



A Tonal Grammar of
ETSAKO

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A Tonal Grammar of Etsako.

by

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ABSTRACT OF THE DISSERTATION

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The aim of this study is to describe the tonal system of Ekpheli, a dialect of the Etsakɔ language. Etsakɔ is spoken in the Etsakɔ Division of Bendel State of Nigeria (formerly Mid-West State of Nigeria).

Although this study is primarily descriptive, it will address itself to certain theoretical questions now being debated among generative phonologists. In particular, it will argue that the lexical representation of each morpheme or formative in Etsakɔ should be in the form of two matrices, a segmental matrix (SM) and a tone matrix (TM) as first suggested by Leben (1971b). As will be discussed in the dissertation, the systematic phonetic matrix is to be derived by a set of mapping rules, after the phonological tone and segmental rules have been applied.

While the focus of the study is on the tone system of Etsakɔ, with emphasis on the Ekpheli dialect, Chapter II will present a summary sketch of the segmental phonology which provides necessary background for understanding the examples presented. Chapter III focuses on general tonal phenomena. Chapter IV discusses the tone alternations in nouns and noun phrases. Chapter V deals with the tone alternations in verbs and verb phrases. As will be seen in Chapters IV and V, the grammar of Etsakɔ is characterized by a complexity of morphotonemic alternations. To better understand the synchronic alternations, diachronic aspects are considered. Thus, while the aim of the study is focussed on the synchronic grammar, some historical reconstructions are presented as well as a discussion of the various tone changes that have occurred. Only in this way is the synchronic analysis which recognizes 'floating tones' meaningful.

Finally, a comparative wordlist of 542 forms -- nouns, verbs, adjectivals, adverbs, and particles in eight dialects of Etsakɔ is given in the Appendix A.

CHAPTER I

Introduction

The aim of this study is to describe the tonal system of Ekpheli, a dialect of the Etsako language. Etsako is the name of a Division of Bendel State of Nigeria. Etsako means 'those who file their teeth' in the language of the people of this region. Earlier in history the filing of one's teeth was a cosmetic practice among the Etsako people. Even today someone who has gaps between the teeth is considered to be a very beautiful and attractive person.

The Division is divided into thirteen Clans: Auchi, Avianwu, Aviele, Awain, Ekpheli, Ijagbe, Okpekpe, South Ibie, South Uneme, Ukpilla, Uzairue, Weppa-Wano, and Three Ibie. Each clan is further sub-divided into villages. Uzairue, for example, has sixteen villages.

The language of the people of this Division is also called Etsako. Etsako is generally considered to have thirteen major dialects, each corresponding to one of the clans. Thus, the Ekpheli dialect of Etsako is the dialect spoken by the Ekpheli clan. Each major dialect can be further divided into sub-dialects or dialect variants corresponding to the individual villages. Most of the dialects are mutually intelligible. Seven of the eight dialects investigated in this study were found to be so. Despite the mutual intelligibility certain systematic differences between these dialects exist. Thus, for example, in cognate forms, /p/ in some dialects corresponds to /f/ in others, and a low tone in some dialects corresponds to a high tone in others. Lexical items may also differ from dialect to dialect. Similar differences are found in the dialects which are not mutually intelligible but they are more extensive.

In the early part of the twentieth century, Etsako was studied to some extent by Thomas (1910, 1914, and 1917) and Strub (1917). Both authors referred to the language as Kukuruku, the name given to the formal Division which included the present Etsako Division and two other divisions. Greenberg (1963) classifies Etsako as Niger-Congo Kwa, Kukuruku, I.A.4. B-E3. Laver (1967, 1969) describes some aspects of the phonological system of the Aviele dialect of Etsako. Elugbe (1973) discusses the phonological systems of two other Etsako dialects, Auchi and Avianwu. Elugbe refers to Etsako as Iyekhee. Both descriptions while insightful are rather sketchy and lacking in detail, particularly in relation to tonal phenomena. Welmers (1973), using data from the Ekpheli dialect, discusses the doubly articulated stops /kp, kph, gb, gbh/ of Etsako. The 'h' of /kph/, /gbh/ is used to differentiate the lax consonants (those with 'h') from the tense consonants. This reflects the present orthographic system. Steveson (1974) published comparative wordlists collected in the Etsako Division. The lists consist of approximately 120 words from five dialects.

These papers constitute the entire literature on the Etsako language except for my earlier paper (Elimelech, 1973) which deals with a limited part of the tonal complexities. The data analyzed in that paper was elicited from only one informant. Except for this paper

previous studies were primarily concerned with segmental phonology.

The dialects considered in this study are as follows:

<i>Dialect</i>	<i>Henceforth abbreviated</i>
Ekpheli	E
Avianwu	Av
Weppa-Wano	W-W
Uzairue	U
South Uneme	SU
South Ibie	SI
Auchi	Au
Aviele	Avie

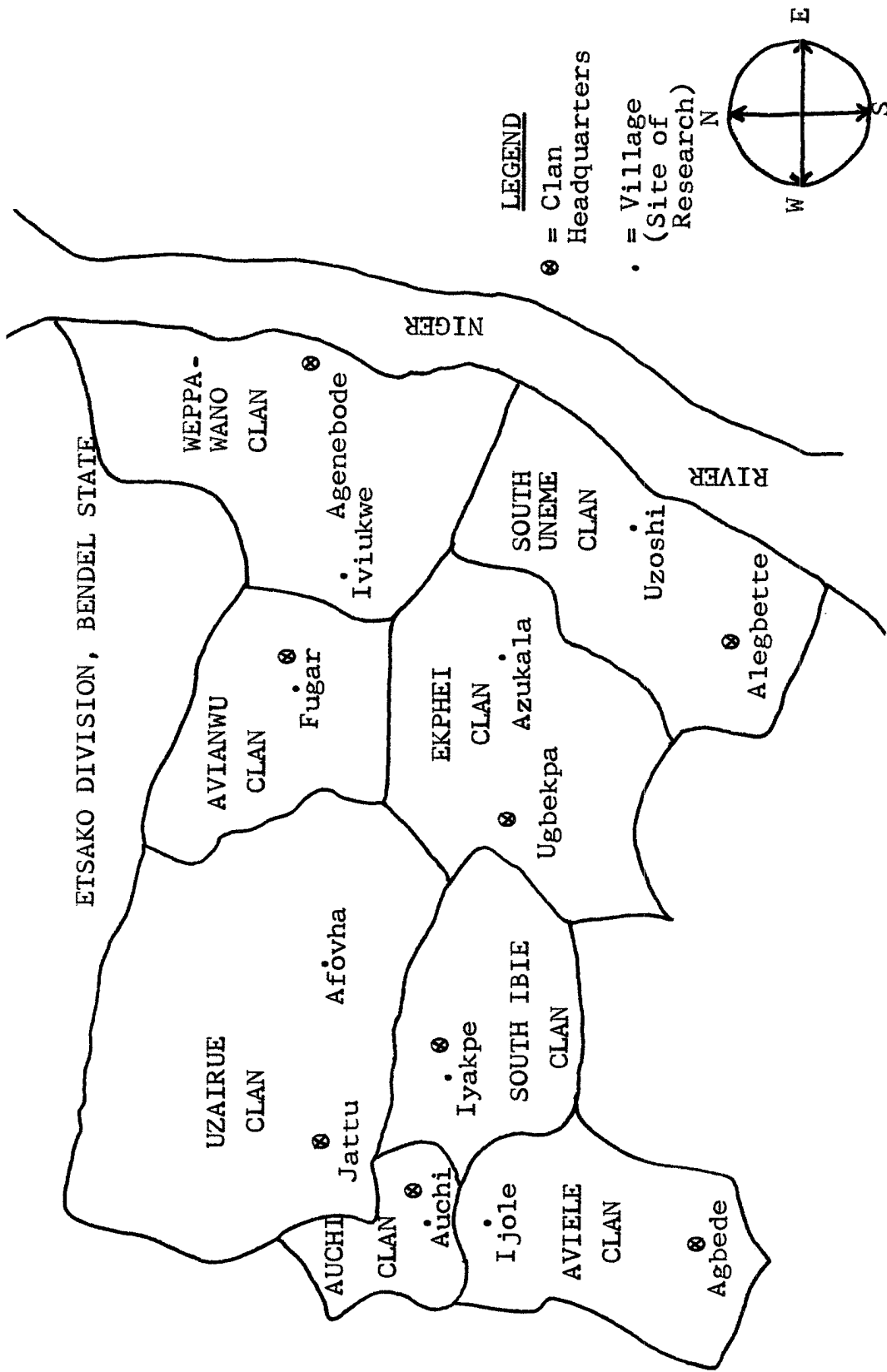
The data were collected in the Etsako Division during the months of December 1974 to September 1975, under a Ford Foundation Fellowship. I conducted my investigation and analysis of Etsako phonology by combining intensive field work with on-going analysis of the data elicited. I worked with native speakers of Etsako in elicitation sessions. Elicitation sessions were held as often as five days a week in villages within close proximity to Auchi. On the other hand, language consultants of far away villages were met with twice or three times a week.

During this period, I resided at Auchi which is the Divisional Headquarters of Etsako. From Auchi I commuted to the various clans and villages covered in this study. I met with the clan chief as well as the village chief who introduced me to a speaker representative of the dialect of the clan. A map outlining the clans, the clan head-quarters, and the villages (where I worked) is given below.

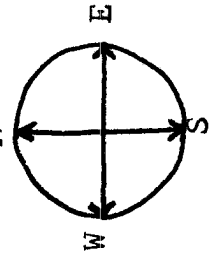
While the focus of the study is on the tone system of Etsako, with emphasis on the Ekpheli dialect, Chapter II will present a summary sketch of the segmental phonology which provides necessary background for understanding the examples presented. Chapter III focuses on general tonal phenomena. Chapter IV discusses the tone alternations in nouns and noun phrases. Chapter V deals with the tone alternations in verbs and verb phrases. As will be seen in Chapters IV and V, the grammar of Etsako is characterized by a complexity of morphotonemic alternations. To better understand the synchronic alternations, diachronic aspects will be considered. Thus, while the aim of the study is focused on the synchronic grammar, some historical reconstruction will be presented as well as a discussion of the various tone changes that have occurred. Only in this way will the synchronic analysis which recognizes 'floating tones' be meaningful.

A wordlist of 542 forms -- nouns, verbs, adjectivals, adverbs, and particles in the eight dialects examined is given in the Appendix A.

The description of the tonological system of Etsako will be presented within the framework of generative phonology (Chomsky and Halle, 1968). Although this study is primarily descriptive, it will address itself to certain theoretical questions now being debated among generative phonologists. In particular it will argue that the lexical representation of each morpheme or formative in Etsako should be in the form of two matrices, a segmental matrix (SM) and a tone matrix (TM) as first suggested by Leben (1971b). As will be discussed below, the systematic



LEGEND
 ⊗ = Clan Headquarters
 • = Village (Site of Research)



phonetic matrix is to be derived by a set of mapping rules, after the phonological tone and segmental rules have been applied.

CHAPTER II

Segmental Phonology

1.0. *Phonemic and phonetic inventory of consonants*

The consonant system of Ekpheli includes the following inventory of systematic phonetic segments, as would be traditionally diagrammed in an IPA chart. The feature analysis of these consonants will follow a discussion of the phonetic correlates of these phones.

(1) Consonant chart:

	Labials	Labio-dentals	Dentals	Alveolars	Palatals	Velars	Labio-velars
Stops	p b			t d		k g	kp/kph gb/gbh
Affricatives				ts dz	(č) (ǰ)		
Fricatives		f v	θ	s	(š)	x ɣ	
Liquids				l r			
Approximants	m/mh u			n	(ɲ) y		w

The symbols in parentheses (e.g., (č)) are allophonic (derived) segments. All other symbols represent systematic phonemes. The list of morphemes given in (2) reveal that there are twenty six consonantal phonemes necessary to distinguish morphemes.

(2) /p/	:	/pa/	→	[pa]	'to clean'
/b/	:	/ba/	→	[ba]	'to plait'
/t/	:	/ta/	→	[ta]	'to sting'
/d/	:	/da/	→	[da]	'to drink'
/k/	:	/ka/	→	[ka]	'to dry'

/g/	: /ga/	→ [ga]	'to worship'
/kp/	: /kpa/	→ [kpa]	'to vomit'
/kph/	: /kpha/	→ [kpha]	'to pluck'
/gb/	: /gba/	→ [gba]	'to build'
/gbh/	: /gbhale/	→ [gbhale]	'to think'
/ts/	: /tsa/	→ [tsa]	'to purge'
	/otsie/	→ [oče]	'apple'
/dz/	: /dzala/	→ [dzala]	'to be straight'
	/iridzia/	→ [iriʃa]	'well (water)'
/v/	: /va/	→ [va]	'to be light in complexion'
/v/	: /va/	→ [va]	'to butcher'
/f/	: /ifa/	→ [ifa]	'wing'
/th/	: /θa/	→ [θa]	'to soak (cloth)'
/s/	: /sa/	→ [sa]	'to soak (wood)'
	/siesie/	→ [šeše]	'to be small'
/x/	: /xa/	→ [xa]	'to be warmed by fire'
/ɣ/	: /aya/	→ [aya]	'chain'
/l/	: /ula/	→ [ula]	'fat (from meat)'
/r/	: /ralɔ/	→ [ralɔ]	'to paint'
/m/	: /ma/	→ [ma]	'to build, mold'
/mh/	: /mhala/	→ [mhala]	'to measure'
/n/	: /na/	→ [na]	'to run'
	/anio/	→ [ano]	'wine'
/y/	: /ya/	→ [ya]	'to be'
/w/	: /wa/	→ [wa]	'to pain from hot pepper'

All of these phonemic and phonetic segments occur in all sub-dialects of Ekpheli (e.g., Azukhala).

With the exception of /p/, /ts/, /dz/, and /θ/ all of the phonemes occur in all dialects of Etsakɔ.

/p/ is completely absent from the U. dialect, and is extremely rare in occurrence in Au., Avie., SU., and SI.. A cross dialectical comparison (cf. Appendix) shows that /p/ is replaced by /f/ in some dialects (e.g., /ope/ in E., /ofe/ in U., 'rat').

/ts/ and /dz/ do not occur in Avie. and SU.. /ts/ is replaced by /s/ (e.g. /otsa/ in E., /osa/ in Avie. and SU., 'soap'); /dz/ is replaced by /z/ (e.g., /ɛdzɔ/ in E., /ɛzɔ/ in Avie., and SU., 'case (in court)').

/θ/ is replaced by /ç/, a voiceless alveolar fricative in some dialects (e.g., /aθu/ in E., /açu/ in Av., U., SI., Au., Avie., 'cap, hat').

2.0. *Phonetic correlates*

The symbol 'h' is used in the orthography of Etsako to indicate the phonemic contrast between the consonants of (3).

(3)		orthography		orthography
	/kp/	kp	/kph/	kph
	/gb/	gb	/gbh/	gbh
	/k/	k	/x/	kh
	/g/	g	/ç/	gh
	/v/	v	/v/	vh
	/t/	t	/θ/	th
	/m/	m	/mh/	mh

These consonants have already received considerable attention in the previous studies cited in other related languages. Laver (1967, 1969), in his study of the Aviele dialect, employs the features [tense]/[lax] to characterize the differences between /k/ and /kh/, /g/ and /gh/, /v/ and /vh/, and /m/ and /mh/. The lax consonants are the 'h' consonants of the pairs. Laver suggests that the distinction is one of greater or less muscular tension during the articulation. Elugbe (1973) makes a similar analysis using the feature [fortis] for [tense] and [lenis] for [lax].

Welmers (1973) employs the binary feature [± suction] to characterize the four labio-velar stop consonants with /kp/ and /gb/ being specified as [+ suction] and /kph/ and /gbh/ as [- suction].

Elugbe and Hombert (1975) in their study of nasals in Ghotuo (a language related to Etsako) use the binary feature [± long] to distinguish the two bilabial nasals /m/ ([+ long]) and /mh/ ([- long]). Their decision was based on a perception experiment in which only the duration of the bilabial nasals was varied, showing that subjects used the length difference as a major cue to differentiate between the two.

