called "class" by some scholars. Thus, while classes 7 and 8 are considered two different classes since they govern two different sets of agreement concords, the pair 7/8 is also considered a class because they consist of the same group of lexical noun stems. For the sake of clarity, I will refer to these singular/plural pairs as "genders" instead and reserve the term "classes" to the individual singular and plural classes.

fix. Symbols used in these tables are " [ ", which marks a paired noun gender, and "-", which indicates morpheme boundaries. Broad phonetic instead of phonological transcription is given such that morphophonemic alternations can be shown:

TABLE 1

Llogoori Noun Classes

class	nouns	ATTR	DEM*				POSS (/-ange/ "my")	NUM (/-rara/ "one"; /-vIrI/ "two")
			this1	this2	that1	that2		
1	mu-yaayI "boy"	mu-rahI	U-yU	U-nU	o-y-o	U-ra	w-aange	mu-la
	va-yaayI "boys"	va-rahI	ya-va	va-nU	ya-v-o	va-ra	v-aange	va-vIrI
1a	8-mboozo "brother"	mu-rahI	U-yU	U-nU	o-y-o	U-ra	w-aange	mu-la
	2a vaa-mboozo "brothers"	va-rahI	ya-va	va-nU	ya-v-o	va-ra	v-aange	va-vIrI
3	m-saara "tree"	mu-rahI	yI-gU	gU-nU	yI-gw-o	gU-ra	gw-aange	mu-la
	4 mi-saara "trees"	mi-rahI	yI-Yi	Yi-nU	yI-Y-o	Yi-ra	Y-aange	Yi-vIrI
5	ri-kudu "turtle"	l-lahI	yI-ri	ri-nU	yI-ry-o	l-la	ry-aange	l-lara
	6 ma-kudu "turtles"	ma-rahI	ya-ga	ga-nU	ya-g-o	ga-ra	ga-aange	ga-vIrI
7	kI-tabu "books"	kI-rahI	yI-kI	kI-nU	yI-c-o	kI-ra	c-aange	kI-la
	8 vi-tabu "books"	vi-rahI	yI-vi	vi-nU	yI-vy-o	vi-ra	vy-aange	vi-vIrI
9	en-goko "chicken"	In-dahi	yI-yI	yI-nU	ye-y-o	I-ra	y-aange	(I)n-dara
	10 ziq-goko "chickens"	zin-dahi	yI-zi	zi-nU	yI-zy-o	zi-ra	zy-aange	zi-vIrI
9a	I-coka "chalk"	In-dahi	yI-yI	yI-nU	ye-y-o	I-ra	y-aange	(I)n-dara
	10a zi-coka "chalks"	zin-dahi	yI-zi	zi-nU	yI-zy-o	zi-ra	zy-aange	zi-vIrI
11	rU-baaho "board"	l-lahI	yI-rU	rU-nU	yI-rw-o	l-la	rw-aange	l-lara
	10 zim-baaho "boards"	zin-dahi	yI-zi	zi-nU	yI-zy-o	zi-ra	zy-aange	zi-vIrI
12	ka-kudu "small turtle"	ka-rahI	ya-ka	ka-nU	ya-k-o	ka-ra	k-aange	ka-la
	13 tU-kudu "small turtles"	tU-rahI	yI-tU	tU-nU	yI-tw-o	tU-ra	tw-aange	tU-vIrI
14	vU-naasi "grass"	vU-rahI	yI-vU	vU-nU	yI-vw-o	vU-ra	vw-aange	-----
15	kU-syeeva "dance"	kU-rahI	yI-kU	kU-nU	yI-kw-o	kU-ra	kw-aange	kU-la
16	ha-vUUndu "place"	ha-rahI	ya-ha	ha-nU	ya-h-o	ha-ra	h-aange	ha-la
18	mm-ba "inside of the house"	mu-rahI	yI-mu	mu-nU	yI-mwo	mu-ra	mw-aange	mu-la
20	gU-kudu "big turtle"	gU-rahI	yI-gU	gU-nU	yI-gw-o	gU-ra	gw-aange	gU-la
4	mi-kudu "big turtles"	mi-rahI	yI-Yi	Yi-nU	yI-Y-o	Yi-ra	Y-aange	Yi-vIrI

\* According to Miss Kilibwa, there is no semantic difference between this1 and this2. That1 is used when referent is near the addressee, while that2 is used when referent is far from both the speaker and the addressee.

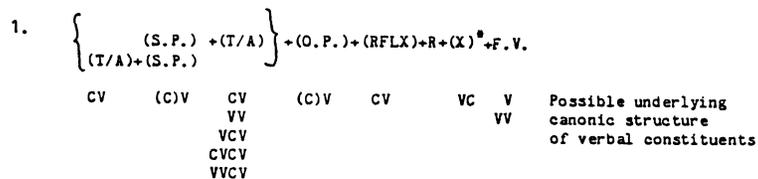
TABLE 2

Noun Class Prefixes: Summary

CLASS NO.	NOUN	ATTR	NUM	POSS	VERB	
					S.P.	O.P.
[ 1.	mu-	mu-	mu-	U-	a-/y <sub>n</sub> -	mu
2.	va-	va-	va-	va-	va-	va-
[ 1a.	<del>ø</del>	mu-	mu-	U-	a-/y <sub>n</sub> -	mu-
2a.	vaa-	va-	va-	va-	va-	va-
[ 3.	mu-	mu-	mu-	gU-	gU-	gU-
4.	mi-	mi-	ʝi-	ʝi-	ʝi-	ʝi-
[ 5.	ri-	ri-	ri-	ri-	ri-	ri-
6.	ma-	ma-	ga-	ga-	ga-	ga-
[ 7.	kI-	kI-	kI-	kI-	kI-	kI-
8.	vi-	vi-	vi-	vi-	vi-	vi-
[ 9.	IN-/Inz-	IN-/Inz-	I-	I-	I-	gI-
10.	ziN-/zinz-	ziN-/zinz-	zi-	zi-	zi-	zi-
[ 9a.	I-	IN-/Inz-	I-	I-	I-	gI-
10a.	zi-	ziN-/zinz-	zi-	zi-	zi-	zi-
[ 11.	rU-	rU-	rU-	rU-	rU-	rU-
10.	ziN-/zinz-	ziN-/zinz-	zi-	zi-	zi-	zi-
[ 12.	ka-	ka-	ka-	ka-	ka-	ka-
13.	tU-	tU-	tU-	tU-	tU-	tU-
14.	vU-	vU-	vU-	vU-	vU-	vU-
15.	kU-	kU-	kU-	kU-	kU-	kU
16.	ha-	ha-	ha-	ha-	ha-	ha-
18.	mu-	mu-	mu-	mu-	mu-	mu-
[ 20.	gU-	gU-	gU-	gU-	gU-	gU-
4.	mi-	mi-	ʝi-	ʝi-	ʝi-	ʝi-

2.1.2 Verbs—Segmental Morphology

As in other Bantu languages, Llogoori verbs have a highly agglutinative segmental morphology that involves both prefixes and suffixes. Based on my data, the maximal expansion of a finite verb in Llogoori has the structure schematized below; only the root and the final vowel are obligatory constituents:



("C" stands for a consonant or consonant cluster, "V" stands for a short vowel or nasal, and "VV" a long vowel. The "\*" after "X" indicates a potential string of the constituent X.)

Thus, a verb unit consists of a selection of the following segmental formatives: a subject prefix (S.P.), a tense/aspect marker (T/A), an object prefix (O.P.), the reflexive /yI-/ (RFLX), a lexical verb root (R), one or more extensions (X), and a final vowel (F.V.). Taking for granted the phonological rules involved in its derivation, below is an example of a fully inflected verb:

2. ndaakwiIdUyIra /nd + aa + kU + yI + dUy + Ir + a/  
1st T/A 2nd RFLX hit APP\*\* F.V.  
sg. (FPT\*) sg.

Gloss: "I hit myself for you (sg.)"

\* FPT=Far Past Tense

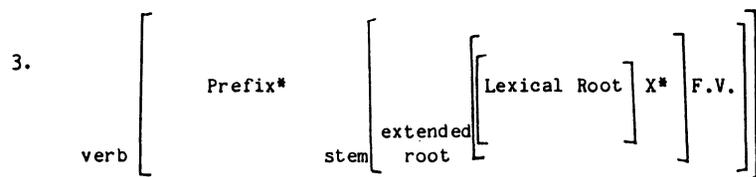
\*\*APP = applied extension

In Llogoori, only one object prefix is allowed within one verb. So given a sentence that has both a direct and indirect object, only one of them can occur as a prefix within the verb unit. With the exception of the Middle Future Tense (c.f. section 4.10) where the T/A marker /na-/ precedes the S.P., the S.P. is the verb initial element. It should be noted that the constituent T/A in the formulation in (1) is not the only morphological expression of tense/aspect. As we will see, tones, vowel length, and the quality of the F.V. are all used in combination to determine tense and other grammatical meaning. Stem extensions may mark grammatical categories (for example, the causative /-iz-/, reciprocal /-ap-/, etc), or, just be semantically empty root expansions (e.g. /-iz-/ and /-Ih-/) attached to specific types of roots in certain grammatical contexts. The F.V.'s are /-a/, /-aa/, /-e/, or /-i/,<sup>3</sup> depending on the tense/aspect of the verb and other grammatical factors. From here on, the term lexical root refers to a verb root in its simplest form, i.e. without any extensions or suffix-

<sup>3</sup> A stem with an /-i/ F.V. is called a "modified base" by Mould (1981).

es attached, while the term extended root refers to the morphological constituent that consists of the lexical root and all the extensions suffixed to it. Both the lexical roots and extended roots will be called roots in general, and the lexical roots plus all its extensions, if any, and the F.V. will be called the verb stem.

It will be an assumption of this study that the Llogoori verb unit has the following bracketing structure:



where '\*' indicates a potential string of the constituents it superscribes.

In Table 2, I have given the complete list of subject and object prefixes of the different noun classes. Given in the next example are the personal subject and object prefixes, independent pronouns, and possessive pronoun stems. Both the preconsonantal and prevocalic alternants are given for the 1st singular S.P. and O.P., and 3rd singular S.P. since alternations in these categories are not predictable by phonological rules that have general application in the language. Only the preconsonantal forms are given for the other categories.

4.

	S.P.	O.P.	Independent Pronouns	Possessive Pronoun Stems
1st sg.	N/nd	N/nd	InzI	-agge
pl.	kU	kU	kUnI	-Itu
2nd sg.	U	kU	yive	-V...o *
pl.	mu	mu	munI	-Inu
3rd sg.	a/y	mu	yive	-V...e *
pl.	va <sup>n</sup>	va	yavo <sup>n</sup>	-avo

\*To be explained below

The possessive pronoun governs the concord of the class to which the head noun belongs (c.f. column of possessive concords listed under POSS in Table 2). In the 2nd and 3rd sg. possessive, the agreement concord seems to occur as an infix filling the "... " slot in the possessive stem. Ignoring the morphophonemic rules involved in their derivations, given below are examples of possessive constructions which illustrate the different surface phonological shapes of "V" in the 2nd and 3rd person possessive pronouns when combined with head nouns of different classes: <sup>4</sup>

<sup>4</sup> Due to space limitations, I will not discuss the morphophonemic rules involved in the derivations of possessive pronouns here.

5a. Possessive constructions with the 2nd sg. possessive pronoun, illustrating the alternation between [i], [u], and [o] in the possessive pronoun stem initial vowel:

- i) kItabu <sup>v</sup>ciico /kI + tabu kI + i + kI + o/ "your (sg.) book"  
 cl.7 book cl.7 2nd cl.7 2nd  
 sg. sg.  
 POSS POSS
- ii) msaara guugwo /mu + saara gU + u + gU + o/ "your (sg.) tree"  
 cl.3 tree cl.3 2nd cl.3 2nd  
 sg. sg.  
 POSS POSS
- iii) makudu googo /ma + kudu ga + o + ga + o/ "your (sg.) turtles"  
 cl.6 turtle cl.6 2nd cl.6 2nd  
 sg. sg.  
 POSS POSS

5b. Possessive constructions with 3rd sg. possessive pronoun, illustrating the alternation between [i] and [e] in the possessive pronoun stem initial vowel:

- i) kItabu <sup>v</sup>ciice /kI + tabu kI + i + kI + e/ "his book"  
 cl.7 book cl.7 3rd cl.7 3rd  
 sg. sg.  
 POSS POSS
- ii) msaara gwigwe /mu + saara gU + i + gU + e/ "his tree"  
 cl.3 tree cl.3 3rd cl.3 3rd  
 sg. sg.  
 POSS POSS
- iii) makudu geege /ma + kudu ga + e + ga + e/ "his turtles"  
 cl.6 turtle cl.6 3rd cl.6 3rd  
 sg. sg.  
 POSS POSS

Unlike in many other Bantu languages, the negative morpheme does not occur as part of the verb unit, but rather, exists as a separate post verbal negative morpheme.

6. kIrUmI dave /kI + rUm + e dave/ "don't bite it!"  
 cl.7 bite F.V. NEG

(Note that for the sake of uniformity, the class 7 concord /kI-/ is used as the O.P. in all examples that contain an object prefix. The choice of this particular prefix is arbitrarily made, as concords of all classes are found to have the same tonal effect in Llogoori verbs.)

The underlying canonic structure of the verbal components are indicated in (1), with the exception of the root, which exhibits a much wider range of possibilities. Roots that are used for exemplification in the study of each verb tense representing each tone class are given below:

7.	H-toned Verbs		Non-H Verbs	
	-CVC-	-rUm- "bite"	-duy- <sub>n</sub>	"hit"
	-CVVC-	-deek- "cook"	-samb-	"burn"
	-CVCVC-	-karag- "cut"	-gUriz-	"sell"
	-yVC-	-yit- <sub>n</sub> "kill"	-yen- <sub>n</sub>	"want"
	-CV(V)-	-rI- "eat"	-sīe-	"grind"

These forms are chosen to represent lexical roots of the five canonic types, namely, -CVC-, -CVVC-, -CVCVC-, -yVC-, and -CV(V). Verb forms with longer canonic structures can be formed with extended or lexically longer roots, and exemplified when needed.

Roots with an initial /y/ (dental glide) underlyingly constitute a special class of verb roots in that the root initial /y/ deletes af-

ter all prefixes that end in a vowel except the MPT tense marker /aa-/ and the reflexive prefix /yI-/. The deletion of /y/ in these roots can be captured by the following rule:

8. Post Vocalic y-Deletion

y \_\_\_\_\_ → Ø / V + \_\_\_\_\_

It should be noted that not all y-initial roots undergo rule (8). Roots that undergo y-Deletion (8) will be referred to as Type A y-initial roots (or "Type A roots"), and those that do not Type B y-initial roots (or "Type B roots" hereafter).<sup>5</sup> Some examples of Type A and Type B roots in my data are listed in their underlying forms below:

9. y-Initial Roots

	Type A	Type B
a) "kill"	-yit- <sub>n</sub>	a) "bury" -yavIr- <sub>n</sub>
b) "fill"	-yizuriz- <sub>n</sub>	b) "love" -yanz- <sub>n</sub>
c) "operate"	-yat- <sub>n</sub>	c) "work" -yInzIr- <sub>n</sub>
d) "swim"	-yereem- <sub>n</sub>	
e) "remember"	-yizuriz- <sub>n</sub>	
f) "want"	-yen- <sub>n</sub>	

<sup>5</sup> In fact, based on the data obtained so far, (8) seems to be a highly morphologically conditioned rule. For instance, while the reflexive prefix /yI-/ undergoes this rule readily (c.f. (2)), nominal root initial /y/ does not, for example,

kayoka	/ka + yoka/	"snake"
<sub>n</sub>	cl.12 "snake"	

As we will see,  $y_n$ -deletion results in resyllabification which in turn affects the tonal structure of the verb form in question. Tonal processes associated with resyllabification can therefore be conveniently studied by examining verbs with Type A  $y_n$ -initial roots.

## 2.2 PHONOLOGY

So far we have taken for granted the phonetic and phonological components of the language, and assumed an orthography that has not been justified or explained. Since an understanding of the main features of the segmental phonology, especially those involving syllable structure, are essential to an understanding of the tonal phonology, this section provides a sketch of these components of Llogoori grammar.

### 2.2.1 Surface Phonetic Segments<sup>6</sup>

#### 10a. Consonants

	labial	dental	alveolar	palatal	velar	glottal
stops/affricates	p b		t d dd*	ç ʝ	k ɡ	
fricatives	f β v		s z	ʃ		
liquids						
lateral tap			l ll*			
glides	w	y <sub>n</sub>		y		h
nasals	m	n	ɲ	ɲ	ŋ	
Prenasalized obstruents	mb		nd nɲ	nʝ	ŋɣ	

\*[dd] and [ll] are geminates

#### 10b. Vowels

i	ii	u	uu
I	II	U	UU
e	ee	o	oo
a	aa		

Given above is an inventory of surface phonetic segments attested in Llogoori. It will be shown in the discussion to follow that not all of these sounds are underlyingly contrastive.

<sup>6</sup> Here the term "surface phonetic segments" is defined as segments occurring in the output of the phonological rule component and the input of the phonetic realization rules.

2.2.1.1 Phonetic Information

A) Consonants

All voiceless stop consonants in Llogoori are lightly aspirated, and voiced stops are fully voiced. [z] is slightly affricated, and often has a dental (but not interdental) articulation with the tip of the tongue against the front teeth. The interdental glide [y] and nasal [ŋ] are pronounced with the tip of tongue between and frequently touching the lower and upper teeth. [h] is voiced.

B) Vowels

One of the major problems concerning the analysis of the Llogoori vowel system is to determine the phonetic basis upon which the phonemic distinction between [i] [I] and [u] [U] is made. Spectrographic analysis of these sounds in Miss Kilibwa's speech do not show consistent distinction in formant structures (F1 and F2) between the two series.<sup>7</sup> However, from a perceptual point of view, it is noticed that [i], [I], [e] and [u], [U], [o] form two series of equidistant auditory steps. Also, [i] and [u] are pronounced with the lips closer together and the jaw higher in position than [I] and [U]. For the purpose of this study, I have arbitrarily assigned the feature [+upper] as a distinctive feature for the two series: [i], and [u] are [+upper] and [I] and [U] [-upper].

Another point to note is that vowels can occur nasalized in some instances when fringed by nasal segments. For example, Kēna "Kenya", riñōni "bird", and kūñi "we". (However, an examination of more rele-

<sup>7</sup> This is perhaps due to the unsuitability of conventional analogue spectography to the formant analysis of female speech. There may in fact be a difference which is undetected.

vant data would be required before a general statement about the nasalization of vowels can be made.)

2.2.2 Distribution of Phones & General Phonological Rules

In this section, I discuss some major distributional patterns of the surface segments in Llogoori. Phonological rules that account for such distributional facts are postulated. It is based upon these distributional facts that an inventory of underlyingly contrastive segments, or "phonemes" hereafter, will be arrived at at the end of this section.

2.2.2.1 Consonants

A) Labial Obstruents

The voiceless labial stop [p] and fricative [f] occur only very infrequently in my data:

11a. [p]:

Singular		Plural	
i)	m-piira "ball"	zi-piira	"balls"
ii)	e-peenzo "pencil"	zi-peenzo	"pencils"

11b. [f]:

Singular		Plural	
i)	kI-fooyo "fox"	vi-fooyo	"foxes"
ii)	rU-fUrU "lather"	zi-fUrU	"lather"
iii)	-ŋaafu "dirty"	---	
iv)	kI-faavi "corruption"	---	

Despite their infrequent occurrences, it is not evident from the data obtained that they are phonological variants of any other sounds of the language. A complete phoneme inventory of the language should therefore include these two sounds.

The bilabial fricative [β] is found to vary freely with the labiodental fricative [v], suggesting that they are free variants of the same phoneme.

#### B) Palatal Obstruents

The palatal affricates [č], [j], and [š], replace [k], [g], and [h] respectively before the upper high front F.V. /-i/.

##### 12a. k ---> č

i)	kUhaandiiči	/kU + handiik + i/ 1st write F.V. pl.	"We have just written"
ii)	kIhaandiiči	/kI + handiik + i/ cl. 7 write F.V.	"You (pl.) write it!"
	compare,		
iii)	kUhaandiika	/kU + handiik + a/ cl.15 write F.V.	"to write"
iv)	kIhaandiikI	/kI + handiik + e/ cl. 7 write F.V.	"You (sg.) write it!"

##### 12b. g ---> j

i)	kIkaraj <sup>v</sup> i	/kI + karag + i/ cl.7 cut F.V.	"You (pl.) cut it!"
ii)	kUkIkaraj <sup>v</sup> i	/kU + kI + karag + i/ 1st cl.7 cut F.V. pl.	"we have just cut it"
	compare,		
iii)	kIkarage	/kI + karag + e/ cl.7 cut F.V.	"You (sg.) cut it!"
iv)	karaga	/karag + a/ cut F.V.	"You (sg.) cut!"

##### 12c. h ---> š

i)	kUrUš <sup>v</sup> i	/kU + rUh + i / 1st get F.V. pl. tired	"we've just got tired"
ii)	kwaarUš <sup>v</sup> i	/kU + aa + rUh + i/ 1st. T/A get F.V. pl (MPT) tired	"we got tired"
	compare,		
iii)	kUrUha	/kU + rUh + a/ cl.15 get F.V. tired	"to get tired"

(Class 15 prefix is the infinitival prefix.)

(The alternation between [I] and [e] in the F.V. in (12a iv) and (12b iii) above is due to vowel assimilation, a phenomenon to be discussed later.)<sup>8</sup>

<sup>8</sup> Throughout the study, we will find that examples used to illustrate one particular phonological process may also involve other rules that have not yet been motivated or discussed. Due to space limitations, I will postpone the accounts for these rules as long as they do not crucially jeopardize the exposition of the phonological process in question.

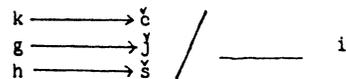
If the following [i] is the initial vowel of the causative extension /-iz-/, [k], [g], and [h] do not palatalize:

- 13a. [k]  
 kUhaandiikiza /kU+ handiik + iz + a/ "to make write"  
 cl.15 write CAU F.V.
- 13b. [g]  
 kUkaragiza /kU + karag + iz +a/ "to make cut"  
 cl. 15 cut CAU F.V.
- 13c. [h]  
 kUrUhiza /kU + rUh + iz + a/ "to make tired"  
 cl.15 get CAU F.V.  
 tired

There are at least two possible ways to account for the absence of palatalization in (13). One explanation is that [k], [h], and [g] palatalize only in front of constituent final [i]. Since the [i] in /-iz-/ is not constituent final, therefore no palatalization takes place. Alternatively, one may assume that it is the extension /-iz/ that constitutes a contextual exception to palatalization. Based on the data obtained so far, it is not evident as to which hypothesis is better. In this study, I have arbitrarily chosen the latter hypothesis.

The alternation between [k] and [č], [g] and [j], and [h] and [š] as seen in (12) can be informally stated as follows:

14. Palatalization of Back Consonants



(Contextual Exception: /-iz-/ [CAUS])

[č], [j], and [š] in some other cases are reductions of [ky], [gy], and [hy] respectively, which in turn are the results of Glide Formation, a phonological process to be discussed in greater detail in a later section. In the examples below, I take for granted the Glide Formation process, among others, and show how [č], [j], and [š] are derived from [ky], [gy], and [hy] respectively:

15. ky → č; gy → j
- a. kItabu čaange /kI + tabu kI + ange/ "my book"  
 cl.7 book cl.7 1st sg.
- b. kUjeena /kU + gI + yē<sub>n</sub> + a / "to want it"  
 cl.15 cl.9 want F.V.

Derivations:

kI+tabu	kI+ange	kU+gI+yē <sub>n</sub> +a	UR
		kUgIena <sub>n</sub>	Post-Vocalic y-Deletion (8)
		kItabu kyaange	Glide Formation (to be formulated in (54), (57) & reformulated in (110)); Vowel Lengthening (to be formulated in (55))
		kItabu čaange	Consonant-Glide Reduction (to be formulated in (19) Other Rules

The examples to illustrate the reduction of a [hy] sequence are not as straightforward. Consider the following forms which have a surface [š]:

- 16a. ma - azi ma - su "hot water"  
 cl.6 water cl.6 hot

16b. kI - tabu    kI - <sup>v</sup>sa                    "new book"  
 cl.7    book    cl.7    new

In (16a) and (16b), the palatal fricative [s̺] surfaces in the stems for "hot" and "new". In fact, the [s̺] in these two stems is never found to alternate with [h] in the SR, suggesting that [s̺] is likely to be the underlying segment in these stems. Evidence for the hypothesis that [s̺] in these stems is derived from a [hy] sequence comes from the following examples, in which the stem for "hot" and "new" are preceded by a nasal segment. In these cases, a [by] sequence surfaces instead of [s̺]:

17a. eŋ - goko    Im - byu                    "hot chicken"  
 cl.9 chicken    cl.9 hot

17b. Im - bwa    Im - bya                    "new dog"  
 cl.9 dog        cl.9 new

As will be shown later, there is a productive rule in Llgooori which changes an underlying [h] to [b] when preceded by a nasal segment.

Given this information and the examples in (17), one may hypothesize that the underlying forms for the stems "hot" and "new" are /-h̄Iu/ and /-h̄Ia/<sup>9</sup> respectively. The high front vowel after [h] changes to [y] by Glide Formation to be formulated in (54), resulting in a [hy] sequence at an intermediate level of derivation. This sequence subseq-

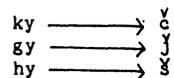
<sup>9</sup> The diacritic "̄" above the high front vowel [I] indicates that the vowel is underlyingly unspecified for the [±upper] distinction. The underspecification here is based on the observation that the feature [±upper] is never found to be relevant for this segment even on the surface level. [Ī] here is to be considered an "archiphonemic" notation for the [+high, +front] vowels of the language.

uently changes to [s̺], thus arriving at the surface forms of these stems in (16). Under this analysis, the derivation of masu<sup>v</sup> "hot, cl.6" and kI<sup>v</sup>sa "new, cl.7" is as follows:

18.	ma + h̄Iu	kI + h̄Ia	UR
	mahyuu	kIhyaa	Glide Formation (to be formulated in (54) (57) and reformulated in (111); Vowel Lengthening (to be formulated in (55)
	mahyu	kIhya	Final Vowel Shortening (to be formulated in (65) & reformulated in (132))
	<sup>v</sup> masu	kI <sup>v</sup> sa	Consonant-Glide Reduction (to be formulated in (19))

(The derivation of Imbyu "hot, cl.9" and Imbya "new, cl.9" in (17) will be illustrated later.) The process of consonant-glide reduction as illustrated in (15) and (18) can be expressed as follows:

19. Consonant-Glide Reduction



Although the surface contrast between [c̣], [ɟ] and [k], [g] respectively in examples (12a-b) and (13a-b) can nevertheless be explained in morphological terms, as I did, the following forms show that the two series must be treated as underlyingly contrastive:

20a. [č̣] Vs. [k]

	[č̣]		[k]	
(i)	I-č̣oka I-č̣oova	"chalk" "outside"	m-kono l	"hand"
(ii)	I-č̣aayi	"tea"	m-kari l	"woman"

20b. [j̣] Vs. [g]

	[j̣]		[g]	
(i)	kI-j̣amano	"rabbit"	kU-ganagap-a	"to think"
(ii)	ri-j̣uungU	"rat"	vaa-guuga	"grandfathers"

In (20), [č̣] and [j̣] are shown to occur in front of the same vowels as [k] and [g] in the SR. [č̣] and [j̣] in the examples in (20a) and (20b) are non-alternating in that they are never found to alternate with [k] and [g] respectively. Also, there is no motivation for analyzing these palatals as being derived from underlying /k̄I/ and /ḡI/ sequences followed by another vowel (like [s̄], which can be derived from an underlying /h̄I/ sequence followed by another vowel).<sup>10</sup>

In (16) I have given examples of surface [s̄] which is derived from an underlying /h̄I/ sequence. I will further conjecture that all other occurrences of [s̄] in my data are derived from /h/ by rule (14),

<sup>10</sup> There is an argument, however, for considering a non-alternating [č̣] in the SR to be derived from an underlying [k̄I] sequence. Evidence for such a hypothesis comes from forms like Ič̣oka and Ič̣oova (c.f. (20a i)) in which the prefix does not lower to [e]: In Llo-goori, as we will see, [l] in the prefix lowers to [e] if the first vowel of an immediately following stem is mid. By analyzing the underlying forms of Ič̣oka and Ič̣oova as /I+k̄Ioka/ and /I+k̄Iova/, one can account for the inapplicability of the vowel lowering rule to be formulated in (82) (and finalized in (87)). However, this alternative hypothesis has its weakness, which I will discuss in footnote (14).

since they are all found in front of the upper high vowel [i] in the

SR:

21a.	I-s̄iiri	"clan"
21b.	ri-dosi	"mud"
21c.	ma-s̄iiga	"cooking stones"

With the palatalization rule (14), one can best account for the highly restricted distribution of [s̄] by analyzing the surface [s̄] in each example in (21) as an underlyingly [h]. Thus:

22a.	I-s̄iiri	/I + hiiri/	"clan"
22b.	ri-dosi	/ri + dohi/	"mud"
22c.	ma-s̄iiga	/ma + hiiga/	"cooking stones"

In conclusion, since the surface contrast between [s̄] and [h] in (12c i-ii) and (13c) can be accounted for in morphological terms, and all other occurrences of [s̄] can be derived from underlying /h̄I/ or /h/ before the upper high front vowel, [s̄] is not considered an underlyingly contrastive segment in this study.

The distribution of the palatal nasal [ɲ] and glide [y] will be discussed along with other nasals and glides respectively in the following paragraphs.

C) Nasals

The dental nasal [ɲ] is never found in front of the upper high vowels [i] and [u] in the SR. When occurring in front of the upper high front vowel [i] at an intermediate or underlying level of derivation, [ɲ] changes to [ɲ̄], regardless of the morphological characteristics of the upper high front vowel:

- 23a. i) kU<sup>v</sup>ceeni . /kU + kI + yen + i/ "we have just wanted  
we cl.7 want F.V. it"
- ii) yeyeni /yI + yen + i/ "want yourselves"  
RFLX want F.V.
- iii) kU<sup>v</sup>ceeniza /kU + kI + yen + iz + a/ "to make it want"  
cl.15 cl.7 want CAU F.V.
- compare,
- 23b. i) kU<sup>v</sup>ceena /kU + kI + yen + a / "to want it"  
cl.15 cl.7 want F.V.
- ii) yeyene /yI + yen + e/ "want yourself!"  
RFLX want F.V.
- iii) kU<sup>v</sup>ceenera /kU + kI + yen + Ir + a/ "to want for it"  
cl.15 cl.7 want APP F.V.

(RFLX = reflexive)

The systematic alternation between [ɲ] and [ɲ̄] as seen in (23) can be expressed by the following rule:

$$24. \quad \underset{\text{ɲ}}{\text{ɲ}} \text{ ----> } \underset{\text{ɲ̄}}{\text{ɲ̄}} / \text{ \_\_\_\_\_\_ } i$$

While no examples in my data show any productive alternation between [ɲ] and [ɲ̄] in front of the upper high back vowel [u] in the SR, [ɲ̄] in all surface [ɲu] sequences may still be analyzed as underlyingly a dental nasal based on the fact that [ɲ] is never found in front

of [u] in the SR. Under this analysis, rule (24) can be generalized to:

$$25. \quad \underset{\text{ɲ}}{\text{ɲ}} \text{ ----> } \underset{\text{ɲ̄}}{\text{ɲ̄}} / \text{ \_\_\_\_\_\_ } [+upper]$$

Rule (25) replaces rule (24).

With rule (25), lexical items like the following can be analyzed as having a dental nasal in their underlying forms:

- 26a. muɲu /mu-ɲu/ "soup"
- 26b. -akaɲu /-akaɲu/ "red"

While [ɲ] occurs exclusively in front of non-upper vowels, [ɲ̄] does not occur exclusively in front of the upper vowels. Consider the following forms which demonstrate the contrast between [ɲ] and [ɲ̄] in front of non-upper vowels:

- 27a. i) kUma<sub>ɲ</sub> /kU + ma<sub>ɲ</sub> + a/ "to know"  
cl.15 know F.V.
- ii) kUma<sub>ɲ̄</sub>Ira /kU + ma<sub>ɲ̄</sub> + Ir + a/ "to know for"  
cl.15 know APP F.V.
- iii) nakUma<sub>ɲ̄</sub> /na + kU + ma<sub>ɲ̄</sub> + e/ "we will know"  
T/A 1st know F.V.  
(MFT) pl

compare,

- 27b. i) kU<sup>v</sup>cuuka<sub>ɲ</sub> /kU + cuuka<sub>ɲ</sub> + a/ "to stir"  
cl.15 stir F.V.
- ii) kU<sup>v</sup>cuuka<sub>ɲ̄</sub>Ira /kU + cuuka<sub>ɲ̄</sub> + Ir + a/ "to stir for"  
cl.15 stir APP F.V.
- iii) nakU<sup>v</sup>cuuka<sub>ɲ̄</sub> /na + kU + cuuka<sub>ɲ̄</sub> + e/ "we will stir"  
T/A 1st pl. stir F.V.  
(MFT)

- 27c. i) kUganagana /kU + ganagan + a/ "to think"  
 cl.15 think F.V.
- ii) kUganaganIra /kU + ganagan + Ir + a/ "to think for"  
 cl.15 think APP F.V.
- iii) nakUganagape /na + kU + gangan + e/ "we will think"  
 T/A 1st pl. think F.V.  
 (MFT)

Based on the opposition between [n̄] and [p] as shown in the data in (27), the underlying contrastive status of [p] can be established.

Nasals in Llogoori assimilate to the following consonants in place of articulation:

- 28a. N → ŋ  
 enḡoko /N + goko/ "chicken"  
 cl.9 chicken
- 28b. N → p  
 Inḡaafu /IN + ʷaaflu/ "dirty, cl. 9"  
 cl.9 dirty
- 28c. N → n  
 endeve /IN + deve/ "chair"  
 cl.9 chair
- 28d. N → m  
 Imburi /IN + vuri/ "goat"  
 cl.9 goat
- 28e. N → n̄  
 nen̄aa /N + yen̄ + aa/ "I am wanting"  
 1st want F.V.  
 sg

With the exception of (28e), the analysis of the examples in (28) is straightforward: the nasal segment in the class 9 prefix /IN-/ assimilates to the following root initial consonant in place of articulation in the SR. In example (28e), the root initial glide is deleted on the surface by Internasal Consonant Deletion (78) to be postulated later. The surface dental articulation of the nasal morpheme /N-/ is then accounted for by ordering the deletion of the interdental glide after the process of nasal assimilation stated as follows:

29. Nasal Assimilation

[+nas] → [ɔ place] / \_\_\_\_ [ɔ place]

An apparent exception to rule (29) is the syllabic nasal [m̄] which is a conditioned variant of the noun classes 1 and 3 prefix /mu-/. It is noticed that [m̄] never assimilates to the following consonants:

- 30a. Cl. 1  
 i) m̄-kari "woman"  
 ii) m̄-saaza "husband"
- 30b. Cl. 3  
 i) m̄-gera "river"  
 ii) m̄-saara "tree"

These apparent exceptions will be accounted for in section 2.2.4.

Nasal segments delete when followed by [s]:

31a. saambaa /N + samb + aa/ "I am burning"  
 1st burn F.V.  
 sg.

compare,

31b. nduyaa /N + duy + aa/ "I am hitting"  
 1st hit F.V.  
 sg.

31c. ngaragaa /N + karag + aa/ "I am cutting"  
 1st cut F.V.  
 sg.

In (31a), the nasal prefix does not surface as it does in (31b) and (31c). The rule of nasal deletion can be informally stated as follows:

32. Nasal Deletion (Preliminary)

N ----> Ø / \_\_\_\_ s

Nasals delete also when followed by another nasal segment:

33a. i) naguraa /N + nagUr + aa/ "I'm running"  
 1st run F.V.  
 sg.

compare

ii) kUnagUraa /kU + nagUr + aa/ "we are running"  
 1st run F.V.  
 pl.

33b. i) moromaa /N + morom + aa/ "I'm speaking"  
 1st speak F.V.  
 sg.

compare,

ii) komoromaa /kU + morom + aa/ "we are speaking"  
 1st speak F.V.  
 pl.

33c. i) pweezaa /N + nue + iz + aa/ "I'm drinking"  
 1st drink F.V.  
 sg.

compare,

ii) kUpweezaa /kU + nue + iz + aa/ "we're drinking"  
 1st drink F.V.  
 pl.

33d. i) nagIraa /N + nagIr + aa/ "I'm jumping"  
 1st jump F.V.  
 sg.

compare,

ii) kUnagIraa /kU + nagIr + aa/ "we are jumping"  
 1st pl. jump F.V.

To account for the data in (33), (32) is revised as follows:

34. Nasal Deletion (Final Version)

N ----> Ø / \_\_\_\_ {s  
 N}

The derivation of pweezaa (see (33c i)) illustrates the application of (34):



/ri+ra/ "that, cl.5" and llahI "pretty, cl.5" on the segmental level are as follows:

39.	ri + ra	ri + rahI	UR
	rra	rrahI	Interliquid Vowel Deletion (37)
	<u>lla</u>	<u>llahI</u>	Lateral Formation (38) (and other rules)

So far, we have seen examples in which a vowel deletes between two underlying /r/ segments. In fact, a vowel deletes also in the context "r\_\_d".

40a.	<u>ddo</u> si	/ri + dohi/ cl.5 mud, earth	"mud, earth"
40b.	<u>ddiri</u> isya	/ri + diriisya/ cl.5 window	"window"
	compare,		
40c.	rikudu	/ri + kudu/ cl.5 turtle	"turtle, cl.5"

In (40) above, the prefix vowel /i/ does not surface in examples (40a) and (40b). Note that in both cases, the prefix vowel is followed by the consonant /d/. To account for the absence of the prefix vowel in these two cases, one may restate the vowel deletion rule in (37) as follows:

41. Interconsonant Vowel Deletion (preliminary)

$$V \longrightarrow \emptyset / r \text{ \_\_\_\_\_\_ } \left\{ \begin{array}{l} r \\ d \end{array} \right\}$$

(41) replaces (37). Then to account for the fact that the prefixal /r/ is realized as /d/, the analysis of the data in (36) is revised. Firstly, Lateral Formation (38) is reformulated as follows:

42. Lateral Formation (Final Version)

$$r \text{ \_\_\_\_\_\_ } \rightarrow l \left[ \begin{array}{l} +son \\ -nas \\ +cons \end{array} \right]$$

(42) replaces (38).

By (42), the second [r] of an [rr] sequence changes to [l]. Then by another assimilation rule to be postulated below, the first [r] assimilates fully to the following consonant just in case that the latter is a voiced non-nasal anterior consonant (like [l] and [d]):

43. Voiced Non-nasal Anterior Consonant Assimilation (VNACA)

$$r \text{ \_\_\_\_\_\_ } \rightarrow \left[ \begin{array}{l} +voiced \\ +anterior \\ -nasal \\ +cons \\ \alpha \end{array} \right] / \left[ \begin{array}{l} +voiced \\ +anterior \\ -nasal \\ +cons \\ \alpha \end{array} \right]$$

By (43), [r] fully assimilates to an immediately following voiced non-nasal anterior consonant like [l] and [d]. (Notice that VNACA (43) also predicts that an [r] would assimilate to an immediately following

[z]. However, there are no data obtained so far that consist of such a sequence--"[rz]"--in an intermediate stage of derivation to test such a prediction.) Given (41), (42), and (43), the derivations of lla "that, cl. 5" llahI "pretty, cl. 5", and ddosi "mud" can be derived as follows:

44a. Derivations of lla and llahI (compare derivations in (39))

ri + ra	ri + rahI	UR
rra	rrahI	Interconsonant Vowel Deletion (41)
rla	rlahI	Lateral Formation (42)
<u>lla</u>	<u>llahI</u>	Voiced Non-nasal Anterior Consonant Assimilation (43) Other Rules

44b. Derivation of ddosi

ri + dohi	UR
rdohi	Interconsonant Vowel Deletion (41)
ddohi	Voiced Non-nasal Anterior Consonant Assimilation (43)
<u>ddosi</u>	Palatalization (14) Other Rules

Again, the account for the surface syllabicity of the first member of the geminate [dd] will be postponed to section 2.2.4.

While a surface geminate [ll] can readily be derived by rules (41), (42), and (43), there are a few occurrences of single [l] which need further explanation:

45a. kI - tabu	kI - la	"one book"
cl.7 book	cl.7 one	
45b. kU - hUla		"to hear"
cl.15 hear		

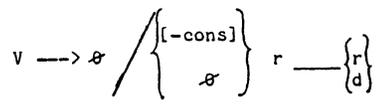
It is proposed here that the single [l] in (45 a-b) is a result of the shortening of a non-initial geminate [ll] which in turn is derived from an [rr] sequence. To see this, let us consider the surface variants of -la "one" and -hUla "hear" in the following examples:

46a. i) ry - aawa	<u>l</u> - lara	"one flower"
cl.5 flower	cl.5 one	
ii) rU-baaho	<u>l</u> - lara	"one board"
cl.11 board	cl.11 one	

46b. kU - hUra	"to hear"
cl.15 hear	

Leaving aside examples (45b) and (46b) for the moment, in example (46a), the stem for "one" is realized as lara as compared to la in example (45a). To account for the surface alternation between lara and la in these forms, it is hypothesized that: 1) the underlying form for "one" is /-rara/ and thus the underlying forms for "one, cl. 5" and "one, cl.11" are /ri + rara/ and /rU + rara/ respectively; 2) the SD of (41) should be restricted as follows:

47. Interconsonant Vowel Deletion (revised)



Rule (47) replaces rule (41)

By rule (47), a vowel will not delete if it is preceded by a consonant-liquid cluster. Now assume that Interconsonant Vowel Deletion (47) applies in a left-to-right manner. Given the underlying form /ri+rara/ "one, cl.5" and /rU + rara/ "one, cl. 11", it would be the prefixal vowel [i] and [U], not the first stem vowel [a], that is first subject to deletion. Once [i] and [U] are deleted, rule (47) will become inapplicable to the first stem vowel [a] because [a] is now preceded by a consonant-liquid cluster in each form, and the SD of (47) is not met. Lateral Formation rule (42) and VNACA (43) then apply to change the geminate [rr] to [ll]. Under this analysis, the derivations of llara /ri+rara/ "one cl.5" and llara /rU + rara/ "one, cl.11" are as follows:

48.	ri + rara	rU + rara	UR
	rrara	rrara	Interconsonant Vowel Deletion (47)
	---	---	Interconsonant Vowel Deletion (47) N/A
	llara	llara	Lateral Formation (42) VNACA (43) (& other rules)

This analysis correctly predicts that the stem for "one" is realized as lara only when preceded by a prefix with a "rV" shape.

Having assumed that the underlying form of "one" is /-rara/, one would expect a word medial geminate [ll] in the course of derivation of kIla "one, cl. 7" as seen in example (45a):

49.	kI + rara	UR
	kIrra	Interconsonant Vowel Deletion (47)
	kIlla	Lateral Formation (42) VNACA (43)

To correctly derive the single [l] in the SR, the following rule of degemination is postulated:

50.	Non-initial Lateral Degemination
	l -----> ∅ / ... ___ l
	where "..." ≠ ∅

The derivation of the form kIla thus proceeds from the last stage of (49) as follows:

51.	kIlla	Last stage in (49)
	kIla	Non-initial Lateral Degemination (50)

The hypothesis that a non-initial geminate [ll] reduces to single [l] in the SR finds support in (45b) and (46b), which are variants of the same verb meaning "to hear". The simplest analysis of these two forms is that the underlying form for "hear" is /-hUrir-/. The surface alternant -hU1- as occurs in the form kUhU1a is then derivable by the same rules employed in the derivation of kIla /kI+rara/ "one, cl.7":

52. Derivation of kUhUla:

kU + hUrir + a	UR
kUhUrira	Interconsonant Vowel Deletion (47)
kUhUlla	Lateral Formation (42) VNACA (43)
kUhUla	Non-initial Lateral Degemination (50)

This analysis correctly predicts that geminate [ll] occurs exclusively in word initial position and single [l] in non-initial positions. (Notice that the surface variation between kUhUla and kUhUrira suggests that perhaps Interconsonant Vowel Deletion (47) is only an optional rule root-internally.)<sup>11</sup>

Since we can derive both the surface geminate [ll] and single [l] from [rr], [l] is not considered an underlyingly contrastive segment in Llogoori. The only thing that has yet to be accounted for is the syllabicity of the first member of a geminate sequence (c.f. [ll] in (36a i) (36b i) (46a)), and [dd] in (40a)). This point will be addressed in section 2.2.4.

E) Glides

[y] in many cases patterns with [w] in that they are both conditioned variants of high vowels when these high vowels are immediately followed by other vowels:

<sup>11</sup> According to Ms. Kilibwa, the variant from that results from Interconsonant Vowel Deletion (47) is used more commonly in colloquial speech. Thus, kUhUrira is favored in writing and more formal speech, while kUhUla is favored in casual speech.

53a. u ---> w		
i) mwaana	/mu + ana/ cl.1 child	"child"
compare,		
ii) muyaayI	/mu + yaayi/ cl.1 boy	"boy"
53b. U ---> w		
i) rwiIga	/rU + Iga/ cl. 11 horn	"horn"
compare,		
ii) rUbaaho	/rU + baaho/ cl.11 board	"board"
53c. i ---> y		
i) ryiIta	/ri+yIta / cl.5 <sup>n</sup> name	"name"
compare,		
ii) rigIna	/ri + gIna/ cl.5 stone	"stone"

([I], though not exemplified above, also surfaces as [y] when in the context C\_\_V.) Note that the change of the [+high] vowels to glides is always accompanied by the lengthening of the following vowels. (Thus, in (53a i), /-ana/ becomes [aana] as /mu-/ becomes [mw], and in (53c i), /-yIta/ becomes [IiIta] as /ri-/ becomes [ry]. Under a linear account of these data, two rules need be formulated, namely, Glide Formation and Vowel Lengthening, informally stated as the following:

54. Glide Formation (Preliminary)

- a) i, I → y / \_\_\_\_ V  
 b) u, U → w / \_\_\_\_ V

55. Vowel Lengthening

- V → VV / { y / w } \_\_\_\_

Condition: [y] and [w] are derived by (54)

Note that these two rules may serve to correctly derive the forms in (53) if and only if they are assumed to always apply in conjunction and in a crucial order: (54) -- (55). There is no independent application of (54) or (55) in Llogoori grammar. It will be shown later that rule conspiracy as well as the "global" condition of (55) can be avoided if an autosegmental approach is adopted.

In example (53) above, the high vowels that undergo glide formation are preceded by consonants. It should be pointed out that the operation of glide formation in Llogoori does not require the presence of a preceding consonant:<sup>12</sup>

56. Imbago yaan<sub>ɛ</sub>ge /IN + vago I + ange/ "my hoe"  
 cl.9 hoe cl.9 1st  
 sg.  
 POSS

In this example, the cl.9 prefix undergoes glide formation although it is not preceded by a consonant. An important point to note is that in this example, the interdental glide [y̠] instead of [y] surfaces, whereas when preceded by a consonant, high front vowels that undergo glide formation always surface as [y] (regardless of the quality of the following vowel). So let us suppose that the high front vowels change to [y̠] when followed by a vowel. A feature changing rule then applies subsequently to palatalize the dental glide if the latter occurs in a "C \_\_ V" context. Under this analysis, Glide Formation (54a) is revised as follows:

57. Glide Formation (Revised)

- a) i, I → y̠ / \_\_\_\_ V (revised from (54a))  
 b) u, U → w̠ / \_\_\_\_ V (same as (54b))

(57) replaces (54).

The rule that palatalizes a [y̠] to [y] in the "C \_\_ V" context can be stated as follows:

58. Palatalization of y̠

- y̠ → y / C \_\_\_\_ V

[y] is also found to be a palatalized variant of [y̠] in front of the upper high front vowel [i]. Consider the following lexical items.

<sup>12</sup> In Luganda, in contrast, the general rule of glide formation takes place only if the high vowel is preceded by a consonant (Clements, 1986).

59.	[y]	[y]	
	kItuyi	"ear"	mgoye "string"
	engoyi	"leopard"	muyaayI "boy"
	yita	"kill"	mwooyo "heart"
			rUwaaya "wire"
			yUma "dry up"

In (59), [y] occurs exclusively in front of the upper high front vowel [i], and [y] occurs exclusively before non-upper vowels. This alternation between [y] and [y] is synchronically productive in Llogoori. Consider the following:

60a.	i)	kUduyi	/kU + duy + i/ 1st hit F.V. pl.	"we have just hit"
		compare,		
	ii)	kUduya	/kU + duy + a/ cl. 15 hit F.V.	"to hit"
	iii)	kIduyI	/kI + duy + e/ cl. 7 hit F.V.	"You (sg.) hit it!"
60b.	i)	kUduyiza	/kU + duy + iz + a/ cl. 15 hit CAU F.V.	"to cause to hit"
		compare,		
	ii)	kUduyIra	/kU + duy + Ir + a/ cl. 15 hit APP F.V.	"to hit for"

On the basis of the data in (60), one may hypothesize that [y] palatalizes to [y] when followed by the upper high front vowel [i]:

61.  $y \xrightarrow{\text{[i]}} y$  / \_\_\_\_\_ i

It should be pointed out, however, that similar to the dental nasal, the dental glide is never found to occur before the upper high back vowel [u] either. So if we suppose that an underlying sequence of /y<sub>n</sub>/ also changes to [yu], rule (61) can be collapsed with rule (25) as follows:

62. Palatalization of Dental Consonants

$y \xrightarrow{\text{[+upper]}} y$   
 $n \xrightarrow{\text{[+upper]}} \eta$

Generalizing rule (62) to the non-alternating forms seen in (59), the underlying forms of kItuyi "ear" and engoyi "leopard" would be /kI+tuyi/ and /IN+goyi/ respectively. Under this analysis, all surface occurrences of [y] are considered conditioned variants of [y] or of the high front vowels (c.f. rules (62), (57a), and (58)). Since there are no occurrences of [y] that cannot be derived in this way, [y] is therefore not established as an underlying phoneme.

The phonological status of [w] in Llogoori also deserves comment. It is noticed that in Llogoori, except in final syllables, where all vowels are short if preceded by a glide, [w] is always followed by long vowels even when cases in which it is unambiguously derived by Glide Formation (57b) (c.f. examples in (53)) are disregarded.

63. In non-final syllables      In final syllables

rU-waaya	"wire"	ry-aawa	"flower"
Iη-gwIina	"crocodile"	Im-bwa	"dog"
vU-rwaani	"war"	ma-rwa	"hard liquor"

There is no instance of [w] occurring in non-final short syllables in my data.