There is no question that the consonants in question differ phonemically and phonetically. There has been some attempt to distinguish all the 'h' consonants from their 'non-h' pairs by one feature, e.g., [± fortis], [± suction] or [± long]. It is not at all clear why one should wish to do this. There are no phonological rules that require the class of 'h' consonants as opposed to the class of 'non-h'. It is therefore possible that the search for the one 'correct' feature will obscure the real phonetic differences between the pairs.

If one wishes a viable phonetic description, an instrumental analysis can help to specify the distinguishing phonetic features. An alternative method would be to conduct perceptual experiments aimed at finding

which acoustic cues are necessary and sufficient to distinguish between the consonants of a pair or between classes of sounds.

As a first attempt, I recorded a number of utterances containing these sounds, made spectrograms, and analyzed the spectrograms. The spectrograms are presented in Figures 1-5.

Figure 1(a,b) gives the spectrograms of four contrastive labio-velar stop consonants in words. It can be observed that the stop closures of [kp] and [gb] are almost twice the length of their counterparts [kph] and [gbh]. It is not possible, however, to tell from spectrographic analysis alone whether the length contrast is the major difference or even the major perceptual cue hearers use to distinguish the pairs. For lack of further physiological data, we can distinguish these phonologically and phonetically by the feature [\pm long]. As cover symbols, however, in keeping with the orthography, we will use the 'h' for the shorter consonants.

Figure 2(a,b) shows spectrograms of the four contrastive velar consonants /k/ and /g/, and /x/ and /ɣ/ (the latter two orthographically 'kh' and 'gh'). It may be observed that /k/ and /g/ contain no frication while the /x/ and /ɣ/ are clearly fricatives. However, in addition to the frication distinction the stops are also twice as long as the fricatives. For phonetic specificity, one would want to use both [\pm continuant] and [\pm long] values in the phonetic matrices. One cannot determine, other things being equal, what the correct distinctive feature is for the phonemic matrices.

Figure 3 presents the spectrograms of two contrastive bilabial nasal consonants as occurring in words. Once more it may be observed that the utterance which orthographically would be represented as 'm' is twice the length of that which would be represented as 'mh'. It is again impossible to tell from acoustic analysis what other properties may distinguish between these.

The spectrograms of /t/ and /θ/ (orthographically 't' and 'th') of Figure 4 again reveals a length distinction with /t/ being longer in duration than /θ/. Like the distinctions between the velar consonants /θ/ ('th') is characterized as having friction, while /t/ is not. [θ] is a dental fricative and [t] is an alveolar stop. The phonetic specification should then provide values for both [\pm continuant] and [\pm long].

Spectrograms of utterances in which /v/ and /ʋ/ ('vh') occur in the words are given in Figure 5. In the articulation of these sounds [ʋ] is a bilabial approximant, and [v] a labio-dental fricative. Note also, however, that [v] is somewhat longer in duration than [ʋ].

Spectrographic analysis has thus revealed some interesting phonetic differences that exist between the two sets of consonants, those orthographically symbolized with 'h' and those without. The use of 'h' does seem to have some phonetic reality in that all the 'non-h' sounds are longer than their 'h' counterparts.

In the case of the four labio-velar stops and the two bilabial nasals the only differentiating factor between the pairs as shown by spectrographic analysis is that of length. This is not to say that the feature [\pm suction] as proposed by Welmers to distinguish the four labio-velar stops is incorrect. One would need to conduct further experimental



Figure 1a. Comparison of Kp and Kph : Spectrograms of the words 'clothes' (on left) and 'erosion' (on right).

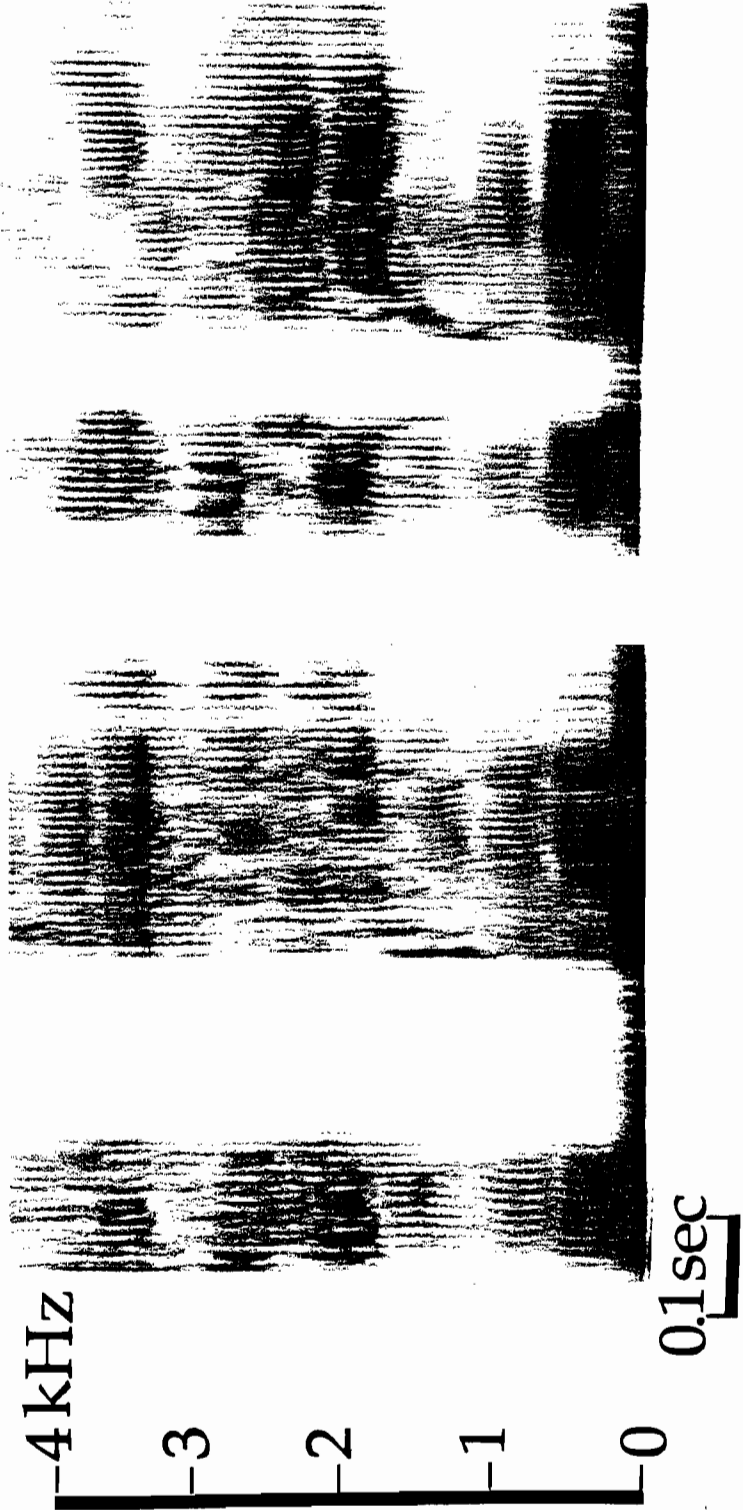


Figure 1b. Comparison of g^{b} and g^{bh} : Spectrograms of the words $\text{é}^{\text{g}}\text{b}^{\text{h}}\text{é}^{\text{é}}$ 'masquerade' (on left) and $\text{é}^{\text{g}}\text{b}^{\text{h}}\text{é}^{\text{é}}$ 'house' (on right).

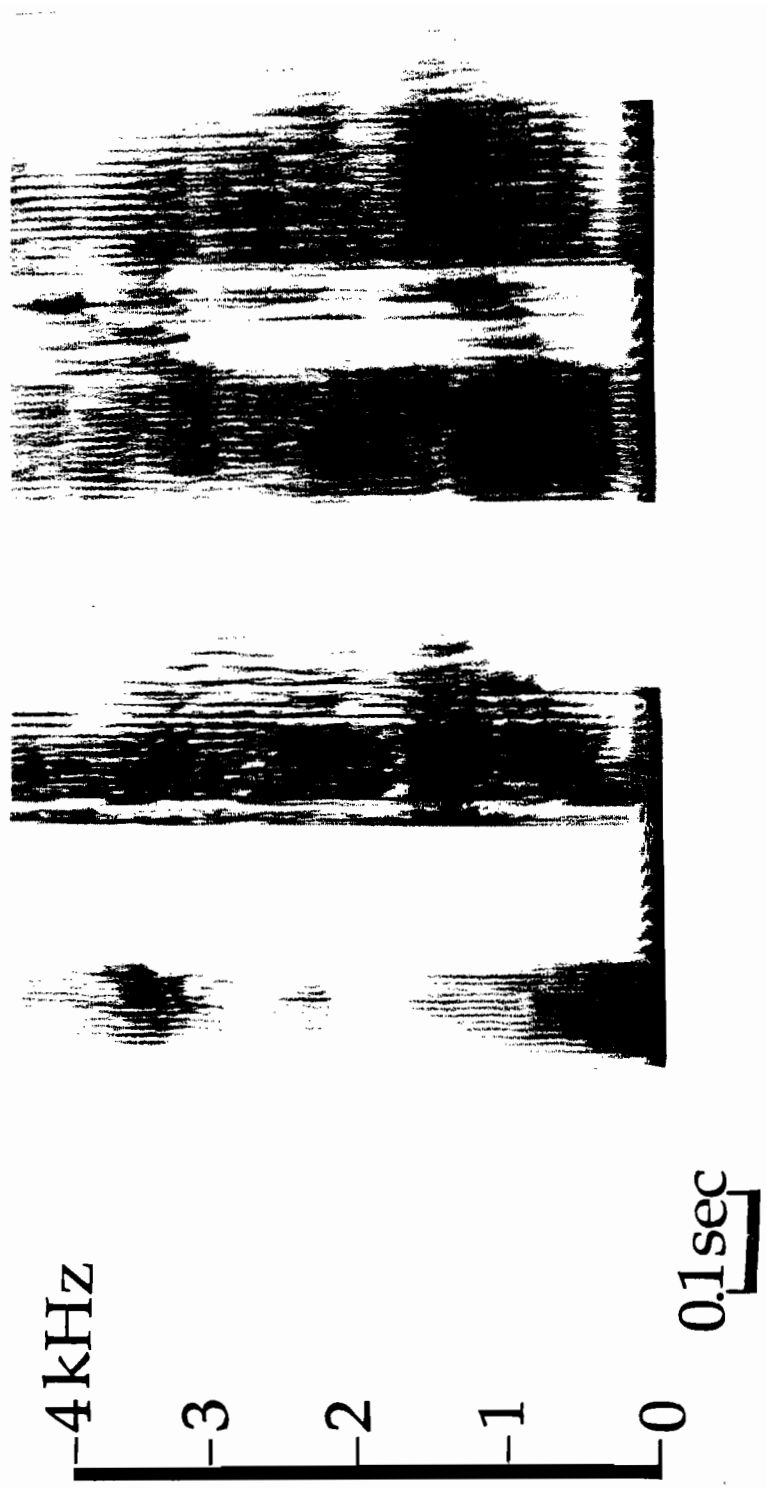


Figure 2a. Comparison of k and x: Spectrograms of the words úkà 'week' (on left) and šxà 'hyena' (on right).

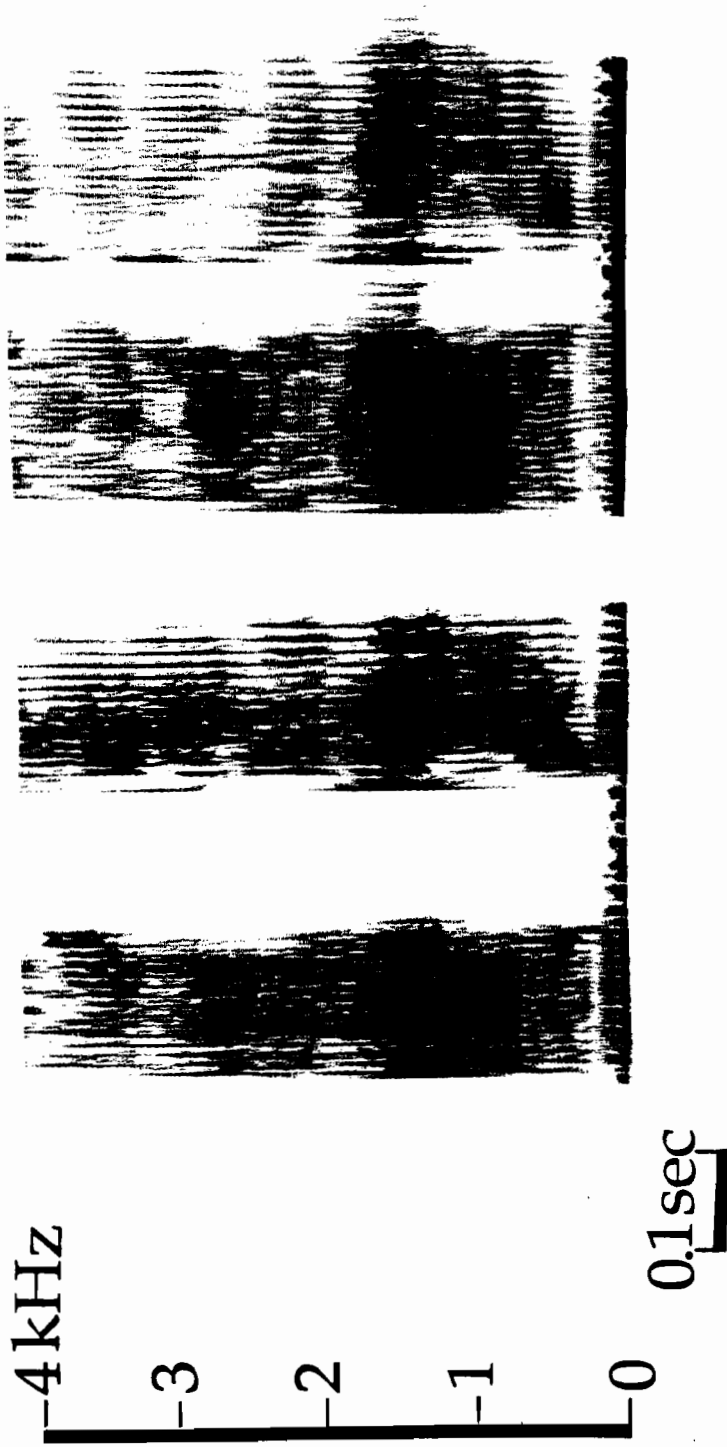


Figure 2b. Comparison of g and γ: Spectrograms of the words àgà 'net' (on left) and àyà 'chain' (on right).



Figure 3. Comparison of m and mh: Spectrograms of the words 'farm' (on left) and 'panic' (on right).