The same generalization cannot be made about the dental glide [y] which occurs in both long and short non-final syllables:

64. <u>In long syllables</u>	<u>In short syllables</u>
mu-yaayI "boy"	mu-yeke "sand"
	kU-yavIr-a "to bury"
	yI-rUm-I "bite yourself"
	kW-aa-yUm-i "we dried"

One possible way to account for the distributional gap of [w] is to analyze every instance of a surface [w] as underlyingly a [+high +back] vowel that becomes [w] by Glide Formation (57b) which in turn induces vowel lengthening (55). This hypothesis correctly predicts that a non-final vowel that follows [w] in the SR is always long. That [w] is followed by short vowels in final position does not constitute an argument against this hypothesis, because these short vowels can be shown to be derived by an independent general rule of the language, namely, Final Vowel Shortening. To see this, consider the derivation of the form kUrya /kU + rI +a/ "to eat". The UR of this form constitutes an input for (57)-(55), after the application of which one expects an intermediate form "kUryaa". The fact that the final vowel of this word in the SR is short suggests that long vowels preceded by a glide are shortened in word final position in Llogoori. This hypothesis is supported by the fact that in Llogoori no final "glide-long vowel" sequences are attested in the SR. The rule of final vowel shortening is postulated as follows:

65. Final Vowel Shortening (Preliminary)

VV ---> V / G \_\_\_ #

where "G" stands for a glide

In conclusion, based on the data obtained so far, all occurrences of surface [w] in the language may be considered underlyingly high back vowels. One of the advantages of postulating this more abstract underlying representation for [w] in forms like those given in (63) is phonological economy: since all occurrences of [w] can be considered derived, it need not be set up as an individual phoneme. More importantly, this analysis explains why non-final vowels are always long after [w] in the SR.

F) Other Rules

a) Voicing of Consonants

With the exception of [s], which causes the preceding nasal to delete (see (34)), all voiceless consonants in Llogoori become voiced when preceded by a nasal segment:

66a. k ---> g

i) ngaragaa /N + karag + aa/ "I'm cutting"  
 1st cut F.V.  
 sg.

compare,

ii) kUkaragaa /kU + karag + aa/ "we are cutting"  
 1st pl. cut F.V.

iii) akaragaa /a + karag + aa/ "He/She is cutting"  
 3rd sg. cut F.V.

66b. t ----> d

i) ndUraa /N + tUr + aa/ "I'm from"  
1st sg. be from F.V.

compare,

ii) atUraa /a + tUr + aa/ "He/She is from"  
3rd sg. be from F.V.

iii) kUtUraa /kU + tUr + aa/ "we are from"  
1st pl. be from F.V.

66c.  $\overset{v}{c}$  ---->  $\overset{j}{j}$

i) engoko InJaafu /IN + goko IN + Jaafu/ "dirty chicken"  
cl.9 chicken cl.9 dirty

compare,

ii) kagoko kaJaafu /ka + goko ka + Jaafu/ "dirty small chicken"  
cl.12 chicken cl.12 dirty

66d. f ( ----> v) ----> b\*

i) mbuuyaa /N + fuuy + aa/ "I am washing"  
1st sg. wash F.V.

compare,

ii) kUfuuya /kU + fuuy + a/ "to wash"  
cl.15 wash F.V.

iii) afuuyaa /a + fuuy +aa/ "He/She is washing"  
3rd sg. wash F.V.

\*That the underlying fricative [f] is realized as a stop will be accounted for by the rule of Stop Formation to be postulated shortly.

(One may speculate that an underlying sequence of [Np] would also surface as [mb]. However, such an underlying sequence is not attested in my data.)

The following rule is postulated for the data in (66):

67. Voicing of Consonants

$$\left[ \begin{array}{l} +\text{cons} \\ -\text{voiced} \end{array} \right] \text{ ----> } [+voiced] / [+nas] \text{ ----}$$

Note that examples seen in (30) above constitute apparent exceptions to rule (67) also. But as we will see later, these exceptions can be accounted for in terms of rule ordering. Likewise, that [s] does not change to [z] by rule (67) (c.f. (31 a)) can be accounted for by ordering Nasal Deletion (34) before (67).

b) Stop Formation

When preceded by nasals, [r] becomes [d], [v] and [h] become

[b]:

68a. r ----> d; v ----> b

i) Imburi Indahi /IN + vuri IN+ rahi / "pretty goat"  
cl.9 goat cl.9 pretty

compare,

ii) kavuri karahi /ka + vuri ka + rahi/ "pretty small goat"  
cl.12 goat cl.12 pretty

iii) gUvuri gUrahi /gU + vuri gU + rahi / "pretty big goat"  
cl.20 goat cl.20 pretty

68b. h ----> b

- i) mbaandiikaa /N + handiik + aa/ "I'm writing"  
1st sg. write F.V.
- ii) mbeenzaa /N + henz + aa/ "I'm looking for"  
1st look F.V.  
sg. for
- compare,
- iii) kUhaandiika /kU + handiik + a/ "to write"  
cl.15 write F.V.
- iv) koheenza /kU + henz + a/ "to look for"  
cl.15 look for F.V.

- 71. IN + h̄Iu IN + h̄Ia UR
- INhyuu INhyaa Glide Formation (57a) & Vowel Lengthening (55)
- In̄suu In̄saa Consonant-Glide Reduction (19)
- --- Stop Formation (69b) N/A
- \*In̄zu \*In̄za Voicing of Consonants (67) & other rules

The following rules of Stop Formation are postulated to account for the data in (68):

69. Stop Formation

- a) r -----> d
- b) h, v -----> b [+nas] \_\_\_\_\_

(69b) just postulated accounts for the derivation of Imbyu "hot cl.9" and Imbya "new cl.9" seen in (17).

- 70. IN + h̄Iu IN + h̄Ia UR
- INhyuu INhyaa Glide Formation (57a) & Vowel Lengthening (55)
- INbyuu INbyaa Stop Formation (69b)
- Imbyu Imbya Nasal Assimilation (29) Final Vowel Shortening (65)

Note that underlying the derivations in (70) is the crucial ordering of Stop Formation (69b) before Consonant Glide Reduction (19), or else incorrect surface forms will result:

c) Spirantization of /y/:

An underlying /y/ surfaces as a [z] after a nasal segment:

- 72a. i) nzereemaa /N + yereem+aa/ "I'm swimming"  
1st.sg. swim F.V.
- ii) vaanzereemere /va+N+yereem+Ir+e/ "They've just swum  
3rd 1st swim APP F.V. for me"  
pl. sg.
- compare,
- iii) yereema /yereem + a/ "You (sg.) swim!"  
swim F.V.
- iv) kwaayereemi /kU+aa+yereem+i/ "we swam"  
1st I/A swim F.V.  
pl.(MPT)
- 72b. i) nzIrUmaa /N + yI + rUm + aa/ "I am biting myself"  
1st RFLX bite F.V.  
sg.
- compare,
- ii) yIrUmI /yI + rUm + I/ "bite yourself"  
RFLX bite F.V.
- 72c. i) nziti /N + yit + i/ "I have just killed"  
1st kill F.V.  
sg.
- compare,
- ii) yita /yit + a/ "You (sg.) kill!"  
kill F.V.
- 72d. i) enzoka /IN + yoka/ "snake"  
cl.9 snake
- compare,
- ii) kayoka /ka + yoka/ "small snake"  
cl.12 snake

The rule that accounts for the spirantization of the high front glide can be informally stated as follows:

73. Spirantization

y ----> z / [+nas] \_\_\_\_\_

As will be shown below, not all occurrences of an underlying /y/ in a post-nasal environment change to a [z].

d) Deletion of /r/ and /y/

/r/ and /y/ delete if the immediately preceding consonant is a nasal and the next consonant is also a nasal.

Consider the following sets of examples, illustrating the deletion of /r/:

- 74a. i) nIIndaa /N + rInd +aa/ "I'm waiting"  
1st wait F.V.  
sg.
- ii) nIIndi /N + rInd +i/ "I've just waited"  
1st wait F.V.  
sg.
- compare,
- iii) kUrIInda /kU + rInd +a/ "to wait"  
cl.15 wait F.V.

74b. i) noondaa /N + rond + aa/  
1st follow F.V.  
sg. "I'm following"

ii) noondi /N + rond + i/  
1st follow F.V.  
sg. "I've just followed"

compare,

iii) koroonda /kU + rond + a/  
cl.15 follow F.V. "to follow"

74c. i) nUmaa /N + rUm + aa/  
1st bite F.V.  
sg. "I'm biting"

ii) nUmi /N + rUm + i/  
1st bite F.V.  
sg. "I've just bitten"

compare,

iii) kUrUma /kU + rUm + a/  
cl.15 bite F.V. "to bite"

Comparing examples i) and ii) in (74a) and (74b) against those of (75) in the following, one can see that in (74), the post nasal /r/ deletes whereas in (75), it undergoes Stop Formation (69a) instead.

75a. i) ndekaa /N + rek + aa/  
1st leave F.V.  
sg. "I'm leaving"

ii) nde<sup>y</sup>ci /N + rek + i /  
1st leave F.V.  
sg. "I've just left"

compare,

iii) koreka /kU + rek + a/  
cl.15 leave F.V. "to leave"

75b. i) ndoraa /N + ror + aa/  
1st see F.V.  
sg. "I'm seeing"

ii) ndori /N + ror + i /  
1st see F.V.  
sg. "I've just seen"

compare,

iii) korora /kU + ror + a/  
cl.15 see F.V. "to see"

75c. i) ndUhaa /N + rUh + aa/  
1st get F.V.  
sg. tired "I'm getting tired"

ii) ndU<sup>y</sup>si /N + rUh + i/  
1st get F.V.  
sg. tired "I've just got tired"

compare,

iii) kUrUha /kU + rUh + a/  
cl.15 get F.V.  
tired "to get tired"

The determinant for the different treatments of the root initial /r/ in (74) and (75) is not the immediately following vowel, since /r/ is followed by the same vowel in the examples in (74b) and (75b), and also in (74c) and (75c). It is proposed here that the deletion of /r/ is conditioned also by the first consonant after /r/: if both the immediately preceding consonant and the next consonant (following /r/) are nasal, then /r/ deletes.

Thus,

76. r ---> Ø / [+nas] \_\_\_ V(V) [+nas]

/y/ deletes in the "[+nas] \_\_\_ V(V) [+nas]" environment also:

- 77a. i) nepi /N + yen + i/  
1st want F.V.  
sg. "I've just wanted"
- ii) vaanepi /va + N + yen + i/  
3rd 1st want F.V.  
pl. sg. "They have just  
wanted me"
- compare,
- iii) yena /yen + a/  
want F.V. "You (sg.) want!"
- iv) kwaayeni /kU + aa + yen + i/  
1st T/A want F.V.  
pl (MPT) "we wanted"
- 77b. i) naanzIraa /N + yanz + Ir + aa/  
1st love APP F.V.  
sg. "I'm loving for"
- ii) vaanaanzIrI /va + N + yanz + Ir + e/  
3rd 1st love APP F.V. "They've just  
pl. sg. loved for me"
- compare,
- iii) kUyaanzIra /kU + yanz + Ir + a/  
1st love APP F.V. "to love for"
- iv) kwaayaanzIrI /kU + aa + yanz + Ir + I/  
1st T/A love APP F.V.  
(MPT) "we loved for"

The rule to account for the data in (77) can be collapsed with (76) as the following:

78. Internasal Consonant Deletion

$$\begin{Bmatrix} r \\ y \end{Bmatrix} \rightarrow \emptyset / [+nas] \_\_\_\_\_\_ V(V)[+nas]$$

(78) replaces (76).

Internasal Consonant Deletion (78) must be ordered before Stop Formation (69a) and Spirantization (73) in order to explain why the /r/ in i) and ii) of (74) does not become [d] and the /y/ in i) and ii) of (77) does not become [z]. Also, to correctly predict the surface phonetic shape of the first nasal in examples i) and ii) of (74) and (77), (78) must be ordered after Nasal Assimilation (29).

Before going on, let us pause to consider an alternative analysis for the forms given in (74) and (77): suppose that /r/ and /y/ in i) and ii) of (74) and (77) first change to [d] and [z] by Stop Formation (69) and Spirantization (73) respectively, and only then do the derived [d] and [z] delete in the "[+nas] \_\_\_ V(V) [+nas]" environment. One of the ways to test this alternative hypothesis is to see if [d] and [z] which are not derived from /r/ and /y/ respectively would delete in this context. The following example shows that [d] and [z] do not delete in the "[+nas] \_\_\_ V(V) [+nas]" context:

- 79a. i) Induumba /IN + dumba/  
cl.9 drum "drum"
- ii) kaduumba /ka + dumba/  
cl.12 drum "small drum"
- 79b. i) zinzimBI /zinz + imbI/  
cl.10 short "short, cl.10"
- ii) zInzIga /zinz + Iga/  
cl.10 horn "horns"

Examples (79a i) and (79b i) show that an underlying [d] (of /-dumba/ "drum") and [z] (of /zinz-/ "class 10") can occur in the SR in the "[+nas]\_\_\_V(V) [+nas]" context, thus suggesting that examples i) and ii) of (74) and (77) cannot be derived by a rule that deletes [d] and

[z] in the "[+nas] \_\_\_ V(V) [+nas]" context. This observation lends support to the hypothesis that it is /r/ and /y/, not [d] and [z], that delete in the "[+nas] \_\_\_ V(V) [+nas]" environment, or else, only the first singular prefix triggers deletion.

#### Summary of Derivations of Underlying Nasal-Consonant Sequences

As one may have noticed, many phonological rules postulated in the preceding discussions involve the nasals in their structural description. Given in the table below is a summary of the derivations of underlying nasal-consonant sequences, along with the rules that are relevant to their derivations:

TABLE 3

#### Derivations of Underlying Nasal-Consonant (NC) Sequences

Relevant Rules	Derivation of underlying NC sequences	Example	Gloss
--	N+p → ?	---	---
--	N+b → ?	---	---
(29),(67), (69b)	N+f (→ mv) → mb	mbuuya /N+fuuya/	"I am washing"
(29) (69b)	N+v → mb	Imburi /IN+vuri/	"goat"
(34)	N+s → s	saambaa /N+samb+aa/	"I am burning"
(29)	N+z → nz	nzIizagIlaa /N+zIizagII+aa/	"I am continuing"
(29), (67)	N+t → nd	ndUraa /N+tUr+aa/	"I am from"
(29)	N+d → nd	nduyaa /N+duy+aa/	"I am hitting"
(29),(69a) (29),(78)	N+r → nd → N	IndahI /IN+raHI/ nUmi /N + rUmi/	"pretty, cl.9" "I have just bitten"
(29),(67)	N+č → nč	Ipčaa /IN+čaa/	"dirty, cl.9"
(29)	N+č → nč	Ipčuu /IN+čuu/	"groundnut"
(29),(67)	N+k → ng	ngaragaa /N+karag+aa/	"I am cutting"
(29)	N+g → ng	ngUrizaa /N+gUriz+aa/	"I am selling"
(69b),(29)	N+h → mb	mbeenza /N+henz+aa/	"I am looking for"
(73) (29),(78)	N+y → nz → N	nziti /N+yit+I/ nenaa /N+yen+aa/	"I have just killed" "I am wanting"
(34)	N1 + N2 → N2	ngUra /N + ngUr+aa/	"I am running"
(34)		moromaa /N + morom+aa/	"I am speaking"
(62), (34)		pweezaa /N + pwe+iz+aa/	"I am drinking"
(34)		nagIraa /N + nagIr+aa/	"I am jumping at"

2.2.2.2 Vowels

One of the most notable phenomena concerning the distribution of Llogoori vowels is that of vowel assimilation, which refers to the mechanisms that govern the agreement of vowel qualities among the morphological constituents.<sup>13</sup>

a) Prefixes

In Llogoori, lower high vowels [I] and [U] in all prefixes alternate depending on the first vowel of an immediately following verb root: For example, the class 7 prefix /kI-/ has the following alternations in both the nouns and the verbs.

80.	Nouns		Verbs	
	ke-meeme	"lamb"	ke-reete	"bring it!"
	ke-vogo	"buffalo"	ke-noore	"find it!"
	compare,			
	kI-tuumba	"stool"	kI-guutI	"defeat it!!"
	kI-gUrU	"mountain"	kI-dUyI	"hit it!"
	kI-jiiiko	"spoon"	kI-viŕI	"hide it!"
	kI-rItU	"chest"	kI-kInIrI	"play for it!"
	kI-tabu	"book"	kI-karage	"cut it!"

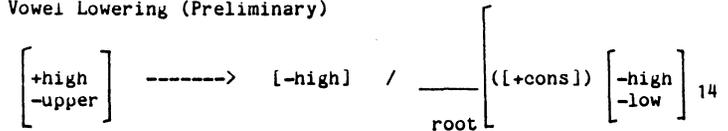
Likewise, the class 11 prefix shows an alternation between /rU-/ and /ro-/ and the infinitive prefix alternates between /kU-/ and /ko-/:

<sup>13</sup> Vowel assimilation occurs within the lexical root also. But due to space limitations, I exclude this topic from the present study since it has no immediate relevance to the understanding of Llogoori verb morphology.

81.	ro-moroma	"language"	ko-moroma	"to speak"
	ro-seke	"straw"	ko-reeta	"to bring"
	compare,			
	rU-baaho	"board"	kU- <sup>v</sup> cuukapa	"to stir"
	rU-fUrU	"lather"	kU-gUriza	"to sell"
	rU-guu <sup>v</sup> ci	"dust"	kU-visa	"to hide"
			kU-kIna	"to play"
			kU-karaga	"to cut"

The rule to account for the prefixal vowel alternations seen in (80) and (81) can be informally stated as follows:

82. Vowel Lowering (Preliminary)



<sup>14</sup> The class 9 prefix /I-/ in some lexical items fails to undergo this rule:

I- <sup>v</sup> coka	"chalk"
kI-fooyo	"fox"
I- <sup>v</sup> coov <sup>a</sup>	"outside"

In footnote (10) earlier, I proposed a hypothesis which can apparently account for the first two forms satisfactorily: under this alternative analysis, the surface [č] in both forms are analyzed as underlyingly a [kI] sequence. Therefore at the underlying level of structure, the root initial vowel is [I], not [o], and the SD of rule (82) would not be met. Likewise, the UR of kIfooyo would be /kI+fUoyo/, with the high vowel /U/ as the first underlying vowel segment in the root, and therefore does not undergo (82). The problem with such a hypothesis is that Glide Formation (57) and Vowel Lengthening (55) will incorrectly predict the [o] in the word "chalk" to be long in the SR:

An interesting observation to make is that vowel assimilation occurs not only between the root and the immediately preceding prefix, but also optionally among prefixes. Consider the two possible surface forms for the verb meaning "to cook it" as given below:

83. kUkedeeka ~ kokedeeka /kU + kI + deek +a/ "to cook it"

Where the prefix immediately preceding the root is represented as P1, the prefix in front of P1 is P2, and so on, the second variant in (83) can be derived by generalizing rule (82) to all prefixes instead of only P1, but stipulating that the rule applies first to P1 and then iteratively to the more peripheral prefixes P2, P3, and so on. Under this analysis, the subscript "root" can be removed from the SD of (82):

84. Vowel Lowering (Revised)

$$\left[ \begin{array}{l} +\text{high} \\ -\text{upper} \end{array} \right] \text{-----} > [-\text{high}] / \text{---} \left[ \begin{array}{l} ([+\text{cons}]) \\ [-\text{high} \\ -\text{low}] \end{array} \right]$$


---

I + k <sup>̄</sup> lɔka	UR
---	Vowel Lowering (82) N/A
Ikyooka	Glide Formation (57) Vowel Lengthening (55)
*I <sup>v</sup> cooka	Consonant-Glide Reduction (19)

Of course, one can argue that since I<sup>v</sup>coka is a loan word (from English "chalk"), it is an exception--like many other loans--to certain phonological rules of the language, in this case, the vowel lowering rule.

Furthermore, in order to account for the first variant form in (83), it is hypothesized that Vowel Lowering applies obligatorily only to P1, and optionally to other prefixes.

Under this analysis, kokedeeka derives as a result of the iterative application of (84)

85. kU + kI + deek + a      UR  
      kUkedeeka              (84)  
      kokedeeka              (84)

b) Suffixes

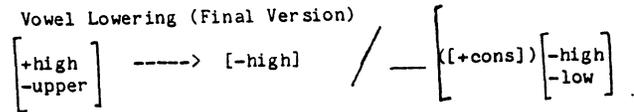
The non-upper high vowel [I] in the suffixal position also lowers if the previous vowel is mid. Consider the surface variations of the applied suffix /-Ir/ in the following:

86. ko-veg-er-a      "to shave for"  
      ko-morom-er-a    "to speak for"  
      compare,  
      kU-dUy-Ir-a      "to hit for"  
      kU-kuž-Ir-a      "to die for"  
      kU-kIn-Ir-a      "to play for"  
      kU-vis-Ir-a      "to hide for"  
      kU-karag-Ir-a     "to cut for"

The forms in (86) can be accounted for by modifying (84) as a mirror image rule. Furthermore, this rule must be a cyclic rule which applies from root to suffix, then stem to prefix so that the

forward assimilation is triggered only by lexical roots, not pre-fixes. The final version of Vowel Lowering is stated as follows:

87. Vowel Lowering (Final Version)



(Mirror Image; Cyclic)

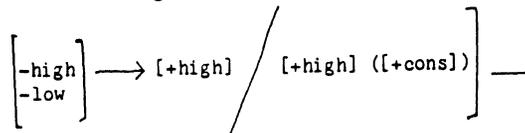
Rule (87) replaces (84).

The F.V. [e] assimilates to the nearest preceding vowel also. The F.V. in the imperatives with an object prefix and a singular subject prefix, for example, shows an alternation between [e] and [I], depending on the height of the preceding vowel:

- |     |             |               |
|-----|-------------|---------------|
| 88. | kI-rUm-I    | "bite it"     |
|     | kI-guut-I   | "defeat it"   |
|     | kI-gUriz-I  | "sell it"     |
|     | kI-dUy-Ir-I | "hit for it!" |
|     | compare,    |               |
|     | ke-veg-e    | "shave it"    |
|     | kI-saamb-e  | "burn it"     |
|     | ke-noor-e   | "obtain it"   |

Assuming that this F.V. is underlyingly /e/, the following rule accounts for such data as that in (88):

89. Vowel Raising



2.2.3 Phoneme Inventory

Having considered the major distributional facts of Llogoori surface phonetic segments, we establish the following as the underlying phonemes of the language:

90. Consonant Phonemes

	labial	dental	alveolar	palatal	velar	glottal
stops/affricates	p b		t d	ç j	k g	
fricatives	f v		s z			
liquids			r			
glides		y				h
nasals	m	n	n	ŋ		

Length is phonemically distinctive in the vowels:

91.	Short	Long
[u]	ri-kudu "turtle"	ri-kuuru "owl"
[U]	Im-bUtU "drop of water"	Im-bUUza "wind"
[i]	mu-ritU "forest"	m-siigo "sack"
[I]	kU-vIt-a "to pass"	kU-hIIz-a "to hunt"
[o]	ko-ror-a "to see"	ko-ŋoor-a "to obtain"
[e]	ko-veg-a "to shave"	ko-deek-a "to cook"
[a]	Im-bara "scar"	m-saara "tree"

In this study, phonological length is considered a parameter independent of the inherent features of the segments themselves. The distinction between long and short vowels will be made in terms of the

number of "timing units", a concept to be elaborated in section 2.2.4, that the vocalic segmental feature matrices are linked to. Consequently, on the segmental tier of structure alone, there is no distinction between long and short segments. The distinctive vowel segments in Llogoori are the following:

92. Vowel Phonemes

i	u
I	U
e	o
a	

In the orthography of this thesis, phonetic spelling is opted for in order that phonological variations can be revealed. Underlying representations are given between slants, as before.

2.2.4 CV Tier and Syllable Structure

In the previous section, I have discussed some major phonological processes in Llogoori in linear terms. In this section, I focus on the organization of segmental elements in relation to other autosegmental tiers, namely, the "CV" tier (to be elaborated below) and the syllable tier. It will be shown that some of the major phonological processes of the language (including some of those discussed in the previous sections) can be better explained as results of rules that affect the associations between the CV and segmental tiers. The phonological unit "syllable" will also be analyzed in terms of the CV units. The analysis of the hierarchical organization of these three tiers of structure to be developed in the following paragraphs is important to the tonal analysis of Llogoori verbs.

2.2.4.1 CV Tier

Following Clements' work on Luganda (Clements 1986), this study assumes that segmental elements in Llogoori are organized into syllables through the mediation of an abstract level of structure called the CV tier (or timing tier) which consists of an array of "C" and "V" units, roughly mnemonic for "consonantal" and "vocalic". They are phonological timing units to which segmental feature matrices are associated through autosegmental linkages exemplified in section 1.2. in order to receive a phonetic interpretation. It is the CV units that are in turn grouped into syllables, thus mediating the association between the segmental and syllable tiers.

The CV units are units in terms of which phonological length is defined; thus, phonologically "long" segments are said to be associated with a larger number of timing units than "short" segments. This approach is opposed to the view that length is an inherent feature (e.g. [ $\neq$ long]) of the segments themselves.

According to Clements' formulation, CV units are distinguished from each other in functional terms by the fact that

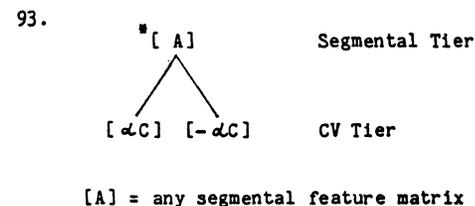
V-units serve as the locus of prosodic properties that cluster around the syllable peak, which may consist of extra intensity, greater duration, higher pitch or some combination of these. C-units do not normally attract these properties.....(ibid.)

So phonetic feature matrices linked to V-units form parts of the syllable peak, and those linked to the C units form parts of the syllable margin.

The unmarked type of linkages between the CV tier and segmental tier usually consists of one-to-one linkages between [-cons] segments and V-units, and between [+cons] and C-units. [-cons] segments that are linked to V-units constitute what we generally call "vowels", and [+cons] segments that are linked to C-units "(nonsyllabic) consonants". One-to-one linkages between the segmental and CV tiers constitute "unit phonemes". Marked linkages, on the other hand, are linkages of a one-to-many or many-to-one character, or linkages between [+cons] segments and V-units ("semivowels"), and between [-cons] segments and C-units ("syllabic consonants"). It is the marked linkages in Llogoori that will be focussed upon in this section.

Certain basic principles that govern the association relations between the segmental and CV units in Llogoori need be stated in the outset.

First of all, it is proposed that in Llogoori, there is a constraint against the linkage of a single segmental feature matrix to both a C-unit and a V-unit simultaneously. Where C is represented as "[+C]" and V "[-C]", a display like the following is ill-formed:



By the association convention (12d) of Halle and Vergnaud (1982) cited below:

94. If the application of a rule results in a violation of the conditions - either universal or language-specific - which must be met by well-formed representations in the language in question, the violation is removed by deleting links between autosegments and core phonemes established by earlier rules or conventions.

a feature matrix will be dissociated from an [ $\mathcal{L}$ C] unit to which is already linked at the point when this matrix comes to be associated with a [- $\mathcal{L}$ C] unit. The constraint as expressed in (93) and the convention stated in (94) will be of crucial importance in the analysis of Glide Formation and other phonological processes.

A Linking Convention similar to the one in Clements (ibid.) is also assumed to govern the CV- and segmental tiers of structure:

95. Linking Convention



In (95) above, V' represents a V-unit that is not associated with any segmental elements. [+son], on the other hand, designates a sonorant feature matrix (non-consonantal segment, liquid, or nasal) which may or may not be already associated with elements on the CV tier. Whenever the SD of (95) is met, an association line will be entered between the [+son] feature matrix and the free V.

Certain language-specific conditions that govern the application of convention (95) in Llogoori are stated as follows:

96a. In case more than one [+son] element can be associated with a single free V by (95), precedence is given to the one that has also the specification [-cons].

96b. If ambiguities persist after applying a), precedence is given to the [+son] feature matrix on the left.

Rule (97) below is furthermore assumed:

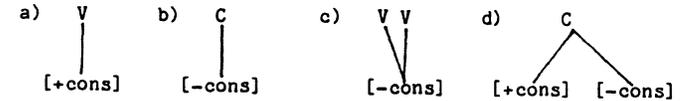
97. Empty Slot Deletion

CV-elements that are not associated with any segmental feature matrices in the SR are deleted.

As we will see, (93), and (95) to (97) serve to account for phonological processes of the language which involve phonological timing (or length) in a natural manner.

In addition to the simple short vowels and consonants, of the marked linkage types described before, Llogoori has the following on the surface: syllabic consonants (a), semivowels (b), long vowels (c), and internally complex consonants (d):

98.



A) Syllabic Consonants

(98a) represents what's generally called a "syllabic consonant", which has been marked by a "l" below the letter in the orthography of this study. Llogoori consonantal elements that can enter association with a V unit in the SR are the nasals, [l], and [d] (see also data in (30), (36) and (40), and (46)):

99a. llesi "sky" /ri+resi/  
 $\begin{array}{c} l \ l \ e \ s \ i \\ | \ | \ | \ | \\ V \ C \ V \ C \ V \end{array}$

99b. mkono "hand" /mu+kono/  
 $\begin{array}{c} m \ k \ o \ n \ o \\ | \ | \ | \ | \\ V \ C \ V \ C \ V \end{array}$

99c. ddosi "mud" /ri+dohi/  
 $\begin{array}{c} d \ d \ o \ s \ i \\ | \ | \ | \ | \\ V \ C \ V \ C \ V \end{array}$

As the data in (99c) (c.f. (40)) shows, like the surface syllabic [l], the surface syllabic [d] is also derived from an underlying /r/. Based on this observation, I propose that surface syllabic consonantal

segments in Llogoori are all results of the syllabification of the so-norant consonants /r/ or /m/ after certain vowel deletion processes. I will examine these vowel deletion processes below.

In Llogoori, the vowel [u] after [m] deletes except when the former is followed by an approximant. To see this, consider the surface variations in the class 1 and class 3 prefix /mu-/:

100a. cl. 1

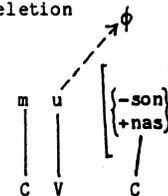
- i) m-kari "woman"
  - ii) m-saaza "husband"
- compare,
- iii) mu-yaayI "boy"

100b. cl.3

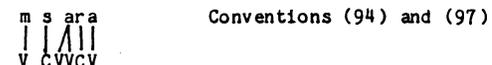
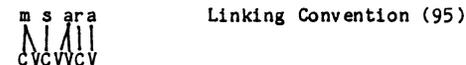
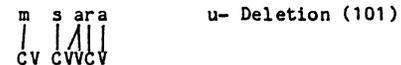
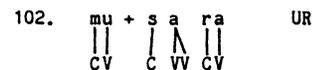
- i) m-saara "tree"
  - ii) m-gera "river"
- compare,
- iii) mu-hIIga "year"
  - iv) mu-riinga "beehive"

This vowel deletion process can be expressed as a process deleting the unit [u] on the segmental tier, but leaving V on the CV tier.

101. u-Deletion



The output of rule (101) is a configuration that constitutes the input for convention (95). By convention (95) and other principles stated in (93)-(97), m-saara "tree" derives as follows:

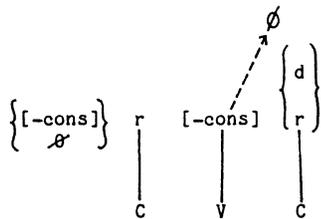


Earlier I mentioned that syllabic nasals do not undergo the nasal assimilation rule postulated in (29) (c.f. examples given in (30)). These exceptions to nasal assimilation can be accounted for by ordering (29) before the u-Deletion rule (101) just postulated. Thus:

103. mu+saara UR  
 ----- Nasal Assimilation (29) N/A  
 msaara u-Deletion (101)  
 | & Other Conventions

In my earlier discussion of surface derivation of geminate [ll] and [dd], I did not account for the fact that the first member of each geminate sequence is always syllabic. This can now be accounted for by reformulating the Interconsonant Vowel Deletion rule (47) as a rule deleting the vowel feature matrix on the segmental tier but leaving the V unit intact:

104. Interconsonant Vowel Deletion (Final Version)



(104) replaces (47). Again, the output of (104) provides an input for convention (95). By principle (96b), the first liquid consonant (or to say, the liquid on the left) associates with the free V-unit. Conventions (94) and (97) then apply as before. Lateral Formation (42) and VNACA (43) then apply to derive the surface representation. The derivations of lleesi llahI /ri+reesi ri+rahi/ "pretty sky" and ddo<sup>∨</sup>si /ri+dohi/ "mud" illustrate this analysis:

105. ri + re si ri + rahI ri + dohi UR  
 CV CVVCV CV CVCV CV CVCV  
 r re si r rahI r dohi Interconsonant  
 CVCVVCV CVCVCV CVCVCV Vowel Deletion (104)  
 r re si r rahI r dohi Linking Convention (95)  
 CVCVVCV CVCVCV CVCVCV (& Principle (96b))  
 rre si rrahI rdohi Conventions (94) and (97)  
 VCVCVCV VCVCV VCVCV  
 rle si rlahI ----- Lateral Formation (42)  
 CCVCVCV CCVCV  
 lle si llahi ddo<sup>∨</sup>si VNACA (43)  
 VCVCVCV VCVCV VCVCV Palatalization (14)

Under the analysis just provided, the reciprocal relation between the loss of a syllabic segment (vowel deletion) and the concomitant gain of a new syllabic segment (sonorant syllabification) is expressed as a natural process by which a segment (the sonorant consonant) is linked to the V unit that's left empty by another segment (the vowel). The most important thing, however, is that the syllabification of these consonants is not an isolated event in the language, but rather, a phenomenon predictable by a general principle (i.e. Linking Convention (95)), the application of which will be shown to be pervasive in the language.

B) Glides

(98b) characterizes glides or "semivowels" which have been represented as [y], [y̥] and [w] in this study. [-cons] elements that may associate with C-units in Llogoori are the [-cons, +high] segments. These segments, when linked to V units, constitute the high vowels of the language. It is important to point out that when linked to V-units in the SR, a further distinction, i.e. [±upper] is made among the [+high] segments: thus /i/ & /u/ Vs. /I/ and /U/. But when linked to C-units in the SR, this distinction is neutralized. In the displays of the following examples, where a high segment of a morpheme is invariably linked to a C-unit in the SR (for example, the [w] in the examples given in (63), and the [y]/[y̥] in (59)), this high segment will be represented on the segmental tier as [̄U] or [̄I] which stand for a [-cons, + high, +back] feature matrix and a [-cons, +high, -back] feature matrix respectively. This notation implies no specification for the feature UPPER. On the other hand, where a glide alternates morphophonemically with a high vowel in the SR, the ± value of the vowel alternant with respect to the feature UPPER will be expressed on the segmental tier of the glide alternant as well. This is merely a notational practice, and not a claim about surface [±upper] contrasts in the glides.

Since in this study, all surface [w]'s are analyzed as underlyingly high back vowels and surface [y]'s as derived from high front vowels or [y̥], the glides that can occur underlyingly are [y̥] and [h]:

106.	y̥		h
a)	muy̥aay̥I	"child"	muhIIga "year"
	$\begin{array}{c} \text{mU-}\bar{\text{I}}\text{a}\bar{\text{I}} \\ \text{  } \text{  } \text{  } \text{  } \\ \text{CV CVVCV} \end{array}$		$\begin{array}{c} \text{mu-h I ga} \\ \text{  } \text{  } \text{  } \text{  } \\ \text{CV CV VCV} \end{array}$
b)	muy̥eke	"soil"	havUUndu "place"
	$\begin{array}{c} \text{mu-}\bar{\text{I}}\text{eke} \\ \text{  } \text{  } \text{  } \text{  } \\ \text{CV CVCV} \end{array}$		$\begin{array}{c} \text{ha-vUndu} \\ \text{  } \text{  } \text{  } \text{  } \\ \text{CV CVVCV} \end{array}$

Surface glides can also be derived by the glide formation process to be discussed in detail shortly.

C) Long Vowels

The configuration in (98c) characterizes a "long" vowel which has been represented as a sequence of two identical vowels in the orthography of this study.

Long vowels can occur both underlyingly or be derived. Examples of underlying long vowels are the following:

107a.	ko-no ra	"obtain , get"
	$\begin{array}{c} \text{  } \text{  } \text{  } \text{  } \\ \text{CV CVVCV} \end{array}$	
107b.	ko-de ka	"to cook"
	$\begin{array}{c} \text{  } \text{  } \text{  } \text{  } \\ \text{CV CVVCV} \end{array}$	
107c.	riku ru	"owl"
	$\begin{array}{c} \text{  } \text{  } \text{  } \text{  } \\ \text{CVCVVCV} \end{array}$	

Long vowels are derived when two vowels are brought to juxtaposition by morphological or phonological processes. In this situation, one of the four processes described below will take place, each one of which results in a long vowel.

a) Identical Vowel Deletion

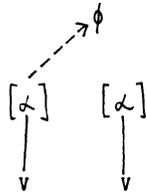
Given a sequence of two vowels, if these two vowels are identical in all features, the result is a long vowel:

108a. kUrIIra /kU + rI + Ir + a/ "to eat for"  
cl.15 eat APP F.V.

108b. riinU /ri + inU/ "tooth"  
cl.5 tooth

The rule of Identical Vowel Deletion is postulated as follows:

109. Identical Vowel Deletion



The result of rule (109) is a configuration that constitutes the input for the Linking Convention (95). Thus, the second vowel reassociates with the free V. (While rule (109) may seem to have no phonetic justifications as its input and output are phonetically identical, it is phonologically motivated. As we will see, rule (109) serves to block Glide Formation in identical high vowel sequences.) By (109), riinU "tooth, cl. 5" derives as follows:

110.  $\begin{array}{c} r i + i n U \\ | \quad | \quad | \quad | \\ C V \quad V C V \end{array}$

UR

$\begin{array}{c} r \quad i n U \\ | \quad | \quad | \quad | \\ C V V C V \end{array}$

Identical Vowel Deletion (109)

$\begin{array}{c} r \quad i n U \\ | \quad | \quad | \quad | \\ C V V C V \end{array}$

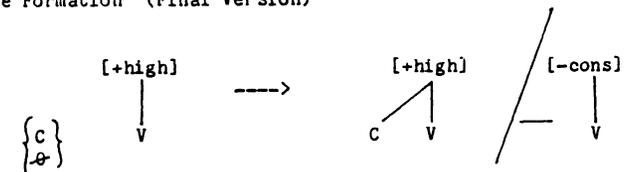
Linking Convention (95)  
Principle (96a)

Note that in this case (96a) guarantees that it is [i], the [-cons] element, not [r], that associates with the free V.

b) Glide Formation

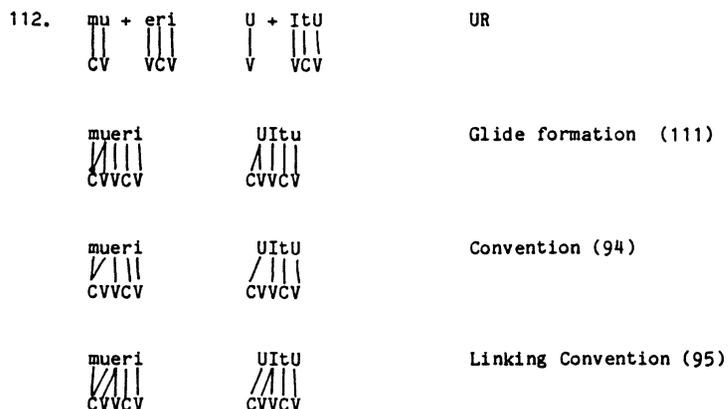
In our earlier discussion, Glide Formation (57) and Vowel Lengthening (55) were found to be two crucially ordered processes which have no independent application elsewhere in the grammar. Now with the notion of the CV tier and convention (95), the reciprocal relation between these two processes can be characterized in a natural manner:

111. Glide Formation (Final Version)



Rule (111) associates a high vowel that is followed by another vowel to a preceding C-unit, which is either pre-existing or otherwise inserted by the rule itself. Convention (94) then applies, dissociating

the high vowel from the V unit it originally links to. This results in a V element associated with no segmental elements, and therefore Linking Convention (95) applies to link the [-cons] element to the free V.<sup>15</sup> The derivation of mw-eeri "moon" and w-IItU "our, cl.1" illustrates the application of (111):



Under this account, the lengthening of the second vowel after the high vowel changes to a glide is not accidental, but rather, the consequence of a much more general process expressed in convention (95).

As one may have already noticed, no glide formation occurs in the forms in (108) seen earlier, although the UR's of these forms satisfy the SD of (111). Exceptions to Glide Formation (111) like these can

<sup>15</sup> Note that the [+high] vowel in the input of (111) cannot be re-linked to the empty V by convention (95) because no linking convention applies in such a way as to create a representation identical to the input of the last rule to have applied.

accounted for by ordering Identical Vowel Deletion (109) before (111) such that any given sequence of identical high vowels will undergo (109) first and be blocked from (111).

c) Non-high Vowel Deletion

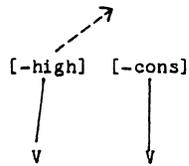
Given a sequence of non-identical vowels where the first one is non-high, the result is a long vowel having the quality of the second member of the sequence.

113a.	mIIta	/ma + yIta/ cl.6 "name"	"names"
113b.	keeri	/ka + eri/ cl.12 moon	"small moons"
113c.	muuva	/ma + uva / cl.6 sun	"suns"
113d.	kUsya	/kU + sIe + a/ cl.15 grind F.V.	"to grind" <sup>16</sup>

To account for these forms, the following rule is postulated:

<sup>16</sup> Justification for the postulation of [e] as the final vowel in the UR of the root "grind" comes from a form like kU-sye-er-a "to grind for". In this form, the APP extension /-Ir-/ is realized as /-er/, requiring that the root final vowel is mid (c.f. Vowel Lowering (87)). As to why it must be /e/ and not /o/, I will provide evidence in note (17).

114. Non-high Vowel Deletion



According to (114), if the first member of a vowel sequence is non-high, this vowel deletes. The application of this rule gives rise to a configuration to which Linking Convention (95) applies. The second vowel thus associates with the V unit freed by the [-high] vowel. The derivation of kUsya "to grind" is the following:

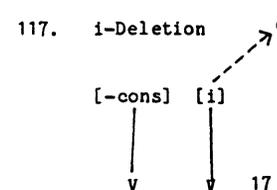
115.  $kU+s\bar{I}e+a$  UR  
 $\begin{array}{c} \text{|||} \\ \text{CV CVV V} \end{array}$
- $kUs\bar{I}ea$  Glide Formation (111), Convention (94)  
 $\begin{array}{c} \text{|||} \\ \text{CVCVVV} \end{array}$
- $kUs\bar{I}a$  Non-H Vowel Deletion (114)  
 $\begin{array}{c} \text{|||} \\ \text{CVCVVV} \end{array}$
- $kUs\bar{I}a$  Linking Convention (95)  
 $\begin{array}{c} \text{|||} \\ \text{CVCVVV} \end{array}$
- $kUs\bar{I}a$  V-Deletion (To be formulated in (132) to replace Final vowel Shortening (65))  
 $\begin{array}{c} \text{|||} \\ \text{CVC V} \end{array}$

There is a systematic exception to (114), however. If [i] is the second member of a vowel sequence, it deletes, thus resulting in a long vowel having the quality of the first member.

116. Examples of [i] deletion

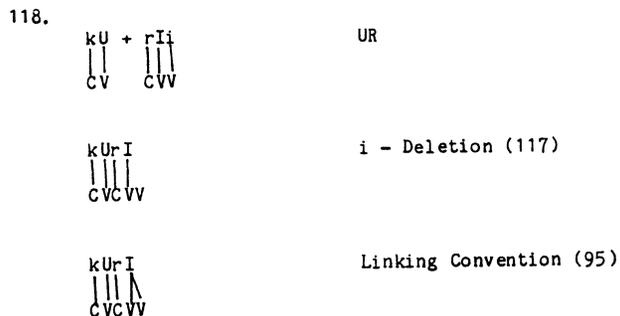
- a)  $vaarII$  / $va + aa + rI + i/$  "they ate"  
 3rd T/A eat F.V.  
 pl. (MPT)
- b)  $kUrII$  / $kU + rI + i/$  "we have just eaten"  
 1st eat F.V.  
 pl.

Also noteworthy is that in example (116), the SD for Glide Formation (111) is also met in the UR, but no glide formation occurs. The forms in (116) can be accounted for if we postulate the following rule and order it before both Glide Formation (111) and Non-high Vowel Deletion (114):

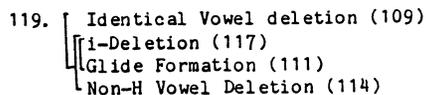


17 With i-Deletion (108), it can now be shown that the final vowel in the root for "grind" is /e/ and not /o/ (c.f. footnote (16)): Consider the form kUsyeeza / $kU+s\bar{I}e+iz+a/$  "to cause to grind". In this form, the underlying /i/ of the causative marker /-iz/ does not surface. This is predicted by i-Deletion (117) which deletes the /i/ of the causative marker after a CV root. The fact that the V-unit left empty by /i/ in this form is linked to an [e]--thus the long vowel [ee] in the extended root [syee] in the SR--requires that the last vowel of the verb root is /e/, not /o/.

Then by convention (95), the first vowel associates with the V left empty by the [i]. The derivation of kUrII is the following:



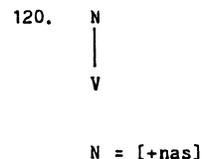
The following is a summary of the rules involving vowel sequences postulated so far; "[ " indicates crucial rule ordering.



d) Internally Complex Consonants

Finally, (98d) represents an internally complex consonant which in Llogoori may be a nasal-consonant sequence or a consonant-glide sequence. All these clusters are derived by rules. The derivation of consonant-glide clusters has already been discussed in the section on Glide Formation before. In the following paragraphs, I provide an analysis of the nasals and show how nasal consonant clusters are derived.

Nasals in Llogoori are analyzed as underlyingly associated with a V-Unit.

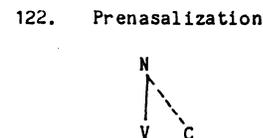


When followed by another V-unit on the CV tier, the V-unit associated with N changes to C:



Note that rule (121) is among the earliest rules to apply to the UR of a given form, even before initial syllabification.

When followed by a C-unit on the CV tier, Prenasalization takes place:



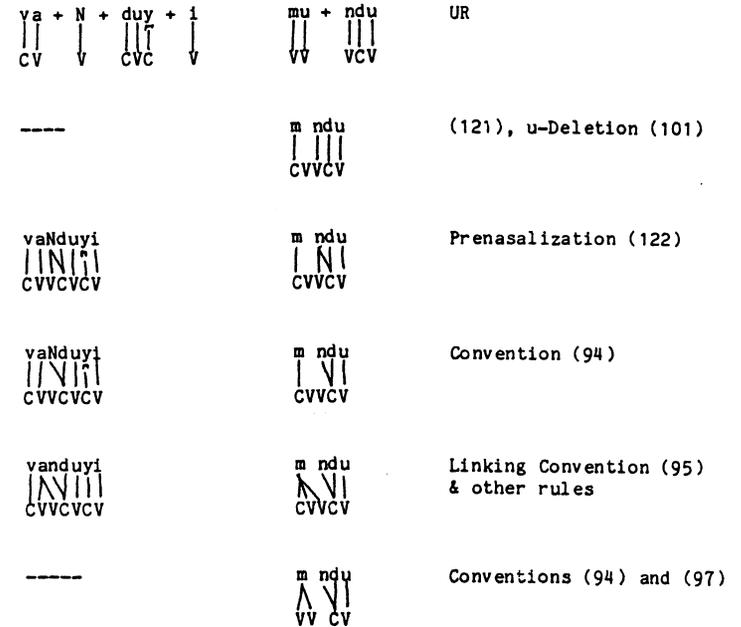
The result of Prenasalization (122) is a multiple linkage of segments to a single C-unit. (The C-unit to which the nasal segment is linked by (122) is already linked to another segment prior to prenasalization.) Another consequence of Prenasalization (122) is that by con-

vention (94), N delinks from V, and gives rise to a free V-unit to which a [+son] segment immediately preceding N can be linked by Linking convention (95). This analysis accounts for the fact that vowels and nasals followed by nasal-internally complex consonants are generally lengthened in the SR.<sup>18</sup> To see this, consider the following data:

- 123a. i) vaanduyi /va + N + duy + i/ "They've just hit me"  
 3rd pl. 1st hi F.V.  
 s g  
 compare,  
 ii) vakIduyi /va + kI + duy + i/ "They've just hit it"  
 3rd pl. cl.7 hi F.V.
- 123b. i) mm-ndu /mu + ndu/ "man"  
 cl.1 man  
 compare,  
 i) m-ci /mu + ci / "vein"  
 cl. 3 vein

In (123), the 3rd pl. S.P. and class 1 and 3 prefix surface as long syllables when followed by a nasal cluster. Under the analysis of the nasals provided above, that vowels are lengthened in front of a nasal-consonant cluster is expected. The derivation of vaanduyi and mmndu are as follows:

124.



Summary

In the foregoing discussion, I have presented a series of phonological data all of which involve the loss of a syllabic segment and the concomitant lengthening of a neighboring segment in the course of derivation. These data are accounted for by the rules of u-Deletion (101) (c.f. data in (100)), Interconsonantal Vowel Deletion (104) (c.f. data in (40), (46)), Identical Vowel Deletion (109) (c.f. data in (108)), i-Deletion (117) (c.f. data in (116)), Non-H Vowel Deletion (114) (c.f. data in (113)), Glide Formation (111) (c.f. data in (53)), and Prenasalization (122) (c.f. data in (122)).

<sup>18</sup> [+son] segments that become lengthened as a result of Prenasalization (122) may become shortened by other rules, which I will not discuss here.

The analyses of these apparently diverse phonological phenomena are unified by the Linking Convention (95) which applies to the output of all these processes, deriving the correct surface forms.

The vowel deletion processes mentioned above are analyzed as involving the deletion of vowel feature matrices alone but not the V-slots to which they are originally linked. The output of each of these processes thus always contains an empty V-unit to which an eligible neighboring segment can be linked by Linking Convention (95).

The analyses of Prenasalization and Glide Formation are slightly more complicated. As for Prenasalization, the loss of the syllabic segment, i.e. the syllabic nasal segment, is analyzed as a result of the linking of the nasal feature matrix to a following C-unit (which is non-syllabic). The result of such an association is a multiple linkage of the nasal feature matrix to both a V-unit and C-unit (c.f. Prenasalization (122)). Then by convention (94), the nasal is automatically delinked from the V-unit to which it is originally linked, leaving behind an empty slot. Linking Convention (95) (and the principles in (96)) then links an eligible neighboring segment to the empty V, resulting in a surface long vowel preceding the nasal. In the case of Glide Formation, the loss of the syllabic segment, i.e. the high vowel, is analyzed as a result of the linking of the high vowel to a preceding C-unit. This again gives rise to a multiple linkage between the high vowel and both a C- and V-unit (see output of Glide Formation (111)). Convention (94) then applies to delink the high vowel from the V-unit it is originally linked. This in turn gives rise to an empty V-unit which constitutes the input for Linking Convention

(95). In short, although Prenasalization (122) and Glide Formation (111) do not directly generate an input for Linking Convention (95) (as the vowel deletion rules do), Convention (94) serves to do this in a natural manner.

#### 2.2.4.2 Syllable Structure

In the previous section, I have characterized the various "segmental types" (in the terminology of a linear approach) and their derivation in terms of association relations between the CV units and the segmental feature matrices. This section provides an analysis of the Llogoori syllable, which will be understood as a purely phonological unit of structure to which phonological/tonal rules may have access at different levels of derivation, and in terms of which generalizations about the tonal organization of the language can be made. It is based on these phonological considerations that the account of the syllable to be given in the following paragraphs is motivated. Under this account, one can distinguish abstract underlying as versus surface syllabic organization of phonological forms. Syllabification will be assumed to be a process that occurs throughout the derivation, after the application of every relevant rule. It will become clear that these assumptions are crucial to the analysis of tones in Llogoori verbs.

##### A) Syllabification

Assuming that no syllabification information is present in the UR of any given phonological string, this string is first syllabified by a Syllabification Rule formulated as follows:

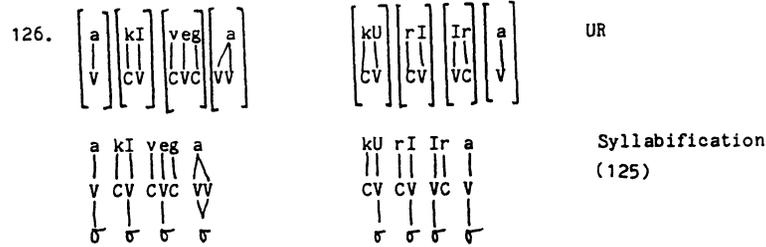
#### 125. Syllabification Rule



where  $V_n$  designates the final member of the sequence of V-units following  $V_1$ ;  $n \geq 0$

By (125), a V-unit and the maximal sequence of V-units following it in the UR will become dominated by one single syllable node. It will be an assumption of this study that the initial domain of syllabification is not the word, but the morpheme. Syllabic organization that results from the application of (125) to the UR of any given form will be referred to as the underlying syllable structure of that form. Surface syllables are then formed by subsequent rules that serve to syllabify any given C unit with the immediately following V unit (c.f. C-Syllabification below) and fuse vowel sequences to single syllables (c.f. Syllable Fusion below). It will become apparent that while early tone assignment rules are sensitive to the underlying syllable structure, certain late tone rules are sensitive only to surface syllabification.

Applying Syllabification Rule (125) within the morpheme, forms like a-ke-veg-aa "he/she is shaving it" and ku-ri-Ir-a "to eat for" syllabify initially as follows:



Brackets demarcate domains of initial syllabification

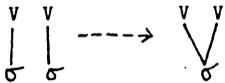
After all tone assignment rules have applied, other syllabification processes as expressed in the following rules may take place:

127. C-syllabification



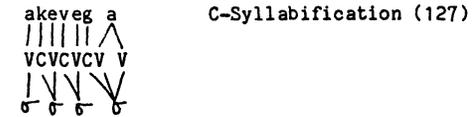
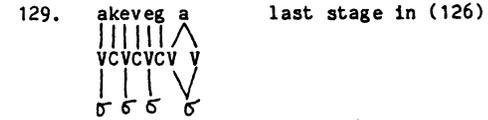
(where the superscript " ' " indicates a "free" autosegment)

128. Syllable Fusion

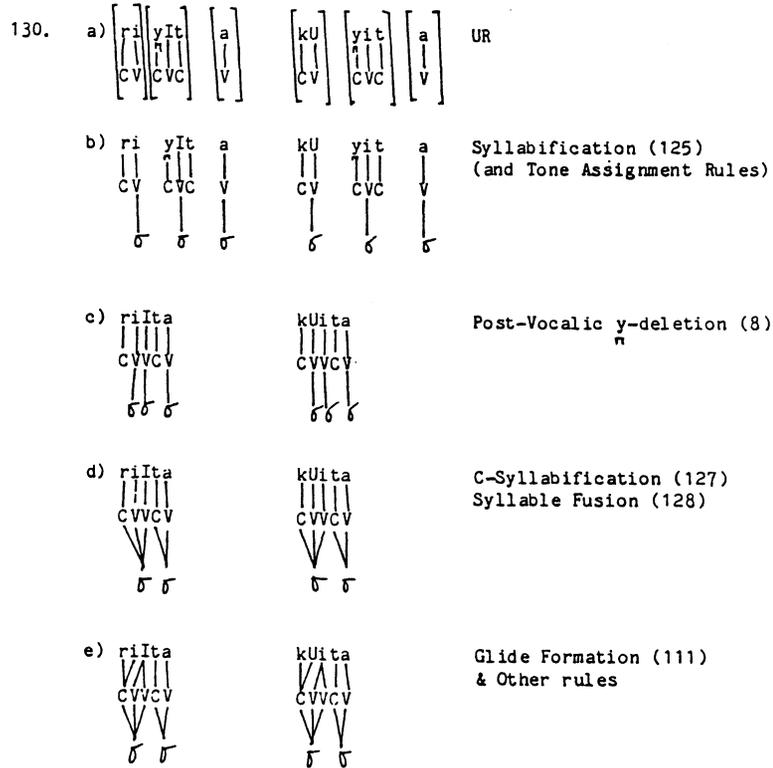


Considering rules (125), (127), and (128) as "core syllable rules" and the word to be the domain of core syllabification, the former (i.e. rules (125), (127), and (128)) are all recurrent rules which can be applied at various levels of derivation, whenever the SD's are met.

Rule (127) syllabifies a C-unit with the following V-unit. With this rule, akevegaa in (126) syllabifies as follows:



A configuration that meets the SD for (128) comes about when phonological or morphological processes bring into juxtaposition a heteromorphic sequence of V-units. By Syllable Fusion (128), the two syllable nodes will fuse to one. It will be assumed that tones that are independently associated with the two syllables will also be reassociated with the new syllable node. To illustrate this reorganization of autosegmental structure, the derivation of ryIita /ri+yIita/ "name" and kwiita /kU+yita/ "to kill" are given as follows:

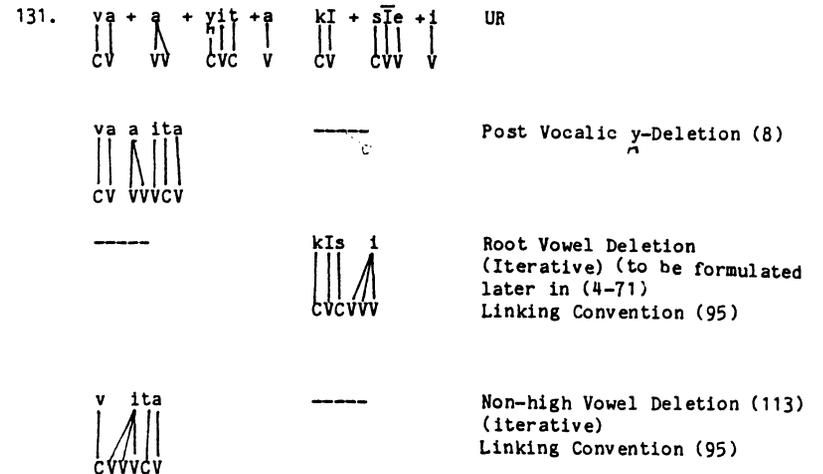


(Brackets demarcate initial domain of syllabification)

In the derivations given in (130) above, Post-Vocalic  $y$ -deletion creates a heterosyllabic sequence of V-units, viz., iI and Ui in ryIIta and kwiita respectively (see stage (c)). Both forms are thus subject to Syllable Fusion (128) in stage (d).

B) Syllable Length

While by (125) and (128), a syllable at any level of derivation may potentially contain any number of V-units, it is noticed that in the SR there is no sequence of more than one V-unit in word final position if the V-unit is preceded by a glide, and no sequence of more than two V-units elsewhere, even if morphological and phonological processes interact to produce such sequences at an early or intermediate level of derivation. That a long final syllable resulting from Glide Formation is reduced to short syllables has been exemplified and accounted for earlier in the rule of Final Vowel Shortening (65). The derivations of viita /va + aa + yit + a/ "they killed" and kisii /kI + sIe + i/ "You (pl.) grind it!" show how a sequence of more than two V's needs be reduced to two:





- (58) Palatalization of y  
 $y_n \rightarrow y / C \_ V$
- (62) Palatalization of Dental Consonants  
 $y_n \rightarrow y / \_ [+upper]$   
 $n_n \rightarrow \eta / \_ [+upper]$
- (67) Voicing of Consonants  
 $\left[ \begin{matrix} +cons \\ -voiced \end{matrix} \right] \rightarrow [+voiced] / [+nas] \_$
- (69) Stop Formation  
 a)  $r \rightarrow d / [+nas] \_$   
 b)  $h, v \rightarrow b / [+nas] \_$
- (73) Spirantization  
 $y_n \rightarrow z / [+nas] \_$
- (78) Internal Consonant Deletion  
 $\left\{ \begin{matrix} r \\ y_n \end{matrix} \right\} \rightarrow \emptyset / [+nas] \_ V (V) [+nas]$

b) Vowels

- (87) Vowel Lowering  
 $\left[ \begin{matrix} +high \\ -upper \end{matrix} \right] \rightarrow [-high] / \left[ \begin{matrix} [+cons] \\ [-high] \\ [-low] \end{matrix} \right]$   
 (Mirror Image; Cyclic)

- (89) Vowel Raising  
 $\left[ \begin{matrix} -high \\ -low \end{matrix} \right] \rightarrow [+high] / [+high] ([+cons]) \_$

- (101) u-Deletion  
 $\left\{ \begin{matrix} m \\ u \\ c \end{matrix} \right\} \rightarrow \emptyset / \left[ \begin{matrix} -cons \\ +nas \end{matrix} \right]$

- (104) Interconsonant Vowel Deletion  
 $\left\{ \begin{matrix} [-cons] \\ \emptyset \end{matrix} \right\} \left\{ \begin{matrix} r \\ c \end{matrix} \right\} \rightarrow \emptyset / [-cons] \left\{ \begin{matrix} d \\ r \\ c \end{matrix} \right\}$

- (109) Identical Vowel Deletion  
 $\left[ \begin{matrix} \lambda \\ \downarrow \\ v \end{matrix} \right] \left[ \begin{matrix} \lambda \\ \downarrow \\ v \end{matrix} \right] \rightarrow \emptyset$

- (114) Non-H Vowel Deletion  
 $\left[ \begin{matrix} [-high] \\ \downarrow \\ v \end{matrix} \right] \left[ \begin{matrix} [-cons] \\ \downarrow \\ v \end{matrix} \right] \rightarrow \emptyset$

- (117) i-Deletion  
 $\left[ \begin{matrix} [-cons] \\ \downarrow \\ v \end{matrix} \right] \left[ \begin{matrix} i \\ \downarrow \\ v \end{matrix} \right] \rightarrow \emptyset$

- (4-71) Unrounded Root Vowel Deletion  
 $\left[ \begin{matrix} -cons \\ -round \end{matrix} \right] \rightarrow \emptyset / \left[ \begin{matrix} st \\ rt \\ \downarrow \\ i \\ \left[ \begin{matrix} IMP \\ PL \end{matrix} \right] \end{matrix} \right]$

B) Relinking Rules

- (111) Glide Formation  
 $\left\{ \begin{matrix} c \\ \emptyset \end{matrix} \right\} \left[ \begin{matrix} +high \\ \downarrow \\ v \end{matrix} \right] \rightarrow \left[ \begin{matrix} +high \\ \downarrow \\ v \end{matrix} \right] / \left[ \begin{matrix} [-cons] \\ \downarrow \\ v \end{matrix} \right]$

- (122) Prenasalization  
 $N \left[ \begin{matrix} \downarrow \\ c \end{matrix} \right] \rightarrow \emptyset$

C) Conventions

(94)

If the application of a rule results in a violation of conditions—either universal or language-specific—which must be met by the well-formedness representations in the language in question, the violation is removed by deleting links between autosegments and core phonemes established by earlier rules or conventions.

(95) Linking Convention



D) Syllable Structure Rules

(125) Syllabification Rule

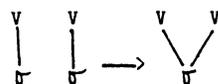


where Vn designates the final member of sequence of V-units following V1; n ≥ 0

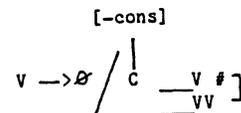
(127) C-Syllabification



(128) Syllable Fusion



(132) V-Deletion



where the right bracket "]" indicates crucial ordering

(iterative)

TABLE 4b

Summary of Crucial Rule Orderings

(69b)	Stop Formation
(14)	Palatalization of Back Consonants
(8)	Post-Vocalic $y$ -Deletion
(62)	Palatalization of Dental Consonants
(19)	Consonant-Glide Reduction
(34)	Nasal Deletion
(29)	Nasal Assimilation
(67)	Voicing of Consonants
(78)	Internasal Consonant Deletion
(73)	Spirantization
(69a)	Stop Formation
(101)	u-Deletion
(109)	Identical Vowel Deletion
(4-71)	Unrounded Root Vowel Deletion
(117)	i-Deletion
(111)	Glide Formation
(114)	Non-H Vowel Deletion

Chapter 3  
INTRODUCTION TO LLOGOORI TONES

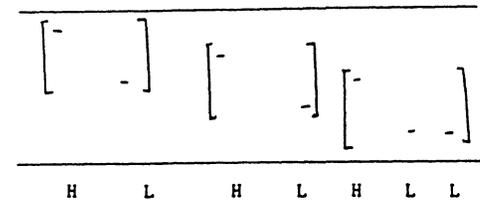
3.1 SURFACE TONES

3.1.1 Downstep

3.1.1.1 Introduction

Llogoori has two contrastive tones on the surface, namely, H and L.<sup>1</sup> The realization of these two tones is complicated by the process of "register shift", or more precisely, "register lowering".<sup>2</sup> By this process, the "register" (Clements 1980), or to say, pitch region within which contrastive tones are realized, systematically lowers as an utterance progresses. The consequence is a clearly perceptible downward drift of overall pitch across the tone group in a "terraced" pattern. A typical tone group that undergoes register lowering as described above has the following pitch configuration:

1.



In the schema in (1), the pair of horizontal lines indicates the overall pitch range of the speaker. Each pair of brackets indicates the register available to the speaker at a given point in the utterance. Represented in (1) is a hypothetical system with two tones, viz., H and L. Within the limits of the speaker's own pitch range, these two tones are realized within successively "lowered" registers. In principle, there is no limit to the number of lowered registers there can be within a single phonological phrase, since an utterance may potentially be infinitely long. Any speaker, however, has only a limited range within which to realize the indefinite number of levels resulting from register lowering. So perhaps, the more lowered registers there are within a given phrase, the less the amount of drop is involved in each downward shift. Alternatively, the speaker could suspend register lowering at the beginning or the end of a phrase.

The system characterized in (1) exhibits so-called "partial downstep" by which the distance between a tone occurring in a given register, say,  $R_1$ , and a like tone occurring in the immediately following lower register, say,  $R_2$ , is less than the distance between a H and a L tone within  $R_1$ . In effect, the H tone of  $R_2$  is realized at a pitch value between those of the H and L tones of  $R_1$ . For instance, the sec-

<sup>1</sup> Underlyingly, as we will see, there is a three way contrast between H, L, and tonelessness.

<sup>2</sup> Register may also shift upwards, constituting what has been described as upsweep or upstep in some languages.

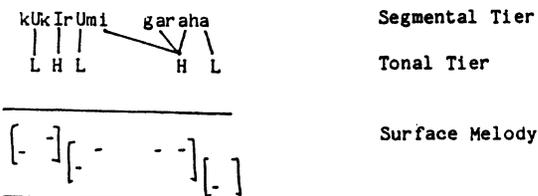
ond H in example (1) is higher than the preceding L but lower than the initial H tone in pitch. In the case of total downstep, on the contrary, the amount of drop from the H in R<sub>1</sub> to the H in R<sub>2</sub> would be the same as the distance between the H and L tones that occur in R<sub>1</sub>. In such a system, a lowered H tone has the same surface pitch as the L tone that occurs in the immediately preceding higher register.

In the literature on register lowering, a distinction has often been made between automatic downstep or downdrift on the one hand, and nonautomatic downstep or downstep on the other. The difference between the two lies in the predictability of the location of register shift in the phrase: In the case of automatic downstep, the occurrence of the downward shift is predictable from the surface phonological environments, whereas in the case of nonautomatic downstep, the conditions for the shift are not phonologically transparent (Stewart 1965). A classical case of automatic downstep as described by many scholars is triggered by a L-H transition on the tonal tier such that each H tone following a L tone in a tonal sequence lowers the register within which subsequent H and L tones can be realized (Clements 1981).

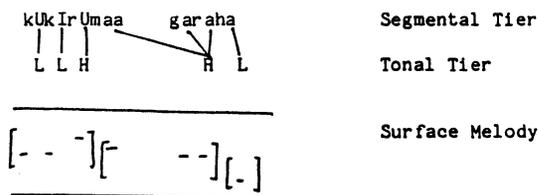
The environment for automatic downstep in Llogoori is different than that of the classical case just described: In Llogoori, any tone (represented "T" below) preceded by a H begins a new lowered register. This lowered register is maintained until a new H-T transition occurs. To see this, consider the tonal realization of the following phrases as indicated by the corresponding pitch diagrams. These diagrams represent the writer's perception of the surface pitch melodies of these

phrases.<sup>3</sup>

2a. "we have bitten it slowly"



2b. "we are biting it slowly"



In the examples in (2), the total register "steps down" after each H tone such that subsequent H and L tones are pronounced within a lower range than those that come before the H-T transition. Thus, in example (2a), the second L tone (on the syllable ru) has a lower surface pitch than the word initial L (on the syllable ku) since the H on the object prefix ki causes the second L to begin a lower register. As a result of register lowering, the second H in the same example (spread across the verb final syllable and the adverb) has a lower surface

<sup>3</sup> Actual pitch tracings of the same Llogoori phrases (to be presented in (4) later) in fact show a rather different relative pitch pattern. It will be argued that the difference between the representations given in example (2) below and those in (4) later can be accounted for in terms of declination, a concept to be introduced shortly.



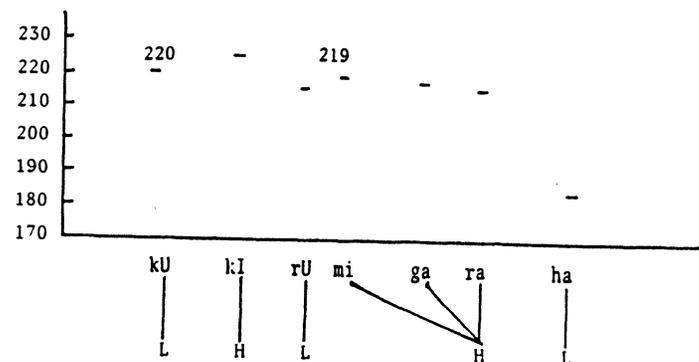
rectly predicts that in Llogoori, a L tone preceding a H tone has a higher surface pitch than the L tone that comes after the H tone. Likewise, given two H tones, say, H1 and H2, that are separated by only L tone(s) or nothing, this analysis also correctly predicts that H1 has a higher pitch than H2 since H2 begins a lower register. The crucial difference between the two analyses, however, lies in their different predictions about the relative pitch height of the H tone of a "// L H ..." sequence (where "//" stands for phrase boundary) and that of a phrase initial H tone. Under Hypothesis I, the H in both the "//L \_ ..." and "// \_ ..." contexts would be analyzed as belonging to the phrase initial or unshifted register. It therefore predicts that the H tone in both contexts would be pronounced with the same pitch. Under Hypothesis II, however, the H in the "//L \_ ..." context would be analyzed as belonging to a shifted or lowered register whereas the phrase initial H the unshifted register. It thus predicts an initial H tone to have a higher pitch than the H tone in the "// L \_ ..." context. As the phonetic facts suggest, in Llogoori, there is no appreciable surface distinction between the H tone in these two environments: for example, the average pitch value (of 4 tokens) of the H tone on the syllable ru in rúbaáho /rU+báaho/ "board" is 220 Hz, and that on the ru of kUkIrúmaa /kU+kI+rUm+aa/ "we are biting it" is 217 Hz. (Note that the drop from a phrase initial H to the next down-shifted H is significantly greater. For example, the average drop from the first H to the next H in the form kwaákíduya /kU+aa+kI+duy+a/ "we hit it" is 17 Hz based on the measurements of 4 tokens of the form.) These observations lead to the conclusion that

in both the "//L\_\_\_\_\_//" and "// \_\_\_\_\_" context, the H tone is unshifted, and therefore Hypothesis I is preferred.

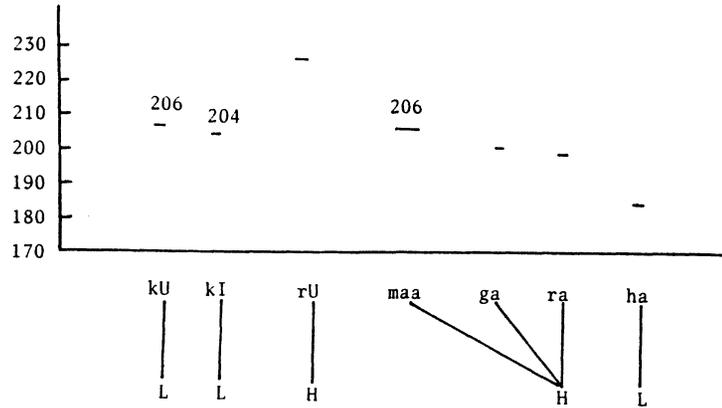
### 3.1.2 Declination

In (2), I presented pitch diagrams of certain Llogoori phrases which show that Llogoori has partial downstep. However, I also pointed out in footnote 3 that there is a gap between the relative pitch levels as presented in these diagrams and those found in the actual pitch tracings of the same utterances. Given below are diagrams based on pitch tracings which show the relative pitch values of the syllables in the phrases in (2a) and (2b). The pitch value of each syllable in these diagrams is the result of averaging the pitch values of 4 tokens of the respective syllable in the same phrase. (Pitch diagrams given in the rest of this chapter will all show the surface pitch melodies averaged from at least four tokens of the same phrases.)

4a. "we have bitten it slowly"



4b. "we are biting slowly"

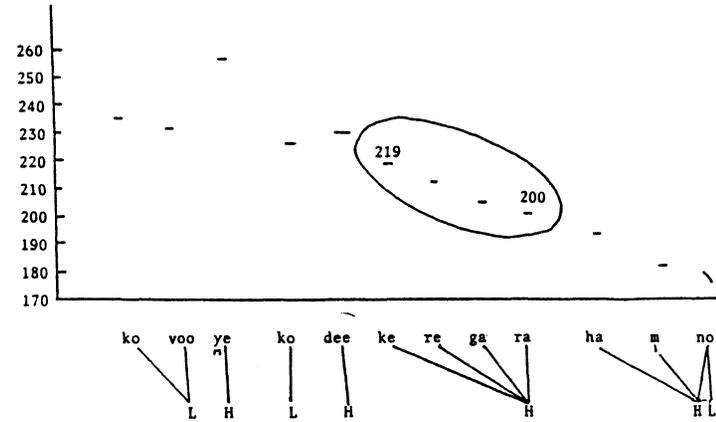


From the pitch diagrams given in (4) above, one can see that each downstepped H is actually realized with more or less the same pitch as the L tone of the preceding register. (This is different than what the pitch diagrams in (2) shows: in those diagrams, a downstep H is higher than the L of the preceding register.) Based on the pitch diagrams in (4), one would conclude that Llogoori has total downstep instead of partial downstep. Such a conclusion is valid, however, if and only if it can be confirmed that register lowering is the only cause for the pitch drop (from a H to the next !H). In the following discussion, I will show that there is most likely another pitch lowering mechanism, namely, declination, at work which is responsible for part of the pitch drop (Pierrehumbert, 1980). In other words, the "total" drop from a H to the next H as seen in the diagrams in (4) reflects the sum of the pitch drop caused by register lowering and that caused by declination.

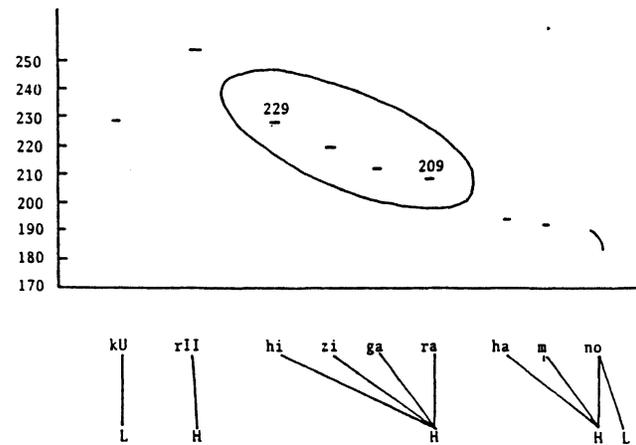
Declination refers to the tendency for the  $F_0$  contour of a given phonological phrase to show a gradual downward trend across the phrase. Ideally, declination affects all non-initial syllables, regardless of their surface tonal specifications. Furthermore, the amount of drop by declination from one syllable to the next is a constant value, say, "x", so that the amount of lowering due to declination on the  $n^{th}$  syllable of a given phrase would equal  $(n-1)x$ . One of the predictions of the declination hypothesis is that given a syllable string that is linked to the same tone, each non-initial syllable would be realized with a slightly lower pitch than the previous one. The presence of declination in Llogoori is inferred from precisely

such a declining pitch contour exhibited in syllables that are linked to one single tone in the SR. Consider the surface melody of the following phrases:

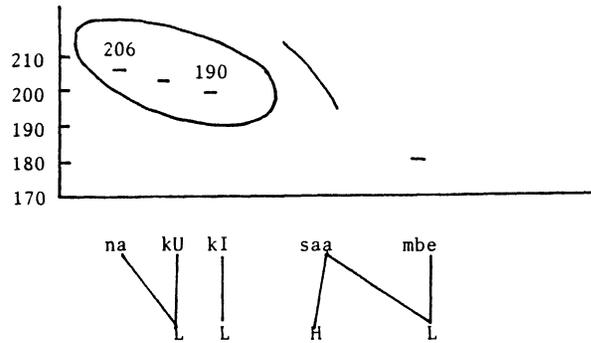
5a. "I say that we cook for very slowly"



5b. "we've just caused (somebody) to eat very slowly"



5c. "we will burn it"



Here I will consider only the syllable sequences encircled. Notice that in each sequence, there is a drop in pitch across the syllables: from 219 Hz to 200 Hz in (5a), from 229 Hz to 209 Hz in (5b), and from 206 Hz to 200 Hz in (5c). Although these sequences by no means constitute the ideal data for the testing of declination--for instance, neither the consonants nor the vowels of the syllables are controlled--such a consistent drop in pitch across these syllable sequences in which all syllables are linked to the same tone nevertheless warrants a tentative hypothesis that declination is present. If it can be assumed that there is declination in Llogoori, a portion of the "total" drop from a H to the next H as seen in (4) should then be attributed to declination, since declination affects all non-initial syllables. Now if declination is responsible for part of the pitch drop from one H to the next, it follows that register lowering can at best be responsible for only the other part of the pitch drop, and because of this, register lowering in Llogoori is only partial, not total.

Another argument--and perhaps a more subjective one--for the analysis that Llogoori has partial instead of total downstep comes from the writer's perception (see pitch transcriptions in (2)). As a preliminary hypothesis, perhaps the gap between the pitch representations in (2) and (4) is due to compensation by the writer in her perception by systematically screening out the declinational effects. (4), on the other hand, does not reflect such a compensatory mechanism.

For the simplicity in notation, pitch diagrams to be presented in the rest of this chapter and the next will be like those in (2) in which the effects of declination are not reflected. Instead, they reflect the surface melodies as they are perceived.

3.1.3 Phrase Final Lowering

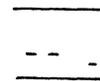
In addition to downstep and declination, there is a third type of pitch lowering mechanism in Llogoori, namely, phrase final lowering. By this process, a phrase final syllable linked to a L tone is realized with a lower pitch than an immediately preceding syllable (sequence) which is linked also only to L tone(s). Consider the tonal realization of the following form:

6a. i) "We've just hit"



Segmental Tier

Tonal Tier



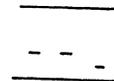
Pitch Diagram

ii) "to hit"



Segmental Tier

Tonal Tier



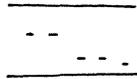
Pitch Diagram

6b. i) "to cut it"



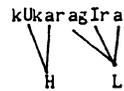
Segmental Tier

Tonal Tier



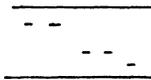
Pitch Diagram

ii) "to cut for"



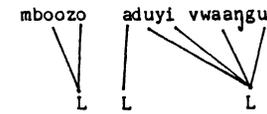
Segmental Tier

Tonal Tier



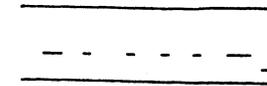
Pitch Diagram

7a. "The brother has just hit slowly"



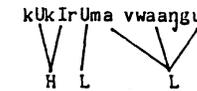
Segmental Tier

Tonal Tier



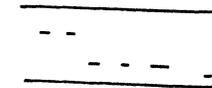
Pitch Diagram

7b. "to bite it quickly"



Segmental Tier

Tonal Tier



Pitch Diagram

In each example in (6) above, there is a phrase final sequence of syllables which are linked to L tones belonging to the same register. Ideally, all these syllables should be perceived as having the same pitch. However, in reality, the word final syllable is consistently heard as being realized with a lower pitch than the preceding syllables. This observation holds in phrases too, as we will see in the following examples:

So far I have shown examples of extra-lowering of a phrase final syllable linked to a L tone. Assuming that extra-lowering of a phrase final syllable is an automatic process in Llogoori, one would expect a final syllable linked to a H tone to have a lower pitch than the preceding syllable(s) linked to the same H. (Note that should the preceding syllable(s) be linked to an independent H tone, register lowering occurs for independent reasons.) However, this does not seem to be the case. Consider the pitch diagrams of the following expressions in which the phrase final syllable of each phrase is linked to a HL:<sup>5</sup>

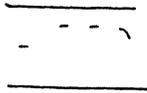
<sup>5</sup> It should be pointed out that in Llogoori, there is no example of

8a. "cause to cut!"



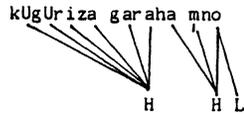
Segmental Tier

Tonal Tier



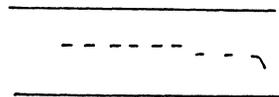
Pitch Diagram

8b. "to sell very slowly"



Segmental Tier

Tonal Tier



Pitch Diagram

In each examples in (8), the H portion of the final syllable is heard as having the same pitch as the preceding syllable(s) linked to the same H tone. This suggests that the phrase final extra-lowering mechanism does not affect final syllables linked to a H tone.

The observations just made about phrase final lowering in Llogoori can be summarized as the following:

phrases ending in a level H tone. This is because all phonological phrases have a L tone appendix inserted by a post-lexical rule (see Final L Insertion (4-10) to be postulated later.)

### 9. Principle of Phrase-Final Pitch Lowering

Given a phrase-final sequence of syllables linked only to L tone(s) in the SR, the pitch of the phrase final syllable is realized lower than the immediately preceding L-toned syllable sequence.

#### 3.1.4 Summary

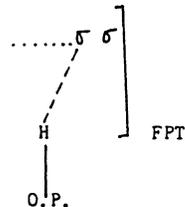
In the previous sections, I have presented three mechanisms in Llogoori which serve to lower the surface pitch values of tones. These mechanisms are downstep, declination, and phrase final lowering. The model for pitch interpretation in Llogoori must be one that addresses the effect of all these mechanisms--more specifically, in a componential manner--such that the surface pitch of any given tone is computed by subtracting the pitch lowering value of each mechanism from the basic value of the tone.<sup>6</sup> Due to space limitation, I will not further discuss such a model of pitch interpretation. Readers are referred to Clements and Leung (1986, ms.) for details on this topic.

<sup>6</sup> Here the term "basic value" refers to the ideal value designated for a certain tone by the grammar of the language relativized to the range of the particular speaker of the language. In theory, this would be the value at which the tone is uttered assuming that there are no other pitch modification mechanisms (like declination, downstep, local pitch interpretation, etc.) at work, and would thus approximate the value of that tone in phrase-initial position.

3.2 TONE ASSIGNMENT

Certain assumptions underlying the tonal analyses of Llogoori verbs need be stated in the outset. First of all, it is assumed that a verb morpheme may be underlyingly specified for tonal properties only, or segmental properties only, or both tonal and segmental properties. Furthermore, it will be assumed that in Llogoori verbs, tonal and segmental elements that constitute a single morpheme are underlyingly unassociated. Free morphological tones -- tones introduced by the morphology--of the word are associated to syllables by initial tone assignment rules which associate single free morphological tones to single syllables within the same verb unit. Many of the ITAR's in Llogoori are specific rules in the sense that their applications are not general in scope, but rather, are conditioned by the grammatical/morphological properties (e.g. tense/aspects, morphological make-up, etc.) of the form in question. Their SD's are mostly defined in grammatical/morphological terms. For instance, in the Far Past Tense, a tone assignment rule like the following is called for:

10. O.P. H Assignment

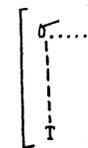


(Brackets demarcate morpheme boundaries)

In (10) above, the designated tone is restricted in morphological terms, i.e., the tone that marks the morphosyntactic category O.P. (object prefix). Also, the morphosyntactic notion "Far Past Tense (FPT)" is stated as the grammatical condition on the domain within which tone assignment takes place.

There are also other tone assignment rules in Llogoori which have much more general application. For example, there is a general principle of Morphological Tone Association stated as follows:

11. Morphological Tone Association



(Brackets demarcate morpheme boundaries)

(11) is a general rule ordered after all other more specific ITAR's except one (see discussion in (4.10) later). By principle (11), any given morphological tone is assigned to the first syllable of the morpheme that it (the morphological tone) characterizes, provided both are as yet unlinked.

Any given morphological tone in Llogoori may in certain verb tenses be assigned by one ITAR and in other tenses by another rule. For example, the H tone that characterizes the morphosyntactic category O.P. is assigned to the penultimate stem syllable in the Far Past Tense by a grammatically conditioned rule stated in (10), but to the object prefix syllable in almost all other tenses by a much more gen-

eral principle of tone assignment, namely, Morphological Tone Association ("MTA" hereafter) stated in (11).

One of the most striking characteristics of Llogoori tonal phonology—especially in the context of autosegmental phonology—is the abundance of ITAR's (see Table 5a) and the almost total irrelevance of the Association Convention (c.f. 1-11). There is only one case in this study where the Association Convention may be used to account for tone assignment. Elsewhere, initial tone assignment is accounted for by ITAR's.

In Llogoori, syllables that do not get assigned any tones through the application of ITAR's must receive tones through other sources.<sup>7</sup> This is accomplished by rules of Phrase Final L Insertion (see 4-10) and Tone Spread (see (4-13)).<sup>8</sup>

---

<sup>7</sup> This in fact is a logical consequence of the well-formedness condition (10b) which requires all tone bearing units to be associated with at least one tone in the SR.

<sup>8</sup> Here and below, numeral prefix to example numbers refer to the chapter in which the example occurs.

In Llogoori, a phrase final syllable is assigned a phrase final L tone. Tone spread rules assign bound tones (including the phrase final L tone) onto adjacent syllables which are hitherto toneless. In sum, while initial tone assignment rules serve to map individual morphological tones onto single syllables, Phrase Final L Insertion (4-10) and Tone Spread (4-13) together guarantee that all syllables will be assigned tones and therefore be tonally interpretable in the SR. All these rules will be individually motivated and exemplified in Chapter 4.

Chapter IV  
VERB TONES

ORGANIZATION OF THE DISCUSSION OF THE VERB TENSES

With the exception of the infinitives and imperatives, Llogoori verb tenses/aspects examined in this chapter are all mentioned in Mould (1981):<sup>1</sup>

1. 1. Infinitives
2. Imperatives
3. Present Continuous Tense
4. Perfect Tense
5. Near Past Tense
6. Middle Past Tense
7. Far Past Tense
8. Near Future Tense
9. Middle Future Tense
10. Far Future Tense
11. Indefinite Future Tense

It will become apparent that Llogoori verb tenses fall into smaller subgroups which differ in tonal make-up and general tonal behavior. It will be shown that the Infinitives, Perfect Tense (PT), Near Past Tense (NPT), Near Future Tense (NFT), and Far Future Tense (FFT) all have non-H or /s/ tense markers and no tonal suffix. Their

<sup>1</sup> Several tenses that Mould mentioned are not studied in this chapter, for example, the "Habitual" tense which is not attested in Miss Kilibwa's speech, the "Still" tense and the Subjunctives which are found to be tonally identical to the Present Continuous Tense and the Middle Future Tense respectively. These verb forms (the "still" tense and the Subjunctives) are therefore not independently discussed.

onal derivations are accounted for by a common set of tone rules. The Middle Past Tense (MPT), Present Continuous Tense (PCT), Indefinite Future Tense (IFT), and the Imperative (IMP), on the other hand, are all characterized by a final H tone in the SR.<sup>2</sup> This H tone induces many interesting morpho-tonological processes in these tenses. The Middle Future Tense (MFT) and Far Past Tense (FPT) are different than both groups described in that they both have a L suffix. In the following discussion, tenses that constitute a subgroup are discussed in succession such that generalizations across tenses can be more easily drawn.

In the following discussion of individual verb tenses, I will restrict myself to verb forms in isolation or in simple VERB-ADVERB constructions. This is because like in many other African tone languages, long phrasal constructions in Llogoori exhibit complex tonal and intonational phenomena which are beyond the capacity of the present study to explore. In the discussion of each tense, I will first discuss forms without an O.P., and then those with one. For the sake of uniformity, the cl. 7 O.P. /kI-/ will be used in all examples that contain an O.P.. (All other O.P.'s have been found to have identical tonal behavior.) When discussing tenses in which the S.P. is an obligatory constituent, the complete paradigm of verb forms with all different subject prefixes will be given for one verb root, while the rest of the roots will be cited with the 1st plural S.P. /kU-/.

<sup>2</sup> Note that the origin of the H suffix in the imperative is not grammatical, like that of the PCT, MPT, and IFT, but rather, is lexical. This point will be elaborated in the section on the Imperatives (c.f. section 4.6).

4.1 INFINITIVES

Grammatically speaking, Llogoori infinitives constitute a category of nouns, viz., class 15. Obligatory constituents of a Llogoori infinitive are the infinitival (or class 15) prefix /kU-/ , the lexical root (R) and the F.V. /-a/: kU + R + a.

Given below are some examples of Llogoori infinitives in citation. Tone marks in all examples of this chapter reflect only surface tone melodies unless stated otherwise. Acute accent ^ indicates a surface H tone on a syllable. The circumflex ^ indicates falling tone, and raised exclamation ! between two H tones shows that the second one is downstepped. Surface L tones will be unmarked. In underlying representations, tone marks are / for H, \ for L, and ° for toneless. Note that in the URs, only morphemes whose underlying tonal structure has previously been established will be marked for tone. Thus, in the data in (2) below, the underlying representations of the infinitives have no tonal marking. This is because the underlying tonal structure of the infinitives has hitherto not been established. In the data in (18), on the other hand, the infinitive marker /kU-/ and F.V. /-a/ are both marked as toneless in the UR, while the verb roots are left unmarked. This is because up to that point of discussion, the underlying tonal status of /kU-/ and /-a/ has already been explicated, but not that of the verb roots. Where verbal phrases (instead of verbs in citation forms) are used for exemplification, surface pitch diagrams will be presented where necessary, and only the underlying form of the verb will be presented.

4.1.1 Infinitives without Object Prefix

2a.	i)	"to bite"	kÚrÚma	[ - - - ]	/kU+rUm+a/
	ii)	"to cook"	kÓdêeka	[ - \ - ]	/kU+deek+a/
	iii)	"to cut"	kÚkaraga	[ - - - ]	/kU+karag+a/
	iv)	"to eat"	kÚryá	[ - \ - ]	/kU+rI+a/
	v)	"to want"	kwiita	[ - - - ]	/kU+yit+a/
	vi)	"to stir"	kÚúukapa	[ - - - ]	/kU+úukap+a/
2b.	i)	"to hit"	kUduya	[ - - - ]	/kU+duy+a/
	ii)	"to burn"	kUsaamba	[ - - - ]	/kU+samb+a/
	iii)	"to sell"	kUguriza	[ - - - ]	/kU+gUriz+a/
	iv)	"to want"	kweena	[ - - - ]	/kU+yen+a/
	v)	"to grind"	kUsya	[ - - - ]	/kU+sTe+a/

4.1.1.1 Surface Tone Melodies

The infinitives in Llogoori have two distinct surface tone melodies: "H L", as in the examples in (2a), and "L", as in the examples in (2b). Verb forms with a surface H tone are H up to and including the first root syllable. In some of these forms, the root initial syllables have a surface H falling tone: (2a ii, iv, v).

Since the lexical root is the only variable in the examples in (2), the tonal contrast between the examples in (2a) and (2b) must be attributed to the tonal contrast in the lexical roots. Using the surface tonal patterns of the infinitival forms as the basis of classification, two classes of Llogoori verb roots can be established, namely,

H and non-H. A H-toned verb root has an underlying H or lexical root H ("root H" hereafter) which surfaces in the tone melody of the infinitives. Non-H verb roots, on the other hand, do not have the root H and have no H tone in the SR of the infinitives. Under this analysis, all forms in (2a) have H-toned lexical roots, and those in (2b) have non-H lexical roots. In the rest of the study, verb forms with H-toned lexical roots are referred to as H-toned verbs, and those with non-H lexical roots non-H verbs.

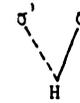
4.1.1.2 Underlying Tonal Structure

A) H-toned Verbs

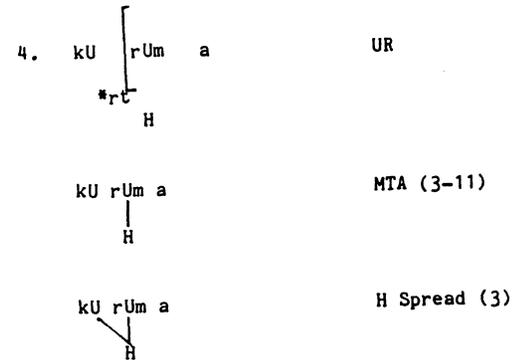
In the H-toned infinitives in (2), Morphological Tone Association (3-11) assigns the root H to the root initial syllable. This analysis accounts for the surface placement of the root H in the roots of the H-toned infinitives in the most straightforward manner.

The /kU-/ prefix has a different tonal realization in each type of verbs: in the H-toned verbs, it is realized H, and in the non-H verbs, it is realized L. Note that in both cases, /kU-/ has the same tone as the following syllable. The simplest analysis of /kU-/ is that it is toneless: toneless morphemes typically acquire their tones from the neighboring syllables. In the case of /kU<sup>o</sup>/, it acquires the tones of the following syllables. To account for the H-toned realization of /kU<sup>o</sup>/ in the H-toned forms, the following rule of H Spread is postulated:

3. H Spread (Preliminary)



Rule (3) spreads the H-tone of a given syllable to a preceding free syllable. This rule correctly predicts that /kU-/ is realized H in the H-toned infinitives since it is followed by the root initial syllable to which the root H is assigned. Thus:



\*rt=root; here and below, a left bracket given in the UR marks the beginning of the verb stem/root.

The F.V. /-a/ in all the examples in (2) is realized L. A surface L tone in phrase final position can be interpreted in at least two ways: 1) it is indicative of an underlying lexical or grammatical L tone; or, 2) it is the result of phrase final lowering effect, and in which case, it is a phrase final L tone. A comparison between H-

toned infinitives and Far Past Tense (FPT) forms with the same lexical roots in a non-final position clarifies the underlying tonal structure of the infinitival F.V., as we shall see now.

Like the infinitival F.V., the F.V. of FPT forms is also pronounced L in citation:

- 5. a) "we bit"      kwaárÚma      /kU+aa+rUm+a/
- b) "we cut"      kwaákaraga      /kU+aa+karag+a/
- c) "we stirred"      kwaácuukapa      /kU+aa+cuukap+a/

However, when followed by a word that has an initial H, the 2 F.V.'s are realized differently. In the following examples, infinitives and FPT forms are followed by the adverb gáráha /garáha/ "slowly".<sup>3</sup> "-" indicates morpheme boundaries and brackets enclose surface pitch diagrams:

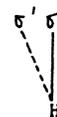
- 6a. i) kw-áa-rÚm-a gáráha      "we bit slowly"      [ - - - - \_ ]
- compare,
- ii) kÚ-rÚm-á gáráha      "to bite slowly"      [ - - - - \_ ]
- 6b. i) kw-áa-kárag-a gáráha      "we cut slowly"      [ - - - - \_ ]
- compare,
- ii) kÚ-kárag-á gáráha      "to cut slowly"      [ - - - - \_ ]

<sup>3</sup> The underlying H tone in gáráha is assigned to the second syllable of the word by an ITAR that does not have immediate relevance to the discussion of Llogoori verb tones. This rule will be taken for granted in the rest of the study.

- 6c. i) kw-áa-cúukap-a gáráha      "we stirred slowly"      [ - - - - \_ ]
- compare,
- ii) kÚ-cúukap-á gáráha      "to stir slowly"      [ - - - - \_ ]

Here I am interested in the relative surface pitch levels of the F.V.'s and the H-toned syllables of gáráha. In the FPT forms above, the F.V. is realized with lower than the H-toned syllables in gáráha, whereas in the infinitives, the F.V. is realized with the same pitch as the H-toned syllables in gáráha. The difference in tonal realization between the two F.V.'s can be satisfactorily accounted for if one analyzes the infinitival F.V. as a toneless morpheme which is not assigned any morphological tone and remains toneless throughout the derivation until the application of H Spread (3) by which it obtains the H tone of the adverb gáráha. The FPT F.V., on the other hand, is analyzed as being assigned a L tone which characterizes the FPT ("FPT L" hereafter).<sup>4</sup> It is this L tone that blocks the leftward spread of the adverb H in the FPT forms. The analysis just provided assumes that H Spread applies across word boundaries and iteratively.

7. H Spread (Reformulated)

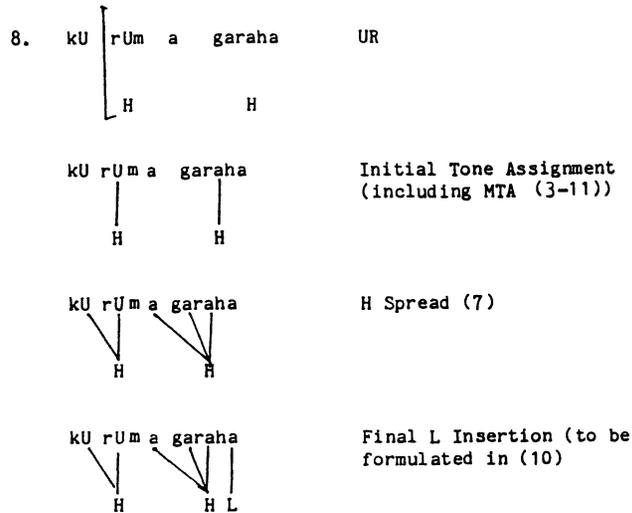


(iterative)

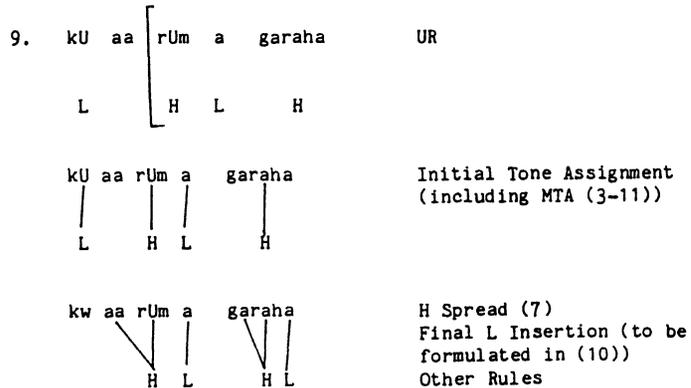
<sup>4</sup> The assignment of the FPT L tone to the F.V. is determined by an ITAR to be motivated in the section on the FPT.

Rule (7) replaces (3).

With H Spread (7), the derivation of  $\overset{!}{\underset{!}{\text{kÚrÚma}}}$   $\overset{!}{\text{gárahá}}$  (see (6a ii)) is as follows:



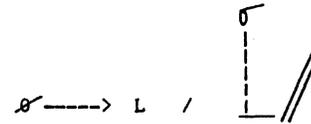
In the FPT forms in (6), on the other hand, the FPT L linked to the F.V. blocks the spreading of the adverb H to the verb unit:



That the H of  $\overset{!}{\text{gárahá}}$  is realized lower than the root H in the examples in (6) is the result of register lowering as explained in section 3.1 of Chapter 3.

Having established that the infinitival F.V. is also underlyingly toneless, its L-tone realization in citation can best be explained as a result of phrase final lowering effect expressed by the following rule:

10. Final L Insertion



"// " demarcates phrase boundary

Rule (10) applies post-lexically to assign the phrase final syllable a L-tone. Note that this L is a "tonal appendix" in the sense that it is attached to the rightmost position of the tone melody. It is always the last tone before the phrase boundary. This suggests that it might best be regarded as a "boundary tone" in the sense of Pierrehumbert (1980). For example, in the form  $\overset{!}{\text{kÚryá}} / \overset{!}{\text{kÚ+rÍ+a}}$  "to eat", the final syllable is associated with the root H. The result of appending a L tone to a final syllable already associated with a H is a falling tone:

11. kU rI a  
 [ H ]

UR

kU rI a  
 σ σ σ  
 |  
 H

Initial Syllabification (2-125)  
 MTA (3-11)

kU rIa  
 σ σ  
 |  
 H

C-Syllabification (2-127)  
 Syllable Fusion (2-128)

kU rIa  
 σ σ  
 \ /  
 H

H Spread (7)

kU rIa  
 σ σ  
 \ /  
 H L

Final L Insertion (10)

kU rya  
 σ σ  
 \ /  
 H L

Other Rules

In a H-toned infinitive with a polysyllabic root, for example, /-kárág-/ "cut", or /-čúukap-/ "stir", the second root syllable is realized L in citation (c.f. (2a iii) and (2a vi) and !H when followed by gáráha /garáha/ (c.f. examples (6b ii) and (6c ii)). Where stem syllables are represented as  $S_1, S_2, S_3 \dots$ , beginning with the stem initial syllable, we may infer that the syllable sequence  $S_2^n$  is realized H when followed by gáráha from rules established so far: Morphological Tone Association (3-11) assigns the root H only to  $S_1$ . All other syllables of the stem remain toneless afterwards. Being toneless, these syllables receive the initial H of gáráha as the result of H Spread (7). Thus, (6b ii) and (6c ii) derive as follows:

12. kU [karaga garaha] kU [čuukana garaha] Initial Tone Assignment  
 (including MTA (3-11))  
 H H H H  
 kU karaga garaha kU čuukana garaha Final L Insertion (10)  
 H H L H L H L  
 kU karaga garaha kU čuukana garaha H Spread (7)  
 H H L H L H L

As for the L-toned realization of  $S_2^n$  in citation, this can be accounted for by assuming that like the H tone, L tone spreads leftward also. Thus, we may generalize our statement of H Spread (7) to a rule of Tone Spread, applying to H tone and L tone alike:

13. Tone Spread

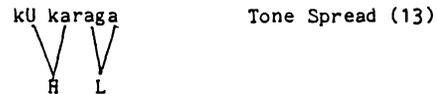
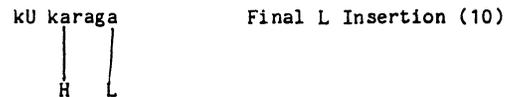
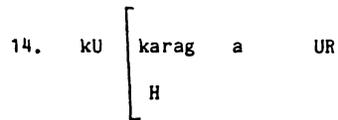


(Iterative)

where "T" stands for "any tone"

Tone Spread (13) replaces H Spread (7).