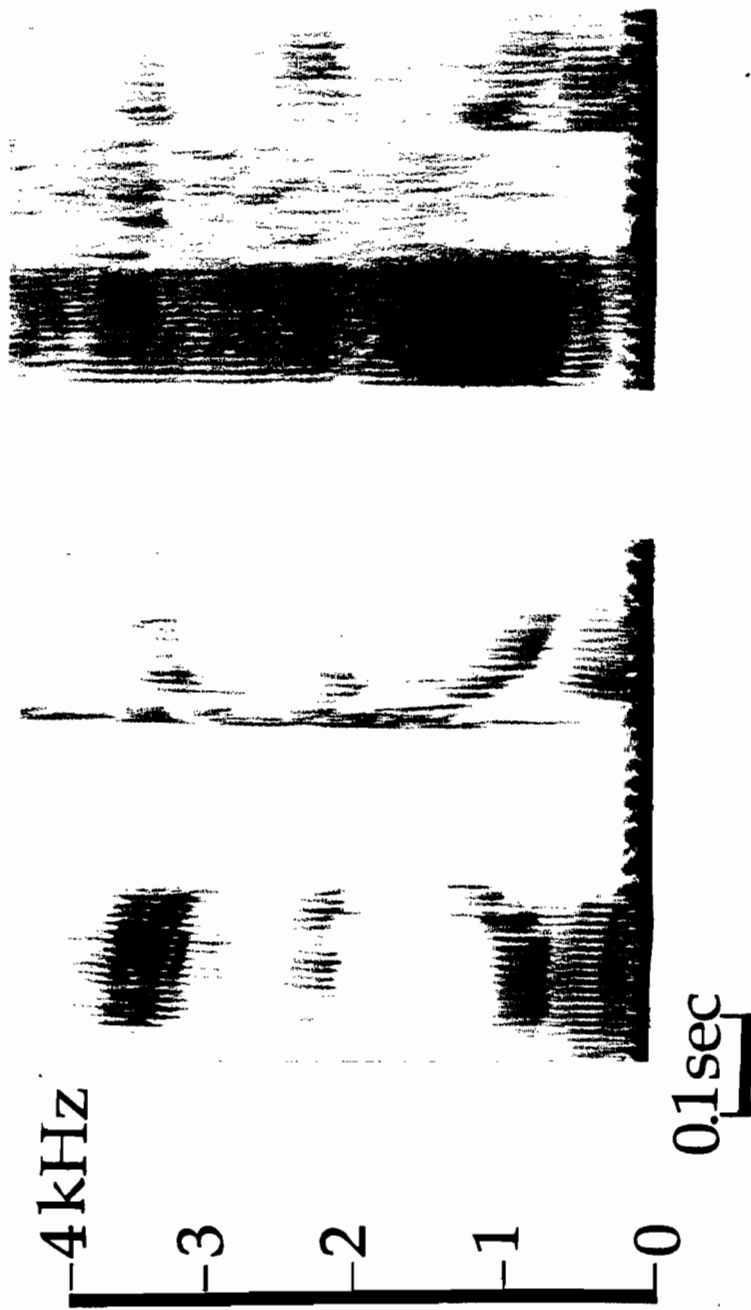


Figure 4. Comparison of t and θ: Spectrograms of the words òtù 'age group' (on left) and áèù 'cap' (on right).



Figure 5. Comparison of v and u: Spectrograms of the words úvfmh} 'draw' (on left) and úvfmh} 'request' (on right).

studies to determine whether there are indeed pressure and air flow differences.

It was further observed that 'k' and 'kh', 'g' and 'gh', and 't' and 'th' differ phonetically both in duration and in frication. Future perceptual studies may resolve the problem of which acoustic cues are most salient for listeners in distinguishing these pairs of consonants.

Similarly, the phonetic difference between the labio-dental 'v' and the bilabial approximant 'vh' shows a length contrast as well as a consonantal contrast.

There is no way to solve the problem of what features should be used phonologically to distinguish between these pairs. The cover features 'tense/lax' and fortis/lenis' are too vague and fail to reveal the phonetic differences. They certainly do not reveal the stop-continuant contrast, although 'by convention' they may reveal the length contrast since in the literature it is often assumed that 'tense' or 'fortis' sounds are longer than their 'lax' or 'lenis' counterparts.

On the phonetic level, I shall use the features [\pm long], [\pm continuant], and [\pm consonantal]. As stated above, there are no compelling phonological reasons to group these consonants into two sets; there exists, for example, no consonant harmony, no consonant alternations, and very few minimal pairs distinguished by the two consonant types. I therefore propose the Distinctive Feature matrices for the phonemes of Ekpheli, as seen in Table 1.

3.0. *Derived phonetic segments (allophonic variants)*

The phonemes /ts/, /dz/, /s/, and /n/ obligatorily undergo a process of palatalization when immediately followed by a [- consonantal, + high, - back] segment, and are thus realized phonetically as [č], [j], [š], and [ɲ] respectively. This will be discussed below in the section on vowels and glide formation. Examples are seen in the list of morphemes given in (2).

4.0. *The vowel system*

On the systematic phonetic level, Ekpheli vowel system reveals seven short vowels, as seen in (4);

(4)	[i]	:	[pi]	'(to) shoot'
	[e]	:	[le]	'(to) eat'
	[ɛ]	:	[nɛ]	'(to) defecate'
	[u]	:	[bu]	'(to) be plenty'
	[o]	:	[do]	'(to) weave'
	[ɔ]	:	[kɔ]	'(to) plant'
	[a]	:	[ma]	'(to) build (mold)'

	l	r	p	b	m	mh	f	v	θ	t	d	ts	s	n	k	g	x	kp	kph	g'b	g'bh	w	y	ɔ	
Vocalic	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-
Labial	-	-	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Back	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anterior	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+
Conronal	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Round	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Voice	+	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+
Continuant	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nasal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strident	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Delayed Release	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

SYSTEMATIC PHONEMES OF EKPELLI

seven long vowels, as shown in (5);

(5)	[ii]	:	[kwii]	'(to) cut'
	[ee]	:	[see]	'(to) climb'
	[εε]	:	[sεε]	'(to) praise'
	[uu]	:	[uumhi]	'grass'
	[oo]	:	[loo]	'(to) imitate'
	[ɔɔ]	:	[vɔɔ]	'(to) store'

a large number of diphthongs of the type illustrated in (6);

(6)	[ai]	:	[okphai]	'basket'
	[ae]	:	[emae]	'food'
	[aε]	:	[ugwaε]	'room'
	[au]	:	[aumhi]	'spirits'
	[ao]	:	[aokwi]	'chameleon'
	[aɔ]	:	[ukaɔmhi]	'counting'
	[oi]	:	[εkoɪ]	'cassava'
	[ou]	:	[oumhi]	'corpse'
	[oa]	:	[upunoa]	'(to) blow out'
	[εi]	:	[εkεi]	'egg'
	[εe]	:	[uθεe]	'snail'
	[εu]	:	[εumhi]	'copper'
	[εa]	:	[ufεa]	'(to) wash (cloth)'
	[ɔi]	:	[oxɔi]	'war'
	[ɔe]	:	[umhɔemhi]	'having'
	[ɔa]	:	[ɔaki]	'not'
	[ei]	:	[esei]	'fish'
	[eu]	:	[eumhi]	'coppers'
	[ea]	:	[uyea]	'forgetting'

and two other sets of diphthongs of the type observed in (7).

(7)	[wi]	:	[a okw]	'chameleon'
	[we]	:	[ɛpwe]	'wealth'
	[wɛ]	:	[axwɛ]	'tomorrow'
	[wo]	:	[udwoyɛ]	'a king's chest'
	[wɔ]	:	[ɔɔɔgwɔ]	'duck'
	[wa]	:	[oθwa]	'harmattan'
	[ye]	:	[oyɛ]	'king'
	[yɛ]	:	[afyɛ]	'urine'
	[yu]	:	[udyudi]	'every palm-tree'
	[yo]	:	[udyoyɛ]	'king's palm-tree'
	[yɔ]	:	[ufyɔ]	'light (lantern)'
	[ya]	:	[ofya]	'shoe'

It will be demonstrated that the vowels of (4) are the only systematic vowel phonemes of the language, and that those in (5-7) are derived. Section 4.1. will discuss why the feature [mid] is selected over the feature [low] in characterizing the vowels of (4). It will also be argued in Section 4.2. that there are no underlying long vowels. In Section 4.3., it will be shown that there are no underlying diphthongs of the type in (6). In Section 4.4., the diphthongs of the type in (7) will be derived from an underlying sequence of vowel + vowel, whereby the first vowel of the sequence becomes a glide or non-syllabic if it has the feature specification [+ high]. In Section 4.5., further arguments against underlying long vowels and underlying diphthongs of the type in (6) and (7) will be presented.

4.1. *Pluralization*

Plurality is characterized by the alternation of vowel prefixes, as seen in (8).

(8)	[akpa]	'cup'	→	[ikpa]	'cups'
	[ukpo]	'cloth'	→	[ikpo]	'clothes'
	[ini]	'elephant'	→	[ini]	'elephants'
	[ɛkpe]	'tiger'	→	[ɛkpe]	'tigers'
	[ope]	'rat'	→	[epe]	'rats'
	[ɔxɔ]	'chicken'	→	[ɛxɔ]	'chickens'
	[eyi]	'tortoise'	→	[eyi]	'tortoises'

In (8), it is observed that nouns which have initial [i], [u], and [a] in the singular show an initial [i] in the plural, whereas those with

initial [e], [ɛ], [o], and [ɔ] in the singular have initial [e] in the plural. The phonetic form of the plural is therefore phonologically conditioned. One might, however, propose a morphological rule by representing the plural prefix as /i/ and stating the conditions under which the /i/ is lowered as in (9).

$$(9) \quad i \rightarrow e / \left[\overline{+ Pl} \right] : \text{ where } \begin{bmatrix} V \\ - \text{ high} \\ - \text{ low} \\ + \text{ Sg} \end{bmatrix}$$

(I am ignoring, for now, what the correct feature specification of these vowels should be, which will be discussed below).

Alternatively, one might posit a strictly phonological rule or, rather, two rules, as given in (10a-b).

$$(10) \quad \begin{array}{l} \text{a.} \\ \text{b.} \end{array} \quad \begin{array}{l} V \\ + Pl \end{array} \rightarrow i / \begin{bmatrix} \alpha \text{ high} \\ -\alpha \text{ low} \end{bmatrix}$$

$$\begin{array}{l} V \\ + Pl \end{array} \rightarrow e / \begin{bmatrix} \alpha \text{ high} \\ \alpha \text{ low} \end{bmatrix}$$

To collapse rules (10a and b) would be very difficult given the feature specifications of the vowels using [\pm high] and [\pm low]. Furthermore, one must distinguish between [e] and [ɛ], and [o] and [ɔ]. Using the SPE (1968) features we would thus distinguish between the vowels as given in (11).

(11)		i	e	ɛ	u	o	ɔ	a
	high	+	-	-	+	-	-	-
	back	-	-	-	+	+	+	+
	low	-	-	-	-	-	-	+
	tense	+	+	-	+	+	-	-

Using these features, rules (9) and (10) would be stated as in (12) and (13).

$$(12) \quad V \rightarrow [- \text{ high}] / \left[\overline{+ Pl} \right] : \text{ where } \begin{bmatrix} V \\ - \text{ high} \\ - \text{ low} \\ + \text{ Sg} \end{bmatrix}$$

$$(13) \quad \begin{array}{l} \text{a.} \\ \text{b.} \end{array} \quad \begin{bmatrix} V \\ + Pl \end{bmatrix} \rightarrow \begin{bmatrix} + \text{ high} \\ - \text{ back} \end{bmatrix} / \begin{bmatrix} \alpha \text{ high} \\ -\alpha \text{ low} \end{bmatrix}$$

$$\begin{bmatrix} V \\ + Pl \end{bmatrix} \rightarrow \begin{bmatrix} - \text{ high} \\ - \text{ back} \\ + \text{ tense} \end{bmatrix} / \begin{bmatrix} \alpha \text{ high} \\ \alpha \text{ low} \end{bmatrix}$$

If instead of using the feature [\pm low] we used the feature [\pm mid] the vowels would be specified as in (14).

(14)		i	e	ɛ	u	o	ɔ	a
	high	+	+	-	+	+	-	-
	back	-	-	-	+	+	+	+
	mid	-	+	+	-	+	+	-

Not only does the feature Mid permit a simpler description but it also permits less complex rules, revealing the generalization in a more intuitively satisfying way. The morphological rule would be stated as in (15), while the phonological alternative would be as in (15').

(15) Pluralization

$$V \rightarrow [+ \text{mid}] \quad / \quad \boxed{+ \text{Pl}} \quad : \quad \text{where} \quad \begin{bmatrix} V \\ + \text{mid} \\ + \text{Sg} \end{bmatrix}$$

$$(15') \quad \begin{bmatrix} V \\ + \text{Pl} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{high} \\ - \text{back} \\ \alpha \text{mid} \end{bmatrix} \quad / \quad \boxed{\alpha \text{mid}}$$

Exceptions to these phonologically conditioned plurals are semantic noun class conditioned plurals, as seen in (16).

(16)	a.	[<u>a</u> lo]	'face'	→	[<u>a</u> lo]	'faces'
	b.	[ɛ <u>ko</u> li]	'tooth'	→	[<u>a</u> ko]	'teeth'
	c.	[<u>o</u> bɔ]	'hand'	→	[<u>a</u> bɔ]	'hands'
	d.	[<u>o</u> wɛ]	'leg'	→	[<u>a</u> gwɛ]	'legs'
	e.	[<u>o</u> lumhi]	'corpse'	→	[<u>a</u> lumhi]	'corpses'
	f.	[ɔ <u>y</u> ya]	'person'	→	[<u>a</u> yya]	'people'
	g.	[ɔ <u>m</u> ɔ]	'child'	→	[<u>i</u> yya]	'children'
	h.	[ɔ <u>d</u> zawoli]	'man'	→	[<u>i</u> dzawoli]	'men'
	i.	[ɔ <u>k</u> potso]	'woman'	→	[<u>i</u> kpotso]	'women'
	j.	[<u>o</u> bo]	'European'	→	[<u>i</u> bo]	'Europeans'

Examples (16a-f) take an [a] prefix in the plural. Notice also that most of these examples of (a-f) are body parts. This suggests a possible historical explanation in the sense that the [a] plural form might be a remnant of the Proto-Niger-Congo gender /ku/--/a/ (sg./pl.) which was used for 'hand', 'leg', and other body parts. Examples (e-f) indicate that the nouns 'corpse' (a dead body), and 'person' (a live body) may also have been considered as 'body parts'. (The irregularity

of (b) and (d) will be discussed under Section 4.5.) Examples (g-j) illustrate that a number of nouns with a possible feature characteristic [+ human] take a semantic noun class conditioned plural [i]. In example (g), the word for 'child' is seen to be irregular in the plural. Not all nouns with the semantic feature [+ body part], or [+ human] take the semantic noun class conditioned plurals [a], or [i]. A number of examples of such nouns are given in (17).

(17)	a.	[<u>u</u> somhi]	'head'	→	[<u>i</u> somhi]	'heads'
	b.	[<u>u</u> kpho]	'heart'	→	[<u>i</u> kpho]	'hearts'
	c.	[<u>u</u> gwa]	'bone'	→	[<u>i</u> gwa]	'bones'
	d.	[<u>a</u> yu]	'belly'	→	[<u>i</u> yu]	'bellies'
	e.	[<u>e</u> gbe]	'body'	→	[<u>e</u> gbe]	'bodies'
	f.	[<u>e</u> sa]	'cheek'	→	[<u>e</u> sa]	'cheeks'
	g.	[<u>e</u> ɔ]	'ear'	→	[<u>e</u> ɔ]	'ears'
	h.	[<u>e</u> to]	'hair'	→	[<u>e</u> to]	'hair'
	i.	[<u>e</u> θa]	'father'	→	[<u>e</u> θa]	'fathers'
	j.	[<u>e</u> ɔ]	'husband'	→	[<u>e</u> ɔ]	'husbands'

In (17), examples (a-j) take phonologically conditioned plurals regardless of the fact that they are characterized by the features [+ body part] (examples (a-h)), or [+ human] (examples (i-j)). The fact that a large number of nouns with the features [+ body part], or [+ human] take the phonologically conditioned plurals is evidence that example (16a-j) which takes the semantic noun class conditioned plurals is an exception to rule (15). Furthermore, the exceptions of example (16a-j) are the only ones found in the data collected for this research. They will simply have to be marked as exceptions to rule (15) in the lexicon. One might wish to provide two minor rules such as seen in (18).

(18)	a.	PL	→	a/	$\left[\begin{array}{l} + \text{exception} \\ + \text{body part} \end{array} \right]_{\text{Sg}}$
	b.	PL	→	i/	$\left[\begin{array}{l} + \text{exception} \\ + \text{human} \end{array} \right]_{\text{Sg}}$

One last topic to be discussed on plurality is what happens to long vowels of the type in (5) and the diphthongs of the sort in (6) when taking the plural. Illustrations are given in (19).

- (19) a. [aokwi] 'chameleon' → [iokwi] 'chameleons'
 b. [aeye] 'buffalo' → [ieye] 'buffaloes'
 c. [ɛamhi] 'meat, animal' → [ɛamhi] 'meats, animals'
 d. [oɛmhi] 'tongue' → [ɛɛmhi] 'tongues'
 e. [uumhi] 'grass' → [iumhi] 'grasses'

Examples of (19a-e) illustrate that only the first part (vowel) of diphthongs and long vowels is effected by the application of rule (15) (pluralization), and not the entire unit as might be the case (i.e., [aokui] → *[iekui], [ɛamhi] → *[eimhi], [oɛmhi] → *[eemhi], and [uumhi] → *[iimhi] after the application of rule (15) since rule (15) effects the prefix of nouns, as was observed in examples (16) and (17). This seems to indicate that the diphthongs and long vowels of the examples of (19a-e) are not functioning as a single diphthong or long vowel segment, but rather as sequences of two separate vowel segments. Furthermore, it appears that the diphthongs and the long vowels of (19) belong to two separate morphemes (i.e., the first vowel of the diphthongs and long vowels that alternates when undergoing the application of rule (15) belongs to the prefix morpheme, while the second vowel belongs to the stem.) Moreover, it will be illustrated in Sections 4.2., and 4.3. that such surface diphthongs and long vowels as seen in (19) are derived from the deletion of an intervocalic /l/. In conclusion, it seems that the process of pluralization offers evidence that the diphthongs of the type in (6) and the long vowels of the sort in (5) should be interpreted as sequences of two contiguous vowels, rather than underlying diphthongs and underlying long vowels.

4.2. *Surface long vowels*

On the systematic phonetic level, Ekpheli exhibits contrastive vowel length, as seen in (20).

- | | | | | |
|------|------------|------------------|----------------|----------------|
| (20) | a. | | b. | |
| | [i] : [pi] | '(to) shoot' | [ii] : [kwii] | '(to) cut' |
| | [e] : [de] | '(to) fall' | [ee] : [see] | '(to) climb' |
| | [ɛ] : [dɛ] | '(to) buy' | [ɛɛ] : [sɛɛ] | '(to) praise' |
| | [u] : [du] | '(to) carry' | [uu] : [uumhi] | 'grass' |
| | [o] : [lo] | '(to) enter' | [oo] : [loo] | '(to) imitate' |
| | [ɔ] : [vɔ] | '(to) be filled' | [ɔɔ] : [vɔɔ] | '(to) store' |
| | [a] : [da] | '(to) drink' | [aa] : [daa] | '(to) melt' |

It will be argued that the vowels of (20b) are not phonological long vowels, but rather they are sequences of two identical vowels of the type in (20a). The examples of (21) illustrate one of the many ways in which the vowels of (20b) are derived.

(21)	Underlying Form		Surface Form
a.	/kuili/	'(to) cut'	→ [kwii] or [kwili]
b.	/sele/	'(to) climb'	→ [see] or [sele]
c.	/sɛlɛ/	'(to) praise'	→ [sɛɛ] or [sɛlɛ]
d.	/dala/	'(to) melt'	→ [daa] or [dala]
e.	/lolo/	'(to) imitate'	→ [loo] or [lolo]
f.	/vɔɔ/	'(to) store'	→ [vɔɔ] or [vɔɔ]

In (21), long vowels are derived by deleting an intervocalic /l/ leaving behind two adjacent identical vowels. The long vowels of the surface form of (21) are found to contrast with verbs that have short vowels (compare for example [dɑ] '(to) drink', [lɔ] '(to) enter', and [vɔ] '(to) be filled' with examples (21d-f)). It should be mentioned here that the surface forms of (21) may or may not contain an intervocalic /l/ (e.g., compare the two columns under Surface Form). Consequently, any rule deleting an intervocalic /l/ must be optional. Therefore, an optional intervocalic /l/ deletion rule is posited in (22) to account for the surface forms of (21).

(22) /l/ Deletion (optional):

$$\left[\begin{array}{l} + \text{ con} \\ + \text{ voc} \\ + \text{ cont} \end{array} \right] \rightarrow \emptyset / [+ \text{ voc}] ____ [+ \text{ voc}]$$

Furthermore, the optionality of this rule explains why there are phonetic long vowels, as well as why all intervocalic /l/'s are not deleted. Not only is rule (22) applicable to verbs as seen in (21), but it is also applicable to nouns, as illustrated in (23).

(23)	Underlying Form		Surface Form
a.	/ebili/	'darkness'	→ [ebii] or [ebili]
b.	/umhele/	'salt'	→ [umhee] or [umhele]
c.	/igbafɛlɛ/	'rice'	→ [igbafɛɛ] or [igbafɛlɛ]
d.	/ulumhi/	'grass'	→ [uumhi] or [ulumhi]
e.	/ilolo/	'song'	→ [iloo] or [ilolo]
f.	/oθɔɔ/	'guinea fowl'	→ [oθɔɔ] or [oθɔɔ]
g.	/agbala/	'main road'	→ [agbaa] or [agbala]

It must be mentioned that there are cases where rule (22) is non-applicable (i.e., rule (22) cannot optionally apply). This refers to morphemes like the example seen in (23e) whereby only one of the two intervocalic /l/'s is deleted, and to morphemes like /ulumhi/ 'entering' whereby the intervocalic /l/ is the only consonant of the stem (i.e., /u/...../mhi/

are affixes for forming the gerundive.). Therefore, if both intervocalic /l/'s are deleted from example (23e) and the only intervocalic /l/ is deleted from /ulomhi/, the stems will be left without an important part of their identification. The examples (where intervocalic /l/ is not deleted when it is the main consonant of the stem) are far more common with verbs than nouns, particles, pronouns, articles, and other grammatical morphemes. Nevertheless, there still remains this general tendency in Ekpheli to retain intervocalic /l/ when its deletion would create a loss of identification of utterances, as observed in (24).

(24)	Uncontracted Form	Contracted Form	
	a. ɔ lo owa	b. ɔ l'owa	c. *ɔ owa
	he enter house	he entered a house	

The utterance of (24a) is possible, acceptable and understandable, but not usually spoken. That is, since it is totally unambiguous, it usually appears in spoken language (as opposed to written) for the purpose of clarity. The utterance of (24b) is what one almost always hears. As can be observed (but less discernible here since two like vowels are concerned), the vowel of the verb is deleted. The final vowel of verbs is always deleted whenever contracted with noun objects (see Section 4.5). Since this is the case with contractions, it usually results in utterances that are ambiguous as is the case of (24b) which has three or more possible meanings. For example, in addition to the meaning given in (24b), it can also mean "he ate a house" (from the verb /le/ 'to eat'), or it can mean "he knew a house" (from the verb /lɛ/ 'to know'). In (24c), if both /l/ deletion and vowel deletion occurs, the entire verb is deleted leaving a pronoun and a noun; the complete identification of the verb is lost. This explains why all intervocalic /l/'s are not deleted. Consequently, we are left with a rule that is phonologically motivated or conditioned, but psychologically constrained (i.e., it can optionally apply to intervocalic /l/'s where the identification of morphemes or utterances is not lost.)

Thus, phonology is not autonomous; semantic factors may constrain phonological processes. Intervocalic /l/ deletion in Ekpheli provides interesting data regarding the necessity of semantic information within phonology. Current linguistic theory doesn't allow us a way to formalize such processes that are phonologically motivated and semantically constrained. It will be noticed in Section 4.3 that glide deletion encounters the same problems. One might suggest that in such cases we find an interaction of grammatical and pragmatic factors which are at present unaccountable for in any theoretical framework. The /l/ deletion rule therefore requires a condition blocking its application when the result would be unclarity or ambiguity.

Other cases where long vowels are derived are of the type in (25).

(25)	Underlying Form		Surface Form		
	(1)	(2)	(3)	(4)	
a.	/eseli/	'fish' → [eseli]	→ [esei]	→ [esee]	
b.	/ekɛli/	'egg' → [ekɛli]	→ [ekɛi]	→ [ekɛɛ]	
c.	/ɛwoli/	'town' → [ɛwoli]	→ [ɛwoi]	→ [ɛwoo]	
d.	/oxɔli/	'war' → [oxɔli]	→ [oxɔi]	→ [oxɔɔ]	
e.	/ukphali/	'horn' → [ukphali]	→ [ukphai]	→ [ukphaa]	

Again, the phonetic forms of (25) can surface with the presence of the intervocalic /l/, as seen in column (2). Consequently, rule (22) is also optional in this case. Notice that if rule (22) applies to the underlying form of column (1), the output of rule (22) would not give the surface forms of column (4), but rather [esei], [ekɛi], [oxɔi], and [ukphai] respectively. These forms can, however, also surface phonetically. Therefore, an intermediate stage whereby an optional assimilation rule would apply to [esei], [ekɛi], [ɛwoi], [oxɔi], and [ukphai] to give the surface forms of column (4) is needed. This optional assimilation rule will be as in (26).

(26) /i/ Assimilation (optional)

$$\left[\begin{array}{c} \text{V} \\ + \text{ high} \\ - \text{ back} \\ - \text{ mid} \end{array} \right] \rightarrow [\alpha\text{F}] / \left[\begin{array}{c} \text{V} \\ \alpha\text{F} \end{array} \right] _____\#$$

This rule states that /i/, in word final position, will assimilate to the features of the preceding vowel. Since the forms *[esele], *[ɛwolo], *[ekɛle], *[oxɔɔ], and *[ukphala] never surface phonetically, this suggests that rule (22) if applied to the underlying form of (25) must be ordered before rule (26) if rule (26) is to apply, or both rules could apply simultaneously. However, simultaneous rule application would not account for the fact that the following forms can occur, e.g., [eseli], [esei], [esee]. That is, rule (26) can only apply if rule (22) has applied.

4.3. Diphthongs of the type in (6)

Ekpheli exhibits a large number of diphthongs (a sequence of two contiguous non-identical vowels), as seen in (27).

(27)

ai oi ei oi ei
ae ee oe
ae
au ou eu
ao
ao
oa ea oa ea

These diphthongs of (27) are derived, as observed in (28).

- (28) a. [ai] : /okphai/ → [okphai] 'basket'
b. [ae] : /emae/ → [emae] 'food'
c. [aε] : /uguae/ → [uguae] 'room'
d. [au] : /alumhi/ → [aumhi] 'spirits'
e. [ao] : /alokui/ → [aokwi] 'chameleon'
f. [aɔ] : /ukalɔmhi/ → [ukaɔmhi] 'counting'
g. [oi] : /ekoli/ → [ekoi] 'cassava'
h. [ou] : /olumhi/ → [oumhi] 'corpse'
i. [oa] : /upunoya/ → [upunoa] 'to blow out'
j. [ei] : /ekeli/ → [ekeli] 'egg'
k. [ee] : /uθele/ → [uθee] 'snail'
l. [ea] : /ufeya/ → [ufea] 'to wash (cloth)'
m. [eu] : /elumhi/ → [eumhi] 'copper'
n. [ɔi] : /oxɔli/ → [oxɔi] 'war'
o. [ɔe] : /umhɔlemhi/ → [umhɔemhi] 'having'
p. [ɔa] : /ɔwaki/ → [ɔaki] 'not'
q. [ei] : /eseli/ → [esei] 'fish'
r. [ea] : /uyeya/ → [ueya] 'forgetting'
s. [eu] : /elumhi/ → [eumhi] 'coppers'

It can be observed in (28a-h, j-k, m-o, q, and s) that a number of these diphthongs are derived by the deletion of an intervocalic /l/. Examples (28i, l, and r) illustrate that other such diphthongs are derived by the deletion of an intervocalic /y/. Example (28p) is shown to be derived from the deletion of an intervocalic /w/. Since the forms left of the arrow are capable of surfacing phonetically with all consonants remaining intact, whatever deletion rules that are necessary to reduce the

forms left of the arrow to those that are right of the arrow must be optional. Rule (22) can account for the optional deletion of intervocalic /l/'s in example (28a-h, j-k, m-o, q, and s). On the other hand, the examples of 28(i, l, r, and p) suggest the positing of an optional glide deletion rule of the form in (29).

(29) Glide Deletion (optional)

$$\begin{bmatrix} - & \text{con} \\ - & \text{voc} \end{bmatrix} \rightarrow \emptyset / [+ \text{voc}] \text{ ______ } [+ \text{voc}]$$

(y,w)

Furthermore, rule (22) and rule (29), having the same environment, can be collapsed into the rule of (30).

(30) Lateral and Glide Deletion (optional)

$$\begin{bmatrix} \alpha & \text{con} \\ \alpha & \text{voc} \\ + & \text{cont} \end{bmatrix} \rightarrow \emptyset / [+ \text{voc}] \text{ ______ } [+ \text{voc}]$$

(l,w,y)

Rule (30), like the intervocalic /l/ deletion rule (22), will apply to glides that will not result in a loss of identification of morphemes. /y/, for example, is found to delete when occurring in what might be called a suffix or splitting verbal units as seen in (31).

(31)	/feya/	'to wash'	→	[fɛa]
	/veya/	'to break'	→	[vɛa]
	/yeya/	'to forget'	→	[yɛa]
	/valaya/	'to separate'	→	[valaa]
	/punoya/	'to blow out'	→	[punoa]
	/kpoluya/	'to clean'	→	[kpolua]
	/gwɔɣɔya/	'to demolish'	→	[gwɔɣɔa]

The verbs of (31) all have an underlying meaning that involves "away or out"; /ya/ adds this particular meaning to verbs. It occurs only as a "suffix" added to verbs, i.e., never occurs as a verb. However, any object of the verbs of (31) occurs between the verb and /ya/ (e.g., ɔ pun(o) eθai ya "he blew out the fire").

The deletion of /w/ is most commonly associated with the negative construction and the word /ɔwa/ 'who'.

Thus far, it has been argued that there are no underlying diphthongs of the type in (6). Furthermore, it has been illustrated that any such surface diphthongs are not vowel sequences in their underlying representations, but have an intervening consonant. There remain, however, a few cases that must be treated as exceptions. Such exceptions, for

example, never surface as diphthongs. Nevertheless, they must be treated as vowel sequences in their underlying representation. Illustrations are given in (32).

(32)	1.	2.	3.	
	a. /áìsì/	→	áàsì	âsì 'ant'
	b. /óìbò/	→	óòbò	ôbò 'European'

The underlying form is given in column (1). Note that the initial stem vowel of column (1a-b) is /i/. The vowel prefix of (a) is /a/, while (b) is /o/. In column (2) the stem vowel undergoes an obligatory rule of vowel assimilation whereby it assimilates to the vowel prefix. In column (3), one of the identical vowels is deleted. The motivation for positing an underlying vowel sequence that never surfaces phonetically is of several sources. First, there is evidence in other dialects that an intervening consonant of (32a) still surfaces phonetically (e.g., [á̀s̀s̀ì] 'ant', see Appendix, word no. 12). In Ekpheli, it is obvious that the intervening consonant has been lost. This alone, of course, would not justify lexical representation which never surfaces if this were the only evidence. A second reason for positing the phonemic forms in column (1) is provided by the plural forms of these words. If the underlying representations were those of column (2) or column (3), the expected plurals (see Section 4.1) would be [iasì]/ [isi] and [iobo] / [ibo] respectively. These are, instead [iisi] / [isi] and [iibo] / [ibo]. Given the underlying representations as suggested above one also can derive the falling tones and the long vowels from sequences of vowels as will be shown to be a regular process in Ekpheli (see Chapter III, and Section 2.1).

This /i/ assimilation rule is almost identical to rule (26) except in its obligatory nature. One might collapse these rules as shown in (33).

(33). /i/ Assimilation.

$$\begin{bmatrix} \text{V} \\ + \text{high} \\ - \text{back} \\ - \text{mid} \end{bmatrix} \rightarrow [\alpha F] / \begin{bmatrix} \text{V} \\ \alpha F \end{bmatrix} \left[\begin{array}{c} \text{---} \\ \langle + \text{Stem} \rangle \end{array} \right] (\#)$$

Condition $\langle + \text{Stem} \rangle$ = obligatory.