By assuming that both H and L tones spread, an infinitive with a H-toned polysyllabic root like kUkaraga in citation derives as follows:



kódeéka /kU+déék+á/ "to cook" (c.f. (2a ii)) has a penultimate falling tone which has not been accounted for so far. It is noticed that when followed by another word, the long syllable in kódeéka has a H level instead of falling tone:

15a. "to cook slowly" kódeéka gáraha [--- -- ]

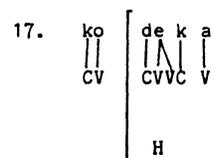
15b. "to cook quickly" kódeéka vwaangu [--- -- ]

In view of the data in (15), it is proposed that H-toned long syllables are realized HL only when they are in a phrase-penultimate position. In this environment, the H-tone is lowered by the leftward spreading of the final L tone on the final syllable:

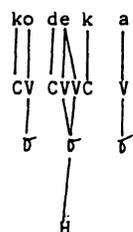
16. Penultimate Lowering



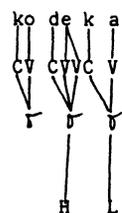
Rule (16) spreads the phrase final L tone to a penultimate H-toned long syllable, thus resulting in a penultimate falling tone. //kódeéka// derives as follows ("//" marks phrase boundary):



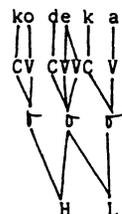
UR



Initial Syllabification (2-125)  
MTA (3-11)



C-Syllabification (2-127)  
Final L Insertion (10)



Penultimate Lowering (16)  
Tone Spread (13)

Not only the phrase final L tone can induce the lowering of a penultimate long syllable. As we will see, a morphological L tone like the MFT L when assigned to the verb final syllable may also undergo rule

(16).<sup>5</sup>

B) Non-H Verbs

In this section, I provide a tonal analysis of the non-H infinitive verbs. As shown in (2), non-H verbs in citation are realized with a surface L tone melody. However, when followed by a word that begins with a H tone-- gáráha, for example--these verbs are realized H:

- 18a. "to hit slowly"  $k\acute{U}d\acute{u}y\acute{a}$   $g\acute{a}r\acute{a}h\acute{a}$  [ - - - - - ] / $k\acute{U}+d\acute{u}y+\acute{a}$ /
- 18b. "to bury slowly"  $k\acute{U}y\acute{a}v\acute{I}r\acute{a}$   $g\acute{a}r\acute{a}h\acute{a}$  [ - - - - - ] / $k\acute{U}+y\acute{a}v\acute{I}r+\acute{a}$ /
- 18c. "to buy slowly"  $k\acute{U}g\acute{U}r\acute{a}$   $g\acute{a}r\acute{a}h\acute{a}$  [ - - - - - ] / $k\acute{U}+g\acute{U}r+\acute{a}$ /
- 18d. "to get slowly"  $k\acute{O}n\acute{O}o\acute{r}\acute{a}$   $g\acute{a}r\acute{a}h\acute{a}$  [ - - - - - ] / $k\acute{O}+n\acute{O}o\acute{r}+\acute{a}$ /
- 18e. "to grind slowly"  $k\acute{U}s\acute{y}\acute{a}$   $g\acute{a}r\acute{a}h\acute{a}$  [ - - - - - ] / $k\acute{U}+s\acute{I}e+\acute{a}$ /

In (18), the non-H infinitives are realized the same pitch as the H-toned syllables in gáráha. The most straightforward explanation for the H-tone realization of the non-H infinitives here is that like the prefix / $k\acute{U}$ -/ and F.V. /- $\acute{a}$ /, non-H verb roots are also underlyingly toneless, and therefore the H of gáráha can spread through the entire verb by rule (13). Take  $k\acute{U}d\acute{u}y\acute{a}$  / $k\acute{U}+d\acute{u}y+\acute{a}$ / in  $k\acute{U}d\acute{u}y\acute{a}$  gáráha as an example:

<sup>5</sup> An interesting observation about penultimate long syllable is that they receive extra length, i.e. they are longer than a long syllable in other locations.

19. kU duy a garaha UR

H

kUduya garaha Initial Tone Assignment



kUduya garaha Tone Spread (13)



kUduya garaha Final L Insertion (10)



Having established that non-H verb roots are toneless, the tonal realization of the non-H forms in citation in (2) is predicted by rules established so far: The final syllable of each non-H infinitive is assigned the phrase final L tone. Then, by Tone Spread (13), the final L tone spreads leftwards through the entire word. The phrase final pitch lowering rule stated in (3-9) accounts for the relative high pitch on the non-final syllables as compared to the final syllables.

C) Resyllabification and Tone Assignment

Root-initial /y/ deletes in the SR of Llogoori infinitives:

20a. H-toned verbs

- i) kwiizuriza /kU + yizUriz + a/ "to fill"
- ii) kwiita /kU + yit + a/ "to kill"

20b. Non-H Verbs

- i) kweena /kU + yen + a/ "to want"
- ii) kweereema /kU + yereem + a/ "to swim"
- iii) kwiizuriza /kU + yizuriz + a/ "to remember"

The deletion of /y/ in these forms gives rise to the input for Syllable Fusion (2-128) which resyllabifies the prefix with the root initial syllable. The question arises as to how resyllabification affects tone assignment in the H-toned infinitives in (20a).

It will be assumed here that initial tone assignment takes place prior to resyllabification by Syllable Fusion (2-128) such that at the stage of initial tone assignment, no syllable extends over more than one morpheme. Under this analysis, the root H tone is assigned to the root initial syllable of the y-initial roots before this syllable fuses with the infinitival prefix /kU-/. Note also that the root initial syllable along with the associated tonal element would become dominated by the same syllable node that originally dominates the prefix as a result of Syllable Fusion (2-128). The derivation of kwiita /kU + yit + a/ illustrates the analysis provided so far:

21. kU  $\left[ \begin{array}{l} \text{yit} \\ \text{a} \\ \text{H} \end{array} \right.$

UR

kU yit a  
 $\left[ \begin{array}{l} \sigma \\ \sigma \\ \sigma \\ \text{H} \end{array} \right.$

Initial Syllabification (2-125)  
 MTA (3-11)

kU i ta  
 $\left[ \begin{array}{l} \sigma \\ \sigma \\ \sigma \\ \text{H} \end{array} \right.$

Post-Vocalic y-Deletion (2-8)

kU i ta  
 $\left[ \begin{array}{l} \sigma \\ \sigma \\ \text{H} \end{array} \right.$

C-Syllabification (2-127)  
 Syllable Fusion (2-128)

kU i ta  
 $\left[ \begin{array}{l} \sigma \\ \sigma \\ \text{H} \quad \text{L} \end{array} \right.$

Final L Insertion (10)  
 Penultimate Lowering (16)

kwiita  
 $\left[ \begin{array}{l} \sigma \\ \sigma \\ \text{H} \quad \text{L} \end{array} \right.$

Glide Formation (2-111)

#### 4.1.1.3 Infinitives with Extended Verb Stems

The analysis offered above applies also to infinitives with extended verb stems. The following are examples of infinitives with the causative and applied extensions /-iz- / and /-Ir-/.<sup>6</sup> Note that both of these extensions have the same tonal effect.

---

<sup>6</sup> The reciprocal extension /an/ and the semantically empty extensions /-iz-/ and /-Ih-/ were also tested for tone. They all have the same tonal effects as the causative and applied extensions /-iz-/ and /-Ir-/.

22a. Infinitives with the causative extension /-iz-/:

H-toned Verbs

i)	"to make bite"	kÚrÚm̩n̩a	/kÚ+rÚm̩+iz+á/
ii)	"to make cook"	kÓdéekiza	/kÚ+déek+iz+á/
iii)	"to make cut"	kÚkárágiza	/kÚ+kár+ag+iz+á/
iv)	"to make eat"	kÚrÍhiza	/kÚ+rÍ+Ih+iz+á/*
v)	"to make kill"	kwiitiza	/kÚ+yít+iz+á/

non-H Verbs

vi)	"to make hit"	kUduyiza	/kÚ+dúy+iz+á/
vii)	"to make burn"	kUsaambiza	/kÚ+samb+iz+á/
viii)	"to make speak"	komoromina	/kÚ+mórom+iz+á/
ix)	"to make grind"	kUsyeehiza	/kÚ+sÍe+Ih+iz+á/*
x)	"to make want"	kweepiza	/kÚ+yēn̩+iz+á/

\* Verb roots of -CV(V)- canonic shape take an additional semantically empty extension /-Ih-/ in the infinitives with the causative extension.

22b. Infinitives with the applied extension /-Ir-/:

H-toned Verbs

i)	"to bite for"	kÚrÚm̩Ira	/kÚ+rÚm̩+Ir+á/
ii)	"to cook for"	kÓdéekera	/kÚ+déek+Ir+á/
iii)	"to cut for"	kÚkárágIra	/kÚ+kár+ag+Ir+á/
iv)	"to eat for"	kÚrÍIra	/kÚ+rÍ+Ir+á/
v)	"to kill for"	kwiitIra	/kÚ+yít+Ir+á/

Non-H Verbs

vi)	"to hit for"	kUduyIra	/kÚ+dúy+Ir+á/
vii)	"to burn for"	kUsaambIra	/kÚ+samb+Ir+á/
viii)	"to speak for"	komoromera	/kÚ+mórom+Ir+á/
ix)	"to grind for"	kUsyeera	/kÚ+sÍe+Ir+á/
x)	"to want for"	kweepera	/kÚ+yēn̩+Ir+á/

The following are examples of infinitives with /-iz/, followed by an adverb:

23.

Extended Infinitives followed by gárána:a) H-toned verbs

- i) "to make bite slowly" kÚrÚmíná gárána [-----] /kÚ+rÚm+iz+a/
- ii) "to make cook slowly" kÓdeékízá gárána [-----] /kÚ+deék+iz+a/
- iii) "to make cut slowly" kÚkárágízá gárána [-----] /kÚ+kárag+iz+a/
- iv) "to make eat slowly" kÚrÍínízá gárána [-----] /kÚ+rÍ+lh+iz+a/
- v) "to make kill slowly" kwíítízá gárána [-----] /kÚ+yít+iz+a/

b) Non-H Verbs

- i) "to make hit slowly" kÚdúyízá gárána [-----] /kÚ+duy+iz+a/
- ii) "to make burn slowly" kÚsáambízá gárána [-----] /kÚ+samb+iz+a/
- iii) "to make speak slowly" kómorómíná gárána [-----] /kÚ+mórom+iz+a/
- iv) "to make grind slowly" kÚsyeehízá gárána [-----] /kÚ+síe+lh+iz+a/
- v) "to make want slowly" kwéepízá gárána [-----] /kÚ+yén+iz+a/

From (22) and (23), one can see that verb extensions behave the same tonally as any post-stem-initial syllables: they are realized L in all the verb forms in isolation (except (22a iv) in which the extension resyllabifies with the H-toned root syllable). They are susceptible to the leftward spread of the initial H of gárána in all examples in (23). All these characteristics point to the conclusion that verbal extensions are also underlyingly toneless. So tonally speaking, there is no distinction between a lexical root and the extended form of the same lexical root. It is for this reason that verbal extensions are considered tonally part of the verb root.

4.1.2 Infinitives with Object Prefix

In the presence of the O.P., Llogoori infinitives have a different tone melody. Consider the following:

24a. H-toned Verbs

- i) "to bite it" kÚkÍrUma /kÚ+kI+rÚm+a/
- ii) "to cook it" kÚkédeeka /kÚ+kI+deék+a/
- iii) "to cut it" kÚkÍkaraga /kÚ+kI+kárag+a/
- iv) "to eat it" kÚkÍrya /kÚ+kI+rÍ+a/
- v) "to kill it" kÚçííta /kÚ+kI+yít+a/
- vi) "to stir it" kÚkÍçuukapa /kÚ+kI+çuukap+a/
- vii) "to cut for it" kÚkÍkaragIra /kÚ+kI+kárag+Ir+a/
- viii) "to cause to stir" kÚkÍçuukapiza /kÚ+kI+çuukap+iz+a/

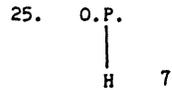
24b. Non-H Verbs

- i) "to hit it" kÚkÍduya /kÚ+kI+duy+a/
- ii) "to burn it" kÚkÍsaamba /kÚ+kI+samb+a/
- iii) "to sell it" kÚkÍgUriza /kÚ+kI+gÚriz+a/
- iv) "to grind it" kÚkÍsya /kÚ+kI+síe+a/
- v) "to want it" kÚçééna /kÚ+kI+yén+a/
- vi) "to love for it" kÚkÍyaanzIra /kÚ+kI+yánz+Ir+a/
- vii) "to sell for it" kÚkÍgUriza /kÚ+kI+gÚriz+Ir+a/

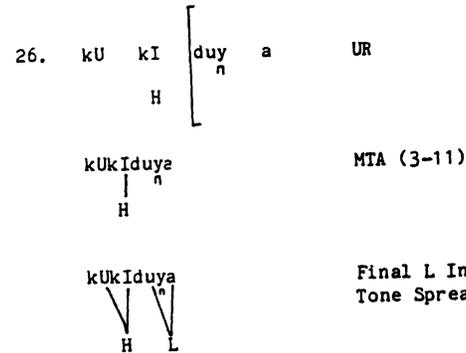
In (24), the tonal distinction between H and non-H verbs is neutralized: both types of verbs are H up to the O.P. and L thereafter.

Having established that the infinitival prefix /kÚ-/, the infinitival F.V. /-a/, and non-H roots are all underlyingly toneless, the

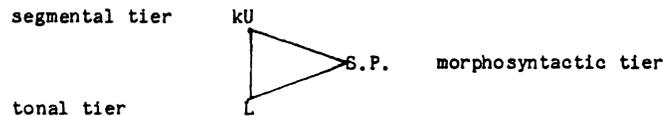
only possible source of H in the SR of the non-H forms in (24b) is the O.P. Thus,



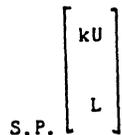
The derivation of  $\frac{kUkIduya}{\underset{\text{H}}{\text{a}}}$  / $\frac{kU+kI+d\ddot{u}y+a}{\underset{\text{H}}{\text{a}}}$ / "to hit it" is as follows:



<sup>7</sup> In this study, morphosyntactic categories are assumed to constitute an independent tier of structure. Their associations with elements on the segmental tier and the tonal tier are on two different planes. With this assumption, given a morpheme consisting of elements on all the 3 tiers--for instance, the "1st PL. SUBJECT PREFIX"--the full autosegmental display of this morpheme is a three dimensional one:



In the display above, association lines linking "kU" and "L", "L" and "S.P.", and "S.P." and "kU" lie on three separate planes. In the rest of the study, however, for the sake of simplicity in notation, where elements on all three tiers need be represented for a certain morpheme, the morphosyntactic category will be represented in terms of a subscript to a bracket structure. Thus, the morpheme "1st PL. SUBJECT PREFIX" will be represented as:



On the other hand, where only elements on any 2 of the 3 tiers are expressed, the simple two dimensional association display will be used (compare the treatment in McCarthy 1981: pp 376-77).

An interesting observation here is that in the H-toned verbs, the root initial syllable on which the root H is supposed to be realized surfaces as L instead. Considering the forms in (24a) alone, one could easily account for the absence of the root H in the SR of the H-toned forms by assuming that the root H deletes in the presence of the O.P.. Under this analysis, Root H deletion would change the underlyingly H-toned roots to toneless roots, thereby neutralizing the tonal distinction between underlyingly H and non-H verbs. However, the tonal realization of these forms when followed by gáráha suggests that this analysis is incorrect:

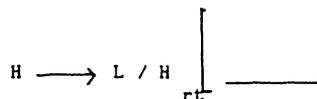
- 27a. H-toned Verbs
- 1) "to bite it slowly" kÚkÍrUmá gáráha [-----] /kÚ+kÍ+rUm+a/
  - 11) "to cook it slowly" kÚkÉdeká gáráha [----] /kÚ+kÍ+dek+a/
  - 111) "to cut it slowly" kÚkÍkaragá gáráha [----] /kÚ+kÍ+karag+a/
  - 1V) "to cut for slowly" kÚkÍkaragÍrá gáráha [-----] /kÚ+kÍ+karag+Ír+a/

27b. Non-H Verbs

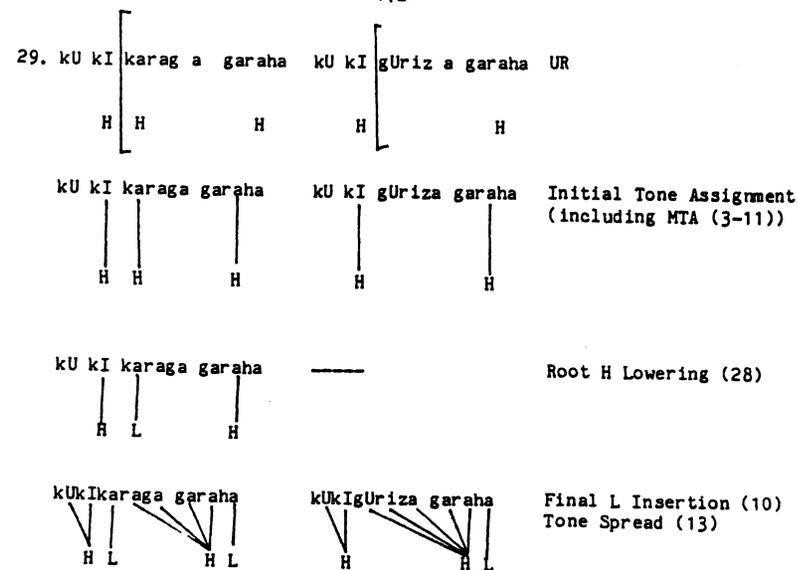
- i) "to hit it slowly" kŭkídúyá gáràhá [-----] /kŭ+kí+dúy+á/
- ii) "to burn it slowly" kŭkísaambá gáràhá [-----] /kŭ+kí+saamb+á/
- iii) "to sell it slowly" kŭkígŭrízà gáràhá [-----] /kŭ+kí+gŭríz+á/
- iv) "to sell for slowly" kŭkígŭrízírà gáràhá [-----] /kŭ+kí+gŭríz+ír+á/

From data in (27) above, one can see that when followed by gáràhá, the distinction between the H-toned and non-H forms surfaces: in each H-toned form, the root initial syllable is realized lower in pitch than the following H-toned syllables, whereas in each non-H form, the root initial syllable is realized the same pitch as the following H-toned syllables. The pitch difference between the root initial syllable and the following syllables in each H-toned form can be accounted for if the root initial syllable becomes L-toned at a certain stage of derivation and thus blocks the leftward spread of the adverb H tone. This explains why the adverb H spreads only up to but excluding the root initial syllable. So suppose that the root H tone changes to L in the presence of a preceding H:

28. Root H Lowering (Preliminary)



With rule (28), kŭkíkárágá gáràhá "to cut it slowly" and kŭkígŭrízà gáràhá "to sell it slowly" derive as follows:



Summary

In the preceding discussion, I have examined in detail the tonal structure of the Llogoori infinitive and tonal processes associated with its derivation. Below is a summary of the major observations made about the Llogoori tonal system so far:

1. Llogoori verb roots fall into two tonal classes, namely, H & toneless.
2. All syllables are underlyingly unassociated with tones. Syllables are assigned morphological tones through ITAR's. A phrase level tone, viz., L, is appended to the last syllable of any given phonological phrase.
3. Syllables that are not assigned any tones by rules mentioned in point (2) receive the tones of the following syllable by Tone Spread (13).
4. Penultimate H-toned long syllables may be realized as HL as a result of the leftward spread of a final L tone by Penultimate Lowering (16).
5. Summary of rules:
  - a) Morphological Tone Assignment
    - i) Initial Tone Assignment Rules (see later discussion)
    - ii) Principle of Morphological Tone Association (3-11)
  - b) Tone Rules
    - Final L Insertion (10)
    - Tone Spread (13)
    - Penultimate Lowering (16)
    - Root H Lowering (28)

4.2 NEAR FUTURE TENSE

The Near Future Tense (NFT) is used when speaking of events or actions which are to take place later during the day. Obligatory segmental constituents are the subject prefix, the tense prefix /ra-/, the root, and the final vowel /-a/: S.P. + ra + Root + a.

4.2.1 Near Future Tense without Object Prefix

30a. H-toned Verbs

i)	"I will shave"	ndávéga	/N+ra+vég+a/
	"we will shave"	kUrávéga	/kU+ra+vég+a/
	"You (sg.) will shave"	Ur ávéga	/U+ra+vég+a/
	"You (pl.) will shave"	mur ávéga	/mu+ra+vég+a/
	"He/She will shave"	ar ávéga	/a+ra+vég+a/
	"They will shave"	var ávéga	/va+ra+vég+a/
ii)	"we will cook"	kUrádééka	/kU+ra+déek+a/
iii)	"we will cut"	kUrákáraga	/kU+ra+kárag+a/
iv)	"we will kill"	kUrííta	/kU+ra+yít+a/
v)	"we will eat"	kUráryá	/kU+ra+rí+a/

30b. Non-H Verbs

i)	"we will hit"	kUraduya	/kU+ra+dúy+a/
ii)	"we will burn"	kUrasaamba	/kU+ra+sámb+a/
iii)	"we will sell"	kUragUriza	/kU+ra+gÚriz+a/
iv)	"we will want"	kUreeña	/kU+ra+yén+a/
v)	"we will grind"	kUrasya	/kU+ra+síe+a/

The NFT prefixal vowel /-a/ is deleted in examples (30a iv) and (30b iv) by Non-high Vowel Deletion (2-114), resulting in a long vowel having the quality of the root initial vowel:

31.  $\begin{matrix} kU+ra+yit+a \\ \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \\ CV \ CV \ CVC \ V \end{matrix}$       $\begin{matrix} kU+ra+yen+a \\ \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \\ CV \ CV \ CVC \ V \end{matrix}$
- $\begin{matrix} kUr+aita \\ \downarrow \downarrow \downarrow \downarrow \\ CVCVVCV \end{matrix}$       $\begin{matrix} kUraena \\ \downarrow \downarrow \downarrow \downarrow \\ CVCVVCV \end{matrix}$      Post Vocalic  $\underset{n}{y}$ -Deletion (2-8)
- $\begin{matrix} kUr \ ita \\ \downarrow \downarrow \downarrow \downarrow \\ CVCVVCV \end{matrix}$       $\begin{matrix} kUr \ ena \\ \downarrow \downarrow \downarrow \downarrow \\ CVCVVCV \end{matrix}$      Non-high Vowel Deletion (2-114)  
Linking Convention (2-95)  
(Principle (2-96a))

In (30), with the exception of ndávéga (30a i), H-toned forms have a "L H L" melody, and non-H forms "L". The tonal realization of the tense prefix /ra-/ in the examples in (30) resembles that of infinitival prefix /kú-/ in that it has a surface H if the following syllable is underlyingly H-toned (see (30a i-v)), and L if the following syllable is underlyingly toneless (see (30b i-v)). Like the infinitival prefix, the NFT prefix /ra-/ is analyzed as being underlyingly toneless. Its H realization in the H-toned verbs is similarly explained as a result of the leftward spread of the root H tone by Tone Spread (13).

With the exception of ndávéga "I will shave" (the first form in example (30a i)) which I will discuss shortly, the S.P. in all forms in (30) have a surface L tone. The most straightforward analysis of the S.P. is that it is underlyingly L-toned, not toneless, since it

blocks the leftward spread of the root H tone in the H-toned forms. Thus,

32. S.P.  
|  
L

(where S.P. stands for the morphosyntactic category "subject prefix")

Like the infinitive, the NFT also has no tonal suffix since the F.V. is always realized L in citation (c.f. examples in (30)) and the same pitch as a following H-toned syllable as in the examples below:

33a. H-toned verbs

- i) "we will shave slowly"  $kU\acute{r}a\acute{v}e\acute{g}a \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+veg+a/
- ii) "we will cook slowly"  $kU\acute{r}a\acute{d}e\acute{e}k\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+deek+a/
- iii) "we will cut slowly"  $kU\acute{r}a\acute{k}a\acute{r}a\acute{g}a \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+karag+a/
- iv) "we will kill slowly"  $kU\acute{r}i\acute{i}t\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+yit+a/
- v) "we will eat slowly"  $kU\acute{r}a\acute{r}y\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+ri+a/

33b. Non-H Verbs

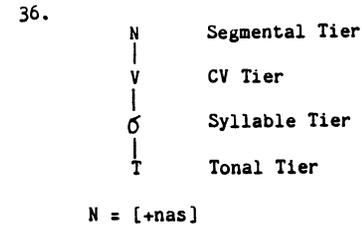
- i) "we will hit slowly"  $kU\acute{r}a\acute{d}u\acute{y}a \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+duy+a/
- ii) "we will burn slowly"  $kU\acute{r}a\acute{s}a\acute{n}a\acute{b}\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+samb+a/
- iii) "we will sell slowly"  $kU\acute{r}a\acute{g}u\acute{r}i\acute{z}\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+guriz+a/
- iv) "we will want slowly"  $kU\acute{r}e\acute{e}\acute{n}\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+yen+a/
- v) "we will grind slowly"  $kU\acute{r}a\acute{s}\acute{y}\acute{a} \acute{g}a\acute{r}a\acute{n}a$  [- - - - -] /kú+ra+si+a/



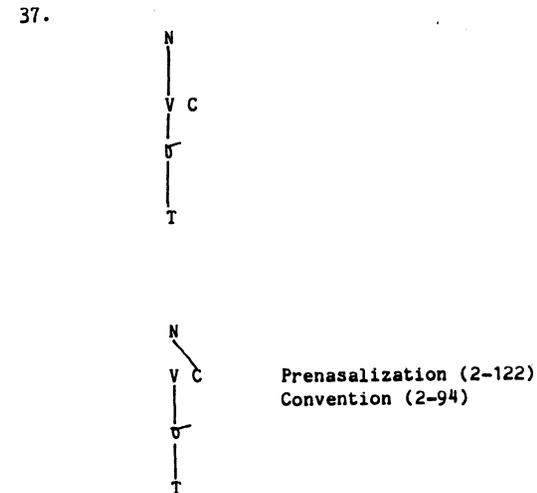
35b. Non-H Verbs followed by gáraha /garáha/

- i) "I will hit slowly" ndádúyá gáraha /N+ra+dúy+a/
- ii) "I will burn slowly" ndásaamba gáraha /N+ra+sámb+a/
- iii) "I will sell slowly" ndágÚrizá gáraha /N+ra+gÚriz+a/
- iv) "I will want slowly" ndééṅá gáraha /N+ra+yéṅ+a/
- v) "I will grind slowly" ndásya gáraha /N+ra+sīe+a/

In the NFT forms in (35), the word initial syllables are all realized H. Assuming that the 1st singular subject prefix /N-/ is underlyingly L-toned, like the other syllabic subject prefixes examined before, one must explain why the L tone on /N-/ is not realized in any of the NPT forms in (35a). As we will see, this can be accounted for in terms of the Prenasalization rule (2-122) and Linking Convention (2-95) which together predict that the underlying tonal properties of a given nasal morpheme would never be realized on the syllable to which the nasal belongs in the SR. Instead, these properties would be realized on the vowel(s) immediately preceding the nasal segment. As in the case of the NPT forms in (35), since the nasal segment is the initial segment of the word and preceded by no other V-units, its tonal properties thus cannot surface. To see this, suppose that the structure of an underlyingly "toned" nasal morpheme after Morphological Tone Association (3-11) can be represented autosegmentally as follows:



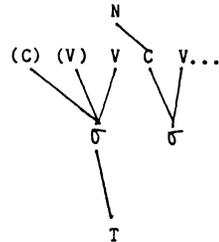
When this configuration is followed by a C-unit,<sup>8</sup> "N" will be linked to this C-unit by the rule of prenasalization (2-122), and subsequently delinked from the V-unit with which it ("N") is originally associated by convention (2-94).



<sup>8</sup> Empirically speaking, the nasal element that constitutes the 1st sg. personal prefix is always followed by a C-unit—even when the prefix is followed by a morpheme that begins with a vowel, since in this case, the allomorph /nd-/ is used instead.

By C-Syllabification (2-127), the C-unit syllabifies with the follow-  
ing string of V-units, and the V-unit left empty by "N" resyllabifies  
 with the immediately preceding C- or V-unit(s), if any, by Syllable  
 Fusion (2-128). As a result, "T" and "N" become associated with two  
different syllable nodes.

38.



C-syllabification (2-127)  
 (Syllable Fusion (2-128))

Up to this stage, one can see how the tonal information represented  
 "T" that is originally borne by the nasal morpheme would only be real-  
 ized on the syllable preceding the nasal segment instead of the sylla-  
 ble to which the nasal segment belongs in the SR. As to whether "T"  
 can be realized on the surface at all, that depends on whether there  
 is any available [+son] feature matrix to which the V unit left empty  
 by the nasal can be linked by Linking Convention (2-95). As in the  
 case of the NFT forms exemplified in (35), since "N" is the initial  
 segment of the verb unit, there is no [+son] segmental feature matrix  
 to which the V-unit left empty by "N" can be linked. This explains  
 why the S.P. L tone is not realized in these forms.

At this point, one may ask if the empty V-unit and its associated  
 prosodic features may resyllabify with and relink to the final vowel

of a preceding word unit. An NFT form in a phrasal context like the  
 following shows that such a hypothesis is incorrect:

39. "I'll shave tonight" (Near Future Tense)

hávu <sup>h</sup> dií <sup>i</sup> kú <sup>u</sup> ndávéga	/havudiíku	N <sup>h</sup> rá <sup>i</sup> +vé <sup>h</sup> g+a <sup>i</sup> /
	tonight	I will shave

Segmentally speaking, no extra length is detected on the final vowel  
 of hávu<sup>h</sup>dií<sup>i</sup>kú<sup>u</sup> "tonight" in the phrase. If Linking Convention (2-95)  
 had linked the final /-U/ of hávu<sup>h</sup>dií<sup>i</sup>kú<sup>u</sup> to the empty V, one would ex-  
 pect this final /-U/ to be long in the SR. Tonally speaking, /-U/ is  
 realized with the same pitch as the following H-toned syllable nda and  
ve. Had the empty V and the associated prosodic features been resyl-  
 labified with the syllable ku of hávu<sup>h</sup>dií<sup>i</sup>kú<sup>u</sup>, one would expect a surface  
 L tone on ku. In sum, it is believed that Linking Convention (2-95)  
 and Resyllabification do not apply across word boundaries. The pro-  
 sodic features associated with the empty V therefore cannot be real-  
 ized in the SR.

Finally, there remains the question as to what happens to the  
 empty V and the associated prosodic features in the SR. There is at  
 least one reason to think that they are all deleted by a general prin-  
 ciple which deletes an empty V unit ("empty" in the sense that it is  
 not associated with any segmental materials) and all prosodic features  
 associated with it: The H of the root -vé<sup>h</sup>g- spreads leftwards to the  
 final syllable of hávu<sup>h</sup>dií<sup>i</sup>kú<sup>u</sup>. If the  $\left[ \begin{smallmatrix} V \\ L \end{smallmatrix} \right]$  configuration left empty by  
 the 1st sg. subject prefix were present on the surface, this linkage  
 would have blocked the H on -vé<sup>h</sup>g- from spreading leftwards.

One last question to consider is whether it is possible that a nasal morpheme like the 1st sg. subject prefix is simply not associated with any V-unit underlyingly and therefore non-tonal. (Note: only V-units can bear tones.) While there is no direct evidence as to whether the 1st sg. subject prefix is tonal or not, its tonal nature is inferred from the facts that: 1) all other subject prefixes (1st pl., 2nd sg. and pl, and 3rd sg. & pl. subject prefixes) are L-toned; 2) the 1st sg. object prefix which has the same segmental shape, viz., "N", is toned--to be specific, it bears a H tone. The latter point will be illustrated in section 4.3 on the Perfect Tense.

#### 4.2.2 Near Future Tense with Object Prefix

##### 40a. H-Toned Verbs

- |      |                    |                            |                     |
|------|--------------------|----------------------------|---------------------|
| i)   | "we will shave it" | kUrá <sup>á</sup> kevega   | /kÙ+rā+kÍ+vég+a̰/   |
| ii)  | "we will cook it"  | kUrá <sup>á</sup> kedeeka  | /kÙ+rā+kÍ+déek+a̰/  |
| iii) | "we will cut it"   | kUrá <sup>á</sup> kíkaraga | /kÙ+rā+kÍ+kárag+a̰/ |
| iv)  | "we will kill it"  | kUrá <sup>á</sup> ciita    | /kÙ+rā+kÍ+yít+a̰/   |
| v)   | "we will eat it"   | kUrá <sup>á</sup> kírya    | /kÙ+rā+kÍ+rí+a̰/    |

##### 40b. Non-H Verbs

- |      |                    |                         |                     |
|------|--------------------|-------------------------|---------------------|
| i)   | "we will hit it"   | kUrakÍduya              | /kÙ+rā+kÍ+duy+a̰/   |
| ii)  | "we will burn it"  | kUrakÍsaamba            | /kÙ+rā+kÍ+samb+a̰/  |
| iii) | "we will sell it"  | kUrakÍgUriza            | /kÙ+rā+kÍ+gúríz+a̰/ |
| iv)  | "we will want it"  | kUrá <sup>á</sup> ceena | /kÙ+rā+kÍ+yén+a̰/   |
| v)   | "we will grind it" | kUrakÍsya               | /kÙ+rā+kÍ+síe+a̰/   |

##### 41a. H-toned Verbs

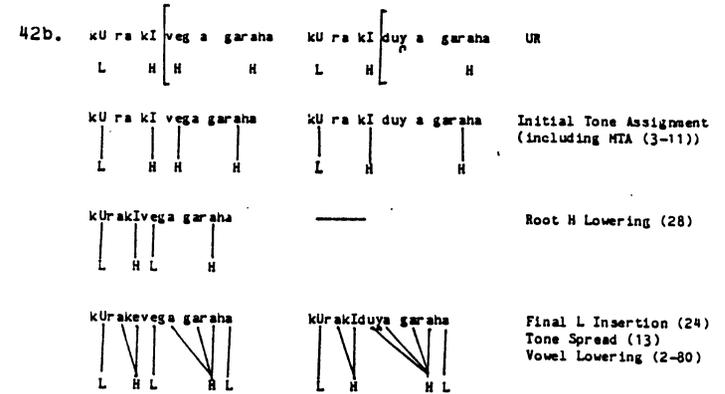
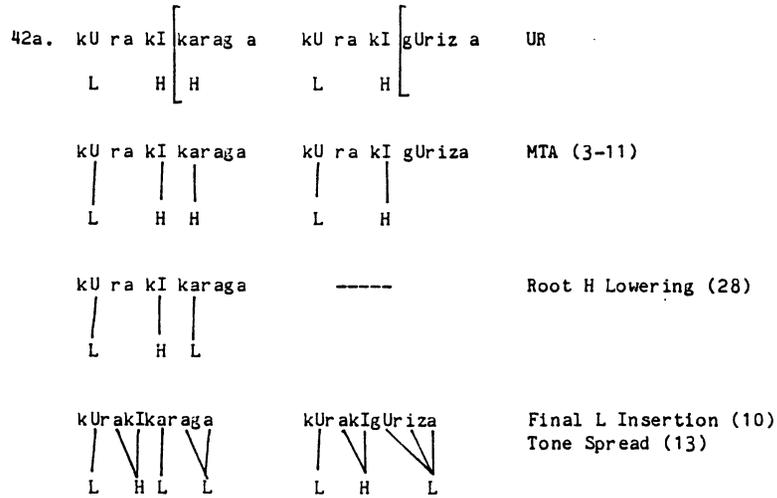
- |      |                           |                                   |                                  |
|------|---------------------------|-----------------------------------|----------------------------------|
| i)   | "we will shave it slowly" | kUrá <sup>á</sup> kevega gáráha   | [- - - - - ] /kÙ+rā+kÍ+vég+a̰/   |
| ii)  | "we will cook it slowly"  | kUrá <sup>á</sup> kedeeka gáráha  | [- - - - - ] /kÙ+rā+kÍ+déek+a̰/  |
| iii) | "we will cut it slowly"   | kUrá <sup>á</sup> kíkaraga gáráha | [- - - - - ] /kÙ+rā+kÍ+kárag+a̰/ |
| iv)  | "we will kill it slowly"  | kUrá <sup>á</sup> ciita gáráha    | [- - - - - ] /kÙ+rā+kÍ+yít+a̰/   |
| v)   | "we will eat it slowly"   | kUrá <sup>á</sup> kírya gáráha    | [- - - - - ] /kÙ+rā+kÍ+rí+a̰/    |

##### 41b. Non-H Verbs

- |      |                           |                                |                                  |
|------|---------------------------|--------------------------------|----------------------------------|
| i)   | "we will hit it slowly"   | kUrakÍduya gáráha              | [- - - - - ] /kÙ+rā+kÍ+duy+a̰/   |
| ii)  | "we will burn it slowly"  | kUrakÍsaamba gáráha            | [- - - - - ] /kÙ+rā+kÍ+samb+a̰/  |
| iii) | "we will sell it slowly"  | kUrakÍgUriza gáráha            | [- - - - - ] /kÙ+rā+kÍ+gúríz+a̰/ |
| iv)  | "we will want it slowly"  | kUrá <sup>á</sup> ceena gáráha | [- - - - - ] /kÙ+rā+kÍ+yén+a̰/   |
| v)   | "we will grind it slowly" | kUrakÍsya gáráha               | [- - - - - ] /kÙ+rā+kÍ+síe+a̰/   |

In (40), the tonal distinction between H-toned and non-H verbs is neutralized: all forms have a surface L on the S.P., H on the tense prefix and the O.P., and L thereafter. In (41), on the other hand, with the exception of (41a iv) and (41b iv) which I will discuss shortly, the H vs. non-H distinction surfaces: the root initial syllable of a H-toned form is realized lower than the following H-toned syllables, whereas in a non-H form, all stem syllables are realized with the same pitch as the adverb H. The analysis of the NFT forms with O.P. is similar to that of the infinitives: The O.P. is characterized by a H tone which spreads to the toneless NFT prefix /ra-/ by Tone Spread (13). The root H tone of the H-toned forms becomes L after the O.P. by Root H tone Lowering (28), and thus blocks the leftward spread of the adverb H in all forms in (41a). Non-H verb stems in (41b) remain

toneless after the O.P., and receive the adverb H as a result of rule (13). The SR of NFT forms in (40) and (41) are then derivable by rules established before. The derivations of kUrakIkaraga "we will cut it", kUrakIguriza "we will sell it", kUrakIvega garaha "we will shave it slowly", and kUrakIduya garaha "we will hit it slowly" illustrate this analysis:



In the form kUrakIita / $kU+ra+kI+yit+a$ /, it is not clear if the root H tone is lowered or not, since whether Root H Lowering applies or not, the same surface representation results. To see this, let us consider the derivation of kUrakIita first under the analysis that Root H Lowering applies and then the one that Root H Lowering does not apply:

43a. If Root H Lowering Applies:

i) kU ra kI yit a UR  
 L H [ H

ii) kU ra kI yit a MTA (3-11)  
 L H H

iii) kU ra kI yit a Root H Lowering (28)  
 L H L

iv) kU ra kI ita Post Vocalic y-Deletion (2-8)  
 Syllable Fusion (2-128)  
 L H L

v) kUra<sup>v</sup>ciita Final L Insertion (10)  
 Tone Spread (13) & other rules  
 L HL L

43b. If Root H Lowering does not apply:

i) kU ra kI yit a UR  
 L H [ H

ii) kU ra kI yita MTA (3-11)  
 L H H

iii) kU ra kI ita Post Vocalic y-Deletion (2-8)  
 Syllable Fusion (2-128)  
 L H H

iv) kU ra kI ita Twin Sister Convention  
 L H

v) kUra<sup>v</sup>kiita Final L Insertion (10)  
 Penultimate Lowering (16)  
 L H L

vi) kUra<sup>v</sup>ciita Tone Spread (13) Other Rules  
 L H L

The difference between the two analyses lies in the source of the penultimate falling tone of the word: under the first analysis, the penultimate falling tone in the SR consists of the O.P. H and the lowered root tone, whereas under the second analysis, the penultimate falling tone is a result of Penultimate Lowering (16). A considera-

tion of the tonal realization of kUraciita in non-phrase final position (c.f. example (41a iv)) shows that the second analysis is more desirable. In (41a iv) ci is realized with a H level tone. Under the analysis which treats the penultimate falling tone on ci as a result of penultimate lowering, the absence of this falling tone in the phrasal context is predictable: in this context, ci is not in a phrase penultimate position and therefore not susceptible to Penultimate Lowering (16). On the contrary, under the analysis that treats the penultimate falling tone on ci as a result of the clustering of morphological tones, an additional rule that changes a HL sequence to H in non-penultimate position would be needed to account for the surface tonal melody of the form in citation.

Having provided evidence for the hypothesis that Root H Lowering (28) does not apply in the form kUraciita, one must then explain why the rule does not apply in precisely this form. Suppose that the rules of y-Deletion (2-8) and Syllable Fusion (2-128) are ordered crucially before Root H Lowering (28). With this ordering, the O.P. H and root H first become tautosyllabic as a result of the Syllable Fusion (2-128) which resyllabifies the object prefix with the root initial syllable (see (43b iii)). This tautosyllabic sequence of H tones is subsequently reduced to a single H by the "Twin Sister Convention" (see (43b iv)). Root H Lowering (28) is then irrelevant (after stage (iv) of (43b) ) since the root H cannot be independently identified.

#### 4.3 PERFECT TENSE

Obligatory segmental constituents of the Perfect Tense (PT) in Llogoori are the subject prefix, the root and the F.V. /-i/:

S.P. + R + i.<sup>9</sup>

---

<sup>9</sup> In the presence of the applied extension /-Ir-/, however, the F.V. is /-e/. (See examples in (44b viii), (57 vii) below.)

4.3.1 Perfect Tense Forms without Object Prefix

44a. H-toned verbs

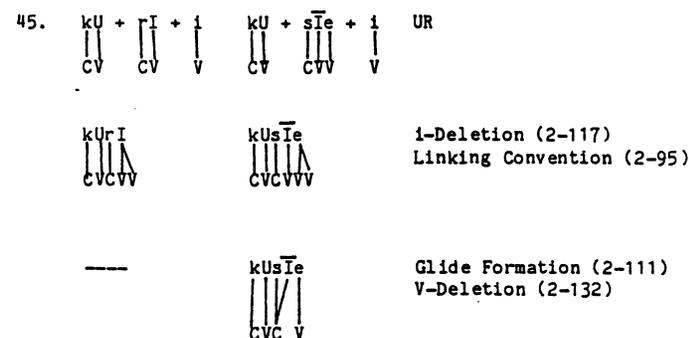
i)	"I've just bitten"	nÚmj	/N+rÚm+i/
	"we've just bitten"	kÚrÚmi	/kÚ+rÚm+i/
	"You (sg.)'ve just bitten"	UrÚmi	/U+rÚm+i/
	"You (pl.)'ve just bitten"	murÚmi	/mù+rÚm+i/
	"He/She's just bitten"	arÚmi	/à+rÚm+i/
	"They've just bitten"	varÚmi	/vâ+rÚm+i/
ii)	"we've just cooked"	kodééçí	/kÙ+déék+i/
iii)	"we've just cut"	kUkárájí	/kÙ+kár ag+i/
iv)	"we've just killed"	kwiítí	/kÙ+yít+i/
v)	"we've just eaten"	kÚrÍí	/kÙ+rÍ+i/
vi)	"we've just filled"	kwiízurizi	/kÙ+yízuriz+i/

44b. Non-H Verbs

i)	"we've just hit"	kUduyi	/kÙ+dúy <sub>n</sub> +i/
ii)	"we've just burned"	kUsaambi	/kÙ+samb+i/
iii)	"we've just sold"	kUgUrizi	/kÙ+gÚriz+i/
iv)	"we've just wanted"	kweéñi	/kÙ+yéñ+i/
v)	"we've just ground"	kUsye	/kÙ+sÍe+i/
vi)	"we've just remembered"	kwiízurizi	/kÙ+yízuriz+i/
vii)	"we've just swum"	kweéreemi	/kÙ+yéereem+i/
viii)	"we've just loved for"	kUyaanzIrI	/kÙ+yanz+Ir+e/
ix)	"we've just worked"	kUyIIInzi	/kÙ+yInz+i/

In the form nÚmi "I've just bitten" (first form in (44a i)), the root initial consonant /r/ is deleted in the SR by Internasal Consonant Deletion (2-78).

The F.V. /-i/ palatalizes the root final velars /k/ and /g/ (as in (44a ii) and (44a iii)), /y/ (as in (44b i)), and /ŋ/ (as in (44b iv)) by Palatalization (2-14) and (2-62). Also, the F.V. is deleted in (44a v) and (44b v) by i-Deletion (2-117) as shown below:



In (44), PT forms in isolation have a L tone on the F.V.. The tonal realization of the F.V. before gáráha suggests that the Present Tense also has no tonal suffix:

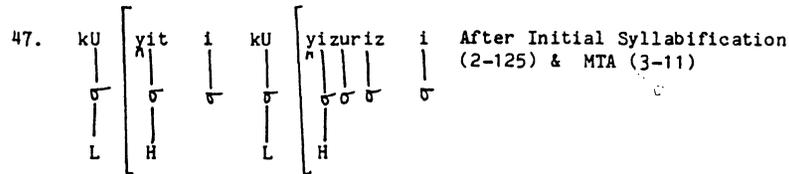
46a. "we've just bitten slowly" kUrÚmí gáráha [- - - -] /kÙ+rÚm+i/

46b. "we've just hit slowly" kUdúyí gáráha [- - - -] /kÙ+dúy+i/

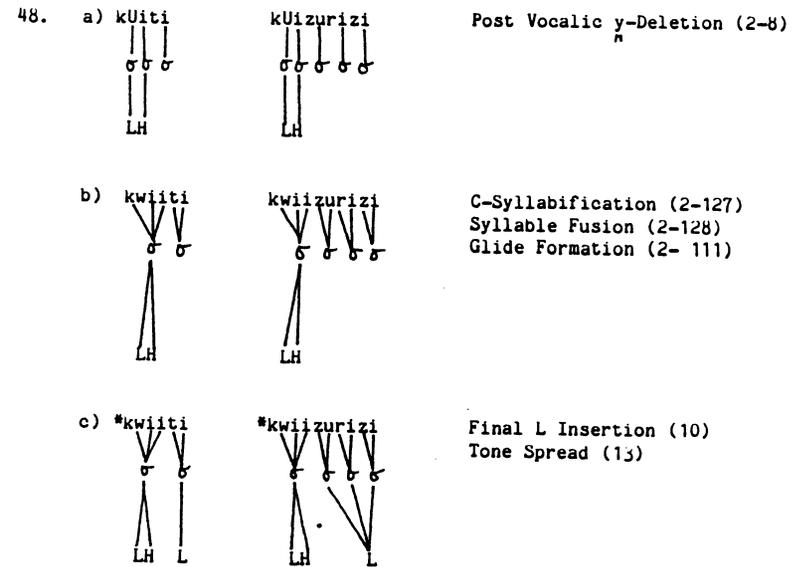
(In (46) and below, where verbs with roots of different canonic shapes do not call for different tonal analyses, only those with the -CVC- roots are exemplified in the "\_\_\_ gáráha" context.) In both examples in (46), the F.V. is realized with the same tone as the H-toned syllables of gáráha. This can be best explained as a result of the leftward spread of the adverb H onto the F.V. which is not assigned any morphological tones by an ITAR or Morphological Tone Association (3-11).

With the exception of (a iv), (a vi), (b iv), (b vi), and (b vii), the tonal analysis of the PT forms in (44) and (46) is similar to that of the infinitives and the NFI forms seen before: By the principle of Morphological Tone Association (3-11), the S.P. L is assigned to the subject prefix in all forms, and the root H tone to the root initial syllable. In the citation forms in (44), Final L Insertion (10) assigns L to the F.V. in all forms. In the H-toned forms, Tone Spread (13) spreads the final L to the preceding toneless syllables, as in (44a iii) and (44a vi). Penultimate Lowering (16) applies in (44a ii) and (44a iv).