This rule states that /i/, whenever occurring as the initial vowel of a stem or a final vowel, will assimilate to the immediately preceding vowel. This rule would then be followed by a vowel contraction rule of the form in (34).

(34) Vowel Deletion (optional)

$$\begin{bmatrix} + \text{voc} \\ - \text{con} \\ \alpha F \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} + \text{voc} \\ - \text{con} \\ \alpha F \end{bmatrix} \text{---}$$

4.4. Diphthongs of the type in (?)

At the systematic phonetic level, Ekpheli displays a number of diphthongs of the sort in (35).

(35)	a.	wi	*wu	b.	*yi	yu
		we	wo		ye	yo
		wɛ	wɔ		yɛ	yɔ
		wa			ya	

We are concerned here with these glide + vowel diphthongs that occur after consonants (e.g., [twɛ] 'to cost', and [pye] 'to clear bush'). The diphthongs *[wu] and *[yi] are starred in (35) to indicate the non-occurrences of such diphthongs, which will be discussed below. It will be illustrated in this section that none of the diphthongs of (35) occur at the systematic phonemic level, but are derived from underlying sequences of two contiguous vowels, as in (36).

(36)	a.	/alok <u>ui</u> /	'chameleon'	→	[alok <u>wi</u>]
	b.	/ɛp <u>ue</u> /	'wealth'	→	[ɛp <u>wɛ</u>]
	c.	/ax <u>uɛ</u> /	'tomorrow'	→	[ax <u>wɛ</u>]
	d.	/oθ <u>ua</u> /	'harmattan'	→	[oθ <u>wa</u>]
	e.	/ɔdɔ <u>guɔ</u> /	'duck'	→	[ɔdɔ <u>gwɔ</u>]
	f.	/oθ <u>ie</u> /	'king'	→	[oθ <u>ye</u>]
	g.	/af <u>iɛ</u> /	'urine'	→	[af <u>ye</u>]
	h.	/of <u>ia</u> /	'shoe'	→	[of <u>ya</u>]
	i.	/uf <u>iɔ</u> /	'light (lantern)'	→	[uf <u>yɔ</u>]

The vowels that concern us here are underlined. Notice that each vowel sequence begins with a vowel of the feature specification [+ high]. And that, it is these vowels that undergo a feature change when immediately preceded by a segment of the specified feature [+ con], and immediately followed by a [+ voc] segment. This feature change of high vowels does not take place, however, if the specified environment is not met. That is, if a /u+V/ or /i+V/ sequence is not immediately preceded by a [+ con] segment, the process does not occur (e.g., when an intervocalic /i/, of the type in /ilokui/ 'chameleons', is deleted leaving behind a vowel sequence /i+o/, it does not become *[yokwi] since it is not immediately preceded by a [+ con] segment. The /i/ in this case is a plural prefix (see Section 4.1.). Furthermore, it must be specified that the immediately following vowel in such sequences as /u+V/ and /i+V/ (where /V/ stands for vowel) must not be of the identical feature specification of the preceding high vowel (i.e., the [+ high, + voc] segment will not undergo

a feature change to [-voc] if the immediately following vowel has identical feature specification (e.g., when an intervocalic /l/ is deleted in /ebili/ 'darkness', it does not become *[ebyi], but rather, it remains [ebii], or the final /i/ can be optionally deleted leaving behind [ebi]).

Due to the fact that most of the VV sequences (except for examples of the type /aisi/ 'ant' and /oibo/ 'European') in previous discussions were derived (e.g., from the deletion of intervocalic /l/, /y/, /w/), one can ask why are there only the occurrences of underlying /VV/ sequences of the type in example (36), and why underlying glides are not posited instead. A possible historical reason is that the vowel sequences of the type in (36) have permanently lost their intervening consonants during the course of history. Synchronic evidence with intervening consonants of some of the VV sequences of the type in (36) is found in cross dialectal comparison. For example, the word for 'beans' is /ezi|ε/ in Aviele, and /isi|ε/ in South Uneme, while it is /efi|ε/ in Ekpheli, Auchi, Avianwu, Uzairue, and South Ibie. Notice that in the former dialects, the word for 'beans' occurs with the intervocalic /l/, while in the latter it occurs without. Similarly, the infinitive 'to faint' is /unilamhi/ in Ekpheli, Uzairue, and South Ibie, while it is /uniamhi/ in Weppa-Wano, and Avianwu. The word for 'voice' is /uɾu|li/ in Auchi, /uɾui|/ in Uzairue, and /uθu|li/ in Ekpheli. The word for 'bundle' is /uku|li/ in Auchi, /uku|/ in Uzairue, /uku|li/ in Ekpheli, /uxu|/ in Wepp-Wano, and Avianwu, and /uxu|li/ in South Ibie. See Appendix for more examples. Further support for positing underlying VV sequences to derive the glides of (36) will be presented in this section below and Section 4.5.

Support for deriving the diphthongs of (35) from sequences of underlying vowels is provided by the noun + noun associative construction as shown in (37).

(37)	1.	2.	3.
a.	/udu # <u>oy</u> le/ 'chest' 'king'	udu <u>oy</u> le	[udwoyye] 'chest of a king'
b.	/udi # <u>oy</u> le/ 'palm-tree' 'king'	ud <u>ioy</u> le	[udyooye] 'palm-tree of a king'

We are concerned with the underlined vowels. In column (1) of (37) the two morphemes are given in their underlying forms. A sequence with two contiguous vowels is observed in column (2). In column (3), the [+voc, +high] segments have undergone a feature change to [-voc]. In the associative construction these [+voc, +high] segments fail to undergo a feature change if the immediately following vowel is of the identical feature specification, as illustrated in (38).

(38)	1.	2.	3.
a.	/idu # <u>uk</u> peko/ 'lion' 'village'	idu <u>uk</u> peko	[idukpeko] 'lion of a village'
b.	/ey # <u>ik</u> o/ 'tortoise' 'messenger'	ey <u>ik</u> o	[eyikɔ] 'tortoise of a messenger'

Again, the underlying forms are given in column (1). A sequence of two contiguous vowels is seen in column (2). The two identical vowels are contracted in column (3) (see Section 4.5 on vowel contraction).

We have observed in this section that [+voc, +high] segments undergo a feature change to [-voc] when immediately following a [+con] segment and immediately preceding a [+voc] segment within morphemes and across morpheme boundaries. Furthermore, it was illustrated that if the immediately following vowel has identical features, then the [+voc, +high] segment will not undergo the feature change to [-voc]. In order to capture the generalization of this glide formation process, a rule of the form in (39) is posited.

(39) Glide Formation.

$$V_1 \rightarrow [-\text{voc}] / C \left[\begin{array}{c} + \text{voc} \\ + \text{high} \end{array} \right] V_2$$

Condition: $V_1 \neq V_2$

The [+high, -back] glide ([y]) has a palatalizing effect on some immediately preceding consonants. That is, the consonants /ts/, /dz/, /s/, and /n/ obligatorily undergo a process of palatalization when occurring immediately before a glide of the feature specification [+high, -back], and, therefore, surface phonetically as [č], [j], [š], [ɲ] respectively. All of the above consonants, except for the /ts/, require the presence of the glide [y] in order to undergo the palatalization process. That is, while /ts/ can optionally undergo the process of palatalization when occurring immediately before the [+high, -back] vowel [i] (e.g., /itsi/ 'pig' can surface phonetically as [itsi] or [iči]), /dz/, /s/, and /n/ cannot (e.g., /odzi/ 'crab', /usi/ 'law', and /ini/ 'elephant' cannot surface phonetically as *[oʃi], *[uši], and *[ɲi] respectively). Thus, palatalization of /ts/ is more general than that of the other segments. The optional rule for palatalization in this case is stated in (40).

(40) Palatalization (optional).

$$/ts/ \rightarrow [č] / _i$$

Since palatalization is conditioned by the glide formation, the palatalization rule of the form in (41) must be ordered after the glide formation rule of (39).

(41) Palatalization (obligatory).

$$\begin{array}{l} ts \\ dz \\ s \\ n \end{array} \rightarrow \begin{array}{l} č \\ j \\ š \\ ɲ \end{array} / _y$$

In various proposed feature sets there is no one feature which would distinguish [ts], [dz], [s], and [n] as a class from [d] and [t]. Yet,

the four segments constitute a class which appears to be intuitive. Research in experimental phonetics is required to determine whether these sounds, excluding the alveolar/dental stops, are phonetically similar. One may find that a feature apical vs. laminal is needed. At this point, all we can suggest is a rule of the form in (42).

(42) Palatalization.

$$\left[\begin{array}{l} + \text{ cor} \\ \{ + \text{ del rel} \} \\ + \text{ nasal} \end{array} \right] \rightarrow \left[\begin{array}{l} + \text{ retracted} \\ + \text{ high} \\ - \text{ back} \end{array} \right] / \text{ ___ } y$$

This rule is one way of expressing rule (41) in features. The glide [y] can be optionally deleted by rule (43) after the palatalization rule has applied.

(43) Glide Deletion Rule (optional).

$$\left[\begin{array}{c} + \text{ Seg} \\ y \end{array} \right] \rightarrow \emptyset / [+ \text{ retracted}] \text{ ______ }$$

This rule specifies that the glide [y] can be optionally deleted only when occurring immediately after [č], [j], [š], and [ɲ].

A sample derivation of the operation of the rules (39), (41), and (43) are given in (44).

(44) Underlying Form		Rule (39)	Rule (41)	Rule (43)
/itsiɛ/	'yours'	itsye	ičye	[iče]
/iridzia/	'well (water)'	iridzya	iriŋya	[iriŋa]
/enesiɛ/	'few'	enesye	enešye	[eneše]
/anio/	'wine'	anyo	anyo	[ano]

Not only does the process of palatalization operate within morphemes, but it also operates across morpheme boundaries, as seen in (45) (the associative construction).

(45)	1.	2.	3.	4.	5.
	/itsi # oyie/ 'pig' 'king'	itsioyie	itsyoyye	ičyoyye	[ičoyye] 'king's pig'
	/odzi # oyie/ 'crab' 'king'	odzioyie	odzyoyye	iŋyoyye	[iŋoyye] 'king's crab'
	/usi # oyie/ 'law' 'king'	usioyie	usyoyye	ušyoyye	[ušoyye] 'king's law'
	/ini # oyie/ 'elephant' 'king'	inioyie	inyoyye	inyoyye	[inyoyye] 'king's elephant'

The vowels, diphthongs, and consonants that concern us here are underlined. In column (1), the underlying forms are given. In column (2),

the two vowels of column (1) are now contiguous. In column (3), rule (39) applies. Rule (41) applies to the output of rule (39) in column (4). In column (5), rule (43) applies.

The one remaining vowel that requires some discussion is /u/, which has a rounding or labializing effect on the consonant /m/ (e.g., /mu/ 'to catch' surfaces phonetically as [mwu]). This suggests the rule in (46).

(46) Labialization.

$$\begin{array}{c} \boxed{\begin{array}{l} + \text{ nasal} \\ + \text{ long} \\ + \text{ ant} \end{array}} \\ m \end{array} \rightarrow [+ \text{ round}] / \text{ ______ } \boxed{\begin{array}{l} + \text{ high} \\ + \text{ round} \end{array}}$$

This rule states that /m/ takes on the feature [+ round] or becomes labialized before the vowel /u/.

4.5. Vowel contraction

The final vowel of verbs is always deleted when preceding a vowel prefix of an immediately following noun object, as seen in (47).

- (47)
- | | | | | |
|----|---------------|---|-----------|--------------|
| | 1. | | 2. | |
| a. | /dɛ # akpa/ | → | [dakpa] | 'buy a cup' |
| | 'buy' 'cup' | | | |
| b. | /sese # akpa/ | → | [sesakpa] | 'make a cup' |
| | 'make' 'cup' | | | |

The underlying form (except for tone) is given in column (1). Observe in column (2) that vowel deletion applies to the final vowel of both monosyllabic verbs (as in (a)) and dissyllabic verbs (as in (b)).

The process of vowel deletion fails to operate, however, if the final vowel of the verb is either /i/ or /u/, unless the immediately following vowel prefix is also either /i/ or /u/ respectively. /i/ and /u/ (see Section 4.4.) become [y] and [w] respectively. Examples are given in (48).

- (48)
- | | | | | |
|----|-----------------|---|------------|-----------------|
| a. | /pi # ɛkpɛ/ | → | [pyɛkpɛ] | 'shoot a tiger' |
| | 'shoot' 'tiger' | | | |
| b. | /du # akpa/ | → | [dwakpa] | 'carry a cup' |
| | 'carry' 'cup' | | | |
| c. | /fomhi # owa/ | → | [fomhyowa] | 'sweep a house' |
| | 'sweep' 'house' | | | |
| d. | /pi # idu/ | → | [pidu] | 'shoot a lion' |
| | 'shoot' 'lion' | | | |
| e. | /du # ukpo/ | → | [dukpo] | 'carry a cloth' |
| | 'carry' 'cloth' | | | |

In (48a-c), it is noted that when the vowel prefix of the noun object is not identical in feature specifications to the final vowel of the verb,

the final vowel of the verb (whether monosyllabic or dissyllabic) undergoes a glide formation rule (39). Observe that such diphthongs of column (2a-c) are of the type seen in (7). To the contrary, examples (d-e) show that the glide formation fails if the final vowel of the verb and the vowel prefix of the noun have identical feature specifications. This process of vowel contraction in the above cases can be accounted for with a rule of the form in (49).

(49) Regressive Vowel Deletion.

$$\left[\begin{array}{c} v_1 \\ \langle + \text{high} \rangle \end{array} \right] \rightarrow \emptyset / \text{---} \left| \begin{array}{c} \text{Verb} \\ v_2 \text{ Prefix} \end{array} \right.$$

Condition $\langle v_1 = v_2 \rangle$

This rule states that the final vowel of a verb is deleted when contracted with a vowel prefix, and that the high vowels (/i/ and /u/) are deleted only if they are identical to the vowel prefix with which they are contracted. The condition of rule (49) can be abandoned if a rule ordering is imposed on rule (39) (glide formation) and rule (49) (regressive vowel deletion), whereby rule (39) must precede rule (49) in the ordering. Thus, rule (39) (ordered before rule (49)) will change all appropriate high vowels into glides. Then rule (49) will simply delete the remaining correct vowels.

The phonological processes of vowel deletion (rule (49)) as observed in the examples of (48) and intervocalic /l/ deletion (rule (22)) as seen in the examples of (21), (23), and (25) can create long vowels of the type in (5) and diphthongs of the type in (6). Illustrations are given in (50).

(50)	1.	2.	3.
a.	/ka <u>l</u> ɔ # aɣia/ 'count' 'people'	→ [kalayya]	→ [kaayya] 'count people'
b.	/ka <u>l</u> ɔ # eseli/ 'count' 'fish'	→ [kaleseli]	→ [kaeseli] 'count fish'
c.	/ka <u>l</u> a # eseli/ 'dry' 'fish'	→ [kaleseli]	→ [kaeseli] 'dry fish'
d.	/se <u>l</u> e # akatsi/ 'mount' 'horse'	→ [selakači]	→ [seakači] 'mount a horse'
e.	/se <u>l</u> e # eθa/ 'climb' 'trees'	[seleθa]	→ [seeθa] 'climb trees'

Note that the forms of column (2) and (3) can both surface phonetically. The final vowel of the verb is deleted in column (2). In column (3), the intervocalic /l/ is deleted. Observe in column (3a,e) that long vowels of the type in (5) are created. It is further shown in column (3b-d) that diphthongs of the type in (6) are derived.

Furthermore, the final vowel of a noun stem is deleted when contracted

with an immediately following vowel prefix, as observed in (51).

- (51)
- | | | | | | |
|----|----------------|---|----|----------|------------------|
| 1. | /owa # oɣie/ | → | 2. | [owoyye] | 'a king's house' |
| | 'house' 'king' | | | | |

Again, vowel deletion fails to operate if the final vowel of the nouns is /i/ or /u/, unless the following vowel prefix happens to be /i/ or /u/ respectively. Examples are given in (52).

- (52)
- | | | | | | | |
|----|------------------|-------------------------|------------|--------------------|-----------|---------------------------|
| a. | 1. | /udi # oɣie/ | → | 2. | [udyoyye] | 'a king's palm-tree' |
| | | 'palm-tree' 'king' | | | | |
| b. | /idu # oɣie/ | → | [idwoyye] | 'a king's lion' | | |
| | 'lion' 'king' | | | | | |
| c. | 1. | /udi # ikɔ/ | → | 2. | [udikɔ] | 'a messenger's palm-tree' |
| | | 'palm-tree' 'messenger' | | | | |
| d. | /idu # ukpeko/ | → | [idukpeko] | 'a village's lion' | | |
| | 'lion' 'village' | | | | | |

Rule (49) can therefore also account for this process as shown in (53).

(53) Regressive Vowel Deletion.

$$\left[\begin{array}{c} V_1 \\ \langle + \text{high} \rangle \end{array} \right] \rightarrow \emptyset / \text{---} \Big|_{N,V} \left[\begin{array}{c} V_2 \\ \text{Prefix} \end{array} \right]$$

Condition: $\langle V_1 = V_2 \rangle$

Again, the condition of rule (53) is unnecessary if an ordering is imposed on rule (39) (glide formation) and rule (53) whereby rule (39) must precede rule (53) in the ordering.

While it is obvious in example (52a-b) that the diphthongs of the type [yo] and [wo] are derived from sequences of underlying vowels of /i + o/ and /u + o/ respectively, it is not so obvious in the examples of (54) that such diphthongs are derived from sequences of two underlying vowels.

- (54)
- | | | | | | | | | | |
|----|------------------|------------------|--------------|----|--------------|-------------------|----|--------------|-----------------|
| a. | 1. | /ayua # ɔkpotso/ | → | 2. | aywa ɔkpotso | → | 3. | [aywɔkpotso] | 'a woman's dog' |
| | | 'dog' 'woman' | | | | | | | |
| b. | /efia # ɔkpotso/ | → | efya ɔkpotso | → | [efyɔkpotso] | 'a woman's shoes' | | | |
| | 'shoes' 'woman' | | | | | | | | |

In column (1), the underlying form is given. The vowel sequences /u a/ and /i a/ underwent glide formation in column (2). In column (3), vowel deletion applies, giving the surface form. There is no real motivation for column (2) to occur before column (3) since it appears that vowel de-

letion can occur before glide formation, simultaneous with glide formation, or after glide formation, and the out-put will still be that of column (3). Therefore, it is not at all obvious as to which vowel (i.e., the /a/ or the /ɔ/) conditions the glide formation, or whether these glides occur in the underlying matrices. The problem is further complicated, as seen in example (55).

(55)	(1)	(2)	(3)	(4)
a.	/ayua # ukpeko/ 'dog' 'village'	→ aywa ukpeko	→ aywukpeko	→ [ay(u)ukpeko] 'a village's dog'
b.	/efia # ikɔ/ 'shoes' 'messenger'	→ efyɔ ikɔ	→ efyikɔ	→ [ef(i)ikɔ] 'a messenger's shoes'

Again, the underlying form is given in column (1). Glide formation takes place in column (2). Vowel deletion takes place in column (3). In column (4), the glides are changed back into vowels, and one of the two vowels of the sequence can be optionally deleted. Again, it is not obvious as to whether or not the glides exist in the underlying structure or whether they are derived from underlying vowel sequences. Furthermore, since they never surface phonetically, one can alternatively argue that vowel deletion applies before glide formation therefore rendering the glide formation rule inapplicable to the examples of (55). This would, nevertheless, create a paradox since in some cases vowel deletion would apply before glide formation, and in other cases after. Adopting the hypothesis that the glides are derived, the additional rules of (56) and (57) are needed to account for the data of (55).

(56) Vocalization

$$C \begin{bmatrix} - \text{voc} \\ + \text{high} \\ \alpha \text{ back} \\ \alpha \text{ round} \end{bmatrix} \rightarrow [+ \text{voc}] / \text{---} \begin{bmatrix} + \text{voc} \\ + \text{high} \\ \alpha \text{ back} \\ \alpha \text{ round} \end{bmatrix}$$

This rule specifies that [y] and [w] become [i] and [u] respectively when preceded by a consonant and followed by [i] and [u] respectively.

(57) Long Vowel Shortening (optional)

$$\begin{bmatrix} + \text{voc} \\ + \text{long} \end{bmatrix} \rightarrow [- \text{long}]$$

This rule states that [ii] and [uu] become [i] and [u] respectively. In order to obtain the correct output in (55), the rules given must be ordered as follows: rule (39) Glide Formation, rule (53) Vowel Deletion, rule (56) Vocalization, and rule (57) Long Vowel Shortening.

Since the final vowel of a noun deletes or undergoes glide formation when contracted to the following vowel prefix of any morpheme, rule (53) would account for all of the instances of vowel contraction found in the examples of (58).

(58)	1.	2.	
	<u>Adverbial</u>		
	a. /ukpo # εnode/ 'cloth' 'yesterday'	[ukpεnode]	'yesterday's cloth'
	b. /aki # εnode/ 'market' 'yesterday'	[akyεnode]	'yesterday's market'
	c. /otu # εnode/ 'age-group' 'yesterday'	[otwεnode]	'yesterday's age-group'
	<u>Adjectival</u>		
	d. /owa # ɔdzɔ/ 'house' 'old'	[owɔɔ]	'an old house'
	e. /uki # ɔgbɔmhi/ 'moon' 'new'	[ukyɔgbɔmhi]	'a new moon'
	f. /idu # ɔueve/ 'lion' 'another'	[idwɔueve]	'another lion'
	g. /umhele # ɔtsomhi/ 'salt' 'some'	[umhelɔtsomhi]	'some salt'
	h. /akpa # ɔdzeva/ 'cup' 'second'	[akpɔdzeva]	'a second cup'
	i. /owa # ɔda/ 'house' 'different'	[owɔda]	'a different house'
	<u>Interrogative (whose noun)</u>		
	j. /owa # ɔwa/ 'house' 'whose'	[owɔwa]	'whose house?'
	k. /idu # ɔwa/ 'lion' 'whose'	[idwɔwa]	'whose lion?'
	l. /udi # ɔwa/ 'palm-tree' 'whose'	[udyɔwa]	'whose palm-tree?'
	<u>Interrogative (how many nouns)</u>		
	m. /ewa # eke/ 'houses' 'how many'	[eweke]	'how many houses?'
	n. /idu # eke/ 'lions' 'how many'	[idweke]	'how many lions?'
	o. /idi # eke/ 'palm-trees' 'how many'	[idyeke]	'how many palm-trees?'
	<u>Noun Reduplication (compounding)</u>		
	p. /owa # owa/ 'house' 'house'	[owowa]	'every house'
	q. /idu # idu/ 'lion' 'lion'	[idwidu]	'every lion'
	r. /udi # udi/ 'palm-tree' 'palm-tree'	[udyudi]	'every palm-tree'

Each grammatical category that is effected is given at the onset of their illustration. The underlying forms are given in column (1) of (58a-r). Observe in column (2 a,d,g-j,m, and p) that the final vowel of the noun is deleted. Examples (b-c, e-f, k-l, n-o, and q-r) of column (2) illustrate that the high vowels /i/ and /u/ undergo rule (39) Glide Formation.

Rule (53) Vowel Deletion followed by rule (22) Intervocalic /l/ Deletion can, again, derive long vowels of the type in (5) and diphthongs of the type in (6), as illustrated in (59).

(59)	1.	2.	3.
a.	/umhe <u>le</u> # ɔtsomhi/ 'salt' 'some'	→ [umhelɔtsomhi]	→ [umheɔtsomhi] 'some salt'
b.	/em <u>a</u> le # oɣie/ 'food' 'king'	→ [emalɔɣye]	→ [emaɔɣye] 'a king's food'
c.	/oθɔ <u>l</u> ɔ # oɣie/ 'guinea-fowl' 'king'	→ [oθɔlɔɣye]	→ [oθɔɔɣye] 'a king's guinea-fowl'
d.	/oθɔ <u>l</u> ɔ # ɔgbɔmhi/ 'guinea-fowl' 'fresh'	→ [oθɔlɔgbɔmhi]	→ [oθɔɔgbɔmhi] 'fresh guinea-fowl'

Observe that the underlined vowels of column (1) are deleted in column (2). In column (3), the intervocalic /l/ is deleted, leaving behind diphthongs in examples (a-c) and a long vowel in example (d).

The final vowel of the definite article (DA) deletes when contracted to a following vowel prefix, as seen in (60).

(60) a.	/ɔna # idu/ 'DA' 'lion'	→ [ɔnidu]	→ 'the lion'
b.	/ɔna # eseli/ 'DA' 'fish'	→ [ɔneseli]	→ 'the fish'
c.	/ɔna # ɛkpa/ 'DA' 'bag'	→ [ɔnɛkpa]	→ 'the bag'
d.	/ɔna # udi/ 'DA' 'palm-tree'	→ [ɔnudi]	→ 'the palm-tree'
e.	/ɔna # owa/ 'DA' 'house'	→ [ɔnowa]	→ 'the house'
f.	/ɔna # ɔmɔ/ 'DA' 'child'	→ [ɔnɔmɔ]	→ 'the child'
g.	/ɔna # akpa/ 'DA' 'cup'	→ [ɔnakpa]	→ 'the cup'

The underlying form is given in column (1). Observe in column (2) that the final vowel of the DA is deleted when contracted with the following vowel prefix. Again, with slight modifications to rule (53), the examples of (60) can be accounted for by a rule of the form in (61).

(61) Regressive Vowel Deletion

$$V_1 \rightarrow \emptyset / \text{DA} _ \left[\begin{array}{l} V_2 \\ \text{Prefix} \end{array} \right]$$

This rule states that the final vowel of the DA deletes before a vowel prefix.

Rule 49, 53, and 61 can be collapsed into a rule of the form in 62.

(62) Regressive Vowel Deletion.

$$\left[\begin{array}{l} V_1 \\ \leftarrow \text{high} \end{array} \right] \rightarrow \emptyset / \left\{ \begin{array}{l} V \\ N \\ DA \end{array} \right\} \left[\begin{array}{l} V_2 \\ \text{Prefix} \end{array} \right]$$

Condition: $\langle V_1 = V_2 \rangle$

Exceptions to rule (62) can be found within the demonstrative construction, some adjectival constructions, and the relative clause construction. The final vowels of nouns are not deleted in these constructions, but instead, the vowel prefix of the demonstratives, adjectivals, and relatives is deleted, as seen in (63).

(63)

- | | | | |
|----|---|---|--|
| a. | /ɔna # akpa # ɔna/
'DA' 'cup' 'this' | → | [ɔnakpana]
'this cup' |
| b. | /ɔna # eyi # ɔna/
'DA' 'tortoise' 'this' | → | [ɔneyina]
'this tortoise' |
| c. | /ɔna # aru # ɔli/
'DA' 'louse' 'that' | → | [ɔnaruli]
'that louse' |
| d. | /akpa # ɔnikeθe/
'cup' 'small' | → | [akpanikeθe]
'a small cup' |
| e. | /eyi # ɔnikeθe/
'tortoise' 'small' | → | [eyinikeθe]
'a small tortoise' |
| f. | /aru # ɔnikeθe/
'louse' 'small' | → | [arunikeθe]
'a small louse' |
| g. | /akpa # ɔnɔmie/
'cup' 'the one he saw' | → | [akpanɔmie]
'a cup that he saw' |
| h. | /eyi # ɔnɔmie/
'tortoise' 'the one he saw' | → | [eyinɔmie]
'a tortoise that he saw' |
| i. | /aru # ɔnɔmie/
'louse' 'the one he saw' | → | [arunɔmie]
'a louse that he saw' |

Again, the vowels that are deleted in examples (63 a-i) are underlined. Column (2) displays the underlined vowels that remain after contraction.

The DA /ɔna/ obligatorily comes with the demonstrative construction. Note in column (1) that the DA /ɔna/ and the demonstrative adjective /ɔna/ are identical morphemes or homonyms. The meaning of /ɔna/ in isolation is 'this one'. In column (2), it is observed that the final vowel of /ɔna/ is deleted by rule (62) when functioning as the DA. To the contrary, it is seen in column (2) that the vowel prefix of /ɔna/ is deleted when functioning as a demonstrative adjective. The demonstrative adjective /ɔli/ 'that' also loses its vowel prefix, as seen in example (63c). In examples (63 d-f), it is observed that the adjectival /ɔnikeθe/ 'small' loses its vowel prefix when contracted to the preceding noun. Examples (g-i) illustrate that relative clauses lose their vowel prefix when contracted to the preceding vowel of the head noun. Examples (a-i) suggest a rule of the type in (64).

(64) Progressive Vowel Deletion:

$$V \rightarrow \emptyset / V \left| \begin{array}{l} N \\ \left\{ \begin{array}{l} \text{Dem} \\ \text{Adj} \\ \text{Rel} \end{array} \right. \end{array} \right.$$

This rule specifies that the vowel prefix of demonstratives, adjectivals, and relatives is deleted when contracted to the final vowel of the preceding noun. Rule (64) Vowel Deletion must be ordered before rule (39) Glide Formation as illustrated in (63 b-c, e-f, and h-i) whereby rule (39) failed to apply. In other words, if rule (39) would have applied before rule (64), the output for (b-c, e-f, and h-i) would have been *[ɔneyɔna], *[ɔnarwɔli], *[eyɔnikeθe], *[arwɔnikeθe], *[eyɔnomye], and *[arwɔnomye] respectively.

(65) lists the rules discussed, in the order of their application:

- (65) Progressive Vowel Deletion (rule 64)
 Glide Formation (rule 39)
 Regressive Vowel Deletion (rule 62)
 Vocalization (rule 56)
 Long Vowel Shortening (rule 57)

5.0 Summary

What appeared to be a large inventory of vowel segments has been reduced at the systematic phonemic level to seven short vowels, as given in (66).

- (66) /i/, /e/, /ɛ/, /u/, /o/, /ɔ/, /a/.

In Section 4.1, it was shown that the distinctive features needed to characterize the seven short vowels are [high], [back], and [mid]. Evidence was also given in Section 4.1 to suggest that long vowels and diphthongs should be interpreted as sequences of two contiguous vowels. We observed in Section 4.2 that phonetic long vowels are derived from the deletion of intervocalic /l/. It became apparent in Section 4.2 that

there are no long vowels at the systematic phonemic level. In the discussion of diphthongs in Section 4.3, it was illustrated that they are derived from the deletion of intervocalic /l/, /y/, and /w/. In Section 4.4, it was shown that the diphthongs of the type /wi/, and /yu/ are derived from a sequence of two underlying contiguous vowels. Furthermore, the diphthongs of the type /yu/ have a palatalizing effect on /ts/, /dz/, /s/, and /n/ causing them to surface phonetically as [č], [j], [š], and [ɲ] respectively. In Section 4.5, more evidence was given to show the lack of underlying long vowels, and diphthongs.

CHAPTER III

The Tonal System

0.0. *Previous works*

One of the most interesting aspects of Etsako phonology, but that which has been least studied or documented in the literature, is its tonal system. Laver (1967, 1969) devotes a small portion of his study to tone.

Based on data from the Aviele dialect, Laver suggests that in non-compound words spoken in isolation, Etsako has two basic (phonemic) tones, high and low. These contrast as shown in (1).

- | | | | | |
|-----|--------|----------|-------|-----------------|
| (1) | /èvá/ | low-high | [_ ˀ] | 'two' |
| | /ígbà/ | high-low | [ˀ _] | 'fences/thorns' |
| | /ìgbà/ | low-low | [_ _] | 'chins' |

Laver further suggests that there is a possibility of a third contrastive tone (high-fall) because of the items in (2).

- | | | | | |
|-----|--------|----------------|-------|-----------------------------|
| (2) | /ìgbâ/ | low-high/fall | [_ ˀ] | 'locust beans/gathering(s)' |
| | /úíú/ | high-high/fall | [ˀ ˀ] | 'to do' |

He does not clarify why the high-fall is not to be considered a 'basic' tone.