Resyllabification occurs in PT forms with Type A  $y_n$ -initial roots, namely, (44a iv), (44a vi), (44b iv), (44b vi), and (44b vii), as a result of the deletion of the root-initial  $/y_n/$ . Prior to Post Vocalic  $y_n$ -Deletion (2-8), tonal associations in the H-toned forms (44a iv) and (44a vi) are as follows:



After  $y_n$ -deletion and subsequent resyllabification by Syllable Fusion (2-128), one would expect a tautosyllabic LH sequence on the word initial syllables of these forms:

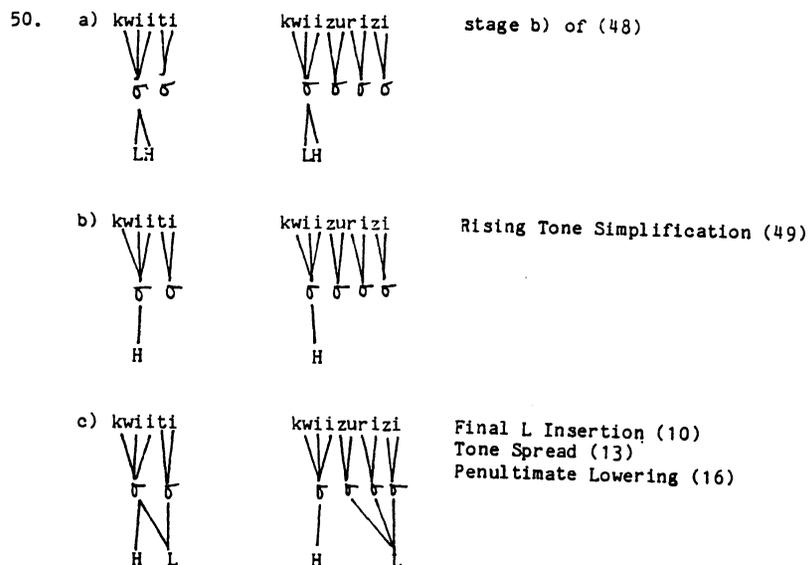


To correctly derive these two forms, it is proposed that a tautosyllabic LH sequence is levelled to H in Llogoori:

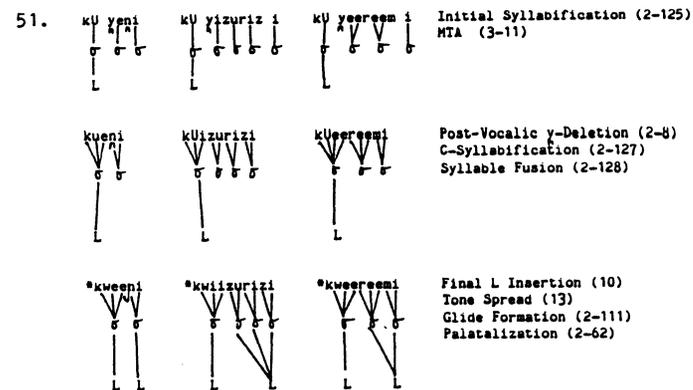
49. Rising Tone Simplification (Preliminary)



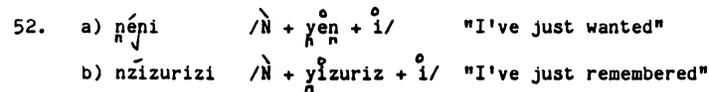
This H tone, in turn, becomes a falling tone in  $kwiiti$  as a result of Penultimate Lowering (16). Under this analysis, the derivations of  $kwiiti$  and  $kwiizurizi$  proceed from stage b) of (48) as follows:



The derivations of non-H forms (44b iv), (44b vi) and (44b vii) deserve further explanation. In the surface representations, all these forms have an initial H which is not present in their underlying structures: /kù+yè<sup>o</sup>n+ī/, /kù+yì<sup>o</sup>zuriz+ī/, /kù+yè<sup>o</sup>ereem+ī/. By rules postulated so far, one expects these two forms to have a surface L melody like the other non-H PT forms in citation:



Considering these three forms alone, one may hypothesize that L becomes H when occurring on long syllables. This hypothesis does not hold when we consider the following forms:

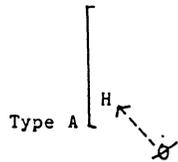


In these forms, the H-toned initial syllables are short, suggesting that syllable length is irrelevant to the presence of a surface H tone in PT forms with the Type A roots.

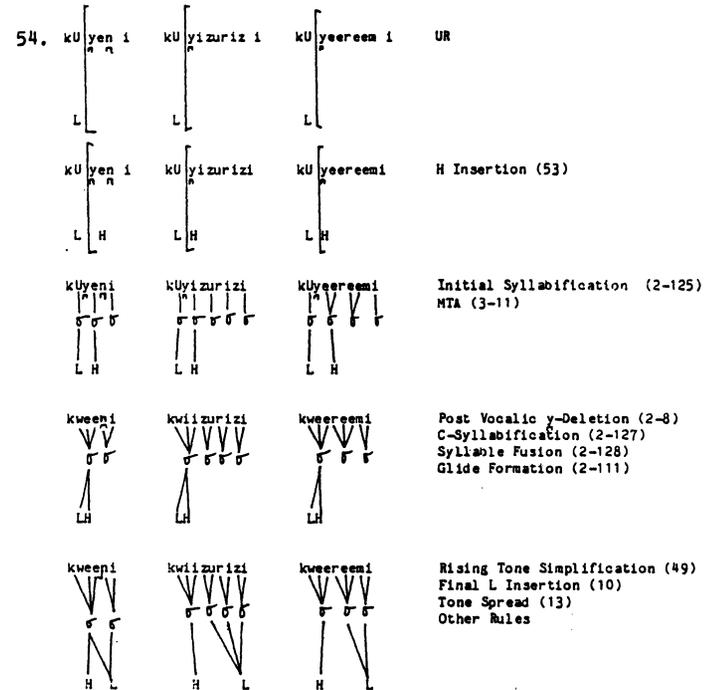
Another interesting observation is that this tonal irregularity is confined to non-H PT forms with type A y-initial roots. (PT forms with Type B y-initial roots (examples (44b vii) & (44b ix)) pattern with other non-H verbs tonally.) So suppose that in the Perfect

Tense, toneless Type A roots as a class are subject to tonal reanalysis by undergoing a H Insertion Rule which inserts a H tone to the verb root:

53. H Insertion Rule



Ad hoc though it seems, (53) will be shown to have a general application in many other tenses. With (53), the derivations of kwe<sup>h</sup>eni and kwiizurizi, and kwe<sup>h</sup>ereemi are as follows:



4.3.2 Perfect Tense Forms with Object Prefix

55a. H-toned Verbs

- i) "We've just bitten it" kUkÍrUmi /kù+kí+rú<sup>o</sup>m+i/
- ii) "We've just cooked it" kUkédeeci /kù+kí+déek+i/
- iii) "We've just cut it" kUkÍkaraŷi /kù+kí+kárag+i/
- iv) "We've just killed it" kUcáiiti /kù+kí+yít+i/
- v) "We've just ate it" kUkÍrII /kù+kí+rí+i/

55b. Non-H Verbs

- i) "We've just hit it" kUkÍduyi /kù+kí+duy+i/
- ii) "We've just burned it" kUkÍsaambi /kù+kí+samb+i/
- iii) "We've just sold it" kUkÍgUrizi /kù+kí+gúriz+i/
- iv) "We've just wanted it" kUcéepi /kù+kí+yén+i/
- v) "We've just ground it" kUkÍsyé /kù+kí+síe+i/

56a. H-toned Verb

"We've just bitten it slowly" kUkÍrUmí gáraha [- - - - -] /kù+kí+rú<sup>o</sup>m+i/

56b. Non-H Verb

"We've just hit it slowly" kUkÍdúyí gáraha [- - - - -] /kù+kí+duy+i/

In (55), the tonal distinction between H and non-H verbs is neutralized. In (56), on the other hand, the distinction is maintained: the H-toned form has a surface L on the stem initial syllable whereas the entire stem of the non-H form has a surface H tone. The analysis of the tonal patterns of PT forms exhibited in (55) and (56) is the same as that of the NFT forms discussed before: The O.P. is characterized by a H tone and it lowers the root H tone of the H-toned verbs. In

citation, Final L Insertion (24) inserts a L to all F.V.'s. Penultimate Lowering (30) and Tone Spread (13) then apply unremarkably where applicable. When followed by gáraha, the adverb H spreads up to and excluding the root initial syllable in a H-toned verb (see example (55a)), and through the entire verb stem of a non-H verb by Tone Spread (13) (see example (56b)).

4.3.2.1 Perfect Tense Forms with 1st sg. Object Prefix

In an earlier section on the Near Future Tense, I proposed that a nasal morpheme like the 1st sg. subject prefix /N-/ may be underlyingly tonal. Thus:  $SP \begin{bmatrix} N \\ L \end{bmatrix}$ . I further argued that the underlying tonal properties of such a nasal morpheme are realized on the preceding syllable, if any, in the SR due to prenasalization and the syllabification rules of the language. In support of these claims, in the following PT forms with the 1st sg. object prefix /N-/, the tonal properties of the O.P. H is found to be manifested on the syllable preceding /N-/, viz., the subject prefix /va-/. Furthermore, it is by assuming the underlying tonal (as versus toneless) nature of the nasal object prefix that the surface tonal characteristics of /va-/ in these forms can be satisfactorily accounted for:

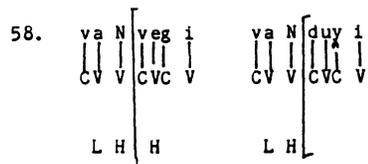
57a. H-toned Verbs

- i) "They've just shaved me" vaambeŷi /vâ+N+vég+i/
- ii) "They've just cut me" váangaraŷi /vâ+N+kárag+i/
- iii) "They've just killed for me" váanzitIrI /vâ+N+yít+Ir+é/
- iv) "They've just made me eat" vaándIIhizi /vâ+N+rí+Íh+iz+i/

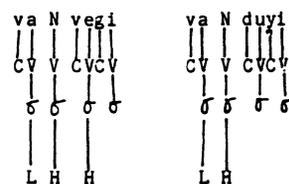
57b. Non-H Verbs

i)	"They've just hit me"	va <sup>1</sup> anduyi	/va <sup>1</sup> +N+duy <sup>0</sup> +i/
ii)	"They've just made me burn"	va <sup>1</sup> asaambizi	/va <sup>1</sup> +N+samb <sup>0</sup> +iz <sup>0</sup> +i/
iii)	"They've just sold me"	va <sup>1</sup> angurizi	/va <sup>1</sup> +N+g <sup>0</sup> uriz <sup>0</sup> +i/
iv)	"They've just wanted me"	va <sup>1</sup> anepi	/va <sup>1</sup> +N+y <sup>0</sup> an <sup>0</sup> +i/
v)	"They've just made me grind"	va <sup>1</sup> asyeehizi	/va <sup>1</sup> +N+s <sup>0</sup> ie <sup>0</sup> +ih <sup>0</sup> +iz <sup>0</sup> +i/
vi)	"They've just remembered me"	va <sup>1</sup> anzizurizi	/va <sup>1</sup> +N+y <sup>0</sup> izuriz <sup>0</sup> +i/
vii)	"They've just swum for me"	va <sup>1</sup> anzeereemere	/va <sup>1</sup> +N+y <sup>0</sup> eereem <sup>0</sup> +ir <sup>0</sup> +e/
viii)	"They've just made me bury"	va <sup>1</sup> anzavirizi	/va <sup>1</sup> +N+y <sup>0</sup> avir <sup>0</sup> +iz <sup>0</sup> +i/

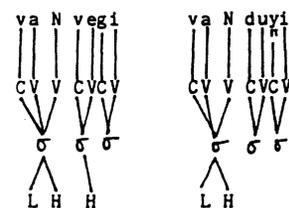
In all forms in (57) above, the S.P. /va-/ (which is lengthened in the surface) is realized H, although its underlying tone is L. This surface H tone on vaa, the lengthened subject prefix, can be accounted for if one assumes that the nasal subject prefix /N-/ is underlying H-toned like all other object prefixes seen so far (c.f. example (25)). With this assumption, the surface H on vaa can be shown to be derived from the resyllabification of the S.P. L tone with the O.P. H tone by Syllable Fusion (2-100): Resyllabification results in a tau-tosyllabic LH sequence on the surface initial syllable. By Rising Tone Simplification (49), this sequence changes to H. The derivations of vaambeji /va<sup>1</sup>+N+veg<sup>0</sup>+i/ "They've just shaved me" and vaanduyi /va<sup>1</sup>+N+duy<sup>0</sup>+i/ "They've just hit me" illustrate this analysis:



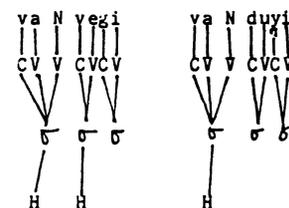
UR



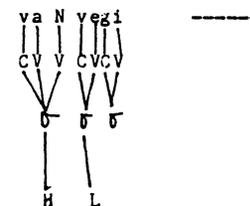
Initial Syllabification (2-125)  
MTA (3-11)



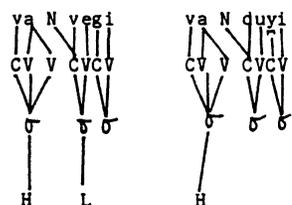
C-Syllabification (2-127)  
Syllable Fusion (2-128)



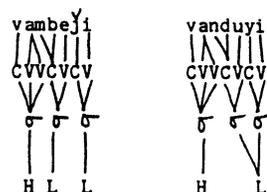
Rising Tone Simplification (49)



Root H Lowering (28)



Prenasalization (2-122)  
Linking Convention (2-95)



Final L Insertion (10)  
Tone Spread (13)  
Other Rules

Without recognizing the underlyingly H-toned nature of the 1st sg. object prefix /N-/, one would be hard put to account for the source for the surface H on vaa. For this reason, the surface H on the subject prefix in the forms in (57) motivates the hypothesis that the 1st sg. object prefix /N-/, like the other object prefixes exemplified so far, is underlyingly H-toned. This hypothesis in turn lends support to the view that other nasal morphemes like the 1st sg. subject prefix /N-/ are also underlyingly tonal. In the case of the first singular subject prefix, the underlying tone is L. This is the view point adopted in the analysis of the Near Future Tense forms in section 4.2.

#### 4.4 FAR FUTURE TENSE

Obligatory segmental constituents of the Far Future Tense (FFT) in Llogoori are the subject prefix, the tense marker /-rika-/,<sup>10</sup> the root, and the F:V. /-e/. S.P. + rika + Root + e.

##### 4.4.1 Far Future Tense Forms without Object Prefix

###### 59a. H-toned Verbs

i)	"I will bite"	ndikárÚmI	/N̄+rika+rÚm̄+e/
	"we will bite"	kÚrìkárÚmI	/kÚ+rika+rÚm̄+e/
	"You (sg.) will bite"	UrìkárÚmI	/Ú+rika+rÚm̄+e/
	"You (pl.) will bite"	murìkárÚmI	/m̄+rika+rÚm̄+e/
	"He/She will bite"	arìkárÚmI	/à+rika+rÚm̄+e/
	"They will bite"	varìkárÚmI	/v̄+rika+rÚm̄+e/
ii)	"we will cook"	kÚrìkádééke	/kÚ+rika+déék̄+e/
iii)	"we will cut"	kÚrìkákáraḡe	/kÚ+rika+káraḡ+e/
iv)	"we will kill"	kÚrìkíit̄I	/kÚ+rika+yít̄+e/
v)	"we will eat"	kÚrìkár̄yI	/kÚ+rika+r̄I+e/

###### 59b. Non-H Verbs

i)	"we will hit"	kUrìkaduȳI	/kÚ+rika+dúȳ+e/
ii)	"we will burn"	kUrìkasaambe	/kÚ+rika+sám̄b̄+e/
iii)	"we will sell"	kUrìkagUr̄izI	/kÚ+rika+ḡUr̄iz+e/
iv)	"we will want"	kUrìkeenē	/kÚ+rika+ȳē̄+e/
v)	"we will grind"	kUrìkasȳI	/kÚ+rika+s̄Ie+e/

<sup>10</sup> There is a variant form for the FFT tense marker, viz., /-raka-/. According to Ms. Kilibwa, the choice between the two forms (/r̄ika-/ and /-raka-/) carries no linguistically significant difference.

60a. H-toned Verb  
 "we will bite slowly" kU<sup>h</sup>ri<sup>h</sup>ka<sup>h</sup>rU<sup>h</sup>mí<sup>h</sup> gá<sup>h</sup>rá<sup>h</sup>ha [------] /kU<sup>h</sup>-ri<sup>h</sup>ka<sup>h</sup>-rU<sup>h</sup>m+e/

60b. Non-H Verb  
 "we will hit slowly" kU<sup>l</sup>ri<sup>l</sup>ka<sup>l</sup>dU<sup>l</sup>yí<sup>l</sup> gá<sup>l</sup>rá<sup>l</sup>na [------] /kU<sup>l</sup>-ri<sup>l</sup>ka<sup>l</sup>-dU<sup>l</sup>y+e/

Non-H Vowel Deletion (2-114) applies in (59a iv) and (59b iv):

61. a)  UR
- b)  Post-Vocalic  $\gamma$ -Deletion (2-8)
- c)  Non-H Vowel Deletion (2-114)  
Linking Convention (2-95)
- d)  Vowel Raising (2-89)

(Note that Palatalization (2-14) cannot apply in the derivation of kU-rikiitI in (61) above or else an incorrect form \*kU<sup>h</sup>ri<sup>h</sup>kiitI would result. The inapplicability of Palatalization (2-14) here may be accounted for by ordering this rule crucially before Post-Vocalic  $\gamma$ -Deletion (2-8) such that after stage (b) in (61) above, Palatalization (2-14) may not apply.

Just like the NFT and PT forms without O.P. given in (30) and (44) respectively, H-toned FFT forms in (59) have a surface "L H L" melody, while non-H forms have a "L" melody. The surface H in each H-toned form is realized on the tense prefix /rika-/ and the root initial syllable. When followed by gáráha /garáha/, the F.V. in all forms is realized with the same pitch as the following H-toned syllables (see examples in (60)). The tonal analysis of the FFT forms here is straightforward: The tense prefix /rika-/ is toneless. It has the same surface tone as any following syllable as a result of Tone Spread (13). The FFT suffix is also toneless. The F.V. has a surface L tone in citation as a result of Final L Insertion (10) and receives the initial H tone of gáráha in (60) by Tone Spread (13). Other tone rules and pitch interpretation rules apply unremarkably to derive the surface representations of all forms in (59) and (60).

4.4.2 Far Future Tense Forms with Object Prefix

62a. H-toned Verbs

- |      |                   |  |  |
|------|-------------------|--|--|
| i)   | "we will bite it" | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> IrUmI   | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+r <sup>0</sup> Um+e/   |
| ii)  | "we will cook it" | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> edeeke  | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+deek+e/                |
| iii) | "we will cut it"  | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> Ikarage | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+k <sup>0</sup> arag+e/ |
| iv)  | "we will kill it" | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> ciitI   | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+yit+e/                 |
| v)   | "we will eat it"  | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> IryI    | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+r <sup>0</sup> I+e/    |

62b. Non-H Verbs

- |      |                    |  |  |
|------|--------------------|--|--|
| i)   | "we will hit it"   | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> IduyI   | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+duy+e/   |
| ii)  | "we will burn it"  | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> Isaambe | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+samb+e/  |
| iii) | "we will sell it"  | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> IgUrizI | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+gUriz+e/ |
| iv)  | "we will want it"  | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> ceene   | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+yen+e/   |
| v)   | "we will grind it" | kU <sup>0</sup> r <sup>0</sup> ikak <sup>0</sup> IsyI    | /kU <sup>0</sup> +r <sup>0</sup> ika+k <sup>0</sup> I+sIe+e/   |

63a. H-toned Verb

"we will bite it slowly" kU<sup>0</sup>r<sup>0</sup>ikak<sup>0</sup>IrUmI g<sup>0</sup>araha [-'---'---]

63b. Non-H Verb

"we will hit it slowly" kU<sup>0</sup>r<sup>0</sup>ikak<sup>0</sup>IduyI g<sup>0</sup>araha [-'-----]

The account for the SR of FFT forms given in (62) and (63) calls for no new analysis of Llogoori verb formatives given before, nor does it necessitate the postulation of new tone rules: The O.P. introduces a H tone which spreads to the preceding toneless tense prefix. Root H is lowered after the O.P. in the H-toned forms. Tone rules established so far predict the rest.

4.5 NEAR PAST TENSE

The Near Past Tense (NPT) in Llogoori is used when speaking of events or actions that have taken place some time between several hours to about a week ago. Obligatory constituents are the subject prefix, the tense marker /-aaku-/, the root, and the F.V. /-a/: S.P. + aakU + ROOT + a.

4.5.1 Near Past Tense Forms without Object Prefix

64a. H-toned Verb

- |      |                |                           |                   |
|------|----------------|---------------------------|-------------------|
| i)   | "I bit"        | ndaakUrUma                | /N+aakU+rUm+a/    |
|      | "We bit"       | kwaakUrUma                | /kU+aakU+rUm+a/   |
|      | "You (sg) bit" | waakUrUma                 | /U+aakU+rUm+a/    |
|      | "You (pl) bit" | mwaakUrUma                | /mu+aakU+rUm+a/   |
|      | "He/She bit"   | yaakUrUma                 | /y+aakU+rUm+a/    |
|      | "They bit"     | vaakUrUma                 | /va+aakU+rUm+a/   |
| ii)  | "we cook"      | kwaakod <sup>0</sup> eeke | /kU+aakU+deek+a/  |
| iii) | "we cut"       | kwaakUkaraga              | /kU+aakU+karag+a/ |
| iv)  | "we killed"    | kwaakwiita                | /kU+aakU+yit+a/   |
| v)   | "we ate"       | kwaakUrya                 | /kU+aakU+rI+a/    |

64b. Non-H Verbs

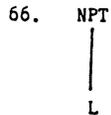
- |      |             |              |                   |
|------|-------------|--------------|-------------------|
| i)   | "we hit"    | kwaakUduya   | /kU+aakU+duy+a/   |
| ii)  | "we burned" | kwaakUsaamba | /kU+aakU+samb+a/  |
| iii) | "we sold"   | kwaakUgUriza | /kU+aakU+gUriz+a/ |
| iv)  | "we wanted" | kwaakweena   | /kU+aakU+yen+a/   |
| v)   | "we ground" | kwaakUsya    | /kU+aakU+sIe+a/   |

- 65a. H-toned verbs  
 "we bit slowly" kwaakÚrÚmá gáráha [ - - - - - ]
- 65b. Non-H Verb  
 "we hit slowly" kwaakÚdÚyá gáráha [ - - - - - ]

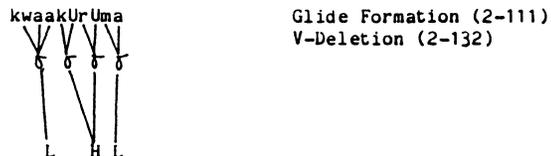
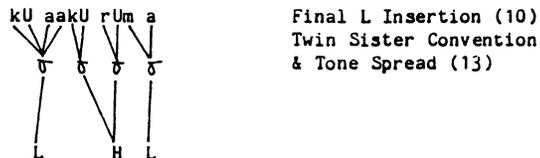
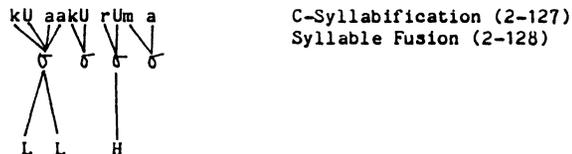
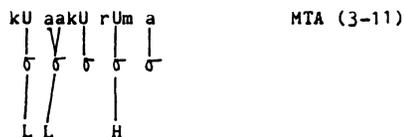
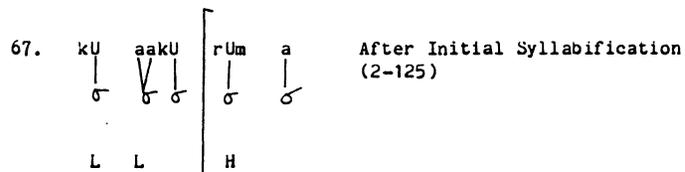
In the NPT forms above, the S.P. syllabifies with the first tense prefix syllable aa which is realized L in all forms. The second tense prefix syllable ku and the root initial syllable are both realized H in each H-toned form, and L in the non-H forms. The F.V. is realized L in citation, but the same pitch as the following H-toned syllables when followed by a word with an initial H tone (examples in (65)).

Like all the tenses examined so far, the NPT is also analyzed as having no tonal suffix since the F.V. is realized L in all forms in (64) and susceptible to Tone Spread (13) in (65).

The tense prefix /aakU-/ is underlyingly L-toned. Evidence for such an analysis comes from H-toned NPT forms with 1st sg. subject prefix like ndaakÚrÚma /N+àakU+rÚm+á/ in which the 1st tense prefix syllable aa has a surface L tone. The source of the L tone on aa here cannot be the S.P., because as established before, tonal properties of a nasal morpheme surface solely on the syllable preceding it (the nasal) in the SR. A straightforward account for the L tone on aa is that NPT is characterized by a L tone:



By Morphological Tone Assignment (3-11), this L tone is assigned to the first syllable of the tense prefix, i.e. aa. When preceded by a subject prefix other than the 1st sg. /N-/ , the NPT L resyllabifies with the S.P. L, resulting in a tautosyllabic sequence of L tones which in turn simplifies to a single L by the Twin Sister Convention. Surface representation of all NPT forms in (64) are then derivable by rules established before. For example, kwaakÚrÚma "we bit" derives as follows:



4.5.2 Near Past Tense Forms with Object Prefix

68a. H-toned Verbs

- i) "we ate it" kwaakÚkÍrUma /kù+aàkU+kÍ+rÚm+a/
- ii) "we cooked it" kwaakÚkédeeka /kù+aàkU+kÍ+deek+a/
- iii) "we cut it" kwaakÚkÍkaraga /kù+aàkU+kÍ+karag+a/
- iv) "we killed it" kwaakÚcÍita /kù+aàkU+kÍ+yít+a/
- v) "we ate it" kwaakÚkÍrya /kù+aàkU+kÍ+rÍ+a/

68b. Non-H Verbs

- i) "we hit it" kwaakÚkÍduya /kù+aàkU+kÍ+duy+a/
- ii) "we burned it" kwaakÚkÍsaamba /kù+aàkU+kÍ+samb+a/
- iii) "we sold it" kwaakÚkÍgUriza /kù+aàkU+kÍ+gÚriz+a/
- iv) "we wanted it" kwaakÚcéena /kù+aàkU+kÍ+yéñ+a/
- v) "we ground it" kwaakÚkÍsya /kù+aàkU+kÍ+sÍe+a/

69a. H-toned Verb

"we bit it slowly" kwaakÚkÍrUma gáraha [ - - - - - ]

69b. Non-H Verb

"we hit it slowly" kwaakÚkÍduya gáraha [ - - - - - ]

Again, the tonal patterns of the forms in (68) and (69) are all predictable: The O.P. introduces a H tone which spreads to the preceding toneless syllable. This H tone causes the root H tone to become L in the H-toned forms. Rules of Final L Insertion (10), Tone Spread (13), and Penultimate Lowering (16) then apply unremarkably where applicable to derive the surface representations of these forms.

4.6 IMPERATIVE4.6.1 Imperative Forms without Object Prefix

Obligatory constituents of the Llogoori imperative are the verb root and F.V. /-a/ if the subject is singular, and /-i/ if the subject is plural. R +  $\left\{ \begin{matrix} a \\ i \end{matrix} \right\}$ .

70a. H-toned Verbs

i)	"You (sg.) bite!"	rUma	/rUm+a/
	"You (pl.) bite!"	rUmi	/rUm+i/
ii)	"You (sg.) cook!"	deeká	/deék+a/
	"You (pl.) cook!"	deéí	/deék+i/
iii)	"You (sg.) cut!"	karága	/kár+ag+a/
	"You (pl.) cut!"	karáji	/kár+ag+i/
iv)	"You (sg.) kill!"	yita	/yít+a/
	"You (pl.) kill!"	yiti	/yít+i/
v)	"You (sg.) eat!"	rya	/rÍ+a/
	"You (pl.) eat!"	rii	/rÍ+i/
vi)	"you (sg.) drink!"	nwa	/nue+a/
	"you (pl.) drink!"	nwi	/nue+i/
vii)	"You (sg.) stir!"	cuukána	/cuukap+a/
	"You (pl.) stir!"	cuukáni	/cuukap+i/
viii)	"You (sg.) write!"	haandiiká	/hándiik+a/
	"You (pl.) write!"	haandiicí	/hándiik+i/
ix)	"You (sg.) write for!"	haandiikÍrā	/hándiik+Ír+a/
	"You (pl.) write for!"	haandiikÍrī	/hándiik+Ír+i/

<sup>11</sup> Unlike the Perfect Tense, the F.V. of the imperative without O.P. is invariably /-i/, even when the applied extension is present (c.f. footnote (9)).

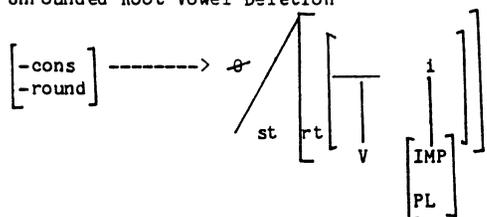
70b. Non-H verbs

i)	"You (sg.) hit!"	duya	/duy+a/
	"You (pl.) hit!"	duyi	/duy+i/
ii)	"You (sg.) burn!"	saamba	/sámb+a/
	"You (pl.) burn!"	saambi	/sámb+i/
iii)	"You (sg.) sell!"	gUriza	/gŪriz+a/
	"You (pl.) sell!"	gUrizi	/gŪriz+i/
iv)	"You (sg.) want!"	yena	/yēŋ+a/
	"You (pl.) want!"	yēni	/yēŋ+i/
v)	"You (sg.) grind!"	sya	/sĪe+a/
	"You (pl.) grind!"	sii	/sĪe+i/
vi)	"You (sg.) remember!"	yizuriza	/yĪzuriz+a/
	"You (pl.) remember!"	yizurizi	/yĪzuriz+i/
vii)	"You (sg.) swim!"	yeereema	/yēreem+a/
	"You (pl.) swim!"	yeereemi	/yēreem+i/

The unrounded root vowel(s) of a -CV(V)- root delete in front of the imperative F.V. /-i/ by a morphologically conditioned vowel deletion rule<sup>12</sup> stated as follows:

<sup>12</sup> The deletion of root vowels preceding the imperative F.V. /-i/ is a special phenomenon which contradicts the predictions of the more general rules of the language. Firstly, in other tenses where the F.V. is /-i/, namely, the Perfect Tense (discussed in section 4.3) and the Middle Past Tense (to be discussed later), /-i/ deletes after a -CV(V)- root instead. Also, by the general rule of Glide Formation (2-111), the underlying root vowels /I/ and /Ī/ of rii /rI+i/ and sii /sĪe+i/ (see 70a v) and (70b v)) would have become [y] instead of being deleted. In order to correctly derive forms like rii and sii, Unrounded Root Vowel Deletion (71) to be postulated below must be ordered before both Glide Formation (2-111) and i-Deletion (2-117).

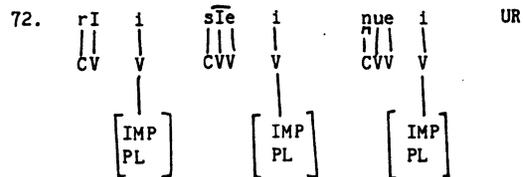
71. Unrounded Root Vowel Deletion



(iterative)

st = stem  
rt = root

Thus,



Unrounded Root  
Vowel Deletion (71)



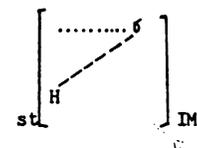
Linking Convention (2-95)  
Glide Formation (2-111)  
V-Deletion (2-132)  
Palatalization (62)

In (70), the H vs. non-H distinction is neutralized in forms with "monomoraic" roots (i.e. roots that contain one V-unit): there is no surface tonal distinction between rUma /rUm+a/ and duya /duy+a/, yita

/yit+a/ and vena /yen+a/, rya /rI+a/ and sya /sIe+a/. Disregarding these forms for the moment, H-toned imperative forms in (70) are L on the word initial syllable, and H thereafter. (The final syllable is realized HL due to Final L Insertion (10).) All non-H forms in (70b) are realized L.

In the H-toned forms, the surface H must have come from the underlying root H, since no H tone surfaces in the non-H forms. But unlike in tenses examined so far, the root H in the plain imperative forms is realized on the F.V. and all preceding syllables but the word initial one. The most straightforward analysis here is that the root H is assigned to the final syllable in the plain imperatives by a tone assignment rule stated as follows:

73. Root H Assignment in the Imperative without O.P. (Preliminary)



(As we will see, (73) will be replaced by a much more general rule to be motivated in section (4.7).)

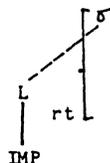
The preceding toneless syllables then receive the root H by Tone Spread (13). That the initial syllable is L is due to the presence of a L prefix which characterizes the imperative:

74.

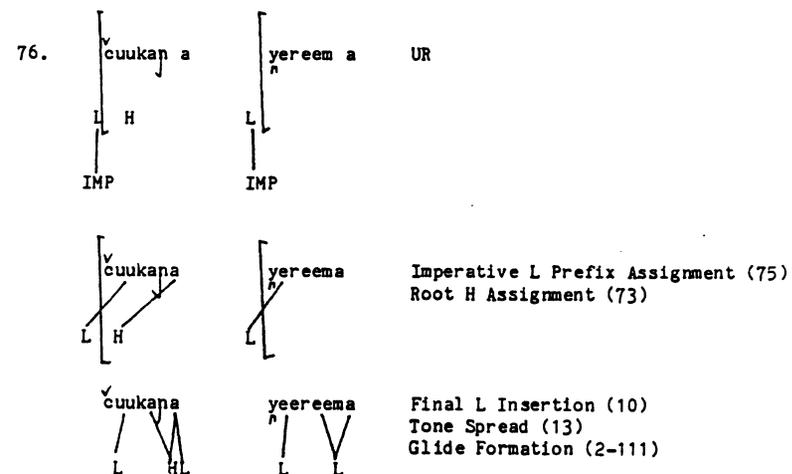


This L prefix is assigned to the root initial syllable<sup>13</sup> by the following rule:

75. Imperative L Prefix Assignment



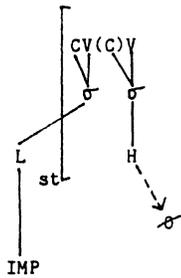
With rules (73) and (75), the derivation of  $\overset{v}{\text{cuukap}}\overset{\hat{a}}{\text{a}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{cuukap}+a/$  (70a vii) and  $\overset{h}{\text{yereema}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{yereem}+a/$  (70b vii) are as follows:



In  $\overset{v}{\text{r}}\overset{\text{h}}{\text{u}}\overset{\text{h}}{\text{a}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{r}\overset{\text{h}}{\text{u}}\overset{\text{h}}{\text{a}}+$ ,  $\overset{v}{\text{rya}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{r}\overset{\text{h}}{\text{a}}+$ , &  $\overset{v}{\text{yita}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{y}\overset{\text{h}}{\text{a}}+$ , the root H tone does not surface. Note that in each of these forms, the root contains only one V-unit. (It is the number of V-units or moras in the root, not syllables, that conditions the absence of the root H, since the root H does surface in forms with monosyllabic roots with long root syllables: e.g.  $\overset{v}{\text{deeka}} / \overset{\text{h}}{\text{`}}\overset{\text{h}}{\text{`}}\text{deek}+a/$  in example (70a ii).) So suppose that the root H in Llogoori imperative without O.P. is deleted following the ITAR's just in case that the root is monomoraic:

<sup>13</sup> Although at this point, one cannot be sure whether it is the initial syllable of the word or the root that the imperative L prefix is assigned to (because the root is the initial constituent of the plain imperative), imperative forms with O.P. to be presented later suggests that it is the root initial syllable that is assigned the L prefix.

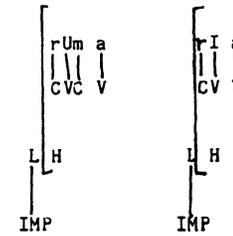
77. H Deletion (Preliminary)



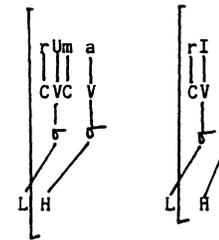
As we will see later, the H suffix of the Indefinite Future Tense also deletes in the plain forms with monomoraic roots (c.f. section 4.9.1).

With rule (77), the derivation of rUma / <sup>ˈ</sup>rUm+a/ "bite!" and rya / <sup>ˈ</sup>rI+a/ "eat!" are as follows:

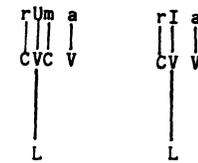
78.



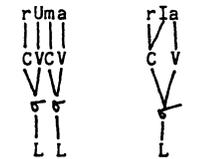
UR



Initial Syllabification (2-125)  
ITAR's (73) and (75)



H Deletion (77)



Other Rules

Another interesting feature of the behavior of the root H tone in the plain imperative is that it deletes also when in non-phrase-final position.

79a. H-toned Plain Imperatives followed by a H-toned word:  
 (\_\_\_\_ gáráha /garáha/ "slowly")

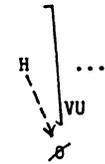
Gloss:	____gáráha		Citation:
i) "cook slowly"	deeká gáráha	[- - - - _]	deeká <sup>^</sup>
ii) "cut slowly"	karágá gáráha	[- - - - _]	karágá <sup>^</sup>
iii) "stir slowly"	ɕuukáɲá gáráha	[- - - - _]	ɕuukáɲá <sup>^</sup>

79b. H-toned Plain Imperatives followed by a non-H word:  
 (\_\_\_\_ vwaangu /vwangu/ "quickly")

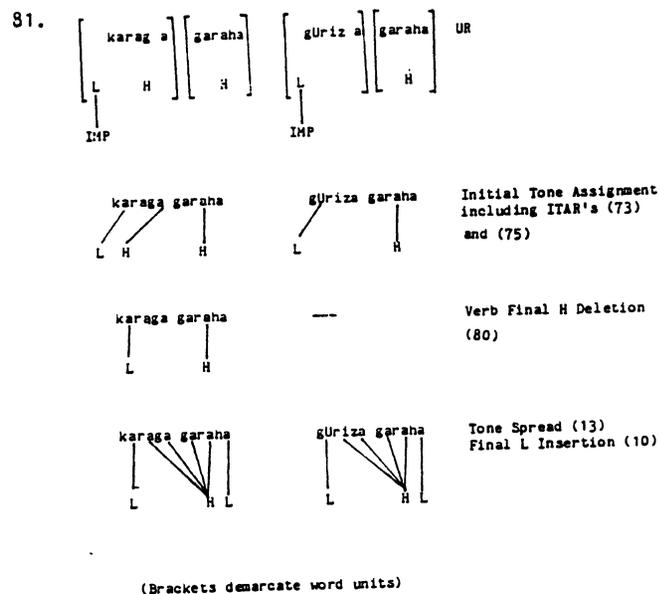
i) "cook quickly"	deeka vwaangu	[- - - - _]	deeká <sup>^</sup>
ii) "cut quickly"	karaga vwaangu	[- - - - _]	karágá <sup>^</sup>
iii) "stir quickly"	ɕuukapa vwaangu	[- - - - _]	ɕuukáɲá <sup>^</sup>

In (79a), non-initial syllables of the imperatives are realized with the same pitch as the initial H of gáráha, and in (79b), all verb syllables have a L tone. These facts suggest that the non-initial syllables of the verb units in (79) must have all become toneless at an intermediate stage of derivation. Being toneless, they can receive the tone of the following adverb by Tone Spread (13). If these (the non-initial) syllables were H-toned in (79), as they are in the citation forms in (70), one would expect them to be realized higher than the following adverbs. (So in (79a), the root H should have caused the initial H of gáráha to become !H.) Based on these observations, it is proposed that the root H in the plain imperative is deleted in non-phrase-final position by the following rule, thus neutralizing the tonal distinction between H and non-H plain imperative forms:

80. Verb Final H Deletion



As will be shown later, H tonal suffixes that mark tense/aspect in general undergo rule (80). Note also that in order to prevent (80) from incorrectly deleting the root H in the plain forms with CV- roots seen in sections 4.1 to 4.5 (e.g. kÚryá /kÚ+rí+á/ "to eat"), it is necessary to order (80) immediately after initial tone assignment and before Syllable Fusion (2-128). In so doing, it can be ensured that only H tones that are assigned to the F.V. by ITAR's will be deleted, not those that are linked to the final syllable as a result of Syllable Fusion (2-128). By rule (80), the derivation of karágá gáráha and gUrízá gáráha are as follows:



#### 4.6.2 Imperative Forms with Object Prefix

With the O.P., the F.V. of a Llogoori imperative with a singular subject prefix is /-e/ instead of /-a/. But like in the plain imperative, the F.V. is /-i/ if the subject prefix is plural. In the following, only imperative forms with singular subject prefix are exemplified:

#### 82a. H-toned Verbs

i) "bite it!"	kIrUmî	/` kI+rUm+e/
ii) "cook it!"	kedeeke	/` kI+deek+e/
iii) "cut it!"	kDkaráge	/` kI+kárag+e/
iv) "kill it!"	çitî	/` kI+yit+e/
v) "eat it!"	kIryî	/` kI+rî+e/
vi) "stir it!"	kIçuukápe	/` kI+çuukap+e/

#### 82b. Non-H Verbs

i) "hit it!"	kIdUyî	/` kI+dUy+e/
ii) "burn it!"	kIsaambê	/` kI+samb+e/
iii) "sell it!"	kIgUrízI	/` kI+gUríz+e/
iv) "want it!"	çeenê	/` kI+yen+e/
v) "grind it!"	kIsyî	/` kI+sîe+e/
vi) "love for it"	kIyaanzîrI	/` kI+yanz+îr+e/

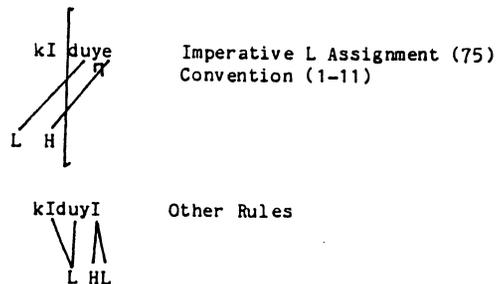
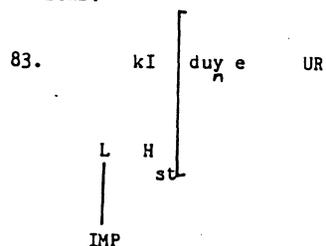
In the imperative forms above, the final vowel /-e/ assimilates to the last root vowel by Vowel Raising (2-89).

In (82), the distinction between H and non-H forms is neutralized: both the H and non-H verbs have a "L H L" surface tone melody. With the exceptions of kIryî /` kI+rî+e/ "eat it!" and kIsyî /` kI+sîe+e/ "grind it!" which will be examined later, the H tone falls on the 2<sup>nd</sup> stem syllable (S<sub>2</sub>).

Unlike in the plain imperative, the surface H in the examples in (82) is not attributed to the underlying root H, since imperative forms with toneless roots also have a surface H (see examples in (82

b)). The common source of the surface H tone here is the is O.P. H, which surfaces on S<sub>2</sub> in all forms.

Suppose that the imperative L prefix is assigned to the first root syllable by the Imperative L Prefix Assignment rule (75) postulated previously for the plain imperative forms. Assuming that (75) applies first, then by the left-to-right mapping convention stated in (1-11), the O.P. H is automatically mapped onto S<sub>2</sub>. Under this analysis, the derivation of a non-H form like  $\frac{kI\hat{d}uyI}{n}$  /  $\backslash kI^{\circ}+d\hat{u}y^{\circ}+e/$  proceeds as follows:



At this point, I would like to point out that the assignment of the O.P. H just discussed will be the only association which can be naturally accounted for by the Association Convention stated in (1-11).

In all other tenses to be discussed, the initial assignment of morphological tones always requires individual ITAR's specific to the grammar of Llogoori. For comparison, let us consider the assignment of the O.P. H in the Far Past Tense, to be discussed in 4.11.2. In this tense, the O.P. H is linked to the penultimate syllable. Such a linking cannot be accounted for by any association convention but rather requires an independent ITAR (c.f. (3-10)). Given this fact (that initial tone assignment is predominantly accountable for by ITAR's instead of Association Conventions), one might wonder if--for the sake of consistency-- the linking of the O.P. H to S<sub>2</sub> in the imperative should also be accounted for by an ITAR instead of Convention (1-11). At this stage of the research, there is no definitive evidence for advocating either one of the two hypotheses.

The analysis of the H-toned forms is not as straightforward. On the underlying tonal tier of a H-toned imperative form with O.P., there are three morphological tones, namely, the imperative L prefix, the O.P. H, and the root H. Having established that the Imperative L prefix is linked to the root initial syllable by (75) and the O.P. H to the second stem syllable by Convention (1-11), one may wonder what happens to the root H in the H-toned forms (see examples in (82a)). Note that the root H tone cannot be assigned to the stem initial syllable by MTA (3-11) because such a linkage would result in the crossing of association lines,<sup>14</sup> nor can it be assigned to the next free

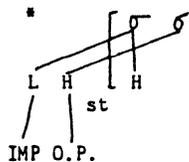
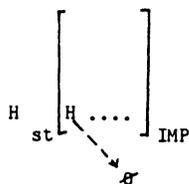
<sup>14</sup> If the root H is allowed to link to the root initial syllable, the following ill-formed configuration would result:

syllable, i.e. S<sub>3</sub> of the verb unit by convention since there is no other H-toned syllables (in the SR) after S<sub>2</sub> in all the forms in (82a). Finally, it can't be lowered after the O.P., as it is in the tenses examined so far. This can be shown by considering the tonal realization of the H-toned imperatives with O.P. in front of gáráha /garáha/:

84. a) "make it stir slowly" kI<sup>v</sup>cuukapízi gáráha [---.....]  
 b) "make it cut slowly" kIkarágízi gáráha [---.....]

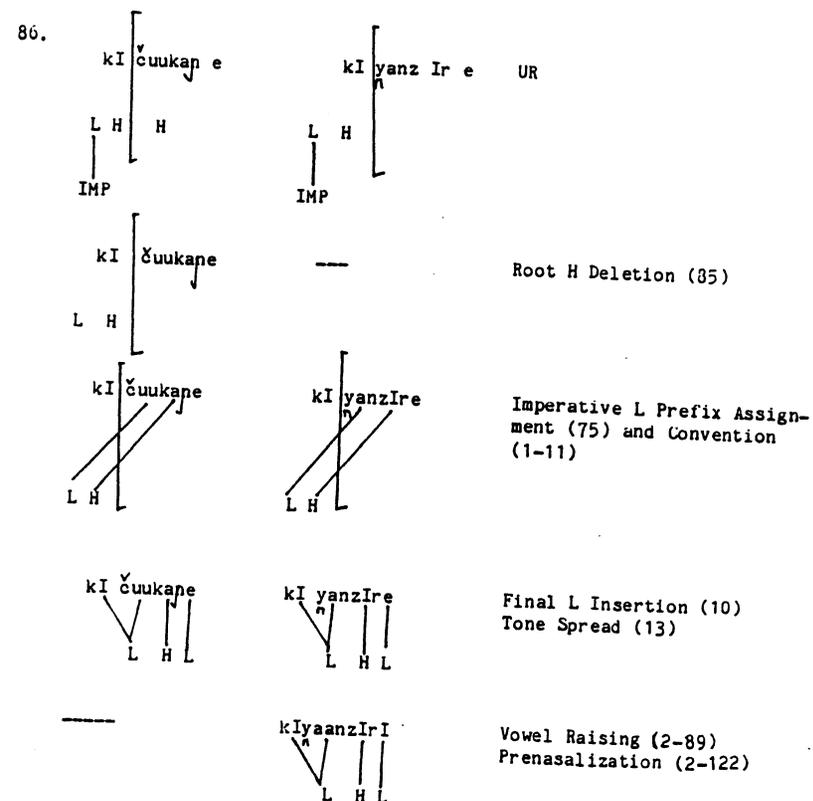
In each form in (84), all syllables after S<sub>2</sub> are realized with the same pitch as the adverb H, suggesting that these syllables are toneless, not L-toned, and receive the adverb H as a result of Tone Spread (13). An alternative analysis which may account for all these facts would be that the root H is deleted in the imperative if the O.P. H is present by the following rule:

85. H Deletion (Preliminary)

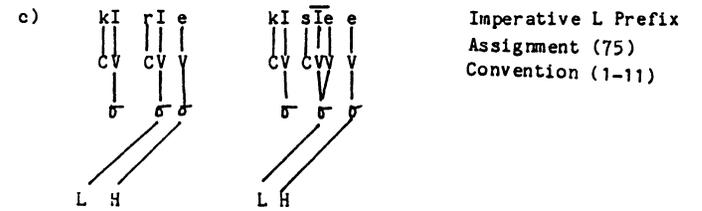
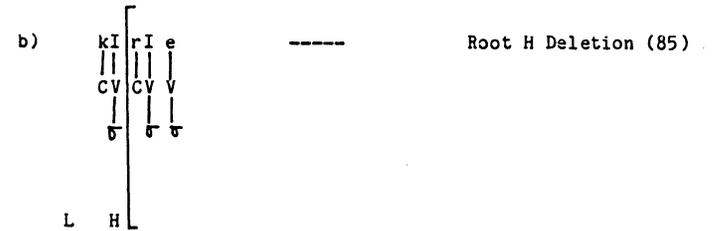
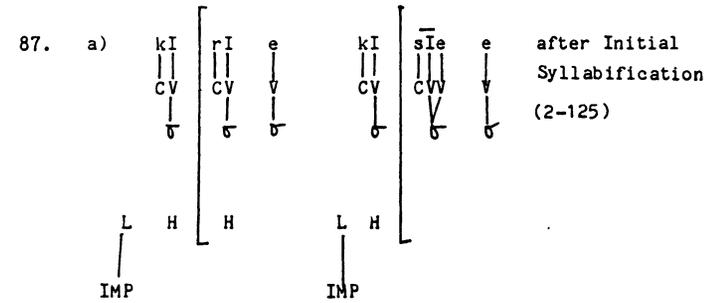


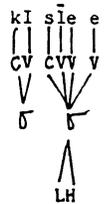
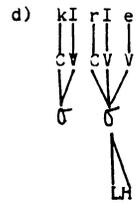
Imperative L Prefix Assignment (75)  
 Convention (1-11)  
 MTA (3-11)

As we will see later, the root H tone deletes also in the FPT (c.f. section 4.11). Under this analysis, the derivations of kI<sup>v</sup>cuukáne "stir it" (82a vi) and kI<sup>v</sup>yaanzíri "love for it!" (82b vi) are as follows:

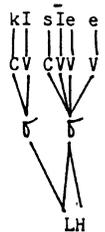
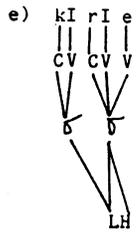


In the imperative forms with -CV(V)- roots, the O.P. H is assigned to the F.V., which constitutes the second stem syllable in the U.R. The derivation of the two forms is given as follows:

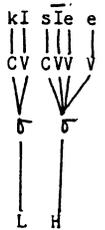
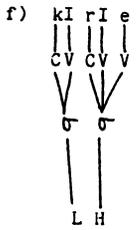




C-syllabification (127)  
Syllable Fusion (128)



Tone Spread (13)



Rising Tone Simplification (49)



Other Rules

the imperative L after stage d) before this L tone can spread onto the object prefix /kI-/. The object prefix would subsequently receive the derived H as a result of H Spread (18), resulting in the incorrect surface tone melody \*H HL.)

(Note that the ordering of Tone Spread (13) before Rising Tone Simplification (49) is crucial here, or else the latter rule would delink

4.7 PRESENT CONTINUOUS TENSE

The present continuous tense (PCT) consists of the subject prefix, the root, the extension /-iz-/ if the root has a -CV(V)- canonic shape, and the long F.V. /-aa/: S.P. + ROOT (+ iz) + aa.