Laver also suggests that in isolated non-compound words containing all identical tones, only low tones will occur as shown in (3).

- | | | | | |
|-----|---------|-------------|---------|-------------|
| (3) | /àjèjè/ | low-low-low | [_ _ _] | 'butterfly' |
|-----|---------|-------------|---------|-------------|

According to Laver, Etsako has both downdrift and downstep. All of the above examples are taken directly from Laver's discussion.

As will be shown below, Laver's analysis cannot account for much of the data in Etsako.

One of the latest treatments of Etsako tone is Elugbe (1973). His work is based on the dialects Avianwu and Áuchi. Basically, he makes some of the same claims as Laver, as given above. But, Elugbe's claims differ from Laver's regarding downstep/downdrift. Elugbe claims that there is no downstep (automatic or non-automatic) in Av. or Au.. What he proposes, instead, is the feature upstep, which he claims is limited to particular constructions (e.g., the negative construction). To support his claim, he further proposes that underlying high tone is realized as a surface phonetic mid tone (equivalent to the mid tone of Yoruba). When there is upstepping, the upstep takes place from the tonetic mid to high, as illustrated in (4).

(4) /íuà dé/ 'I did not buy' [- _ -] → [̄ _ -]

He presents little evidence in support of this claim. The process of upstep as proposed by him is not phonologically conditioned nor phonetically motivated. The only examples given are cases where he claims that the subject pronoun of the negative construction upstepped from tonetic mid to high. All examples given illustrate only one case of upstep to each phrase or sentence. Furthermore, the data presented can be accounted for by the process of downdrift rather than upstep. Since downdrift and downstep widely attested in African languages have a phonetic explanation, and can account for the same data, there is no reason to posit an ad-hoc 'upstep'. In my discussion of 'downdrift/downstep', evidence will be presented to support the existence of these two phenomena in Etsako.

As mentioned in Chapter I, Etsako is characterized by a complex set of morphotonemic alternations. The purpose of this chapter is to present and discuss the general tone properties that underlie this complex set of morphotonemic alternations. Although some evidence will be taken from other dialects, the main sources will come from Ekpheli.

1.0. Surface tones

At the systematic phonetic level, Ekpheli exhibits five tones (high [V̄], low [V̂], falling [V̄], rising [V̂], and downstep [V̄]). Three of these five tones (high, low, and falling occur in simple or compound words cited in isolation. All five tones (high, low, falling, rising, and downstep) occur in isolated compound words. Illustrations are given in (5).

- | | | | | | |
|--------|-----------------|-------|----|---------------------|---------------|
| (5) a. | [è <u>v</u> á] | 'two' | f. | [ó <u>w</u> à] | 'house' |
| b. | [à <u>k</u> pà] | 'cup' | g. | [à <u>t</u> ásà] | 'plate' |
| c. | [ú <u>d</u> zê] | 'axe' | h. | [ú <u>p</u> èpè] | 'bed' |
| d. | [à <u>s</u> ì] | 'ant' | i. | [á <u>k</u> pámè] | 'cup (water)' |
| e. | [ò <u>k</u> é] | 'ram' | j. | [ó <u>w</u> òwà] | 'every house' |
| | | | | or [ó <u>w</u> òwà] | |

Examples (a-h) are words which contain two morphemes, the singular prefix

(see Section 4.1 of Chapter II) and the stem. Examples (i-j) are compounds which contain four morphemes (i.e., example (i) contains /à+kpà/ 'cup' and /à+mè/ 'water', while example (j) contains /ó+wà/ 'house' and /ó+wà/ 'house'. Thus each compound contains two prefixes and two stems). The contrasting tones and their domain that concern us here are underlined. Notice that a phonetic contrast between high, low and falling exist on the final syllable in examples (a-c), on the initial syllable in examples (b-d), and on the medial syllable in examples (g-i). Moreover, all five tones (high, low, falling, rising and downstep) are observed to contrast on the medial syllable in examples (g-j). The rising tone and the downstep tone are much more constrained in their occurrences in isolated compound words than the high, low, and falling.

2.0. Systematic phonemic tones

In Section 1.0., it was observed that Ekpheli has five phonetic tones (high, low, falling, rising and downstep). It will be argued in this section that only two tones (high and low) occur at the systematic phonemic level, and that the other three tones (falling, rising, and downstep) are derived from these.

2.1. The falling tone

The processes of vowel deletion, vowel coalescence, loss of syllabicity, etc. result in the creation of falling tones, as can be seen in (6).

(6)	1.	2.	3.	4.	
	a. /òdzàwólì/	→ òdzàwól	→ òdzàwòò	→ [òdzàwò]	'man'
	b. /áìsì/	→	→ áàsì	→ [ásì]	'ant'

Example (6 a-b) illustrates how an underlying tone sequence of high followed by low on two separate vowel segments can be realized as HL (falling). Note that this process of contour formation takes place within a single word. Since the two separate vowel segments involved are different in their underlying form (i.e., while (a) contains an intervocalic /l/ between its two separate vowel segments, (b) does not.), examples (a) and (b) will be discussed separately.

In column (1) of (6a), the underlying form is given. Notice that, at this stage, the two separate vowel segments (which have the high and low tone that concern us) are separated by an intervocalic /l/. In column (2) of (6a), the intervocalic /l/ is deleted by the application of rule (22) (given in Chapter II) leaving behind two contiguous vowels with two contiguous tones. Observe in column (3) of (6a) that by the application of rule (33) (/i/ assimilation, given in Chapter II), the high vowel /i/ is assimilated to the preceding vowel. In column (4) of (6a), the high tone and the low tone occur on a vowel segment with a resultant falling tone. The listener definitely hears a short falling contour pitch on a short vowel. In other words, what is claimed here is that there is a phonetic length distinction between columns (3) and (4),

the form in column (4) being shorter in duration than that in column (3). In fact, the forms in both columns (3) and (4) can surface phonetically, showing that contraction does occur. This motivates the intermediate stage of /i/ assimilation, rather than simply having /i/ delete from the very beginning, and having its tone retained.

We observed in (6a) that the tone sequence of high followed by low and their tone bearing vowels were separated by an intervocalic /l/ at the systematic phonemic level, whereas in column (1) of (6b), the tone sequence of high followed by low and their tone bearing vowels are not. See Chapter II, example (32) for a discussion of nouns of the type in (6b). Example (6b) illustrates further that when two morphemes come together to form a tone sequence of high followed by low, the results are falling contour tones. In column (1) of (6b), the underlying form is given. Notice that the prefix vowel has a high tone, while the initial vowel of the stem (which is underlined) has a low tone. The initial vowel of the stem obligatorily assimilates to the prefix vowel by the application of rule (33), in column (3) of (6b). Again, in column (4) of (6b), the high tone and the low tone occur on a single vowel segment with a resultant falling tone. Given these underlying forms in (6a-b), an explanation is provided for the falling tone on the final and initial syllable of some words in Ekpheli.

Thus far, the evidence in support of the claim that falling tones are derived from underlying tone sequences of high followed by low has been seen to occur within words in citation form. Further evidence comes from isolated compounds and short sentences, as seen in (7).

- (7)
- | | | | | |
|----|-----------------|-----------|------------|-----------------|
| | 1. | 2. | 3. | |
| a. | /àkpà//'/àmè/ | → ákpáàmè | → [ákpâmè] | 'cup (water)' |
| b. | /ò + dé/ /àkpà/ | → òdèàkpà | → [òdâkpà] | 'he buys a cup' |

Example (7a-b) is an illustration of how falling tones are derived when a tone sequence of high followed by low is created as a result of vowel contraction between two words. In column (1) of (7a-b), the underlying form is given. Note that (a) is a compound word consisting of the morphemes 'cup', and 'water', and the associative marker (AM) (see Chapter IV for a discussion of the associative construction), which is an underlying high floating tone. (b) is a sentence consisting of the morphemes 'he', 'buy', and 'cup', and it is in the habitual tense. Observe in column (2) of (7a) that the high 'floating' tone of the AM has a tone raising effect on all immediately preceding low tones (i.e., àkpà + AM + àmè → ákpá + AM + àmè). What is of concern here are the two vowel sequences with the tone sequences of high followed by low, as seen in column (2) of (7a-b). In column (3) the vowel is deleted and the result is the falling tone. The falling tone in example (5i) is accounted for in this way.

More evidence supporting the claim that falling tones are derived from underlying tone sequences of high followed by low is given in (8).

- (8)
- | | | | | |
|----|--------|--------|----------|--------------|
| | 1. | 2. | 3. | |
| a. | /ítúò/ | → ítwò | → [ítwô] | 'underneath' |
| b. | /ìufà/ | → ìuyà | → [ìuyâ] | 'mat' |

Examples (8 a-b) illustrate how a falling tone is derived as a result of the loss of syllabicity of a high tone vowel of a tone sequence of high followed by low. In column (1) of (8 a-b), the underlying form is given. Notice that there is a tone sequence of high followed by low on the last two vowels of each word. In column (2), the two high vowels (/u/ and /i/) have been changed to [w] and [y] respectively by the application of rule (39) Glide Formation. In (3), the high tones on the glides are realized as falling tones on the vowels. Similar processes apply to compound words and sentential phrases as shown in (9).

- (9)
- | | | | | |
|----|--------------------------|-----------|-----------|-------------------------|
| | 1. | 2. | 3. | 4. |
| a. | /ùdù/'//òyìè/ | → údúòyìè | → údúòyìè | → [údwôyyè] |
| | 'chest' 'AM' 'king' | | | 'chest of a king' |
| b. | /údì/'//òyìè/ | → údíòyìè | → údíòyìè | → [údyôyyè] |
| | 'palm-tree' 'AM' 'king' | | | 'palm-tree of a king' |
| c. | /ò + dú/ /àkpà/ | → òdúàkpà | → òdúàkpà | → [òdwâkpà] |
| | 'he' 'carry' 'cup' | | | 'he carries a cup' |
| d. | /ò + pí/ /òxà/ | → òpíòxà | → òpíòxà | → [òpyôxà] |
| | 'he' 'shoot' 'porcupine' | | | 'he shoots a porcupine' |

The next bit of evidence in support of deriving falling tones is of a different sort from previous evidence already examined. For example, the sequence of two contiguous vowels with a sequence of high followed by low is not involved here. Consequently, there is no vowel contraction. But the falling tone is still derived from a tone sequence of high followed by low. Illustrations are given in (10).

- (10)
- | | | | |
|----|-----------|-------------|--------------|
| | 1. | 2. | |
| a. | /údzé/ | → [údzê] | 'axe' |
| b. | /òké/ | → [òkê] | 'ram' |
| c. | /ákògá/ | → [ákògâ] | 'bat' |
| d. | /émhémhó/ | → [émhémhò] | 'inside' |
| e. | /àgbèdó/ | → [àgbèdò] | 'blacksmith' |
| f. | /òtsédé/ | → [òtsédê] | 'sunrise' |

The underlying form is given in column (1) of (10 a-f). Note that all nouns end in a high tone. Observe in column (2) of (10 a-f) that a high tone in syllable final position in words cited in isolation, or in pre-pause position is realized as a falling tone. This process is extremely general in Ekpheli. Except for the numbers ([òkpá] 'one', [èvá] 'two', and [ìgbé] 'ten') and a few compounds of the types ([àkpâkpá] 'every cup',

and [íkápákpó] 'all cups'), there are no occurrences of a high tone in syllable final position in words cited in isolation or in pre-pause position. In other words, the final syllable of all words in pre-pause position will bear either a falling tone or a low tone. Therefore, all underlying high tones on final syllables of words in isolation or in pre-pause position will be converted to falling tones. This can be accounted for by a rule such as is given in (11).

(11) Low Tone Insertion/Pre-pause Tone Rule

$\emptyset \rightarrow [- \text{HIGH}] / [+ \text{HIGH}] _____\% \text{ (where \% = pause)}$

One may alternatively suggest a phonetic intonation rule to account for this pre-pausal fall, but as will be seen in Section 3.0 this would fail to account for the observed data.

Rule (11) explains the occurrence of examples (5 c, e, and h), as well as the non-occurrence of some expected phonetic tone patterns in certain contexts (e.g., *[HH], *[LH] etc.). This rule is obligatory in Ekpheli, optional in some dialects, and non-existent in others. (See wordlist of Appendix).

Furthermore, it is observed in (12) that when the morphemes of (10) appear in context that is not in pre-pause position, the high tone does not become a falling tone, unless it is contracted with a following low tone.

(12)		1.		2.	3.	
	a.	/údzé # òkpá/	→	[údzòkpá]	[údzókpá]	'one axe'
		'axe' 'one'				
	b.	/òké # òkpá/	→	[òkòkpá]	[òkókpá]	'one ram'
		'ram' 'one'				
	c.	/ídzé # élà/	→	[ídzélà]		'three axes'
		'axes' 'three'				
	d.	/èké # élà/	→	[èkélà]		'three rams'
		'rams' 'three'				

In column (1) of (12), the underlying form of both the noun and the numeral is given. Note that the nouns are in the plural in examples (c-d). In column (2) (a-b), the high tone of the noun stem and the low tone of the prefix of the numeral contract into a falling tone. It is further observed in column (3) that the falling tone can optionally simplify to a high, and the low tone portion of the fall effects a downstep on the following high. In column (2) of (c-d), it is observed that the high tone of the noun stem and the high tone of the prefix of the numeral contract into a high tone. In both cases of vowel contraction in (12), it is the stem vowel of the noun that is deleted.

The occurrence of all falling tones can therefore be accounted for by deriving them from sequences of HIGH + LOW.

2.2. *The rising tone*

We have already noted above that the occurrences of rising tones in words cited in isolation are extremely rare. Except for examples of the type seen in (5j), there are none. In fact, it will be observed in subsequent sections that most rising tones are simplified to either a high tone, low tone or a downstep tone, thus, in one sense accounting for the rarity of rising tones in the language. Nevertheless, the same processes (vowel deletion, and loss of syllabicity, etc.) that govern the creation of falling tones are also involved in deriving phonetic rising tones. One of the processes for creating rising tones occurs when two morphemes are joined, as shown in (13).

- (13)
- | | | | |
|-----------------|---------|---------|---------------|
| 1. | 2. | 3. | |
| /ówà # ówà/ | ówǾ ówà | [ówǾwà] | 'every house' |
| 'house' 'house' | | | |

(13) is an example of noun reduplication to form compounds (see Chapter IV). The underlying form is given in (1). Column (2) gives the form after the vowel is deleted, with the tone remaining. Column (3) gives the phonetic form with a rising tone.

(14) demonstrates that rising tones are also created by the application of the glide rule.

- (14)
- | | | | | | | |
|----|-------------------------|---|--------|---|----------|-------------------|
| a. | /ídù # ídù/ | → | ídǽídù | → | [ídǽídù] | 'every lion' |
| | 'lion' 'lion' | | | | | |
| b. | /údì # údì/ | → | ídǽúdì | → | [ídǽúdì] | 'every palm-tree' |
| | 'palm-tree' 'palm-tree' | | | | | |

(14) further illustrates noun compounding as a result of noun reduplication.

2.3. *The downstep*

It was observed in previous sections that falling tones are derived from underlying sequences of high followed by low, and that rising tones are derived from underlying sequences of low followed by high. Also, it was demonstrated that these contour tones result from the application of segmental phonological rules. It will be illustrated in this section that downsteps are also derived from underlying sequences of low followed by high. In some cases, rising tones are first derived directly from underlying sequences of low followed by high, and downsteps are subsequently derived from rising tones by a process of simplification.

It was noted in (5j) that at the systematic phonetic level, Ekpheli shows a downstep. (5j) is repeated in the form of (15).

- (15)
- | | | |
|---------|----|-----------------------|
| 1. | 2. | |
| [ówǾwà] | → | [ówǾwà] 'every house' |

In column (1) of (15), the derivation begins at a stage where the rising

tone has already been derived. In column (2), the rising tone is simplified to a downstep. This process is conditioned by the preceding high tone. Also, under certain conditions, the tone simplification rule is optional, i.e., either (1) or (2) of (15) can surface phonetically.