4.7.1 Present Continuous Tense Forms without Object Prefix

88a. H-toned Verbs

1)	"I am biting"	nUmaa	/N+rUm+aa/
	"we are biting"	kUrUmaa	/kU+rUm+aa/
	"you (sg.) are biting"	UrUmaa	/U+rUm+aa/
	"you (pl.) are biting"	murUmaa	/mu+rUm+aa/
	"he/she is biting"	arUmaa	/a+rUm+aa/
	"they are biting"	varUmaa	/va+rUm+aa/
ii)	"we are cooking"	kodeekaa	/kU+deek+aa/
iii)	"we are cutting"	kUkaragaa	/kU+karag+aa/
iv)	"we are eating"	kUrIizaa	/kU+rI+iz+aa/
v)	"we are stirring"	kUcuukanaa	/kU+cuukan+aa/
vi)	"we are writing"	kUhaandiikaa	/kU+handiik+aa/
vii)	"we are cutting for"	kUkaragIraa	/kU+karag+Ir+aa/
viii)	"we are stirring for"	kUcuukanIraa	/kU+cuukan+Ir+aa/

88b. Non-H Verbs

i)	"we are hitting"	kUduyaa	/kU+duy+aa/
ii)	"we are burning"	kUsaambaa	/kU+samb+aa/
iii)	"we are selling"	kUGurizaa	/kU+gUriz+aa/
iv)	"we are grinding"	kUsyeezaa	/kU+syee+iz+a/
v)	"we are loving for"	kUYaanzIraa	/kU+yanz+Ir+aa/
vi)	"we are thinking"	kUGanagapaa	/kU+ganagap+aa/
vii)	"we are continuing"	kUziizagIlaa	/kU+ziizagI+aa/
viii)	"we are selling for"	kUGurizIraa	/kU+gUriz+Ir+aa/

In (88) above, PCT forms with type A y-initial roots are deliberately left out. They will be discussed later.

The H-toned PCT forms in (88) are L on the subject prefix and the root initial syllables, and H thereafter. The non-H forms, on the other hand, exhibit two different surface tonal patterns: some forms are H on the stem initial syllable only, while the others are H on both the first and second stem syllables:

89. Non-H PCT Forms:

<u>H on both S<sub>1</sub> and S<sub>2</sub></u>	<u>H on S<sub>1</sub> only</u>
kU-duyaa (88b i)	kU-saambaa (88b ii)
kU-gurizaa (88b iii)	kU-syeezaa (88b iv)
kU-ganagapaa (88b vi)	kU-yaanzIraa (88b v)
kU-gurizIraa (88b viii)	kU-ziizagIlaa (88b vii)

I will show later that initial tone assignment in both groups is determined by the same ITAR. Only a subsequent tonal process causes the surface tonal difference between the two.

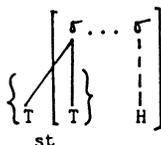
The fact that the PCT forms of non-H verbs in (88) also contain a H tone in the surface tone melody suggests that the source of H tone is the tense itself. Thus:

90.



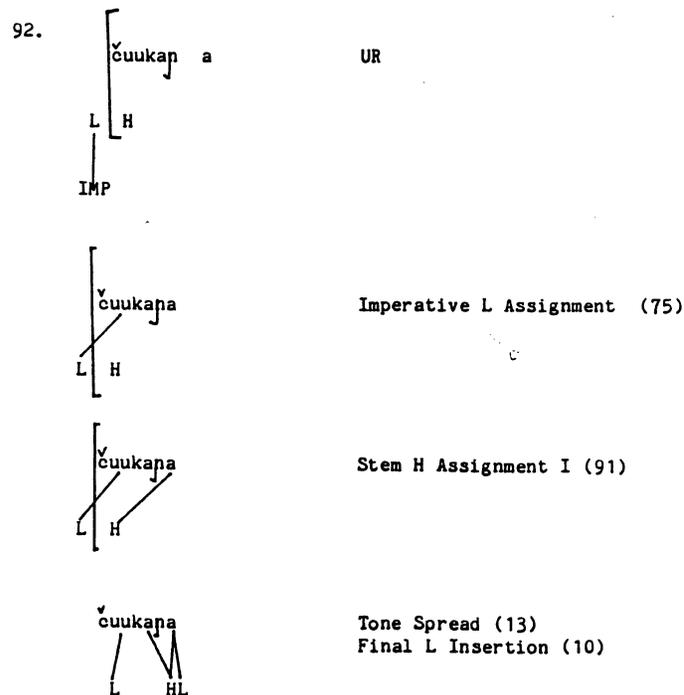
Like the root H of a plain imperative form (c.f. data in (70)), the PCT H in the plain PCT forms with H-toned stems is assigned to the verb final syllable (see rule (73)). As we will see, the tense H suffix of the Indefinite Future Tense (IFT), for instance, is also assigned to the stem final syllable in the H-toned plain forms. To account for these data, one may propose that given any "stem H tone"-- informally defined as "a H tone that constitutes part of the morphological stem underlyingly", this H tone is assigned to the stem final syllable if the root initial syllable is linked to a preceding tone:

91. Stem H Assignment I



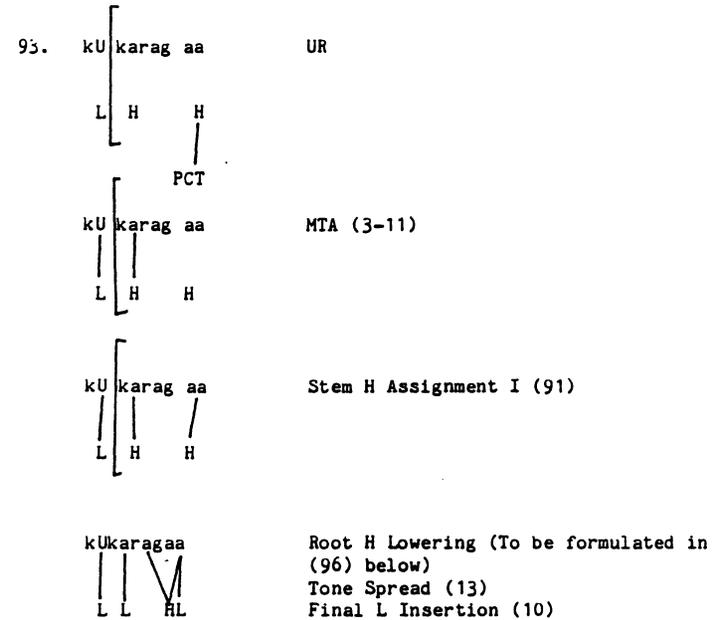
(This rule is numbered as the first of the stem H assignment rules since, as we will see, more stem H assignment rules will be needed to account for certain tonal data to be presented later. Also, the brackets "{ }" indicate that the root initial syllable is linked to a tone "T" which may or may not be part of the verb stem.)

Rule (91) accounts for the placement of the root H in the plain imperative forms (c.f. data in (70)) in which the stem initial syllable is assigned the imperative L tone by (75). Assuming that (75) is ordered before (91), The result of applying (75) to a plain imperative form with a H-toned root is a configuration that satisfies the SD of (91). By the latter rule, the root H is then linked to the stem final syllable. The derivation of  $\check{c}uuk\acute{a}n\hat{a}$  / \`  $\check{c}uuk\acute{a}n+a$  "stir!" illustrates this analysis (c.f. derivation of the same form in (76)):



Under this analysis, the assignment of the root H tone in the plain imperative can be predicted by a general rule i.e. (91) instead of a highly morphologically conditioned Root H Assignment rule stated in (73). Rule (91) replaces (73).

Rule (91) can account for the placement of the PCT H in the H-toned PCT forms if one assumes that it applies crucially after MTA (3-11). With this assumption, one can explain why it is always in the H-toned verbs, not the non-H verbs, that the H tonal suffix is assigned to the stem final syllable: a H-toned verb has a lexical root tone that by MTA (3-11) is assigned to the root initial syllable, thus giving rise to a configuration that satisfies the SD of (91). The derivation of kUkaragaa /kU+kárag+aa' / "we are cutting" (88a iii) illustrates this analysis:



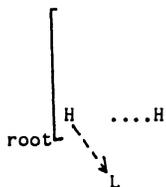
(Note that here the F.V. and the H tonal suffix are considered two independent formatives and therefore are not linked to each other by MTA (3-11) (c.f. Introduction of Chapter 3).)

There is a problem with the analysis proposed so far: In the MPT forms with toneless roots (to be presented later in section (4.8)), the tense H suffix is found to be always assigned to the stem final syllable, regardless of the association status of the root initial syllable after the application of all other relevant tone assignment rules. I will address this problem in the section on the MPT.

In each H-toned form in (88), the root initial syllable is realized L, whereas in each non-H form, this syllable is realized H. The

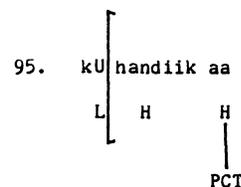
most straightforward explanation is that in the H-toned forms, the root H tone is lowered in the presence of the PCT H suffix. (Again, as we will see, there are other tenses with a H tense suffix, namely, the MPT and IFT, in which the root initial syllable also has a surface L tone in the H-toned forms.) The lowering of the root H tone can be accounted for by a general rule of Root H Lowering stated as follows:

94. Root H Lowering (Preliminary)

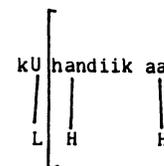


Earlier in the study, we have seen cases in which the root H lowers also after the O.P. H tone (c.f. Root H Lowering (28)). It will be shown later that in case both a tense H suffix and O.P. H are present, it is the O.P. H, not the root H, that lowers.

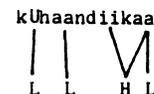
The derivation of kUhaandiikaa /kU+hándiik+aa' / illustrates the analysis provided for the plain H-toned PCT forms so far:



UR



MTA (3-11)  
Stem H Assignment I (91)



Root H Lowering (94)  
Tone Spread (13)  
Final L Insertion (10)  
Prenasalization (2-122)

As far as the non-H forms in (88) are concerned, at first glance, no single rule stated in terms of the syllable can account for the placement of this H suffix in all forms (see (89)). On the contrary, the simplest analysis seems to be that the PCT H suffix is assigned to the second V-unit of the stem. This analysis challenges the assumption that the tone bearing unit of the language is the syllable. Examining the forms in (89) more carefully, however, one will notice that in every form where H is realized on the S<sub>1</sub> only, S<sub>1</sub> is long, whereas in the other cases, S<sub>1</sub> is short. Tonal data on the Middle Future Tense illuminates the surface tonal patterns of the PCT data in (89):

96. Examples of Plain MFT forms:

a) H-toned Verbs

- i) "we will cut for"    nakUkárágÍrI    /ná+kù+kárag+Ír+e ` /
- ii) "we will stir for"    nakUčúúkápÍrI    /ná+kù+čúúkáp+Ír+e ` /
- iii) "we will write for"    nakUhaándiikÍrI    /ná+kù+hándiik+Ír+e ` /

b) Non-H Verbs

- i) "we will think"    nakUgánágápe    /ná+kù+gánagap+e ` /
- ii) "we will love for"    nakUyaánzÍrI    /ná+kù+yáanz+Ír+e ` /
- iii) "we will swim for"    nakweéréemere    /ná+kù+yéreem+Ír+e ` /

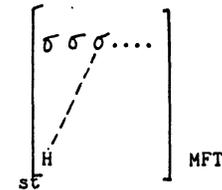
According to my analysis of the MFT (to be detailed in 4.11), the source of the surface H in the examples in (96) is the root H, which is inserted by rule to the underlyingly toneless forms in (96b).

Like in the non-H PCT forms in (88), the forms in (96) show two surface tonal patterns: in examples (96a i-ii) and (96b i-ii), the stem is H up to the third syllable (S<sub>3</sub>)-- not the third mora (see (96a ii) and (96b ii)), whereas in examples (96a iii) and (96b iii) where the syllable preceding S<sub>3</sub>, i.e. S<sub>2</sub>, is long, the stem is H up to only S<sub>2</sub>. Note that no single tone assignment rule can be stated in terms of the syllable or the V-unit to account for the surface tonal patterns of all MFT forms in (96) in a direct manner.

Considering the data in (96) in conjunction with those in (89), one may make the generalization that in both sets of data, the verb stem is H up to the n<sup>th</sup> stem syllable unless the (n-1)<sup>th</sup> syllable is long, in which case, the stem is H only up to the (n-1)<sup>th</sup> syllable; n

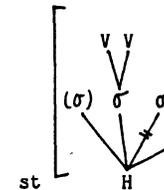
= 2 in (89) and n = 3 in (96). Now suppose that in the MFT, the root H is assigned to the third stem syllable by a rule stated as follows:

97. Stem H Assignment II



This H tone spreads leftwards to all preceding toneless syllables. In stems where the second syllable is long, however, the tense H dissociates from the designated syllable (i.e. S<sub>3</sub>) by the following rule:

98. Stem H Dissociation

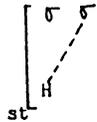


(It should be pointed out that in any single verb form, if the stem H is assigned by (91), this H tone is never found to subsequently become dissociated by (98). Thus, the PCT H suffix in a H-toned PCT form like kUhaandiikáa /kù+hándiik+aa´ / "we are writing" (88a v1) does not undergo Stem H Dissociation (98) to derive an incorrect form

\*kUhaandiikaa. This fact can be easily accounted for by comparing the SD's of (91) and (98): the SD of (91) specifies that the stem initial syllable must be bound whereas that of (98) implies that the stem initial syllable must be free after the application of all tone assignment rules, since this syllable is susceptible to Tone Spread (13). No single H tone can be found to occur in an environment that satisfies the SD of both rules.

With rule (98), one can then account for the data in (89) by postulating an ITAR that assigns a free H tone in the stem to the second stem syllable. Further, this rule is ordered crucially after Stem H Assignment I (91) and Stem H Assignment II (97). Such a rule represents the default case of Stem H Assignment:

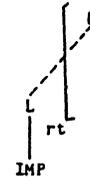
99. Stem H Assignment III



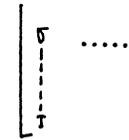
The initial tone assignment rules postulated so far and their correct orderings are summarized as follows:

100. Summary of Initial Tone Assignment Rules

(75) Imperative L Prefix Assignment

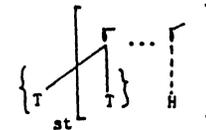


(3-11) Morphological Tone Association

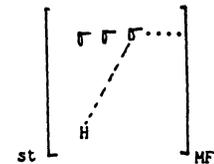


(Brackets demarcate morpheme boundaries)

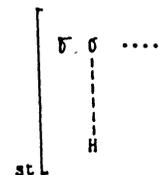
(91) Stem H Assignment I



(97) Stem H Assignment II



(99) Stem H Assignment III







The non-H forms, however, have interesting variations.<sup>15</sup> Each non-H form in (102) has two possible surface tonal patterns, one being characteristic of the H-toned plain PCT forms examined before, and the other one the non-H forms. Take (102b i), viz.,  $\frac{\text{n}}{\text{n}}\frac{\text{e}}{\text{n}}\frac{\text{n}}{\text{n}}\hat{\text{e}}\text{r}\hat{\text{a}}\text{a} \sim \frac{\text{n}}{\text{n}}\frac{\text{e}}{\text{n}}\frac{\text{n}}{\text{n}}\text{e}\text{r}\text{a}\text{a}$  as an example. The first tonal pattern consists of a L tone on the stem initial syllable, and H thereafter, which is the same as that of the H-toned form  $\text{nzi}\hat{\text{t}}\text{r}\hat{\text{a}}\text{a}$ . The second surface tonal pattern, on the other hand, is predictable under the analysis provided for other non-H forms: the second stem syllable is assigned the PCT H, which spreads leftwards to the stem initial syllable. The final syllable is L due to final L Insertion (10). The analysis of the tonal variations in the other examples in (102b) is analogous.

What the tonal data in (102b) suggest is that in Llogoori, there is an optional neutralization of H and non-H plain PCT forms with type A  $\frac{\text{y}}{\text{n}}$ -initial roots. The surface tonal pattern of the H-toned forms is the neutralized case. Recall that in the Perfect Tense also, non-H verbs with a type A  $\frac{\text{y}}{\text{n}}$ -initial root are tonally the same as H-toned verbs in the SR, without any obvious phonological explanation. The difference is that in the Perfect Tense, non-H forms with type A  $\frac{\text{y}}{\text{n}}$ -initial roots are always pronounced with a melody characteristic of the H-tone forms. There is no variations between a H and non-H treatment as there is in the PCT forms.

In view of these observations, perhaps the tonal neutralization of verb forms with type A  $\frac{\text{y}}{\text{n}}$ -initial is better explained at the lexical level. Apparently, all non-H Type A  $\frac{\text{y}}{\text{n}}$ -initial roots are lexically marked for H Insertion (53). In the Perfect Tense, rule (53) is an obligatory rule, whereas in the Present Continuous Tense and other tenses to be examined later, it is an optional rule. Of course, more data consisting of verb forms with non-H  $\frac{\text{y}}{\text{n}}$ -initial roots are needed for a final conclusion to be drawn.

-----  
<sup>15</sup> The variations are recorded during different elicitation sessions. It should be pointed out that within each single session, the speaker was consistent as to which tonal melody she used. (In other words, during each session, only one of the two possible tone melodies was recorded for each verb.)

4.7.2 Present Continuous Tense Forms with Object Prefix

103a. H-toned Verbs

- |       |                                  |                             |                       |
|-------|----------------------------------|-----------------------------|-----------------------|
| i)    | "we are biting it"               | kUkIr <sup>!</sup> Umáá     | /kÙ+kÍ+rUm+aa´ /      |
| ii)   | "we are cooking it"              | kUkedéekáá                  | /kÙ+kÍ+deek+aa´ /     |
| iii)  | "we are cutting it"              | kUkIkáragáá                 | /kÙ+kÍ+kárag+aa´ /    |
| iv)   | "we are eating it"               | kUkIrÍizáá                  | /kÙ+kÍ+rÍ+iz+aa´ /    |
| v)    | "we are killing it"              | kUciitáá                    | /kÙ+kÍ+yit+aa´ /      |
| vi)   | "we are gathering them together" | kUvivU <sup>!</sup> Ungizáá | /kÙ+vi+vUngiz+aa´ /   |
| vii)  | "we are writing it"              | kUkIháandiikáá              | /kÙ+kÍ+hándiik+aa´ /  |
| viii) | "we are filling it"              | kUciizurizáá                | /kÙ+kÍ+yizuriz+aa´ /  |
| ix)   | "we are cutting for it"          | kUkIkáragÍráá               | /kÙ+kÍ+kárag+Ír+aa´ / |

103b. Non-H Verbs

- |      |                         |               |                       |
|------|-------------------------|---------------|-----------------------|
| i)   | "we are hitting it"     | kUkIdúyáá     | /kÙ+kÍ+duy+aa´ /      |
| ii)  | "we are burning it"     | kUkIsáambaa   | /kÙ+kÍ+sáamb+aa´ /    |
| iii) | "we are selling it"     | kUkIgúrizaa   | /kÙ+kÍ+gúriz+aa´ /    |
| iv)  | "we are grinding it"    | kUkIsyéezaa   | /kÙ+kÍ+síe+iz+aa´ /   |
| v)   | "we are loving for it"  | kUkIyáanzÍraa | /kÙ+kÍ+yáanz+Ír+aa´ / |
| vii) | "we are thinking of it" | kUkIgánagapaa | /kÙ+kÍ+gánagap+aa´ /  |

104. PCT forms with O.P. that have toneless Type A y-initial roots

- |      |                          |               |                       |
|------|--------------------------|---------------|-----------------------|
| i)   | "we are wanting it"      | kUčééñáá      | /kÙ+kÍ+yéñ+aa´ /      |
| ii)  | "we are remembering it"  | kUčizurizáá   | /kÙ+kÍ+yizuriz+aa´ /  |
| iii) | "we are swimming for it" | kUčééréeméráá | /kÙ+kÍ+yérem+Ír+aa´ / |

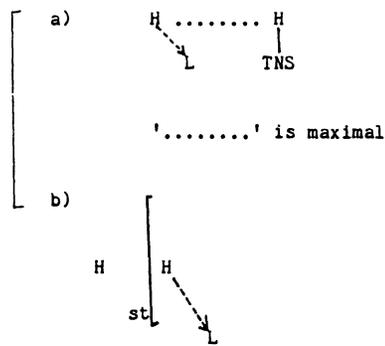
The surface tonal pattern of the non-H PCT forms with O.P. in (103b) above is the same as that of the non-H plain PCT forms seen in (88b): H on the stem initial syllable only if this syllable is long, and H on the first two stem syllable otherwise. Other syllables are L-toned.

The surface tone melody of the H-toned PCT forms in (103a) is L H !H L, with the first L tone on the object and subject prefixes, H on the first stem syllable, and downstepped H thereafter. (The final syllables are !HL due to the insertion of a final L tone.) The forms in (104), though underlyingly consisting of toneless roots, have the same surface tone melody as the H-toned forms in (103). I will discuss these forms later.

Underlyingly, the tone melody of a H-toned PCT form with O.P. is composed of four morphological tones: the S.P. L, the O.P. H, the root H, and the PCT H. On the surface, however, both the subject and object prefixes have a L tone. To account for the surface L tone on the object prefix, one may argue that in the presence of a tense H suffix, the O.P. H becomes L. (Justification for such a claim comes from the

observation that in all other tenses with a H tense suffix, namely, the IFT and MPT, the O.P. has a surface L tone.) An interesting point to note is that it is the O.P. in the H-toned forms (as well as the non-H forms)--not the root H--that lowers. This is contradictory to the prediction of both of the Root H Lowering rules (28) and (94). To account for all the different cases of H tone lowering seen so far, it is proposed that there is a rule in Llogoori that changes the leftmost H tone of a tonal sequence consisting of a tense H suffix to L, and that this rule is crucially ordered before Root H Lowering (28):

105. H Tone Lowering



(same as rule (28))

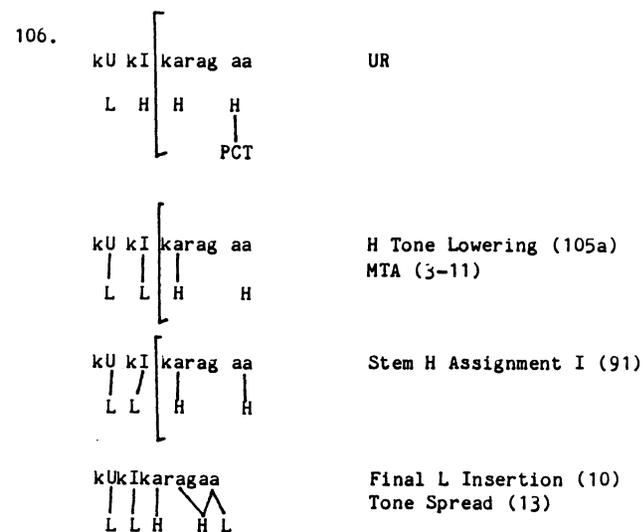
(Note: " [ " between a) and b) indicates crucial ordering)

(105a) replaces (94) as its scope encompasses that of the latter:

(105a) correctly predicts that in a verb form with a H tense suffix but no O.P., it is the root H--which is the leftmost H tone--that de-

letes (same prediction as (94)). In addition, it correctly predicts that should the O.P. H be present, it would be the O.P. H instead of the root H that deletes, since the O.P. H will in this case be the leftmost H tone, not the root H.

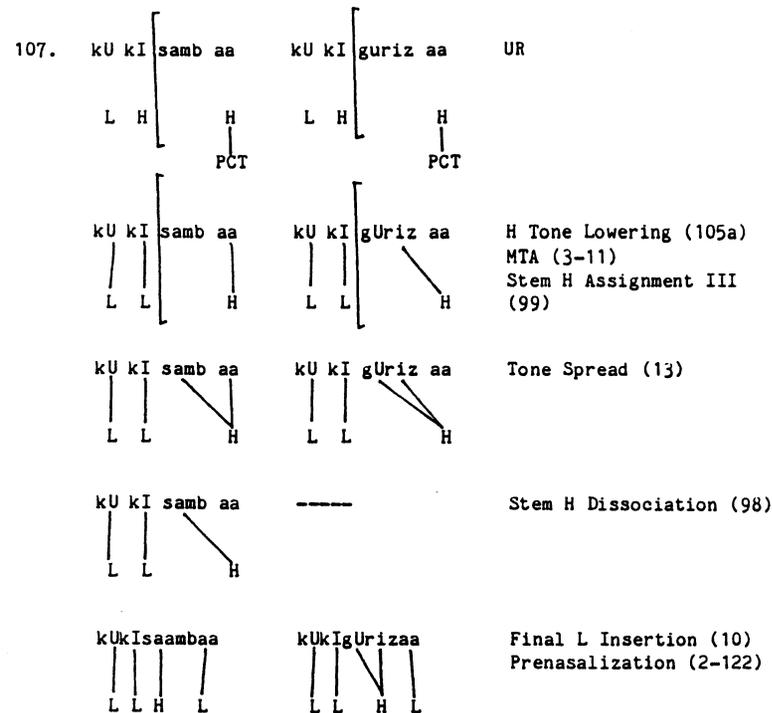
Like in the H-toned plain PCT forms, the PCT H suffix is assigned by rule (91) in the H-toned forms in (103). This H suffix spreads leftwards up to and excluding the stem initial syllable which is linked to the root H. Being immediately preceded by the root H, the PCT H suffix is realized !H on the surface. The derivation of kUkI-karagaa /kU+kI+karag+aa / "we are cutting it" (103a iii) illustrates the analysis provided for the H-toned PCT forms in (103a) so far:



In the case of the PCT forms with  $y$ -initial roots (see examples (103a v) and (103a viii), the root H resyllabifies with the O.P. L

(derived from the underlying H by rule (105a)). Then by Rising Tone Simplification (49), the tautosyllabic LH sequence becomes H. This accounts for the fact that in both (103a v) and (103a viii), the stem initial syllable is H-toned in the SR.

The analysis of the non-H PCT forms with O.P. is the same as that of the non-H plain PCT forms: the PCT H suffix is assigned to the second stem syllable by Stem H Assignment III (99). Just in case that the stem initial syllable is long, the H suffix dissociates from the designated syllable, i.e. S<sub>2</sub>, by Stem H Dissociation (98) (c.f. (103b ii), (103b iv), and (103b v)). Rules established before then account for the rest. For example, the derivations of kUkÍsaambaa /kU+kÍ+samb+aa' / "we are burning it" (103b ii) and kUkÍgÚrizaa /kU+kÍ+gÚriz+aa' / "we are selling it" (103b iii) are as follows:



#### 4.7.2.1 PCT Forms with O.P. that Have Toneless Type A y<sub>n</sub>-initial Roots

Data in (104) shows that the H vs. non-H distinction is obligatorily neutralized in PCT forms with O.P. that have Type A y<sub>n</sub>-initial roots, with the tonal melody of the H-toned forms appearing in the neutralized case.

4.7.3 PCT H Suffix Deletion

As in the plain imperative, the H suffix in the PCT forms deletes in non-phrase-final position.

Gloss:	<u>    </u> gáràna <u>    </u> vvaanggu	Citation:	UR:
<u>Plain PCT Forms</u>			
a) i) "we are cutting slowly"	kUkarágáa gáràna	kUkarágáa	/kù+kárag+aa /
ii) "we are cutting quickly"	kUkaragaa vvaanggu		
b) i) "we are selling slowly"	kUgúrízàa gáràna	kUgúrízàa	/kù+gùriz+aa /
ii) "we are selling quickly"	kUgUrizaa vvaanggu		
<u>PCT Forms with O.P.</u>			
a) i) "we are cutting it slowly"	kUkIkárágáa gáràna	kUkIkárágáa	/kù+kl+kárag+aa /
ii) "we are cutting it quickly"	kUkIkaragaa vvaanggu		
b) i) "we are selling it slowly"	kUkIgúrízàa gáràna	kUkIgúrízàa	/kù+kl+gùriz+aa /
ii) "we are selling it quickly"	kUkIgUrizaa vvaanggu		

In the examples above, syllables on which the H suffix is realized in citation are all realized the same as the initial tone of a following adverb. This shows that these syllables are toneless in non-final position, or else, one would expect them to be realized higher than the following adverb.<sup>16</sup>

<sup>16</sup> Note that in the "\_\_\_\_\_ gáràna" context, if the PCT H suffix were present in the verb, one would expect the initial H of gáràna to downstep.

4.8 MIDDLE PAST TENSE

The Middle Past Tense (MPT) is used when speaking of events that have taken place between several days to about a week ago. Obligatory segmental constituents are the subject prefix, the tense prefix /-aa-/, the root, and the final vowel /-i/: S.P. + aa + Root + i.<sup>17</sup>

4.8.1 Middle Past Tense Forms without Object Prefix

109a. H-toned Verbs

i) "I bit"	ndaarUmî	/N+aa+rUm+i/
"we bit"	kwaarUmî	/kù+aa+rUm+i/
"you (sg.) bit"	waarUmî	/ù+aa+rUm+i/
"you (pl.) bit"	mwaarUmî	/mù+aa+rUm+i/
"He/she bit"	yaarUmî	/y+aa+rUm+i/
"They bit"	vaarUmî	/v+aa+rUm+i/
ii) "we cooked"	kwaadeeçî	/kù+aa+déek+i/
iii) "we cut"	kwaakarájî	/kù+aa+kárag+i/
iv) "we killed"	kwaayitî	/kù+aa+yít+i/
v) "we ate"	kwaarîî	/kù+aa+rîî+i/
vi) "we stirred"	kwaacúukapî	/kù+aa+cúukap+i/
vii) "we wrote"	kwaahaandíîçî	/kù+aa+hándik+i/
viii) "we cut for"	kwaakaragírî	/kù+aa+kárag+Ir+e/
ix) "we filled for"	kwaayizúrizírî	/kù+aa+yízuriz+Ir+e/

<sup>17</sup> Note that as in the Perfect Tense, the F.V. is /-e/ instead of /-i/ in the presence of the applied extension /-Ir/ (see examples (109a viii) (109a ix), (110a ii), (110a iii), and the examples in (110b).

109b. Non-H Verbs

i)	"we hit"	kwaadúyî	/kU+aa+dúy+i/
ii)	"we burnt"	kwaasáambî	/kU+aa+sáamb+i/
iii)	"we sold"	kwaagúrízî	/kU+aa+gúriz+i/
iv)	"we ground"	kwaasyê	/kU+aa+sîe+i/
v)	"we thought"	kwaagánágânî	/kU+aa+gánagan+i/
vi)	"we continued"	kwaazíizágíî	/kU+aa+zíizagil+i/

110. Plain MPT forms with toneless y-initial Roots

a) Type A y-initial Roots

i)	"we wanted"	kwaayéñî ~ kwaayéñî	/kU+aa+yéñ+i/
ii)	"we remembered for"	kwaayizúrizírî ~ kwaayizúrizírî	/kU+aa+yizuriz+ír+e/
iii)	"we swam for"	kwaayeeréeméré ~ kwaayeeréeméré	/kU+aa+yéerem+ír+e/

b) Type B y-initial Roots

i)	"we loved for"	kwaayaanzírî ~ kwaayaanzírî	/kU+aa+yáanz+ír+e/
ii)	"we buried"	kwaayavírî ~ kwaayavírî	/kU+aa+yáv+ír+e/

The Middle Past Tense is the only tense in which the initial /y/ of both Type A and Type B roots does not delete after the tense prefix

vowel (see examples (109a iv), (109a ix), and examples in (110)).<sup>18</sup> Unlike the Imperative F.V. /-i/, the Middle Past Tense F.V. /-i/ deletes when preceded by a -CV(V)- root. The derivations of kwaaríî /kU+aa+rí+i/ "we ate" (109a v) and kwaasyê /kU+aa+sîe+i/ "we ground" (109b iv) are given as follows:

111.			UR
			i-Deletion (2-117) Convention (2-94) Linking Convention (2-95)
			Glide Formation (2-111) Convention (2-94) Linking Convention (2-95) V-Deletion (2-132)

Note also that the root final velar and interdental consonants palatalize in front of the MPT F.V. /-i/ (see (109a ii), (109a iii), (109a vii), (109b i) and (110a i)) by the palatalization rules (2-14) and (2-62).

In the examples in (109), the H-toned forms are L on the tense prefix syllable and root initial syllable, and H thereafter. The non-H forms, on the other hand, are L on only the tense prefix, and H on the entire stem.

<sup>18</sup> The initial /y/ of Type A roots deletes after the the Near Future Tense prefix /ra-/, the Far Future Tense prefix /raka-/, and the Remote Past Tense prefix /aa-/ (c.f. data in 4.2, 4.4, and 4.11).

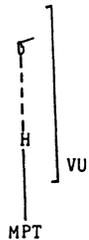
That the MPT is characterized by a H tone can be inferred from the presence of a surface H in the non-H MPT forms in (109b). Thus,

112.



Unlike the PCT H which is assigned differently in the H-toned and non-H verbs (by (91) and (99) respectively), the MPT H is always assigned to the stem final syllable regardless of the underlying tonal structure of the root. Furthermore, this H tone never undergoes Stem H Dissociation (98), even when the SD of the rule is met. So for instance, the form for "we burnt" is kwaasaáambi and not \*kwaasaáambi (kwaasaáambi  $\xrightarrow{(98)}$  \*kwaasaáambi). So far I have not found any phonological explanation for the exceptional behavior of the MPT H. For the purpose of this study, I will account for the special phonological status of the MPT H suffix in morphological terms. Thus, the MPT H suffix is assigned by a morphologically conditioned ITAR which is ordered crucially before Stem H Assignment (91):

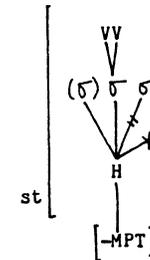
113. MPT H Suffix Assignment



VU = Verb Unit

Furthermore, in order to avoid the MPT H suffix from undergoing Stem H Dissociation (98), (98) is restated as follows:

114. Stem H Dissociation (Final Version)



(114) replaces (98).

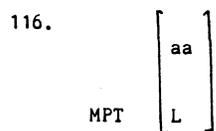
In the H-toned forms, this suffix spreads leftwards up to but excluding the root initial syllable which is linked to the lexical root tone. In the non-H forms, it spreads through the entire stem since all stem syllables are toneless.

Considering the data in (109) alone, the underlying tonal status of the tense marker is ambiguous: it (the tense prefix) could be analyzed as a toneless morpheme which obtains the L tone of the S.P. as a result of resyllabification, or, alternatively, it could be analyzed as underlyingly L-toned. A non-H MPT form with the 1st sg. subject prefix shows that the tense prefix is in fact L-toned:

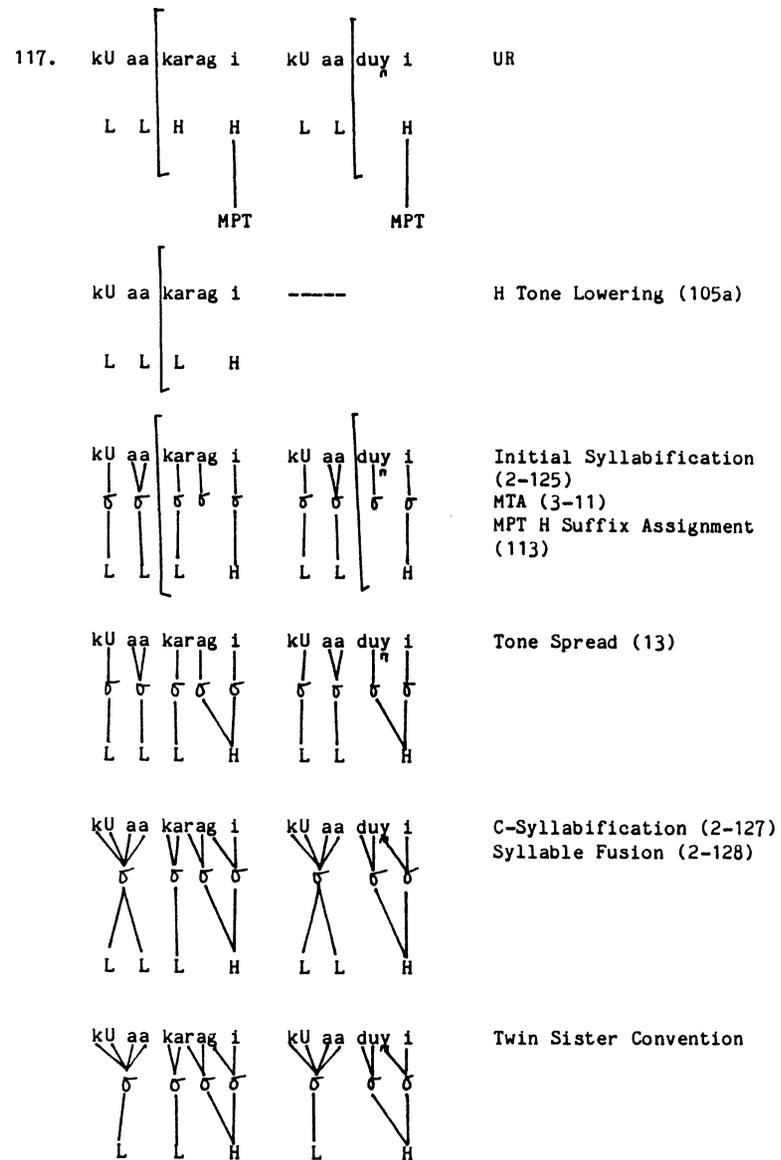
115. "I bit"      ndaadúyî      /N+aa+dúy<sup>o</sup>i /

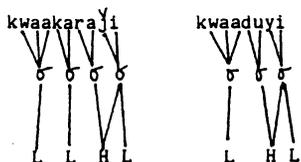
As pointed out before, the tonal properties of a nasal morpheme in word initial position do not surface (c.f. discussion in 4.2). Thus, the surface L on the tense prefix in ndaadúyî /N+aa+dúy<sup>o</sup>i /

cannot be attributed to the S.P. L tone. The simplest explanation for the surface L here is that the tense prefix itself is L-toned:



The derivation of kwaakaráyi /kù+aa+kárag+i / "we cut" (109a iii) and kwaadúyi /kù+aa+dúy+i / "we hit" (109b i) illustrate the analysis so far:





Glide Formation (2-111)  
 V-Deletion (2-132)  
 Palatalization (2-14) &  
 (2-62)  
 Final L Insertion (10)

With respect to MPT forms with toneless y-initial roots, data in (110) show that both plain MPT forms with Type A roots and those with Type B roots are subject to tonal reanalysis.<sup>19</sup>

<sup>19</sup> This is not like in the Perfect Tense, the Present Continuous Tense, and other tenses to be examined later where only verb forms with Type A y-initial roots may be treated as H-toned verbs. It should be noted, however, that at a later session, the speaker judged that the "L L H L" melody (the surface tone melody characteristic of the H-toned forms) "is better" in the Type A plain MPT forms in (110), and "L H L" (the melody characteristic of the non-H forms) in the Type B forms, although both melodies are acceptable in both types of verbs. What this seems to suggest is that the tonal neutralization of the y-initial roots by H Insertion (53) is an on going process in Llogoõri, beginning with the Type A toneless roots, and only gradually "diffusing" to the Type B roots. The questions remain, however: 1) Why should tonal neutralization take place in the Type A roots in the first place; 2) Why should this "diffusion" of change to Type B roots take place in the MPT first? These are questions that await further study on the language to address.

4.8.2 Middle Past Tense Forms with Object Prefix

118a. H-toned Verbs

- |       |                 |                 |                        |
|-------|-----------------|-----------------|------------------------|
| i)    | "we bit it"     | kwaakIrúmi      | /kù+aa+kí+rúmi /       |
| ii)   | "we cooked it"  | kwaakedééçi     | /kù+aa+kí+déék+i /     |
| iii)  | "we cut it"     | kwaakIkáráji    | /kù+aa+kí+kárag+i /    |
| iv)   | "we killed it"  | kwaaciiti       | /kù+aa+kí+yít+i /      |
| v)    | "we ate it"     | kwaakIryi       | /kù+aa+kí+rí+i /       |
| vi)   | "we stirred it" | kwaakIcuukani   | /kù+aa+kí+çuúkan+i /   |
| vii)  | "we wrote it"   | kwaakIhaandiiçi | /kù+aa+kí+hándiik+i /  |
| viii) | "we filled it"  | kwaaciizurizi   | /kù+aa+kí+yízuriz+i /  |
| ix)   | "we cut for it" | kwaakIkáragIrí  | /kù+aa+kí+kárag+Ir+e / |

118b. Non-H Verbs

- |       |                    |                |                         |
|-------|--------------------|----------------|-------------------------|
| i)    | "we hit it"        | kwaakIdúyi     | /kù+aa+kí+dúy+i /       |
| ii)   | "we burnt it"      | kwaakIsaambi   | /kù+aa+kí+samb+i /      |
| iii)  | "we sold it"       | kwaakIgurizi   | /kù+aa+kí+gúriz+i /     |
| iv)   | "we ground it"     | kUaakIsýe      | /kù+aa+kí+síe+i /       |
| v)    | "we thought of it" | kwaakIganágani | /kù+aa+kí+ganagan+i /   |
| vi)   | "we loved it"      | kwaakIyaanzi   | /kù+aa+kí+yanz+i /      |
| vii)  | "we worked for it" | kwaakIInzili   | /kù+aa+kí+yínzIr+Ir+e / |
| viii) | "we buried it"     | kwaakIyavíri   | /kù+aa+kí+yávIr+e /     |

119. MPT Forms with O.P. That Have Toneless Type A  $\underline{y}$ -Initial Roots

a) "we wanted it"

kwaac<sup>1</sup>ee<sup>1</sup>ni<sup>1</sup>

/kU+aa+kI+y<sup>o</sup>en<sup>o</sup>+i /

b) "we remembered it"

kwaac<sup>1</sup>iizurizi<sup>1</sup>

/kU+aa+kI+y<sup>o</sup>izuriz+i /

c) "we swam for it"

kwaac<sup>1</sup>ee<sup>1</sup>re<sup>1</sup>me<sup>1</sup>re<sup>1</sup>

/kU+aa+kI+y<sup>o</sup>ereem+Ir+e /

Like in the plain MPT forms, the MPT H is assigned to the stem final syllable in the MPT forms with O.P.

The surface tonal pattern of the H-toned MPT forms in (118) is the same as that of the PCT forms seen in (103): The prefixes have a surface L tone, the root initial syllable is H, and !H thereafter. The tonal analysis of the H-toned MPT forms with O.P. and that of the H-toned PCT forms without O.P. are also the same: The O.P. is lowered by rule (105a). In the forms with Type A  $\underline{y}$ -initial roots (c.f. (118a iv) and (118a viii)), the object prefix /kI-/ induces Post-Vocalic  $\underline{y}$ -Deletion (2-8). The O.P. L (derived from H) consequently resyllabifies with the root initial H tone. By Rising Tone Simplification (49), a H tone results on the surface. Thus, the derivation of kwaac<sup>v</sup>iiti "we killed it" (118a iv) is as follows:

120. kU aa kI yit i  
L L H H H  
MPT

UR

kU aa kI yit i  
L L L H H

H Tone Lowering (105a)

kU aa kI yit i  
| | | | |  
σ σ σ σ σ  
| | | | |  
L L L H H

Initial Syllabification (2-125)  
MTA (3-11)  
MPT H Suffix Assignment (113)

kU aa kI it i  
| | | | |  
σ σ σ σ σ  
| | | | |  
L L H H

Post-Vocalic  $\underline{y}$ -Deletion (2-8)  
C-Syllabification (2-127)  
Syllable Fusion (2-128)  
Twin Sister Convention

kU aa kI it i  
| | | | |  
σ σ σ σ σ  
| | | | |  
L H H

Rising Tone Simplification (49)

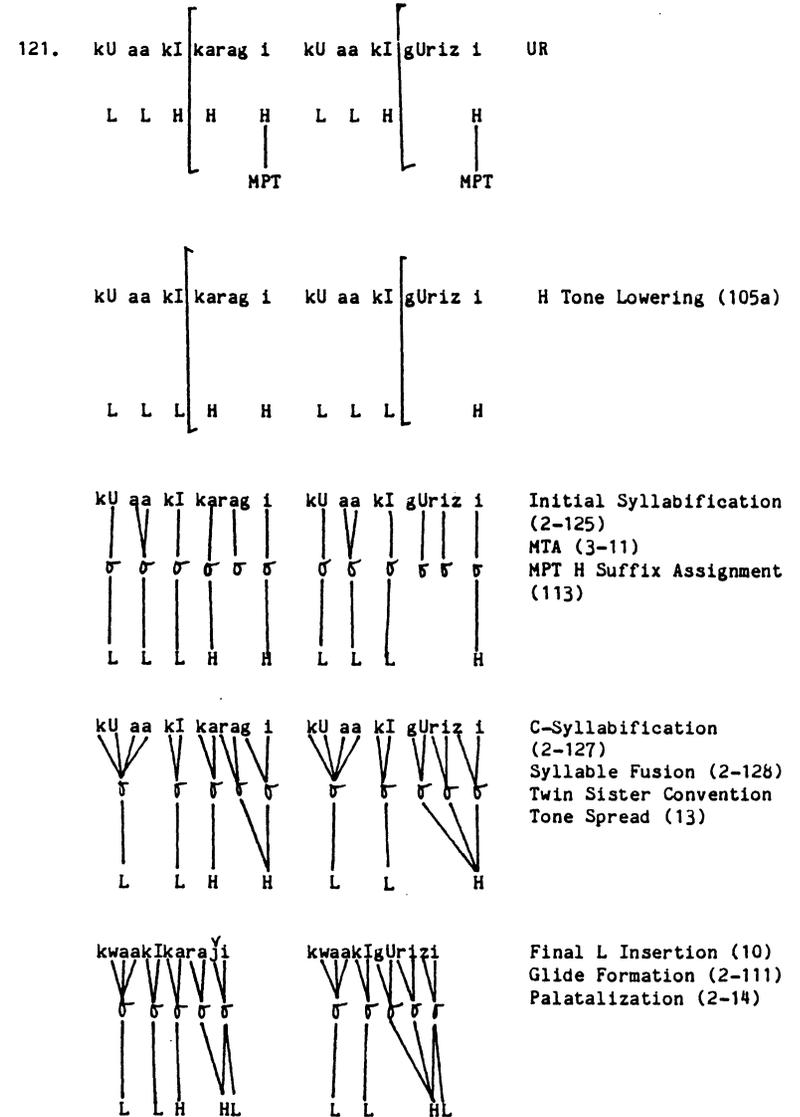
kwaac<sup>v</sup>iiti  
| | | | |  
σ σ σ σ σ  
| | | | |  
L H HL

Palatalization (2-14)  
Glide Formation (2-111)  
V-Deletion (2-132)  
Final L Insertion (10)

The H suffix is downstepped as it is preceded by another H, viz., the root H.

In the non-H MPT forms with O.P., the O.P. H is lowered also by rule (105a). Then like in the plain non-H MPT forms, the H suffix spreads leftwards through the entire toneless stem.

The derivations of kwaakIkaráji /kù+aa+kí+kárag+i' / "we cut it" (118a iii) and kwaakIgÚrizi /kù+aa+kí+gúriz+i' / "we sold it" (118b iii) illustrate the analysis of the MPT forms with O.P. provided above:



4.8.2.1 MPT Forms with Toneless  $y_n$ -initial Roots

Comparing examples (118b vi-viii) with those in (119), one sees that in the presence of the O.P., only MPT forms with Type A  $y_n$ -initial roots are treated as lexically H-toned. But note also that in the presence of the O.P., the distinction between Type A and Type B forms surface: Type A roots undergo Post-Vocalic  $y_n$ -Deletion (2-8) and Type B roots do not. This shows that the exceptionality of Type A roots to Post-Vocalic  $y_n$ -Deletion (2-8) is due to a property of the formative element /-aa-/ and not the morphosyntactic category "Middle Past Tense" itself.

4.8.3 MPT H Suffix Deletion

Like the root H in plain imperative forms and the PCT H suffix, the MPT H suffix deletes in non-phrase-final position:

122.	Gloss:	<u>    </u> gáráha <u>    </u> vvaangú	Citation:	UR:
<u>PLAIN MPT FORMS</u>				
a) i)	"we cut slowly"	kwaakarájí gáráha	kwaakarájí	/kù+aa+kárag+i' /
ii)	"we cut quickly"	kwaakarájí vvaangú		
b) i)	"we sold slowly"	kwaagúrízì gáráha	kwaagúrízì	/kù+aa+gúriz+i' /
ii)	"we sold quickly"	kwaagúrizì vvaangú		
<u>MPT FORMS WITH O.P.</u>				
a) i)	"we cut it slowly"	kwaakIkárájí gáráha	kwaakIkárájí	/kù+aa+kí+kárag+i' /
ii)	"we cut it quickly"	kwaakIkárájí vvaangú		
b) i)	"we sold it slowly"	kwaakIgúrízì gáráha	kwaakIgúrízì	/kù+aa+kí+gúriz+i' /
ii)	"we sold it quickly"	kwaakIgúrizì vvaangú		

Again, in the examples above, syllables that receive the H suffix in citation are realized the same as the initial tone of a following adverb, suggesting that these syllables are toneless in non-final position.

## 4.9 INDEFINITE FUTURE TENSE

Obligatory constituents of the Indefinite Future Tense are the subject prefix, the tense prefix /ri-/, the root, and the F.V. /-a/:  
S.P. + ri + Root + a.

## 4.9.1 Indefinite Future Tense Forms without Object Prefix

## 123a. H-toned Verbs

i)	"I will bite"	ndirUma	/N̄+ri+rŭm+a/
	"we will bite"	kŭrirUma	/kŭ+ri+rŭm+a/
	"You (sg.) will bite"	UrirUma	/ŭ+ri+rŭm+a/
	"You (pl.) will bite"	murirUma	/mŭ+ri+rŭm+a/
	"He/She will bite"	arirUma	/a+ri+rŭm+a/
	"They will bite"	varirUma	/v̄a+ri+rŭm+a/
ii)	"we will cook"	kŭrideekâ	/kŭ+ri+déek+a/
iii)	"we will cut"	kŭrikarâgâ	/kŭ+ri+kârag+a/
iv)	"we will kill"	kŭriitâ	/kŭ+ri+yít+a/
v)	"we will eat"	kŭrirya	/kŭ+ri+rî+a/
vi)	"we will stir"	kŭričúukâpâ	/kŭ+ri+čúukap+a/
vii)	"we will cut for"	kŭrikarâgîrâ	/kŭ+ri+kârag+îr+a/

## 123b. Non-H Verbs

i)	"we will hit"	kŭridúyâ	/kŭ+ri+dúy+a/
ii)	"we will burn"	kŭrisaâmba	/kŭ+ri+sâmb+a/
iii)	"we will sell"	kŭrigŭrîza	/kŭ+ri+gŭrîz+a/
iv)	"we will grind"	kŭrisyâ	/kŭ+ri+sîe+a/
v)	"we will sell for"	kŭrigŭrîzîra	/kŭ+ri+gŭrîz+îr+a/
v)	"we will love for"	kŭriyâanzîra	/kŭ+ri+yâanz+îr+a/
vi)	"we will work"	kŭriyînzîra	/kŭ+ri+yînz+îr+a/

## 124. Plain IFT Forms with Toneless Type A y-initial Roots

a)	"we will want"	kŭryeeṅâ	/kŭ+ri+yēṅ+a/
b)	"we will swim for"	kŭryeeréemérâ	/kŭ+ri+yēreem+îr+a/
c)	"we will remember"	kŭriizúrîzâ	/kŭ+ri+yîzuriz+a/

The Indefinite Future Tense (IFT) is characterized by a H tone, since non-H IFT forms also have a surface H tone:

125.

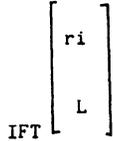


With the exception of the examples in (123a i) and (123a v), all H-toned forms in (123) are L up to and including the root initial syllable, and H thereafter. The non-H forms, on the other hand, are L on the prefixes, H on the stem initial syllable if this syllable is long, or else, H on both the first and the second stem syllables, and L thereafter. The IFT forms with toneless Type A y-initial roots have the same surface tone pattern as the H-toned forms (see data in (124)).

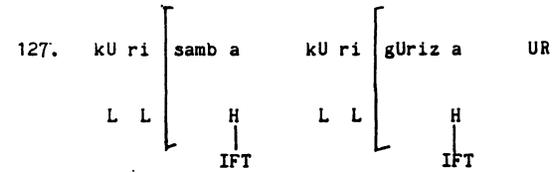
Like other H tense suffixes seen before, the IFT H is assigned to the second stem syllable in the non-H plain IFT forms by (99). In the cases where the stem initial syllable is long, by Stem H Dissociation (114), the IFT H suffix is dissociated from the second stem syllable. This accounts for the location of the surface H in kŭrisaâmba /kŭ+ri+sâmb+a / (123b ii), kŭriyâanzîra /kŭ+ri+yâanz+îr+a /

(123b v), and kU<sup>ri</sup>íInzIra /kU<sup>ri</sup>+y<sup>ri</sup>InzIr+a<sup>ri</sup>/ (123b vi). That the tense prefix /ri-/ blocks the leftward spread of the IFT H in the non-H forms suggests that /ri-/ is L-toned. Thus,

126.

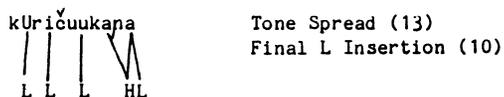
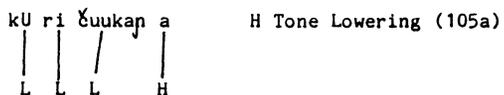
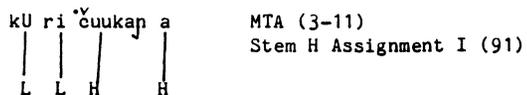
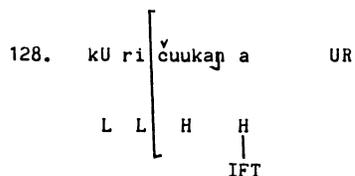


The derivations of kU<sup>ri</sup>sáamba /kU<sup>ri</sup>+sáamba<sup>ri</sup>/ "we will burn" (123b ii) and kU<sup>ri</sup>gU<sup>ri</sup>za /kU<sup>ri</sup>+gU<sup>ri</sup>za<sup>ri</sup>/ "we will sell" (123b iii) illustrate the analysis provided for the non-H IFT forms in (123) so far:



Note also that in the last stage of derivation of kurisaamba above, the autosegmental configuration of the form meets the SD of Penultimate Lowering (16), which, if applied, would derive an incorrect surface form: \*kU<sup>ri</sup>sáamba. (A similar observation was made about the derivation of the PCT form kUsáambaa (c.f. (101))). The inapplicability of Penultimate Lowering (16) in kU<sup>ri</sup>sáamba will be accounted for in section 4.10 on the Middle Future Tense.

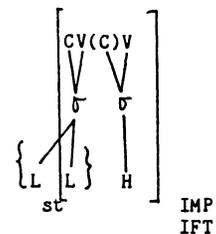
In the H-toned IFT forms, the IFT H is assigned to the stem final syllable by Stem H Assignment I (91). The surface L on the root H of the H-toned verbs is predictable by H Tone Lowering (105a). Disregarding the examples in (123a i) and (123a v) for the moment, tonal derivations of all forms in (123a) are straightforward. For example, kUričúukápa /kù+rì+čúukap+a´ / "we will stir" (123a vi) derives as follows:



Surprisingly, the IFT H suffix does not surface in the SR of kU-rirUma /kù+rì+rúma´ / "we will bite" (123a i), and kUrirya /kù+rì+rí+a´ / "we will eat" (123a v). Note that both forms have a -CV(C)- root structure underlyingly. This reminds us of the deletion

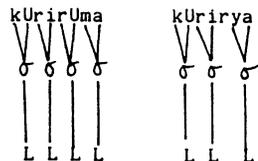
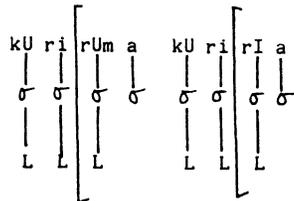
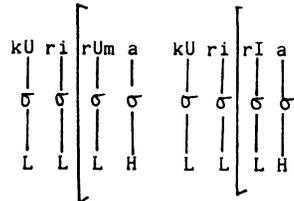
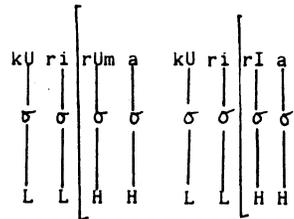
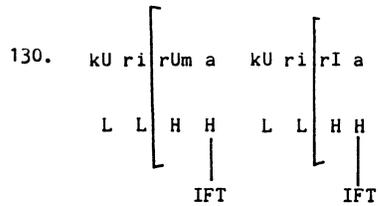
of root H in the plain imperative forms with -CV(C)- roots discussed in section 4.6 before. The deletion of the root H in the IFT forms just cited can be accounted for by revising H Deletion (77) as follows:

129. H Deletion (Final Version)



(In (129) above, the pair of brackets "{ }" indicates that the first stem syllable may be linked to a L tone inside the stem or preceding the stem.) Rule (129) replaces (77).

Assuming that (129) applies after Stem H Assignment I (91) and H Tone Lowering (105a), and before Syllable Fusion (2-128), the surface tone melodies of kUrirUma and kUrirya will then be accounted for:



UR

Initial Syllabification  
(2-125)  
MTA (3-11)  
Stem H Assignment I (91)

H Tone Lowering (105a)

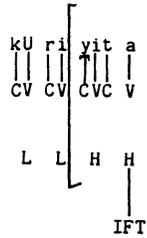
H Deletion (129)

C-Syllabification (2-127)  
Syllable Fusion (2-128)  
Final L Insertion (10)  
& Other Rules

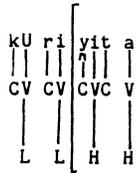
a -CVC- canonic shape. If this underlying canonic structure were maintained at the stage of derivation at which H-Deletion (129) applies, one would expect the IFT H suffix to be deleted, resulting in an incorrect form \*kUriita. To correctly account for the derivation of kUriitā, I propose that Post-Vocalic y-deletion (2-8) is ordered crucially before H Deletion (129) to change the canonic shape of the root from -CVC- to -VC-, and thus bleeds H-Deletion (129):

The derivation of the form kUriitā /kU+ri+yit+a / "we will kill" deserves further explanation. Underlyingly, the root of this form has

131.



UR



MTA (3-11)  
Stem H Association I (91)



H Tone Lowering (105a)



Post-Vocalic  $y_n$ -Deletion (2-8)

-----

H Deletion (129) N/A



Other Rules

Data in (124) show that in the IFT, non-H forms with Type A  $y_n$  initial roots undergo H Insertion (53) obligatorily. Their treatment is the same as that of the H-toned forms given above.

4.9.2 Indefinite Future Tense Forms with Object Prefix

132a. H-toned Verbs

i) "we will bite it"	kUrikIrU <sup>h</sup> m <sup>h</sup> a	/kU+ri+kI+rUm+a /
ii) "we will cook it"	kUriked <sup>h</sup> é <sup>h</sup> k <sup>h</sup> a	/kU+ri+kI+déek+a /
iii) "we will cut it"	kUrikIk <sup>h</sup> árag <sup>h</sup> a	/kU+ri+kI+kárag+a /
iv) "we will kill it"	kUrici <sup>h</sup> it <sup>h</sup> a	/kU+ri+kI+yit+a /
v) "we will eat it"	kUrikIry <sup>h</sup> a	/kU+ri+kI+rI+a /
vi) "we will stir it"	kUrikI <sup>h</sup> cuúk <sup>h</sup> ap <sup>h</sup> a	/kU+ri+kI+cuukap+a /
vii) "we will cut for it"	kUrikIk <sup>h</sup> árag <sup>h</sup> íra	/kU+ri+kI+kárag+ír+a /

132b. Non-H Verbs

i) "we will hit it"	kUrikIduy <sup>n</sup> a	/kU+ri+kI+duy+a /
ii) "we will burn it"	kUrikIs <sup>n</sup> ámba	/kU+ri+kI+sámb+a /
iii) "we will grind it"	kUrikIs <sup>n</sup> yá	/kU+ri+kI+síe+a /
iv) "we will sell it"	kUrikIg <sup>n</sup> úriza	/kU+ri+kI+gúriza /
v) "we will love for it"	kUrikIy <sup>n</sup> áanzIra	/kU+ri+kI+yáanz+ír+a /
vi) "we will bury it"	kUrikIy <sup>n</sup> ávIra	/kU+ri+kI+yávIr+a /
vii) "we will work for it"	kUrikIy <sup>n</sup> íInzIra	/kU+ri+kI+yíInz+ír+a /

133. IFT Forms with O.P. That Have Type A y-initial Roots

- a) "we will want it" kU<sup>!</sup>ri<sup>!</sup>ce<sup>!</sup>ena /kU+ri+KI+y<sup>o</sup>en+a /
- b) "we will swim for it" kU<sup>!</sup>ri<sup>!</sup>ce<sup>!</sup>ere<sup>!</sup>emera /kU+ri+KI+y<sup>o</sup>ereem+Ir+a /
- c) "we will remember it" kU<sup>!</sup>ri<sup>!</sup>ci<sup>!</sup>izuriza /kU+ri+KI+y<sup>o</sup>izuriz+a /

The tonal analysis of the IFT forms with O.P. is the same as that of the PCT forms with O.P.: In both the H-toned and non-H IFT forms, the object prefix is lowered by H Tone Lowering (105a). In the H-toned forms, the IFT H is assigned by Stem H Assignment I (91). It spreads leftwards up to but excluding the stem initial syllable which is associated with the root H tone, and it is realized as !H since it is preceded by another H tone, viz., the lexical root H. In the non-H forms, the IFT H is assigned to the second stem syllable by Stem H Assignment III (99). Stem H Dissociation (114) applies where the stem initial syllable is long (c.f. examples (132b ii), (132b v), and (132b vii)). Other general tone rules account for the rest.

Finally, the toneless IFT forms with Type A y-initial roots also undergo H Insertion (53) (see data in (133)). They are accounted for by the same analysis provided for the H-toned forms in (132).

4.9.3 IFT H Suffix Deletion

Like the PCT and MPT H suffix, the IFT H suffix deletes in non-phrase-final position:

134.

Gloss: gáráha Citation: UR  
vwaangu

PLAIN IFT FORMS

- a) i) "we will cut slowly" kU<sup>!</sup>ri<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga gáráha kU<sup>!</sup>ri<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga /kU+ri+ka<sup>o</sup>ra<sup>o</sup>ga /
- ii) "we will cut quickly" kU<sup>!</sup>ri<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga vwaangu
- b) i) "we will sell slowly" kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza gáráha kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza /kU+ri+gi<sup>o</sup>uriz+a /
- ii) "we will sell quickly" kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza vwaangu

IFT FORMS WITH O.P.

- a) i) "we will cut it slowly" kU<sup>!</sup>ri<sup>!</sup>ki<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga gáráha kU<sup>!</sup>ri<sup>!</sup>ki<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga /kU+ri+ki<sup>o</sup>ka<sup>o</sup>ra<sup>o</sup>ga /
- ii) "we will cut it quickly" kU<sup>!</sup>ri<sup>!</sup>ki<sup>!</sup>ka<sup>!</sup>ra<sup>!</sup>ga vwaangu
- b) i) "we will sell it slowly" kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza gáráha kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza /kU+ri+gi<sup>o</sup>uriz+a /
- ii) "we will sell it quickly" kU<sup>!</sup>ri<sup>!</sup>gi<sup>!</sup>uriza vwaangu

4.10 MIDDLE FUTURE TENSE

4.10.1 Middle Future Tense Forms without Object Prefix

The Middle Future Tense (MFT) is used when speaking of events that are to take place sometime between tomorrow and several years later. Unlike the other tenses where the SP occupies a word-initial position, the tense marker /na-/ in the MFT is the word initial element: na + S.P. + Root + e.

135a. H-toned Verbs

1)	"I will bite"	naanÚmĪ	/na+N+rÚm+e/
	"we will bite"	nakUrÚmĪ	/na+kU+rÚm+e/
	"You (sg.) will bite"	nUUrÚmĪ	/na+U+rÚm+e/
	"You (pl.) will bite"	namurÚmĪ	/na+mù+rÚm+e/
	"He/She will bite"	naarÚmĪ	/na+a+rÚm+e/
	"They will bite"	navarÚmĪ	/na+và+rÚm+e/
ii)	"we will cook"	nakodeékê	/na+kU+déek+e/
iii)	"we will cut"	nakUkárágê	/na+kU+kárág+e/
iv)	"we will eat"	nakUryĪ	/na+kU+rĪ+e/
v)	"we will stir"	nakÚcuukápê	/na+kU+cuukap+e/
vi)	"we will cut for"	nakUkárágĪrI	/na+kU+kárág+Īr+e/
vii)	"we will stir for"	nakÚcuukápĪrI	/na+kU+cuukap+Īr+e/
viii)	"we will write"	nakUháandiĭkI	/na+kU+háandiik+e/
ix)	"we will write for"	nakUháandiĭkĪrI	/na+kU+háandiik+Īr+e/

135b. Non-H Verbs

i)	"we will hit"	nakUdúyĪ	/na+kU+dúy+e/
ii)	"we will burn"	nakUsáámbe	/na+kU+sámbe+e/
iii)	"we will sell"	nakUgÚrízĪ	/na+kU+gÚriz+e/
iv)	"we will grind"	nakUsyĪ	/na+kU+sĪe+e/
v)	"we will love for"	nakUyáanzĪrĪ	/na+kU+yánz+Īr+e/
vi)	"we will think"	nakUgánágápe	/na+kU+gánagap+e/
vii)	"we will continue"	nakUziízágilI	/na+kU+ziizagil+e/
viii)	"we will sell for"	nakUgÚrízĪrI	/na+kU+gÚriz+Īr+e/

136. Plain MFT Forms with Type A y-initial roots

a) H-toned Verbs

i)	"we will kill"	nakwiitĪ	/na+kU+yit+e/
ii)	"we will fill for"	nakwiizúrízĪrI	/na+kU+yizuriz+Īr+e/

b) Non-H Verbs

i)	"we will want"	nakweene	/na+kU+yēn+e/
ii)	"we will remember for"	nakwiizúrízĪrI	/na+kU+yizuriz+Īr+e/
iii)	"we will swim"	nakweereéme	/na+kU+yēreem+e/
iv)	"we will swim for"	nakweereémere	/na+kU+yēreem+Īr+e/

137. Plain MFT Forms Followed by gárána /garána/

Gloss:	<u>gárána</u>	Citation:	UR
a) "we will bite slowly"	nakUrúMí <sup>1</sup> gárána	nakUrúMí	/na+kù+rúm+e/
b) "we will cook slowly"	nakodeéké <sup>1</sup> gárána	nakodeéké	/na+kù+deék+e/
c) "we will cut slowly"	nakUkárágé <sup>1</sup> gárána	nakUkárágé	/na+kù+kárág+e/
d) "we will fill slowly"	nakwiizúrízI <sup>1</sup> gárána	nakwiizúrízI	/na+kù+yízuriz+e/
e) "we will stir for slowly"	nakUçuúkáńÍrI <sup>1</sup> gárána	nakUçuúkáńÍrI	/na+kù+çuúkan+Ír+e/
f) "we will think for slowly"	nakUgánágánÍrI <sup>1</sup> gárána	nakUgánágánÍrI	/na+kù+gánagan+Ír+e/
g) "we will write slowly"	nakUhaándíikI <sup>1</sup> gárána	nakUhaándíikI	/na+kù+hándíik+e/

Let us first consider the data in (135). In the examples in (135), the distinction between H and non-H verbs is neutralized: In the MFT forms with stems containing less than three syllables ("short stems" hereafter), viz. examples (i, ii, iv) of (135a) and (135b), the entire stem is H. In forms with stems containing three or more syllables ("long stems" hereafter), viz., examples (135a iii, v-ix) and (135b iii, v-viii), the stem is H up to the third syllable in all forms except nakUhaándíikI (135a viii), and nakUhaándíikÍrI (135a ix) where the stems are H up to the second syllable. The generalizations just made about the data in (135) apply to the data in (136), except that in the latter the root initial syllable (which resyllabifies with the subject prefix /kU-/) in each form is L-toned on the surface. The surface L tone on the root initial syllable of these forms will be discussed later. Meanwhile, note that like the stems in the forms nakUhaándíikI (135a viii) and nakUhaándíikÍrI (135a ix), the stems in

nakweereéeme (136b iii) and nakweereémere (136b iv) are also H only up to the second stem syllable instead of the third. The following display of the MFT data seen in (135) and (136) summarizes the surface tonal generalizations just made; "-" marks the beginning of the verb stem in each form:

138a. MFT forms with long stems in which

i) the verb stem is H up to the third syllable in the SR:

<u>H-toned Verbs</u>		<u>Non-H Verbs</u>	
nakU-kárágé	(135a iii)	nakU-gúrízĪ	(135b iii)
nakU-çuúkáńé	(135a v)	nakU-yaánZĪrĪ	(135b v)
nakU-kárágĪrI	(135a vi)	nakU-gánágápe	(135b vi)
nakU-çuúkáńÍrI	(135a vii)	nakU-zíizágĪlI	(135b vii)
nakw-izúrízĪrI	(136a ii)*	nakU-gúrízĪrI	(135b viii)
		nakw-lizúrízĪrI	(136b ii)*

ii) the stem is H up to the second syllable in the SR:

<u>H-toned Verb</u>		<u>Non-H Verbs</u>	
nakU-haándíikI	(135a viii)	nakw-eereéeme	(136b iii)*
nakU-haándíikÍrI	(135a ix)	nakw-eereémere	(136b iv)*

138b. MFT forms with short stems: the verb stem is H on all syllables

<u>H-toned Verbs</u>		<u>Non-H Verbs</u>	
nakU-rúMí	(135a i)	nakU-dúyĪ	(135b i)
nako-deéké	(135a ii)	nakU-saámbé	(135b ii)
nakU-ryĪ	(135a iv)	nakU-syĪ	(135b iv)
nakw-ittĪ	(136a i)*	nakw-eeńé	(136b i)*

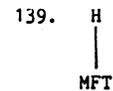
(The surface L tone on the stem initial syllables of the forms with an asterisk will be accounted for later.)

In all the forms presented above, the prefixes are realized L. As established before, the S.P. is L-toned underlyingly. That it surfaces as L is totally predictable. The underlying tonal structure of the MFT prefix /na-/, on the contrary, is unclear: It could be underlyingly toneless and receive the S.P. L as a result of Tone Spread (13). Alternatively, it could be underlyingly L-toned. While there is no direct evidence for or against either hypothesis, data on the Far Past Tense (FPT) to be presented in the next section motivate the hypothesis that the prefix /na-/ is toneless. I will discuss this point in greater detail in the section on the FPT.

As far as the surface tonal patterns exhibited in the verb stems are concerned, in the following paragraphs, I will first provide an analysis which is similar to those of the PCT and IFT and show how this analysis results in a contradiction in the tonal phonology of Llogoori verbs. I will then present an alternative hypothesis which calls for a more idiosyncratic treatment of the MFT but accounts for the widest range of tonal facts about the tense without contradicting the analyses of data of the other tenses.

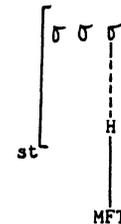
Let us now consider the first hypothesis (or "Hypothesis I").

Considering the data in (135), one may say that the MFT is characterized by a H tone since there is a surface H tone present in the non-H forms (see data in (135b) and (136b)) as well. (The same line of reasoning was followed in the analyses of the IFT and PCT in which the tense H suffixes are inferred also on the basis of the presence of a surface H tone in the non-H forms.) Thus:



Furthermore, based on the surface tonal pattern of the long MFT forms (see (138a i)) alone, the most straightforward analysis seems to be that the MFT H tone in both the H-toned and non-H forms is assigned to the third stem syllable by a rule like the following:

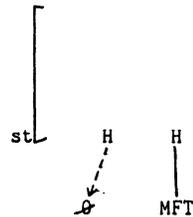
140. Stem H Assignment in the MFT



Note that in both the H-toned and non-H forms, the MFT H tone spreads leftwards to up to and including the root initial syllable. Under this analysis, the fact that the MFT H suffix can spread to the root initial syllable of even the H-toned forms must be due to the deletion of the root H tone:<sup>20</sup>

<sup>20</sup> Other alternative tonal treatments of the root that we have seen before will give an incorrect surface tone melody in the H-toned MFT forms: If the root H were lowered by Root H Lowering (105a), as it is in other tenses with a H tense suffix, one would expect it to block the leftward spread of the MFT H. Or, if the root H is preserved without lowering, then one would expect it to trigger the downstepping of the MFT H.

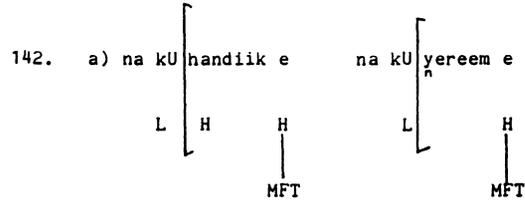
141. Root H Deletion in the MFT



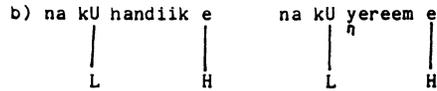
In nakUhaándiikI /ná+kÙ+hándiik+e/ "we will write", nakUhaándiik-IrI /ná+kÙ+hándiik+Ir+e/ "we will write for", nakweereéeme /ná+kÙ+yereem+e/ "we will swim", and nakweereémere /ná+kÙ+yereem+Ir+e/ "we will swim for" (see data in (138a ii)), the stems are H only up to the second syllable instead of the third. Under this analysis, one could say that the root H is first deleted in the H-toned forms nakUhaándiikI and nakUhaándiikIrI by Root H Deletion (141). Then like in the MFT forms in (138a i), the MFT H in each form is assigned to the third stem syllable-- kI and me in nakUhaándiikI/nakUhaándiikIrI and nakweereéeme/nakweereémere respectively. Tone Spread (13) then applies to spread the MFT H leftwards through the entire stem. The fact that the second syllable is long in each of these forms triggers the stem H Dissociation rule (114) which delinks the MFT H from kI and me, causing the stem of each form to be H only up to the second syllable on the surface.

The analysis proposed so far runs into a major problem, however, in accounting for the penultimate falling tones on nakUhaándiikI /ná+kÙ+hándiik+e/ "we will write" (135a viii) and nakweereéeme /ná+kÙ+yereem+e/ "we will swim" (136b iii). To see this, let us look

at the derivations necessary to derive the correct SR of these two forms:



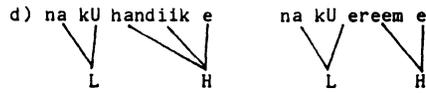
UR



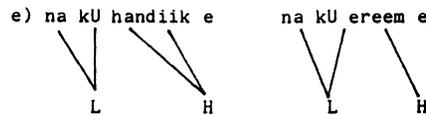
Root H Deletion (141)  
Stem H Assignment (140)  
MTA (3-11)



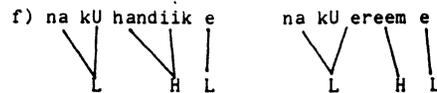
Post-Vocalic y-Deletion (2-8)  
Syllable Fusion (2-128)



Tone Spread (11)



Stem H Dissociation (114)



Final L Insertion (10)



Penultimate Lowering (16)



In the derivations given in (142) above, the surface penultimate falling tone on each form is attributed to Penultimate Lowering (16) (see stage (g)). Such an account is inconsistent with the account for the IFT and PCT data provided before: Earlier in the discussion of the PCT and IFT forms, I have shown that a H-toned penultimate long syllable does not undergo Penultimate Lowering in these tenses. Thus, kUsáambaa (kUsáambaa <---- kUsáambáa <---- kUsaambáa <---- /kU+sám+aa /) "we are burning" and kUrisáamba (kUrisáamba <---- kUrisáamba <---- kUrisaamba <---- /kU+rì+sám+a /) "we will burn" (see derivations in (101) and (127)). The two possible explanations proposed before to account for the inapplicability of Penultimate Lowering (16) in these two tenses are recapitulated as follows:

143a. that Penultimate Lowering (16) applies crucially before Stem H Dissociation (114) such that the output of Stem H Dissociation (114) may not undergo Penultimate Lowering (16);

or,

143b. that grammatical H tones block Penultimate Lowering (16)

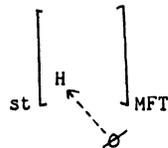
Note here that solution (143a) contradicts the rule ordering requirements in (142) (see stages (142e) to 142g)), and the alternative solution (143b) also makes the incorrect prediction that the MFT H tone--being a tense H suffix--would not undergo Penultimate Lowering (16).

So in sum, either solution proposed to account for the lack of penultimate lowering in the PCT and IFT would incorrectly predict the syllable di in nakUhaándaíki and ree in nakweereéme to be a high level instead of falling tone. There is no simple way to resolve this contradiction under the present analysis of the MFT forms.

Now let us consider an alternative analysis of the MFT data seen in (135) and (136). This hypothesis will be referred to as "Hypothesis II".

Suppose that unlike in the PCT and IFT, the source of the surface H tone in the MFT forms in (135) and (136) is not the morphosyntactic category MFT, but rather, the root, which, if toneless underlyingly, acquires a H tone by a H Insertion Rule stated as follows:

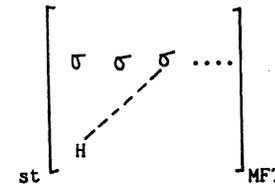
144. MFT H Insertion



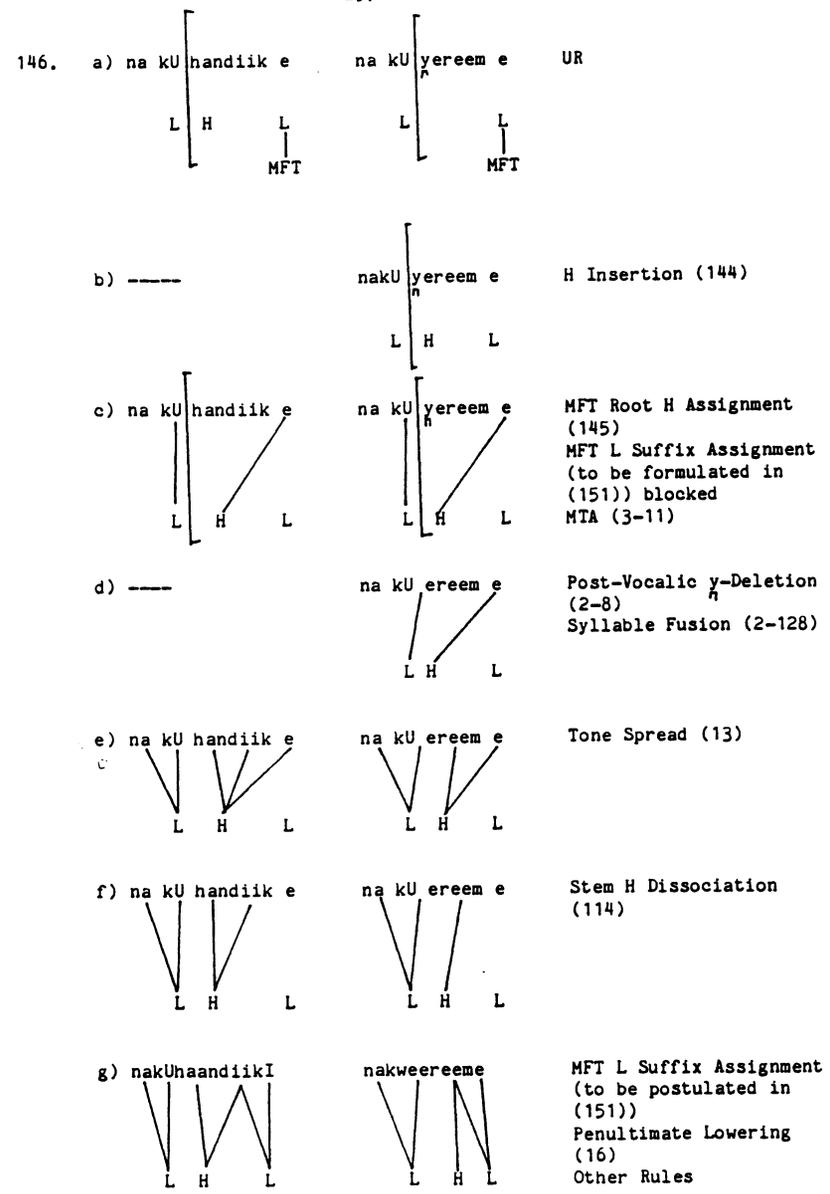
(It should be noted that root H insertion in the MFT is a necessarily different phenomenon than the insertion of a root H to the Type A  $y$ -initial roots in the PT, PCT, IFT, and MPT seen before. I will return to this point later.) The main advantage of Hypothesis II just proposed is that since the H tone is not a grammatical H tone, one can account for the susceptibility of this H tone to Penultimate Lowering (16) in nakUhaándaíki and nakweereéme (as opposed to the PCT and IFT H which blocks Penultimate Lowering (16)) by adopting analysis (143b), viz., that only grammatical H tones block penultimate Lowering (16).

(FPT data to be presented in the next section further confirms the correctness of this analysis.) Under Hypothesis II, there is no need for a Root Stem H Deletion rule like the one in (141), since the root H tone is the surface H in each form. The placement of the root H under this hypothesis is predicted by an ITAR similar to the one in (140). This rule has been presented earlier in (97) and is recapitulated as follows:

145. MFT Root H Assignment (same as Stem H Assignment II (97))

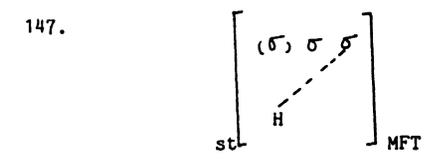


Tone Spread (13) and Stem H Dissociation (114), among other rules, then apply to derive the correct surface form. The derivations of nakUhaándaíki and nakweereéme given below illustrate this hypothesis: (The MFT L suffix given in the derivation below will be motivated later.)



Notice that in (146) above, the MFT L suffix is first blocked from linking to the F.V. (see stage (c)), but then assigned at a later stage (see stage (g)) once the F.V. is freed by Stem H Dissociation (114) (see stage (f)). Such an analysis suggests that the surface final L tone in nakUhaandiikI and nakweereeme is the MFT L, not the phrase final L tone. Motivation for such an analysis will be presented shortly.

Concerning the MFT forms with short stems (see data under (138b)), since the stems of these forms have less than three syllables, MFT Root H Assignment (145) as stated will not be applicable. One possible way to accommodate these short MFT forms is to reformulate the MFT Root H Assignment Rule as follows:



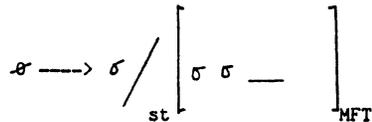
The major problem of treating root H assignment as a unitary process predicted by rule (147) in both the long and short forms is that Stem H Dissociation applies in only the long forms but not the short forms: Consider the surface tonal pattern of nakUsaambe /na+kU+samb+e/. By rule (147), the root H is assigned to the second stem syllable mbe, which spreads leftwards to the long stem initial syllable saa. At this stage of derivation, the SD of Stem H Dissociation (114) is met. One would then expect the root H to be dissociated

from mbe, just the way it dissociates from the third stem syllable kI of nakUhaandiikI (see the derivation of nakUhaandiikI in (146)). Such a derivation would parallel that in the PCT or IFT forms with -CVVCV stems which undergo Stem H Dissociation (114) as the tense H Suffix is assigned to the second stem syllable:

148. kUsáamba ← kUsáambá ... ← /kú+sámb+aa / "We are burning"  
 kUrisáamba ← kUrisáambá ... ← /kú+ri+sámb+a / "We will burn"

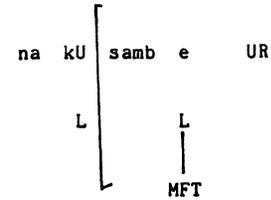
An alternative analysis assumes that the speaker uses Stem H Assignment rule (145) in both the long and short forms, with the short forms being reanalyzed as having three syllables in the stem prior to tone assignment. Such a reanalysis is due to a syllable insertion rule stated as follows:

149. Empty Syllable Insertion

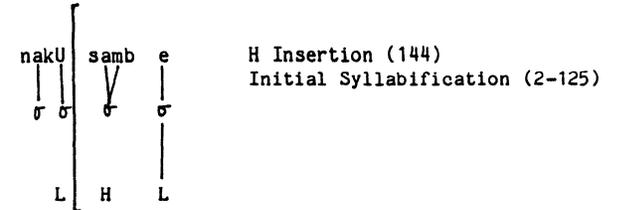


With this "empty syllable" (i.e. a syllable node that is linked to no segmental elements), one can account for the inapplicability of Stem H Dissociation (114) in a form like nakUsáambe, as the following partial derivation of the form illustrates:

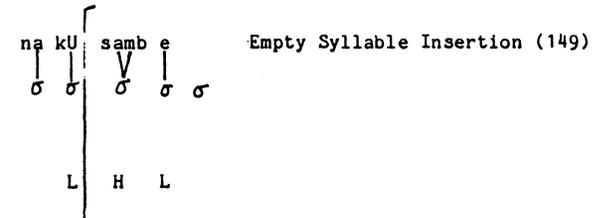
150. a)



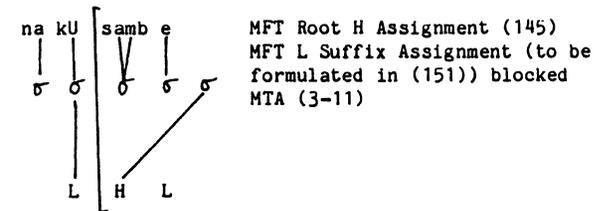
b)



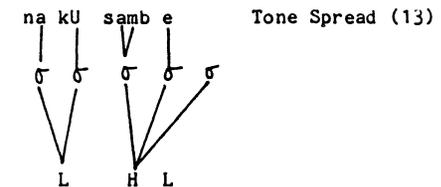
c)



d)



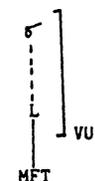
e)



f)

Stem H Dissociation (114) N/A

151. MFT L Assignment



VU = Verb Unit

As one can see from the partial derivation above, Empty Syllable Insertion (149) alters the autosegmental structure of nakUsáambé such that after tone assignment and Tone Spread (13), the structural description of Stem H Dissociation (114) is not met (see stage (e)). The latter is therefore not applicable (see stage (f)).<sup>21</sup>

Data in (137) show that the MFT is characterized also by a L tone suffix: In examples (137d) to (137g), the syllable sequence after the Root H in each form is realized lower than the initial H tone of the adverb gáráhá, suggesting that this sequence of syllable(s) is L-toned. Based on the SR of these long MFT forms, the following rule can be formulated to account for the assignment of the MFT L tone:

Having established a L suffix for the MFT, the question arises as to whether the final falling tones in the MFT forms with three stem syllables is made up of the root H and the phrase final L tone or the MFT L tone assigned to the same syllable. There are at least two reasons to analyze the final L in these forms as the phrase final L instead of the MFT L. Firstly, considering the contextual forms of these verbs (c.f. example (137c)), the word final syllable is realized H level. If the final L of these verbs in citation is the phrase final L, the absence of this L tone in non-final position is totally predictable. No further explanation is needed. On the contrary, if the verb final L tone in citation is analyzed as the MFT L, one must postulate a rule that deletes the final L tone assigned by (151) in non-final position just in case that this L tone is preceded by a tautosyllabic H tone. This is an additional rule of the tonal grammar of Llogoori that does not have any independent motivation. Furthermore, this latter analysis implies that a tautosyllabic sequence of morphological H and L tones surfaces as a falling tone (since in citation, nakUkárágé has a final falling tone). This prediction contradicts the data in the FPT to be shown later in which a tautosyllabic sequence of lexical/grammatical H and L tones changes to L in the SR.

-----  
<sup>21</sup> While the idea of introducing an "empty" syllable node an autosegmental display may seem novel, the presence of other kinds of empty prosodic elements like the C unit, for instance, has been argued for in Turkish and Finnish (Clements and Keyser 1983). Other independent evidence for the notion of empty syllable node within Llogoori itself would of course strengthen the claim of a rule like (149). But such evidence may have to await further research on the language to provide.

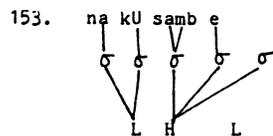
Having shown why it is better to analyze the final falling tones in the MFT forms with three stem syllables as consisting of the lexical H and phrase final L tones, one must explain why the MFT L tone is not realized in these forms. This can be easily accounted for with an assumption stated earlier in the introduction of Chapter 3, viz., that morphological tones can be assigned only to free syllables in Llogoori. By assuming that morphological tones can be assigned to free or unbound syllables only, if MFT Root H Assignment (145) is ordered before MFT L Suffix Assignment (151), one can then explain why in verbs with three syllables, the final syllable cannot be assigned the MFT L suffix, since in these forms, the stem final syllable would be first assigned the root H by (145) and not be available for the MFT L suffix. The MFT L suffix might be assigned at a later stage of derivation, however, should the verb final syllable be freed from the root H by another rule, e.g., Stem H Dissociation (114). To see this, let us consider the derivation of nakUhaáandíikI in (146) again. In this form, MFT L Suffix Assignment (151) is first blocked in stage (146c), and then applies in (146g) after Stem H Dissociation (114) has freed the verb final syllable (see (146f)). What this analysis implies is that the surface final L in the form nakUhaáandíikI is the MFT L suffix, not the phrase final L. The motivation for such an analysis comes from the surface tone melody of nakUhaáandíikI in the "\_\_\_\_\_ gáráha" context where the verb final syllable kI is realized with a L tone (see (137g)):

152. "we will write slowly" nakUhaáandíikI gáráha [ - - - - - ]

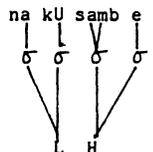
If kI were linked to the phrase final L in citation--which would follow if kI is not linked to any lexical/grammatical tone, one would expect it to receive the H of gáráha in the "\_\_\_\_\_ gáráha" context, thus producing an incorrect surface form \*nakUhaáandíikI gáráha.

The analysis of the surface final L tone in the MFT forms proposed above can be summarized as follows: a) the final L tone that constitutes a falling tone " ^ " in an MFT form is the phrase final L tone, since this L tone does not surface when followed by another H-toned sequence, e.g. gáráha; b) the final L tone that is associated singly (that is, preceded by no tautosyllabic H) to the final syllable is the MFT L suffix, since such a L tone surfaces in the "\_\_\_\_\_ gáráha" context.

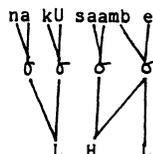
Another interesting question to ask is what happens to the MFT L suffix in the SR in cases where it cannot be assigned in the course of the derivation. As suggested in the section on the Near Future Tense (c.f. section 4.2) before, prosodic elements that cannot be linked to any segmental elements are deleted from the display altogether. By this principle, the empty syllable node as well as the final L tone in stage (e) of the derivation given for nakUsaámbe in (150) are deleted. The derivation of the form continues from (150) as follows:



last stage of (150)



Deletion of floating prosodic elements



Final L Insertion (10)  
Other Rules

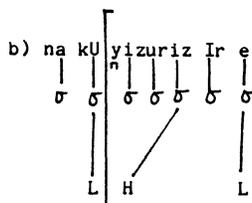
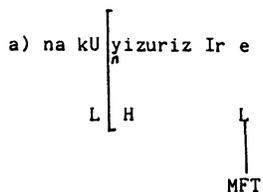
It should be emphasized at this point that the deletion of floating prosodic elements is a very late process which occurs after many other tone rules including Verb Final H Deletion (80). Let us take nako-dééké /ná+kù+deék+e` / "we will cook" (137b) as an example. In the "\_\_\_\_ gáráha" context, nakodééké causes the adverb to be downstepped:

154. "we will cook slowly"      nakodééké <sup>!</sup>gáráha    [ - - - - - ]

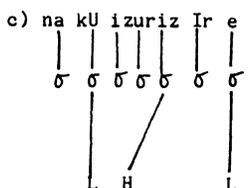
Should the deletion of the MFT L occur before Verb Final H Deletion (80), the root H would have become the last H tone of the verb unit and be subject to deletion by the latter rule (i.e. Verb Final H Deletion (80)), thus deriving an incorrect surface form \*nakodééké gáráha.

MFT forms with type A  $y_n$ -initial roots deserve further comment. Based on what has been established so far, the most straightforward analysis to correctly derive the surface L tone on the 1st stem syllable of these forms seems to be to order Syllable Fusion (2-128) crucially before Tone Spread (13), since the reversed ordering of the two rules will derive a H instead of L on the stem initial syllable. Take the derivation of nakwiizúrízIrI /ná+kù+yízuriz+Ír+e` / "we will fill for" as an example:

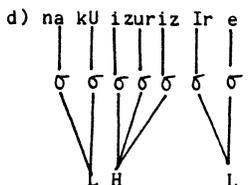
155. Derivation of nakwiizurizIrI following the rule ordering  
Tone Spread (13) -- Syllable Fusion (2-128)



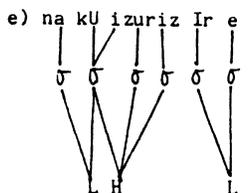
Initial Syllabification  
(2-125)  
MFT Root H Assignment (145)  
MFT L Suffix Assignment (151)  
MTA (3-11)



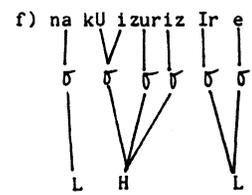
Post-Vocalic y-Deletion (2-8)



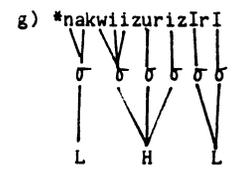
Tone Spread (13)



Syllable Fusion (2-128)



Rising Tone Simplification  
(49)

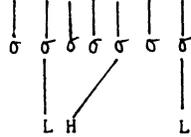


Other Rules

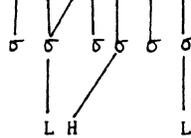
In (155) above, by ordering Tone Spread (13) before Syllable Fusion (2-128), the Root H is allowed to spread to the root initial syllable (stage (155d)) which subsequently resyllabifies with the L-toned subject prefix to constitute a single syllable kUi with a rising tone (see stage (155e)). By Rising Tone Simplification (49), this rising tone would surface as a H tone, thus resulting in an incorrect surface tone on the syllable kwii in this form.

If Syllable Fusion (2-128) applies before Tone Spread (13), however, the toneless root initial syllable of stage (155c) resyllabifies with the L-toned subject prefix first and is then blocked from the leftward spreading of the MFT H. Under this analysis, the derivation of nakwiizurizIrI would proceed from stage (155c) as follows:

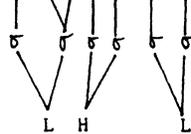
156. a) na kU izUriz Ir e stage (155c)



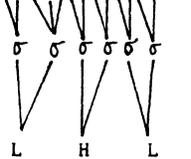
b) na kU izuriz Ir e Syllable Fusion (2-128)



c) na kU izuriz Ir e Tone Spread (13)



d) nakwiizurizIrI Other Rules



While the Syllable Fusion (2-128) -- Tone Spread (13) ordering succeeds in accounting for the surface L tone on the stem initial syllables of the plain MFT forms with Type A roots, it contradicts the data on the FPT to be presented later which calls for precisely the opposite ordering of the two rules. I will return to this paradox of rule ordering in the section on the FPT, and show how this contradiction can be avoided by postulating an independent tonal simplification rule (different from Rising Tone Simplification (49)).

4.10.2 Middle Future Tense Forms with Object Prefix

157a. H-toned Verbs

- i) "we will bite it"      nakUkIr<sup>u</sup>mI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+r<sup>u</sup>m+e ` /
- ii) "we will cook it"      nakUkedee<sup>e</sup>ke      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+deek+e ` /
- iii) "we will cut it"      nakUkIk<sup>a</sup>rage      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+k<sup>a</sup>rag+e ` /
- iv) "we will eat it"      nakUkIry<sup>i</sup>I      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+r<sup>i</sup>I+e ` /
- v) "we will stir it"      nakUkIcu<sup>u</sup>kap<sup>e</sup>      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+cu<sup>u</sup>kap+e ` /

157b. Non-H Verbs

- i) "we will hit it"      nakUkId<sup>u</sup>y<sup>i</sup>I      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+du<sup>u</sup>y+e ` /
- ii) "we will burn it"      nakUkIs<sup>a</sup>ambe      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+s<sup>a</sup>mb+e ` /
- iii) "we will sell it"      nakUkIg<sup>u</sup>rizI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+g<sup>u</sup>riz+e ` /
- iv) "we will grind it"      nakUkIsy<sup>i</sup>I      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+s<sup>i</sup>le+e ` /
- v) "we will love for it"      nakUkIya<sup>a</sup>anzIrI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>a</sup>anz+Ir+e ` /
- vi) "we will bury it"      nakUkIya<sup>v</sup>IrI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>a</sup>vIr+e ` /

158. MFT Forms with O.P. That Have Type A y-initial Roots

a) H-toned Verbs

- i) "we will kill it"      nakUci<sup>i</sup>tI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>i</sup>it+e ` /
- ii) "we will fill it"      nakUci<sup>i</sup>zurizI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>i</sup>zuriz+e ` /

b) Non-H Verbs

- i) "we will want it"      nakUce<sup>e</sup>ne      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>e</sup>ne+e ` /
- ii) "we will remember it"      nakUci<sup>i</sup>zurizI      /n<sup>o</sup>a+k<sup>u</sup>U+k<sup>i</sup>I+y<sup>i</sup>zuriz+e ` /

159. MFT Forms with O.P. followed by gárána:

a) H-toned Verb

- i) "we will bite it slowly" nakUkIrúMI gárána /ná+kù+kí+rúM+e \ /
- ii) "we will cook it slowly" nakUkedééke gárána /ná+kù+kí+deék+e \ /
- iii) "we will cut it slowly" nakUkIkárage gárána /ná+kù+kí+kárag+e \ /
- iv) "we will kill it slowly" nakUčíítI gárána /ná+kù+kí+ít+e \ /
- v) "we will eat it slowly" nakUkIryí gárána /ná+kù+kí+rí+e \ /

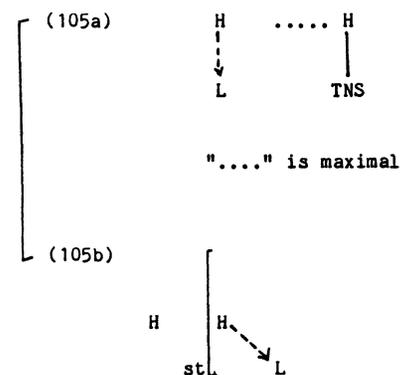
b) Non-H Verb

- i) "we will hit it slowly" nakUkIdúyí gárána /ná+kù+kí+duy+e \ /
- ii) "we will burn it slowly" nakUkIsáambe gárána /ná+kù+kí+sámb+e \ /
- iii) "we will sell it slowly" nakUkIgúrizí gárána /ná+kù+kí+gúriz+e \ /
- iv) "we will want it slowly" nakUcééne gárána /ná+kù+kí+yéñ+e \ /
- v) "we will grind it slowly" nakUkIsyí gárána /ná+kù+kí+síe+e \ /

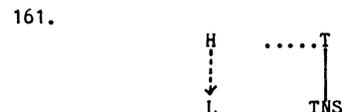
In both the H-toned and toneless MFT forms in (157) above, the prefixes are L on the surface. The tonal distinction between the two tone classes, however, surfaces in the stems: In each H-toned form, the stem is H on the first syllable, and L thereafter. In the non-H forms, on the other hand, with the exception of nakUkIsáambe /ná+kù+kí+sámb+e \ / (157b ii) and nakUkIyaanzIrí /ná+kù+kí+yáanz+ír+e \ / (157b v), the stems of all forms are H up to the second syllable.

The surface L tone on the O.P. is not predictable by the set of H tone lowering rules established in (105) before. These rules are recapitulated below:

160. H Tone Lowering Rules Recapitulated:



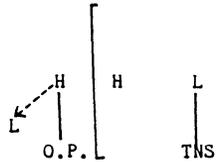
The H Lowering Rule (105a) is not applicable in the MFT since the MFT suffix is L, not H. (105b), on the other hand, is applicable but makes the wrong predictions that the O.P. H would stay H whereas the root H would change to L in the SR. At first glance, a simple way to account for the surface L on the O.P. would be to reformulate (105a) as follows:



(161) makes incorrect predictions, however, about the plain MFT forms seen before in which the root H does not change to L in the SR (c.f. derivations in (146)). The FPT data to be presented in the next section further contradict a rule like (161). Based on these observa-

tions, a rule like the following is postulated to account for the MFT data at hand (as well as the FPT data to be seen later):

162. O.P. H Lowering



Note that O.P. H Lowering Rule (162) must have precedence over H Lowering (105b). Furthermore, it must apply crucially after H Insertion (144) in order to account for the fact that the O.P. H lowers in both the underlyingly H-toned and toneless MFT forms.

The surface L tone on the subject prefix is predictable, since it is underlyingly L-toned. This L tone spreads leftwards to the toneless tense prefix /nã-/.

The surface tonal patterns of the stems are interesting: unlike the plain MFT forms in which the tonal contrast between the underlyingly H and non-H verbs is neutralized in the SR, the MFT forms with O.P. manifest such a distinction in the stems. Note that the root H tone in the MFT with O.P. falls on different verb syllables than that in the plain MFT forms: Generally speaking, in the H-toned MFT forms with O.P., only the stem initial syllable is H, and in the non-H forms with O.P., the first two stem syllables are H. In the plain forms, on the other hand, the first three stem syllables are H. In view of these observations, a satisfactory analysis of the MFT forms with O.P. must be able to account for the three-way surface tonal contrast among

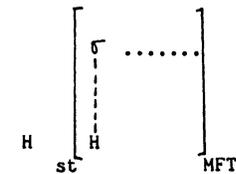
the plain MFT forms, the H-toned MFT forms with O.P., and the toneless MFT forms with O.P.

The source of the three-way tonal distinction just mentioned lies in the placements of the Root H: In the plain MFT forms, the root H is assigned to the third stem syllable by (145). In the MFT forms with O.P., the root H is assigned to the first stem syllable in the H-toned forms, and the second stem syllable in the toneless forms.

Let's say that the ITAR that assigns the root H of the underlyingly H-toned MFT forms with O.P. is "H<sub>1</sub>" and the one that assigns the acquired root H of the underlyingly toneless MFT form with O.P. "H<sub>2</sub>". To account for the different placements of the root H in the two tone classes, one must assume that H<sub>1</sub> is crucially ordered before H Insertion (144). This is because once H Insertion (144) applies, the underlyingly toneless forms will have the same tonal structure as the H-toned forms. If H<sub>1</sub> applies after the underlying tonal distinction between the two groups is neutralized, H<sub>1</sub> would apply to both tone classes, not only the underlyingly H-toned forms.

Suppose that the H-toned MFT forms with O.P. is assigned by a rule stated as follows:

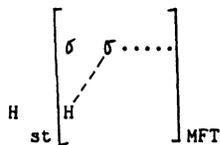
163. Root H assignment in the H-toned MFT forms with O.P.



Note that rule (163) has as part of its SD the O.P. H tone (the H preceding the root bracket). This specification serves to distinguish the SD of (163) from that of (145). Then, by ordering (163) before (145), one can account for the different placements of the root H in the H-toned MFT forms with O.P. and the plain MFT forms.<sup>22</sup> Furthermore, as mentioned before, (163) should be ordered crucially before H Insertion (144) such that the non-H MFT forms with underlyingly toneless stems will not undergo (163) after they have acquired the root H.

To account for the placement of the acquired root H of the toneless MFT forms with O.P., the following rule is postulated:

164. H Assignment in the Toneless MFT Forms with O.P.



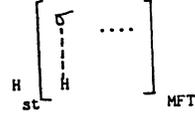
Note that as far as the SD is concerned, (164) and (163) are identical. The difference is in the Structural Change (SC). To ensure that (163) affects only the H-toned forms with O.P. and (164) the toneless forms, (164) is ordered after H Insertion (144). The fact that nakUk-Isaambe /nā+kŪ+kÍ+sāmb+e ` / and nakUkIyaanzIrI /nā+kŪ+kÍ+yānz+Ir+e ` / are H only on the first stem syllable can be easily accounted for by Stem H Dissociation (114) which delinks the root H from the second stem syllable of each form. Note also that like (163), (164) is also

<sup>22</sup> Such a rule ordering is in fact implied by other rule ordering relations (see the summary of rule orderings in (165) below).

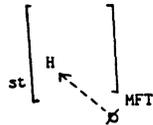
ordered before (145) to make sure that the toneless MFT forms with O.P. do not undergo (145).

The rules and their correct ordering as required by the MFT data analyzed so far can be summarized as follows:

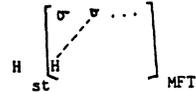
165. (163) MFT Root H Assignment in the H-toned MFT Forms with O.P.



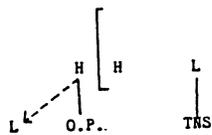
(144) H Insertion



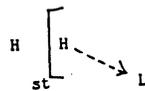
(164) Root H Assignment in the Toneless MFT Forms with O.P.



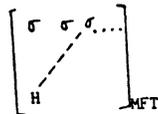
(162) O.P. H Lowering



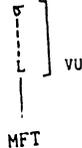
(105b) Root H Lowering



(145) Root H Assignment in Plain MFT forms  
(same as Stem H Assignment II (97))

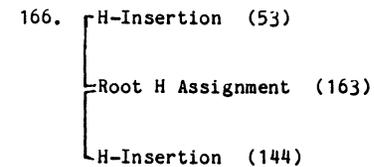


(151) MFT L Assignment



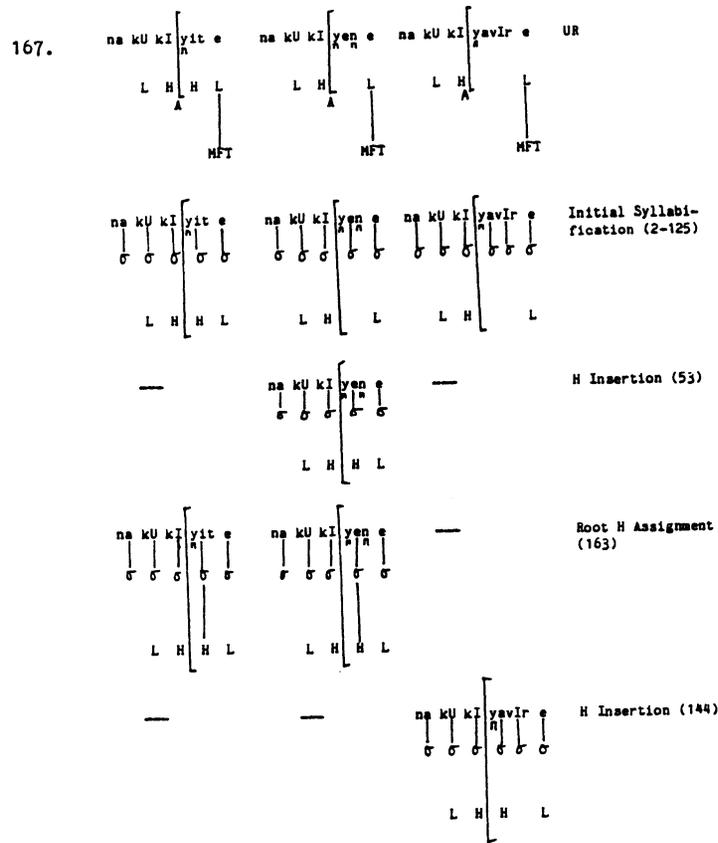
Earlier in the discussion of the plain MFT forms, I pointed out that the process of Root H Insertion in the MFT (c.f. (144)) is a different process than Root H Insertion in the toneless type A  $y_n$ -initial roots in selected tenses (c.f. rule (53)). The forms in (158) illustrate this point.

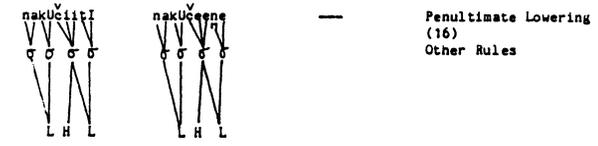
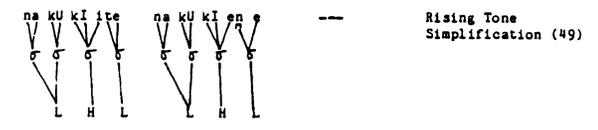
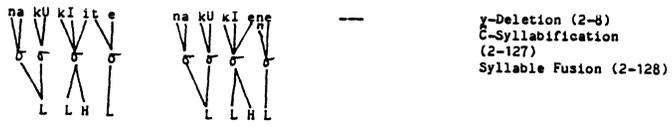
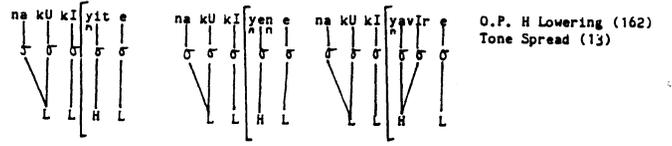
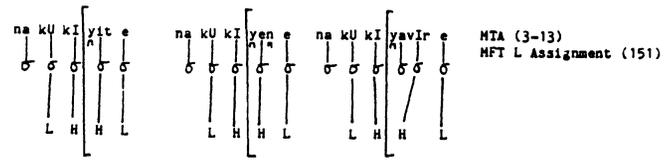
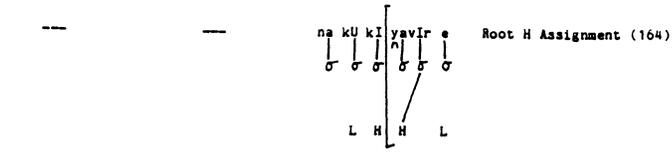
In (158), the underlyingly tonal distinction between the toneless and H-toned MFT forms is neutralized. The surface tonal pattern of the toneless forms is predictable under the analysis provided for the H-toned MFT forms with O.P.. Notice that only toneless Type A  $y_n$ -initial roots undergo Root H Assignment (161), and not toneless forms of any other root type. This shows that: a) H Insertion (53) must have applied before Root H Assignment (163) such that the acquired H tone of the Type A  $y_n$ -initial roots (by (53)) may undergo (163); b) H Insertion (144) must be ordered after Root H Assignment (163) (as established before) to block the other toneless MFT forms (with non-Type A roots) from undergoing (163). Thus:



In view of the rule ordering relations shown in (166) above, the two Root H Insertion rules must be treated as two independent processes

and may not be collapsed as one. The derivations of nakU<sup>o</sup>ciitI /na<sup>o</sup>+kU<sup>o</sup>+kI<sup>o</sup>+yit+e` / "we will kill it", nakU<sup>o</sup>ceene /na<sup>o</sup>+kU<sup>o</sup>+kI<sup>o</sup>+yen+e` / "we will want it", and nakUkIyavIrI /na<sup>o</sup>+kU<sup>o</sup>+kI<sup>o</sup>+yavIr+e` / "we will bury it" illustrate the rule orderings just discussed:





4.11 FAR PAST TENSE4.11.1 Far Past Tense Forms without Object Prefix

The Far Past Tense (FPT) in Llogoori consists of the subject prefix, the tense marker /-aa-/, the root, and the final vowel /-a /:

S.P. + aa + R + a.

168a. H-toned Verbs

i)	"I bit"	ndaárÚma	/N̄+aa+rÚm+a/
	"we bit"	kwaárÚma	/kÚ+aa+rÚm+a/
	"You (sg.) bit"	waárÚma	/Ū+aa+rÚm+a/
	"You (pl.) bit"	mwaárÚma	/mŪ+aa+rÚm+a/
	"He bit"	yaárÚma	/à+aa+rÚm+a/
	"They bit"	vaárÚma	/vâ+aa+rÚm+a/
ii)	"we cooked"	kwaádéeka	/kÚ+aa+déek+a/
iii)	"we cut"	kwaákáraga	/kÚ+aa+kárag+a/
iv)	"we killed"	kwiíta	/kÚ+aa+yít+a/
v)	"we ate"	kwaárya	/kÚ+aa+rÍ+a/

168b. Non-H verbs

i)	"we hit"	kwaádúya	/kÚ+aa+dúy+a/
ii)	"we burnt"	kwaásáamba	/kÚ+aa+sáamb+a/
iii)	"we sold"	kwaágúriza	/kÚ+aa+gúríz+a/
iv)	"we wanted"	kweéna	/kÚ+aa+yéñ+a/
v)	"we ground"	kwaásya	/kÚ+aa+síe+a/

169. FPT Forms Followed by gáráhaa) H-toned Verbs

i)	"we bit slowly"	kwaárÚma gáráha	/kÚ+aa+rÚm+a/
ii)	"we cooked slowly"	kwaádéeka gáráha	/kÚ+aa+déek+a/
iii)	"we cut slowly"	kwaákáraga gáráha	/kÚ+aa+kárag+a/
iv)	"we killed slowly"	kwiíta gáráha	/kÚ+aa+yít+a/
v)	"we ate slowly"	kwaárya gáráha	/kÚ+aa+rÍ+a/

b) Non-H Verbs

i)	"we hit slowly"	kwaádúya gáráha	/kÚ+aa+dúy+a/
ii)	"we burnt slowly"	kwaásáamba gáráha	/kÚ+aa+sáamb+a/
iii)	"we sold slowly"	kwaágúriza gáráha	/kÚ+aa+gúríz+a/
iv)	"we wanted slowly"	kweéna gáráha	/kÚ+aa+yéñ+a/
v)	"we ground slowly"	kwaásya gáráha	/kÚ+aa+síe+a/

In all forms above, the distinction between H and non-H verbs is neutralized: In both the citation forms in (168) and contextual forms in (169), all verbs have a surface H tone up to the first stem syllable, and L thereafter.

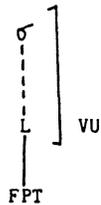
The surface tonal realization of the FPT forms in (169) shows that all syllables after the stem initial syllable are linked to a L tone since the adverb H is blocked from spreading across these syllables. To account for the source of this L tone, it is proposed that the FPT is characterized by a L tonal suffix:

170.



Furthermore, this FPT L tone is assigned to the verb final syllable by the following rule:

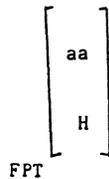
171. FPT L Suffix Assignment



This L tone spreads leftwards to any preceding free syllables, causing these syllables to have a surface L tone.

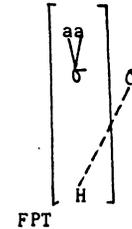
Besides a L tonal suffix, the FPT is characterized also by a H tone, since non-H FPT forms also have a surface H tone (see data in (168b) and (169b)). Suppose that the FPT tense prefix /aa-/ is H-toned, its morphological properties can be expressed as follows:

172.



This H tone is assigned to the syllable following /aa-/ by a rule like the following:

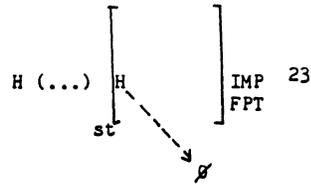
173. FPT H Assignment



Only subsequently does the FPT H spread leftwards back onto the FPT prefix /-aa-/.

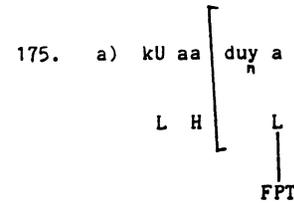
Having established that the FPT prefix is H-toned, one expects that in the UR of a H-toned FPT form, there are two H tones: the FPT H and the root H. But based on the data in (168a) and (169a), one can see that the root H tone does not surface in these forms: there is only one H tone in the SR of each form, and as established before, this H tone is the FPT H prefix. So suppose that as in the imperatives with O.P. (c.f. section 4.6.2), the root H deletes in the FPT also. The deletion of the root H in the FPT can be accounted for by revising H Deletion (85) postulated for the imperatives before:

174. H Deletion (Final Version)

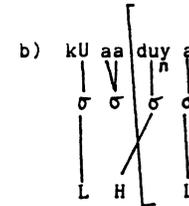


Earlier in my discussion of the MFT, I showed how one can account for the stem initial H in a plain MFT form like nakwiizúrízIri /ná+kù+yízuriz+ír+e\ 'we will fill for' by ordering Syllable Fusion (2-128) before Tone Spread (13) (c.f. derivations in (155) and (156)). I also pointed out, however, that this rule ordering is contradicted by the FPT data. To see this, consider the derivation of kwaádúya /kù+áá+dúy+a\ 'we hit':

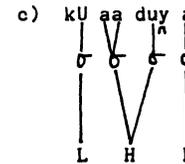
<sup>23</sup> At first glance, the optional contextual element "... in the SD of (174) seems superfluous. I will account for its crucial presence in the next section (4.11.2). (c.f. footnote (26))



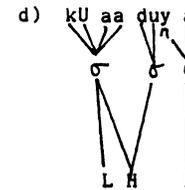
UR



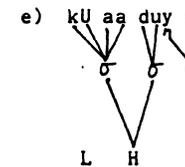
Initial Syllabification (2-125)  
FPT L Assignment (171)  
FPT H Assignment (173)  
MTA (3-11)



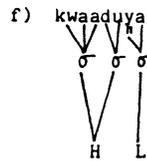
Tone Spread (13)



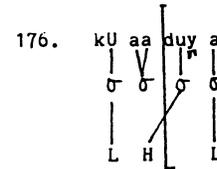
C-Syllabification (2-127)  
Syllable Fusion (2-128)



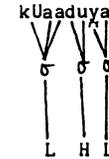
Rising Tone Simplification (49)



Other Rules



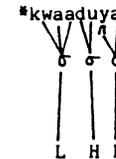
Stage (b) in (175)



Syllable Fusion (2-128)

---

Tone Spread N/A

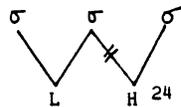


Other Rules

Crucial in the derivation above is the ordering of Tone Spread (13) before Syllable Fusion (2-128). Such an ordering ensures that the verb initial syllable in stage (d) is linked to both a L and H tone and thus subject to Rising Tone Simplification (49) in stage (e). Should Syllable Fusion (2-128) be ordered before Tone Spread (13), the verb initial syllable kwa would have been realized with a L tone:

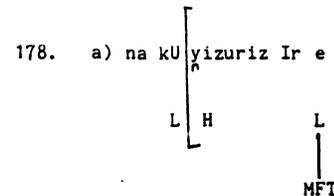
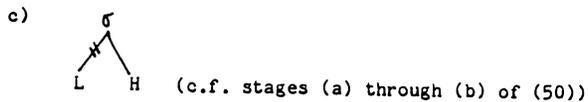
To resolve this rule ordering paradox, I maintain that Tone Spread (13) -- Syllable Fusion (2-128) is the correct ordering, and that there is an independent tonal simplification rule that accounts for the MFT data. This rule is stated as follows:

177. Trisyllabic Tone Absorption

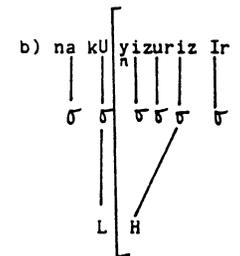


Furthermore, this rule is ordered crucially before Rising Tone Simplification (49) so that it bleeds the latter. With rule (177), the derivation of the MFT form nakwiizurírIrI /ná+kU+yízuriz+Ir+e` / "we will fill for" is as follows:

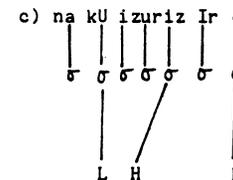
<sup>24</sup> So far, we have already seen that Rising Tone Simplification (49) applies in all three of the configurations shown below:



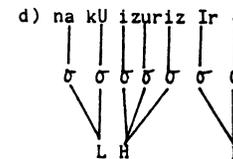
UR



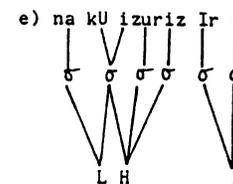
Initial Syllabification (2-125)  
MFT Root H Assignment (145)  
MFT L Suffix Assignment (151)  
MTA (3-11)



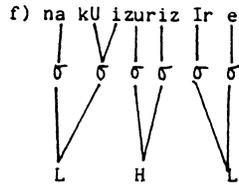
Post-Vocalic y-Deletion (2-8)



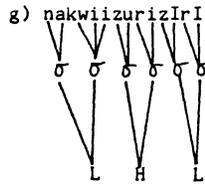
Tone Spread (13)



Syllable Fusion (2-128)

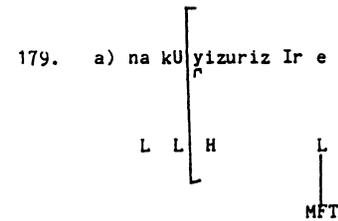


Trisyllabic Tone Absorption (177)



Other Rules

Earlier in my analysis of the MFT in 4.10, I pointed out that there is no direct evidence for postulating the MFT prefix /na-/ as being underlyingly L-toned or toneless. In the derivation given in (178), however, the underlyingly toneless status of /na-/ is crucial: Should /na-/ be underlyingly L-toned, the SD of Trisyllabic Tone Absorption (177) would have never been met. To see this, let us consider the derivation of nakwiizurizIrI as though /na-/ is underlyingly L-toned:



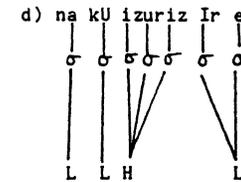
UR



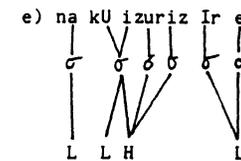
Initial Syllabification (2-125)  
MFT Root H Assignment (145)  
MFT L Suffix Assignment (151)  
MTA (3-11)



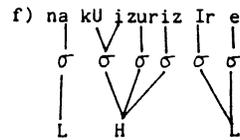
Post-Vocalic y-Deletion (2-8)



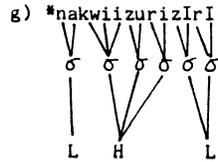
Tone Spread (13)



Syllable Fusion (2-128)



Trisyllabic Tone Absorption  
N/A  
Rising Tone Simplification  
(49)

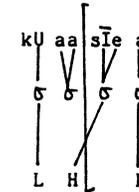
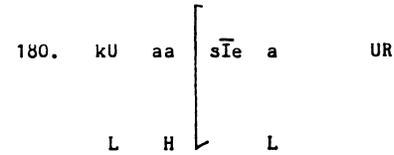


Other Rules

As one can see from the derivation given in (179) above, the SD of (177) is not met at stage (e), and thus the rule does not apply at stage (f). (In fact, the tonal configuration of the contour tone at stage (e) is the same as the one mentioned in a) of footnote (24).) As a result, Rising Tone Simplification (49) applies instead, thus deriving the incorrect surface form \*nakwiizurizIrI.

So in sum, the analysis of the tonal simplification processes in Llogoori proposed so far motivates the hypothesis that the MFT prefix /na-/ is toneless.

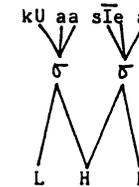
The derivation of the Plain FPT forms with CV(V) roots deserves comment (see examples (168a v) and (168b v)). On the surface, the final syllable of each of these verbs has a L tone. At an intermediate stage of derivation, however, this syllable is linked to a sequence of H and L tones. Consider the partial derivation of kwaásya /kU+aa+sIē+a / "we ground" in the following:



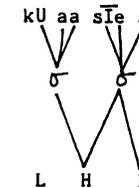
Initial Syllabification (2-125)  
FPT L Assignment (171)  
FPT H Assignment (173)  
MTA (3-11)



Tone Spread (13)



Syllable Fusion (2-128)



Rising Tone Simplification (49)

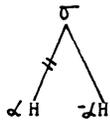
At the last stage of derivation in (180), the verb final syllable is linked to both a H and L tone. The fact that this syllable has a surface L shows that a tautosyllabic sequence of H and L tones changes to L:

181.



Rule (181) just postulated can in fact be collapsed with Rising Tone Simplification (49) as follows:

182. Contour Tone Levelling



Of course, Contour Tone Levelling (182) must be ordered after Trisyllabic Tone Absorption (177), and before Final L Insertion (10) and Penultimate Lowering (16) such that falling tones that results from the two rules are not simplified to a surface L tone.

Finally, in my account of the penultimate lowering falling tone on the MFT forms like nakUkIsaambe / $\overset{\circ}{n}\overset{\circ}{a}+k\overset{\circ}{U}+k\overset{\circ}{I}+samb+e$  / "we will burn it", nakUhaandiikI / $\overset{\circ}{n}\overset{\circ}{a}+k\overset{\circ}{U}+handiik+e$  / "we will write", and nakweer-eme / $\overset{\circ}{n}\overset{\circ}{a}+k\overset{\circ}{U}+yereem+e$  / "we will swim", I adopted the crucial hypothesis that only grammatical H tones fail to undergo Penultimate Lowering (16) (c.f. discussion in section (4.10.1)). (That means, a H tone linked to a penultimate long syllable does not surface as a HL just in case that this H tone characterizes an affix.) This hypothesis is born out in the FPT data: the FPT H prefix, as a grammatical tone marking the FPT, does not undergo Penultimate Lowering (16).

(Thus, kwaadeeka / $k\overset{\circ}{U}+aa+deek+a$  / "we cooked", kwiita / $k\overset{\circ}{U}+aa+yit+a$  / "we killed", kwaasaamba / $k\overset{\circ}{U}+aa+samb+a$  / "we burnt", and kwéena / $k\overset{\circ}{U}+aa+yen+a$  /, but not \*kwaadeeka, \*kwiita, \*kwaasaamba, and \*kwéena.)

4.11.2 Far Past Tense Forms with Object Prefix

183a. H-toned Verbs

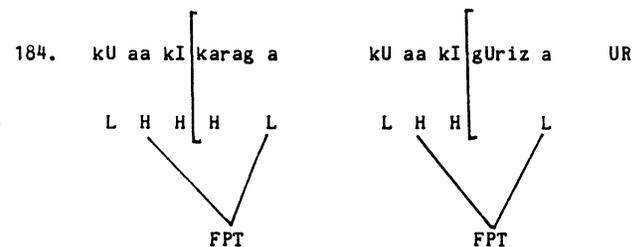
i)	"we bit it"	kwaakÍrUma	/kÙ+aa+kÍ+rÚm+a ` /
ii)	"we cooked it"	kwaakédeeka	/kÙ+aa+kÍ+deek+a ` /
iii)	"we cut it"	kwaakÍkaraga	/kÙ+aa+kÍ+kárag+a ` /
iv)	"we killed it"	kwaacíita	/kÙ+aa+kÍ+yít+a ` /
v)	"we ate it"	kwaakÍrya	/kÙ+aa+kÍ+rÍ+a ` /

183b. non-H Verbs

i)	"we hit it"	kwaakÍdúya	/kÙ+aa+kÍ+dúy+a ` /
ii)	"we burnt it"	kwaakÍsaamba	/kÙ+aa+kÍ+sámb+a ` /
iii)	"we sold it"	kwaakÍgúrizá	/kÙ+aa+kÍ+gúriz+a ` /
iv)	"we wanted it"	kwaacéena	/kÙ+aa+kÍ+yéñ+a ` /
v)	"we ground it"	kwaakÍsya	/kÙ+aa+kÍ+sÍe+a ` /

Disregarding (183a iv-v) and (183b iv-v) for the moment, in the data in (183) above, H-toned verbs and non-H verbs have distinctive surface tonal patterns: H-toned forms are H up to the object prefix and L thereafter, whereas the non-H forms all have a H tone on the prefixes, and a !H L melody on the stem. The surface H tone on the prefixes of both the H-toned and non-H forms can be accounted for easily: it comes from the FPT H which is assigned to the O.P. /kI-/ by FPT H Assignment (173). This H tone subsequently spreads leftwards to the prefix /aa-/. The S.P. L is assigned to the subject prefix /kU-/ and is later delinked by Contour Tone Levelling (182) after resyllabifying with the FPT marker /aa-/. The surface final L can also be accounted

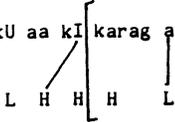
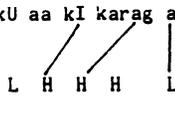
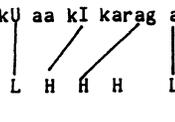
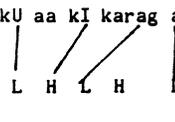
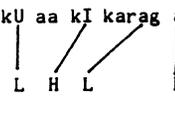
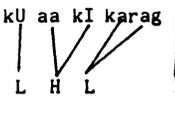
for in a straightforward manner: it is the result of assigning the FPT L tone to the word final syllable by FPT L Assignment (171). The major point of interest of the data given in (183) lies in the surface tonal contrast between the underlyingly H-toned and toneless roots (compare (183a i-iii) against (183b i-iii)): in the H-toned forms, all root syllables are realized L, whereas in the toneless forms, all roots syllables are realized H (with downstepping). Based on the rules established so far, it is not immediately clear why there is such a surface tonal distinction between the two groups. Below I will provide an account for such a surface tonal distinction, using the derivations kwaakÍkaraga /kÙ+aa+kÍ+kárag+a ` / "we cut it", a H-toned form, and kwaakÍgúrizá /kÙ+aa+kÍ+gúriz+a ` / "we sold it", a toneless form, as examples for illustration. Now let us first consider the underlying representations of these two forms:



As proposed above, the FPT H tone in both forms in (184) is assigned to the object prefix /kI-/ by FPT H Assignment (173) and the FPT L to the final vowel /-a/ by FPT L Assignment (171). The autosegmental configurations of these two forms after the application of these rules are given below:



rule that is already motivated for the toneless form, and its lowering (from H to L) is predictable by O.P. H Lowering (162),<sup>25</sup> also a rule that has been independently motivated before for the MFT. The root H is then deleted by H Deletion (174). The derivation of kwaakIkaraga proceeds from (185) as follows:

188. a) kU aa kI karag a      same as in (185)  

- b) kU aa kI karag a      O.P. H Assignment (186)  

- c) kU aa kI karag a      MTA (3-11)  

- d) kU aa kI karag a      O.P. H Lowering (162)  

- e) kU aa kI karag a      H Deletion (174)  

- f) kU aa kI karag a      Tone Spread (13)  

- g) kwaakIkaraga      Other Rules  

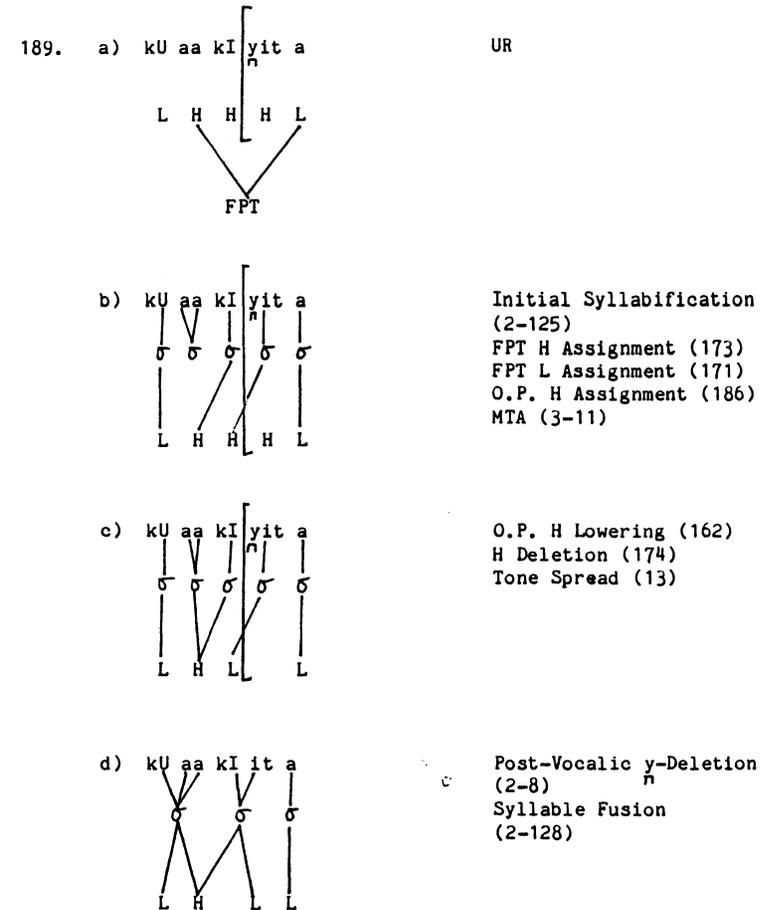

---

<sup>25</sup> Notice that O.P. H Lowering (162) is not applicable in the toneless form, since there is no root H tone in the toneless form and the SD of (162) is thus not met.

Notice that the analysis of the H-toned form just given calls for the crucial ordering of O.P. H Lowering (162) before H Deletion (174) since the latter bleeds the former.<sup>26</sup> Also, it assumes that O.P. H Assignment (186) is ordered before Morphological Tone Association (3-11) to avoid the root H from being assigned to the root initial syllable by the latter rule. (The output of O.P. H Assignment (186) blocks the application of MTA (3-11) to the root H tone (see the autosegmental configuration in (188b)).)

The H versus non-H distinction is neutralized in the surface tone melodies of kwááçííta /kù+áá+kí+yít+a` / "we killed it" ((183a iv)) and kwááçééna /kù+áá+kí+yéñ+a` / "we wanted it" ((183b iv)), kwáákírya /kù+áá+kí+rí+a` / "we ate it" (183a v) and kwáákísyá /kù+áá+kí+síe+a` / "we ground it" (183b v).

While the surface tonal pattern of kwááçééna can be readily derived by rules established before, that of kwááçííta is not. Based on the analysis of the FPT forms with O.P. proposed so far, the surface syllable çii of kwááçííta is derived from a falling tone at an intermediate level of derivation:

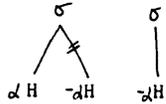


<sup>26</sup> Earlier in footnote (23), I pointed out that the optional "... context is essential to the SD of H Deletion (174). The "O.P. H Lowering (162) -- H Deletion (174)" rule ordering requirement just mentioned motivates the postulation of this optional contextual element. To see this, let us consider the derivation given in (188) again: After the application of O.P. H Lowering (162) in stage d), the verb root is preceded by a L, not H tone. Without the optional "... context in the SD of H Deletion (174), the root H will fail to delete since its immediately preceding tone is not H. The presence of the "... element, on the contrary, allows the FPT H prefix to condition the lowering of the root H tone.

At the last stage of derivation in (189) above, the syllable kIi (which gives rise to the surface syllable çii) is linked to both a H and a L. By the Contour Tone Levelling rule (182) established earlier, one would expect the H tone of the sequence to delink, incorrectly predicting a surface L instead of H tone on the surface syllable çii.

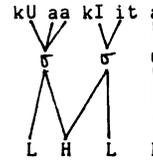
To correctly derive the surface H tone on ci, the following tonal dissimilation rule is proposed:

190. Tonal Dissimilation

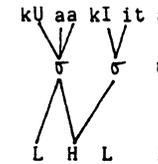


Rule (190) must have precedence over Contour Tone Levelling (182) such that it is the former rule that applies to (189d) and not the latter. With Tonal Dissimilation (190), the derivation of kwaaciita proceeds from (189d) as follows:

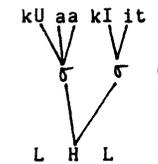
191. kU aa kI it a (189d)



Tonal Dissimilation (190)



Contour Tone Levelling (182)

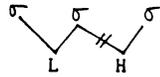


Other Rules

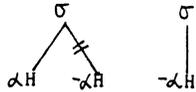


The tonal simplification rules postulated in this section and their correct orderings are summarized below:

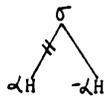
192. Trisyllabic Tone Absorption (177)



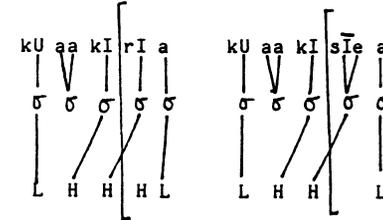
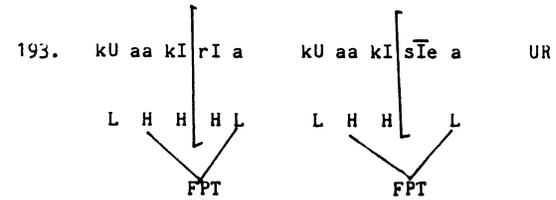
Tonal Dissimilation (190)



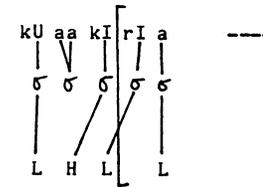
Contour Tone Levelling (182)



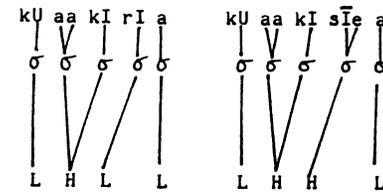
The surface tonal neutralization between kwaákírya and kwaákísyá can be accounted for easily: The fact that there is no downstepped H in the SR of kwaákísyá can be explained as a result of Contour Tone Levelling (182). Given below are the derivations of kwaákírya and kwaákísyá under this analysis:



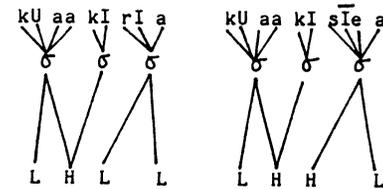
Initial Syllabification (2-125)  
 FPT H Assignment (173)  
 FPT L Assignment (171)  
 O.P. H Assignment (186)  
 MTA (3-11)



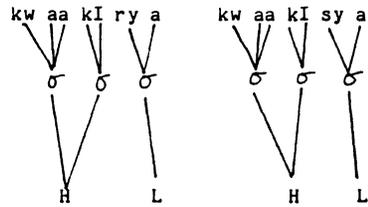
O.P. H Lowering (162)  
 H Deletion (174)



Tone Spread (13)



C-Syllabification (2-127)  
 Syllable Fusion (2-128)



Contour Tone Levelling  
(190)  
Other Rules

#### 4.12 OTHER TENSES

As mentioned in the beginning of this chapter (c.f. footnote (1)), there are couple Llogoori tenses that are not studied in this thesis. These are the "Still" Tense and the Subjunctives. Tonally speaking, the "Still" Tense is identical to the Present Continuous Tense, and the Subjunctives are the same as the Middle Future Tense forms. Although the data of these two tenses are not presented in this thesis due to time and space limitations, they will certainly be included in the future expanded version of this work.

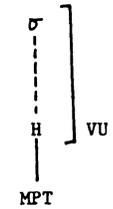
TABLE 5a

Summary of Tone Rules

(A) Initial Tone Assignment Rules

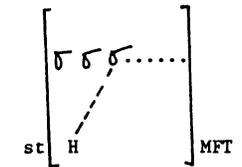
Rule No	Name of Rule	Formulation of Rule
(3-11)	Morphological Tone Association	$\left[ \begin{array}{c} \sigma \dots \\   \\ T \end{array} \right]$ <p>where "[ ]" demarcates morpheme boundaries</p>
(75)	Imperative L Prefix Assignment	
(91)	Stem H Assignment I	
(99)	Stem H Assignment III	

(113) MPT H Suffix Assignment

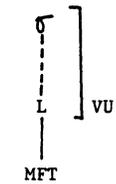


VU = Verb Unit

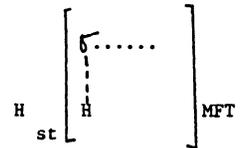
(145) Stem H Assignment in the Plain MFT Forms (Stem H Assignment II)



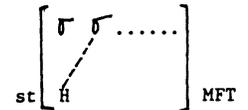
(151) MFT L Assignment



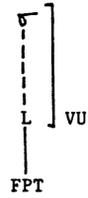
(163) Root H Assignment in the H-toned MFT Forms with O.P.



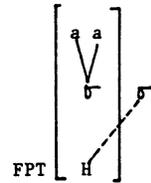
(164) Root H Assignment in the Toneless MFT Forms with O.P.



(171) FPT L Suffix Assignment

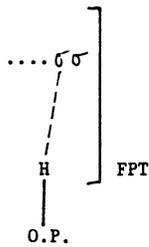


(173) FPT H Prefix Assignment



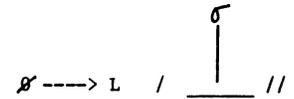
where "[ ]" demarcates morpheme boundaries

(186) O.P. H Assignment

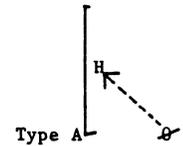


(B) Insertion Rules

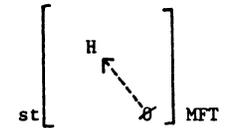
(10) Final L Insertion



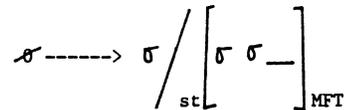
(53) H Insertion



(144) MFT H Insertion

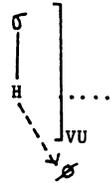


(149) Empty Syllable Insertion

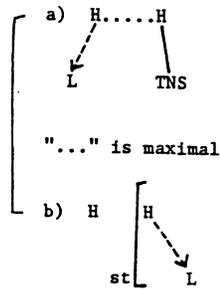


(C) Tone Change Rules

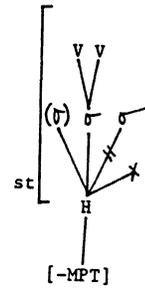
(80) Verb Final H Deletion



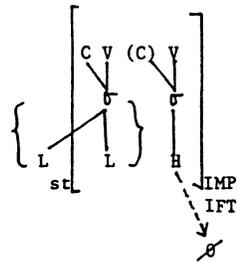
(105) H Lowering



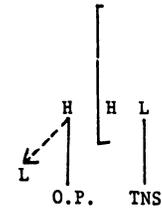
(114) Stem H Dissociation



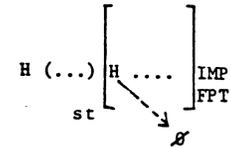
(129) Root H Deletion



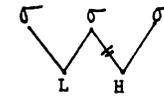
(162) O.P. H Lowering



(174) Root H Deletion



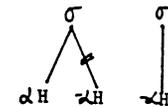
(177) Trisyllabic Tone Absorption



(182) Contour Tone Levelling



(190) Tonal Dissimilation



(D) Tone Spread Rules

(13) Tone Spread



(iterative)

(16) Penultimate Lowering

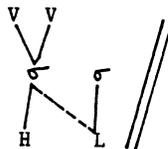


TABLE 5b

Summary of Crucial Rule Orderings\*  
(Tone Rules)

[	(53)	H Insertion
[	(75)	Imperative L Prefix Assignment
[	(113)	MFT H Suffix Assignment
[	(186)	O.P. H Assignment
[	(3-11)	Morphological Tone Association
[	(91)	Stem H Assignment I
[	(163)	Root H Assignment in the H-toned MFT Forms with O.P.
[	(144)	MFT H Insertion
[	(164)	Root H Assignment in the Toneless MFT Forms with O.P.
[	(162)	O.P. H Lowering (in the RPT)
[	(149)	Empty Syllable Insertion
[	(145)	Root H Assignment in the Plain MFT Forms (Stem H Assignment II)
[	(99)	Stem H Assignment III
[	(151)	MFT L Assignment
[	(174)	H Deletion (in the IMP & RPT)
[	(105)	H Tone Lowering
[	(2-8)	Post-Vocalic y-Deletion
[	(129)	H Deletion (in the IMP & IFT)
[	(13)	Tone Spread
[	(177)	Trisyllabic Tone Absorption
[	(190)	Tonal Dissimilation
[	(182)	Contour Tone Levelling
[	(10)	Final L Insertion
[	(16)	Penultimate Lowering
[	(80)	Verb Final H Deletion
[	(2-128)	Syllable Fusion

\* In all rule numbers that have a numeral prefix, the prefix indicates the chapter in which the rule is found. All other rules

TABLE 6

Llogoori Verb Tenses: Summary of Morphological Features

Tense	SP	Segmental Prefix	Tonal Prefix	Root	Segmental Suffix	Tonal Suffix
INF	Ø	kU	Ø	Root	a	Ø
NFT	SP	ra	Ø	Root	a	Ø
PT	SP	Ø	Ø	Root	i/e*	Ø
FFT	SP	rika	Ø	Root	e	Ø
NPT	SP	aakU	L	Root	a	Ø
IMP	Ø	Ø	L	Root	a/e**(sg) i (pl)	Ø
PCT	SP	Ø	Ø	Root	aa	H
MPT	SP	aa	L	Root	i/e*	H
IFT	SP	ri	L	Root	a	H
MFT	SP	na***	Ø	Root	e	L
RPT	SP	aa	H	Root	a	L

\* The /-e/ suffix occurs in the presence of the applied extension /-Ir/, and the suffix /-i/ elsewhere;

\*\* /-a/ occurs in the singular imperative forms without O.P., and /-e/ in the singular forms with O.P.; /-i/ occurs with all plural forms, regardless of the presence or absence of the O.P.

\*\*\*The MFT tense prefix /na-/ precedes the S.P. in the verb unit.

CONCLUSIONS

In this thesis, I have provided detailed descriptions and analyses of eleven Llogoori verb tenses, along with a general introduction to the Llogoori morphology and phonology. Although this work encompasses only a still relatively limited scope of data--given its nevertheless preliminary nature--its findings are illuminating to the understanding of both Llogoori itself and the African tone languages in general.

As far as Llogoori is concerned, this study has revealed the skeleton of the tonal phonology of Llogoori through examining its verbal system. Some of the major characteristics found are that:

1. Llogoori has a three-way contrast between H, L, and tonelessness underlyingly, but only H versus L on the surface (due to association rules to be mentioned in point 4 below);
2. the segmental and tonal components of any given morpheme are associated by Initial Tone Assignment Rules (ITAR's);
3. ITAR's in Llogoori are numerous and they are predominantly specific rules conditioned in morphological/grammatical terms;
4. The mapping of toneless syllables and tones after initial tone assignment is predominantly governed by language-specific rules like Tone Spread (4-13) and Final L Insertion (4-10).
5. Llogoori exhibits partial downstep by which any tone after a H tone begins a lowered register. Other surface pitch modifica-

tion mechanisms like declination and phrase final lowering are also present.

As a minor contribution, the study also provides a relatively comprehensive sketch of the Llogoori phonological/morphological system. The ample data and analyses provided should serve as a point of departure for any future research on the language.

In the general context of other Bantu tonal systems, the characteristics of the Llogoori tonal system just outlined in point 1 to 5 above are of great theoretical interest: They shed light on many issues concerning significant topics like initial tone assignment, the universality of Association Conventions, and the typology of downstep, to name just a few.

As mentioned in point 3 above, Llogoori is characterized by its abundance of ITAR's which are specific rules conditioned in grammatical and morphological terms. This is different than many other Bantu systems in which initial tone assignment is achieved by relatively few ITAR's the application of which is generally unrestricted by morphological/grammatical conditions. Furthermore, with the exception of one situation (i.e. imperatives with O.P.(c.f. section 4.6.2.)) in which tone assignment may be accounted for by an Association Convention, the mapping of morphological tones and tone bearing units are achieved by ITAR's and other language specific association mechanisms (like Final L Insertion (4-10) and Tone Spread (4-13)). The Association Conventions motivated by many other Bantu tone languages play almost no role in Llogoori.

The analysis of downstep in Llogoori presented in Chapter 3 provides yet another case of downstep without a floating L tone. (Other languages found to exhibit downstep without a floating L are Kishambaa (Odden 1982) and Igbo (Clark, in preparation).) Finally, the evidence--thought still preliminary in nature--for the interaction between downstep and other surface tonal modification mechanisms like declination and phrase final lowering hints at the need for a model of pitch interpretation that addresses the effects of all pitch modification mechanism in a componential manner.

In view of these observations, our first step towards understanding Llogoori can also be considered a step towards understanding the ever-so-intricate systems of Bantu tone languages.

## BIBLIOGRAPHY

- Anonymous. No Date. Luragoli Grammar.
- Bennett, Patrick. 1973. "A Phonological History of Northeast Victoria Bantu". Paper read at the Annual Conference on African Linguistics 4. New York.
- Clark, Mary M. In preparation. "The Tonal System of Igbo". Manuscript. University of New Hampshire.
- Clements, George N. 1979. "The Description of Terraced-level tone Languages", Language 55.3:538-58.
- \_\_\_\_\_. 1980. "A Hierarchical Model of Tone" Phonologica 4:69-75.
- \_\_\_\_\_. 1981. "The Hierarchical Representation of Tone Features". In G. N. Clements (ed.) Harvard Studies in Phonology, 2:50-107. Distributed by the Indiana University Linguistics Club.
- \_\_\_\_\_. 1982. "Principles of Tone Assignment in Kikuyu". In Clements and Goldsmith (eds.) Autosegmental Studies in Bantu Tone. Foris, Dordrecht.
- \_\_\_\_\_. 1986. "Compensatory Lengthening and Consonant Gemination in Luganda". In L. Wetzels and E. Sezer (eds.). Studies in Compensatory Lengthening. 33-37. Foris, Dordrecht.
- Clements, George N., and Kevin C. Ford. 1979. "On the Phonological Status of Downstep in Kikuyu". In G. N. Clements (eds.). Harvard Studies in Phonology 1:187-272. Department of Linguistics, Harvard University, Cambridge.
- \_\_\_\_\_. 1979. "Kikuyu Tone Shift and its Synchronic Consequences", Linguistic Inquiry 10:179-210.
- Clements, George N., and John Goldsmith. 1984. Autosegmental Studies in Bantu Tone. Foris, Dordrecht.
- Clements, George N., and Elizabeth W. Leung. 1986. "Downstep in Llogoori". Manuscript. Talk given at the Language and Communication Conference III. Syracuse University. Also presented at Workshop on Phonological Features. University of Leiben.
- Goldsmith, John. 1975. "Tone Melodies and the Autosegment". In R. K. Herbert (ed.). Annual Conference on African Linguistics 6. Ohio State Working Papers in Linguistics 20:135-147.
- \_\_\_\_\_. 1976. "An Overview of Autosegmental Phonology". Linguistic Analysis 2:23-68.
- \_\_\_\_\_. 1976. Autosegmental Phonology. Ph.D. Dissertation. M.I.T. Garland Press, New York.
- \_\_\_\_\_. 1979. "The Aims of Autosegmental Phonology". In Daniel Dennsin (ed.), Current Approaches to Phonological Theory. Indiana University Press, Bloomington.
- \_\_\_\_\_. 1984. "Tone and Accent in Tonga". In G. N. Clements and J. Goldsmith (eds.). Autosegmental Studies in Bantu Tones. Foris, Dordrecht.
- Guthrie, Malcolm. 1967-71. Comparative Bantu. 4 Vols. Gregg International Publishers, Farnborough, Hants.
- Halle, Morris and Jean-Roger Vergnaud. 1982. "On the Framework of Autosegmental Phonology". In Harry Van Hulst and Morval Smith (eds.) The Structure of Phonological Representation. Vol. 1. 65-82. Foris, Dordrecht.
- Haraguchi, Shosuke. 1977. The Tone Pattern of Japanese: an Autosegmental Theory of Tone. Kaitakusha, Tokyo.
- Heine, Bernd, and Wilhelm J.G. Mohlig (eds.). 1980. Language and Dialect Atlas of Kenya. Vol. 1. Reimer, Berlin.
- Hinnebusch, Thomas H, Derek Nurse, and Martin Mould (eds.). 1981. Studies in the Classification of Eastern Bantu Languages. Buske, Hamburg.
- Huang, Cheng-Teh James. 1980. "The Metrical Structure of Terraced-level Tones", North Eastern Linguistics Society 11. Cahiers Linguistiques d'Ottawa 9:257-270. Department of Linguistics, University of Ottawa.
- McCarthy, John. 1981. "A Prosodic Theory of Nonconcatenative Morphology". Linguistics Inquiry 12.3:373-417.
- Meeusen, A.E. 1980. Bantu Lexical Reconstructions. Musee Royal de l'Afrique Centrale, Tervuren, Belgium. Archives d'Anthropologie, no. 27.
- Meinhof, Carl. 1932. Introduction to the Phonology of the Bantu Languages. Reimer, Johannesburg, Berlin.
- Mould, Martin. 1981. "Greater Luyia". In Thomas H Hinnebusch, Nurse Derek, Martin Mould. Studies in the Classification of Eastern Bantu Languages. 181-230. Buske, Hamburg.
- Odden, David. 1982. "Tonal Phenomena in Kishambaa" Studies in African Linguistics. 13.2:177-208.

- Pierrehumbert, Janet. 1980. The Phonology and Phonetics of English Intonation. Unpublished Ph.D. dissertation. M.I.T.
- Pulleyblank, Douglas. 1983. Tone in Lexical Phonology. Unpublished Ph.D. dissertation. M.I.T.
- Stewart, John M. (1965). "The Typology of the Twi Tone System". Bulletin of the Institute of African Studies 1:1-27. University of Ghana, Legon.
- Tucker, A. N., and M. A. Bryan. 1957. Linguistic Survey of the Northern Bantu Borderland. Vol. 4. Oxford University Press, London, New York.
- Van der Hulst, Harry, Norval Smith (eds.). 1982. The Structure of Phonological Representation. Vol. 1. Foris, Dordrecht.
- Welmers, Wm. E. 1973. African Language Structures. University of California Press, Berkeley.
- Whiteley, Wilfred. 1974. Language in Kenya. Oxford University Press, Nairobi.
- Yip, Moira J. W. 1980. The Tonal Phonology of Chinese. Unpublished Ph.D. dissertation, M.I.T. Distributed by the Indiana University Linguistics Club.