2.4. *Tone features*

Only one tone feature is needed to contrast the two level tones on the lexical level, as seen in (16).

- (16) high tone = [+ HIGH] (+ H)
 low tone = [- HIGH] (- H)

The Downstep tone can be designated with the additional feature [+ Downstep] (+ D). The falling and rising tones can be designated as representing a complex set of features, e.g., sequence, at the time they are mapped onto the segmental matrices. (See below).

3.0. *Downdrift/downstep*

An interesting aspect of tone languages is the phenomenon of down-drift (automatic)/downstep (non-automatic) (e.g., Welmers, 1959, 1970, 1973; Stewart, 1965; Schachter and Fromkin, 1968; Fromkin, 1972; Williamson, 1970; Peters, 1973; Hombert, 1974; Hyman, 1975; La Velle, 1975; and others). The phenomenon of downdrift is noted to occur in many tone languages of Africa, particularly the Niger Congo Group. This process involves the overall lowering of pitch throughout a phrase. More specifically, it involves the progressive lowering of a high tone after a low tone. Thus, a sequence of /HLHLH/ is realized phonetically as (17a) rather than (17b).

- (17) a. /HLHLH/ → [̄ — — — —]
 b. /HLHLH/ → [̄ — — — —]

In (17a), note that the pitch of the second and third high tones is realized as progressively lower than the preceding high, because of the intervening low tones. In other studies (Schachter and Fromkin, 1968; Hombert, 1974; Hyman, 1975), it has also been pointed out that in some languages, the low tones which intervene between the high tones, in examples such as (17), are also subject to downdrift. The intervals created by the degrees of lowering of low tones were reported to have been found to vary from language to language. This could imply that the down-drifting of low tones might go unnoticed in some languages.

Related to 'downdrift' is the phenomenon of 'downstep'. Downstep refers to the lowering of high tones where the conditioning intervening low tones are lost (deleted or assimilated) or where a high tone can be followed by a high (same), a lower high, or a low, but a low tone can only be followed by a low (same) or non-low. In cases where the lost low tones intervening between high tones are recoverable (i.e., the segment of such a low tone appears in the synchronic grammar before deletion or

assimilation, etc.) there has been no need to posit a phonemic downstep (Fromkin, 1968) since such downsteps can be derived from high tones. But since all downstep tones in a synchronic grammar cannot be derived from a deleted LOW (although this might have been the case historically) some linguists have posited the need for a phonemic downstep (Fromkin, 1972). That is, it is suggested that establishing a LOW which would always be deleted and which serves only to account for DOWNSTEP is an ad-hoc device and is not warranted.

The setting up of a 'non-existent' deleted LOW to account for DOWNSTEP should not, however, be confused with the possible need of including 'floating' tones in a language, where such tones are shown by their effect on surrounding tones and/or represent separate morphemes. Obviously, the justification for such tones must be compelling. Such 'floating' tones in Etsako will be discussed in Chapter IV.

Ekpheli is characterized by the same phenomenon of downdrift as outlined above for many tone languages of Africa. An illustration is given in (18).

- (18) a. [θéγwè nímhè] → [̄ - - _]
 'give me a goat'
 b. [ḵ θéγwè nímhè] → [-̄ - - _]
 'he is giving me a goat'
 c. [ḵ θéγwè góxò gévhyò nímhè] → [̄ - - - - _]
 'he is giving me a goat,
 a chicken, and a rabbit'

In (18a-c), the realization of the pitch patterns of these sentences is given in the phonetic brackets, right of the arrow. Notice that all high tones with intervening low tones are realized on different phonetic pitch levels. It should also be observed that low tones with intervening high tones also 'downdrift'. The sort of downdrift illustrated here places Ekpheli in the group of languages called 'terraced level' (Welmers, 1959).

Moreover, Ekpheli also displays downstep tones, as shown in (19).

- (19) [ówòwà] → [̄ - _]

To account for the downstep phenomena a rule as given in (20) can be posited.

(20) Downstep Rule

[+ H] → [+ D] / [- H] _____

Downsteps are not usually found in isolated non-compound words in Ekpheli. There are, however, a number of interrogatives that have downsteps, as seen in (21).

- (21) a. [é¹mè¹] 'what?'
 b. [é¹lè¹] 'when?'
 c. [ésè¹] 'where?'
 d. [ówà¹] 'who?'
 e. [ékè¹] 'how many?'

Downsteps in these examples may be related to a rising tone at the end of these interrogatives that signal a question. This is speculative since one cannot elicit these interrogatives without a downstep; one can however elicit other nouns that are being questioned. In such cases, a rising tone occurs on the final syllable of these nouns. However, these rising tones are not simplified to a downstep, as illustrated in (22).

- (22) a. [ówà] → [ówǎ] 'a house?'
 b. [àkpà] → [àkpǎ] 'a cup?'
 c. [údzé] → [údzé¹] 'an axe?'

In (22), it is observed that all nouns when in question end in a rising tone. This method of questioning nouns in isolation does not apply to larger constituents (e.g., sentences). This method of questioning nouns in isolation suggests a rule of the kind in (23).

(23) High Tone Insertion

$$\emptyset \rightarrow [+HIGH]/[-HIGH] \left[\begin{array}{c} \text{N} \\ \text{---} \end{array} \right] \#?$$

Notice that this rule (23) must be ordered after rule (11) Low Tone Insertion. This can be observed in (22c), where the high tone marking the interrogative is 'attached' to a high-low-fall, producing a fall-rise. Earlier, the pre-pause low tone addition was discussed. If this were merely a pre-pausal fall, one would not expect the fall to occur in this case. Thus, it appears that the falling tones occurring on final syllables (derived from final high tone) are derived by the rule given in (11) rather than by an 'intonation' rule. The question words of (21) can therefore be accounted for as shown in the derivation of (24).

(24) Sample derivations:

- a. /émè/ → [émè¹] → [émè¹] 'what?'
 b. /élè/ → [élè¹] → [élè¹] 'when?'
 c. /ésè/ → [ésè¹] → [ésè¹] 'where?'
 d. /ówà/ → [ówǎ] → [ówǎ¹] 'who?'
 e. /ékè/ → [ékè¹] → [ékè¹] 'how many?'

The underlying form is given in column (1) of (24). In column (2), a final high tone is inserted (rule (23)) for questioning single words in isolation. The output of rule (23) is a rising tone. Again, the rising tone whenever immediately following a high tone is susceptible to tone simplification, as in column (3). The rule is discussed below. The final vowel of column (3) can be optionally lengthened depending on the speaker's mood.

4.0. Representation of tone

It has been observed throughout this chapter that whenever a two vowel sequence loses one of its vowels, either through vowel deletion or loss of syllabicity, the tone structure of the word is preserved. If, for example, the tones of the two vowels of the syllable are identical, the two tones will be contracted into a single tone, after the deletion or loss of syllabicity of one of the vowels, as seen in (25).

(25)	1.	2.	
	a. /áγ <u>ù</u> à/	→ [áγwà]	'dog'
	b. /òγ <u>ì</u> è/	→ [òγγè]	'king'
	c. /ú <u>m</u> í <u>é</u> mhì/	→ [úmyémhì]	'to see'
	d. /ú <u>g</u> ú <u>é</u> mhì/	→ [úgwémhì]	'to say'

As already discussed above, if a two vowel sequence consists of a tone sequence of opposite feature specifications, and one of the two vowels of the sequence deletes or loses its syllabicity, the following results are obtained, as illustrated below.

(26)	1.	2.	
	a. /f <u>t</u> ú <u>ò</u> /	→ [ftwô]	'underneath'
	b. /l <u>v</u> í <u>à</u> /	→ [luyâ]	'mat'
	c. /ú <u>d</u> ì <u>ú</u> dì/	→ [údyǔdì]	'every palm-tree'
	d. /f <u>d</u> ù <u>f</u> dù/	→ [fdwǐdù]	'every lion'
(27)	a. /ó <u>w</u> à <u>ó</u> wà/	→ [ówôwà]	'every house'
	b. /à <u>k</u> pá <u>à</u> kpá/	→ [àkpâkpá]	'every cup'
(28)	a. /ó <u>n</u> ák <u>p</u> á <u>ò</u> nà	→ [ónâkpânà]	'this cup'

If you compare (27) and (28), it will be seen that the second vowel of the two vowel sequence is deleted in (28), while the first vowel of the two vowel sequence is effected in (27).

The examples in (26), (27), and (28) illustrate the cases discussed in Chapter II where either the first or the second vowel is deleted. Note, however, that in either case the underlying tones remain, i.e., are not deleted with vowel segmental features.

This leads us to question whether tones would not better be represented in suprasegmental matrices, separate from the segmental matrices, with mapping rules provided in the grammar.

It has already been proposed by Leben (1971b, 1973a,b) that tone is a suprasegmental phenomenon in some languages. Using evidence from Mende (a Mande language of Sierra Leone) he argues that morphemes of this language can have the tonal contour LHL (e.g., mbá 'companion', nyàhá 'woman', and níkíí 'groundnut') but may not have HLH (e.g., *mbá, *nyàhá, and *níkíí). This restriction applies to morphemes (words) of any number of syllables. In the event of this restriction, any suggestion that tone is a feature of the vowel (segmental) in this language would appear to be 'ad-hoc'. Consequently, he suggests that tone be represented as in a tonal matrix of the morpheme.

Leben further argues for suprasegmental matrices with evidence showing that tone is distinguished from features on segments in its ability to undergo rules of tone erasure. He suggests that tone erasure occurs in compound constructions such as Noun-Noun or Noun-Adjective, where one morpheme is taken as the head of a polymorphemic tonal unit; the tonal shape of the head determines the tonal shape of the whole unit, irrespective of the underlying tonal properties of the other members of the units. Evidence was drawn from Hausa, Maninka, Bambara, and Mende.

Leben further suggests that by adopting suprasegmental matrices, contour tones which fall on single vowels can be analyzed as sequences of level tones (which occur suprasegmentally), thereby excluding the need for contour features.

Furthermore, Leben shows that if tone is represented as features of the morpheme, there is no difficulty with representation of floating tone morphemes. Floating tone morphemes often have a phonetic realization; they obtain this by forming a tonal melody with neighboring suprasegmental tones, all of which ultimately are mapped onto segments. He illustrates this point with the 'floating low tone' definite article of Maninka.

Further evidence in support of suprasegmental matrices is found in Ekpheli. In Ekpheli, it appears that tone operates independently of segments. That is, the tonal contour (or melody) of a word remains even if vowels (segments) delete or lose their syllabicity, as seen in the examples given below.

- (29) a. /ówà # ówà/ → ów̃ ówà → [ów̃ówà] 'every house'
 'house' 'house'
- b. /ídù # ídù/ → íd̃ídù [íd̃ídù] 'every lion'
 'lion' 'lion'

The examples of (29) are discussed in greater detail in Chapter IV. Note that a vowel is deleted in (29a), while a vowel loses its syllabicity in (29b). In either case the underlying tones remain intact (i.e., they are not deleted with the vowel segmental features). Given a theory where tone is represented as a feature on the segment, one would expect the tone feature to delete along with the vowel segmental features. The problems that are raised when treating a segment as the domain for tone

are not encountered when tone is represented as a feature of the morpheme, as seen in Chapters III, IV, and V.

Evidence of floating tone morphemes found in Ekpheli further reveals a need for suprasegmental matrices. As seen in Chapter IV, there appears to be no difficulty with the representation of floating tone morphemes, if tone is represented as features on the morpheme. To the contrary, all kinds of complications are encountered if the segment is treated as the domain of tone in this language.

Given that the hypothesis of two matrices (segmental and suprasegmental) is adopted for this language, the tones of the suprasegmental matrix must be mapped onto the segmental matrix since at the systematic phonetic level tones and segmental features are realized simultaneously. The mapping rules which Leben suggests for Mende will not work in Ekpheli. If the ones he suggests are the correct rules for Mende, then it appears that mapping rules are language dependent rather than universal. It is possible (and probable) that there are universal constraints on such mapping rules, but one needs descriptions of many more tone languages in which suprasegmental matrices are found necessary before we can formulate such universal constraints. The following mapping rules appear to be those needed for Ekpheli.

(30) Mapping Rule:

Map tones onto segments within innermost brackets; map first tone onto first vowel, second tone onto second vowel, etc. If there is no vowel, let tone 'float'. Remove innermost brackets whether or not rule can apply. Map tone onto segments only where segments have not yet been specified by tone features.

(31) Mapping Rule:

Map 'floating' tones onto closest immediate vowel (not separated by a consonant).

Rule (30) is therefore confined to mapping tone features onto segments unspecified for tone. Rule (31) specifies the assignment of 'floating' tones to segments already specified for some tone features.

When all tones are mapped onto segments, then all brackets are removed.

Rule (30) and Rule (31) are necessary in order to prevent incorrect mapping of tones. For example, suppose the mapping rule were simply stated as in (32).

(32) Map first tone onto first vowel, second tone onto second vowel, etc.

Then each tone would be mapped onto each vowel with the 'floating tones' all occurring at the end of the phrase or sentences as shown in (33).

(33) TM: H L H L SG: owa owa

 ∅ V deletion

Mapping rule (32)

H	L	H	L
ow			owa

If the mapping first occurs within syntactic categories then there is no problem, as shown in (34).

(34) Sample Derivation

TM	[_N [_N [H L] [_N [H L]]]]	
	[[H L] [D L]]	Downstep Rule (20)
SM	[[owa] [owa]]	
	[[ow∅] [owa]]	Vowel Deletion Rule (62)
TM	[[H L] [D L]]	Mapping Rule (30)
SM	[[ow] [owa]]	
	[H L D L ow owa]	Remove Brackets
	[H L D L ow owa]	Mapping Rule (31)
	[H L D L ow owa]	
	[ówǒwà]	'every house'

This provides a further example from suprasegmental phenomena of the interrelation between phonology and syntax, i.e., the need for syntactic brackets in phonology. As we will see below, this is also further evidence for the need for the cyclic application of phonological (i.e., tone) rules in phonology.

The simplification of the rising tone (LOW HIGH) to a downstep has not yet been accounted for. The simplification must occur after the tones have been mapped onto segments since the LOW before a HIGH is only deleted when both tones occur on one vowel. This rule may be stated as in (35).

(35) Tone Simplification

$$[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{c} \text{---} + \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$$

There are other general tone rules (e.g., Tone Absorption and a further tone simplification rule) which will be discussed in Chapter IV. The following derivation illustrates the rules so far posited.

(36) Sample Derivation

TM	[[H L] [H L]]	
	N N N	
	[[H L] [D L]]	Downstep Rule (20)
SM	[[owa] [owa]]	
	[[ow∅] [owa]]	Vowel Deletion Rule (62)
TM	[[H L] [D L]]	Mapping Rule (30)
	[[ow] [owa]]	
	[H L D L]	Remove Brackets
	[ow owa]	
	[H L D L]	Mapping Rule (31)
	[ow owa]	
	H (L) D L	Tone Simplification Rule (35) (optional)
	ow owa	
	[ówǒwà]	
or	[ówòwà]	'every house'

CHAPTER IV

Tonal Alternations in Nouns and Noun Phrases

0.0. *Introduction*

The grammar of Ekpheli is characterized by a complexity of morpho-tonemic alternations. A large number of such morphotonemic alternations effect nouns and noun phrases in many different grammatical constructions. These are illustrated in (1). Since low tones are most often effected by such tonal alternations, a noun with all low tone in isolation is given in all possible forms. (The systematic phonetic tones are given).

- | | | | |
|-----|----------|----------------------|------------------------|
| (1) | [àkpà] | 'cup' (in isolation) | |
| a. | ákpâmè | 'water cup' | Associative |
| b. | ákpómò | 'a child's cup' | Associative (genitive) |
| c. | ákpá mhè | 'my cup' | Possessive |
| d. | ákpówà | 'whose cup?' | Interrogative |
| e. | ákpénòdè | 'yesterday's cup' | Adverbial Time Phrase |
| f. | ónákpànà | 'this cup' | Demonstrative |

g.	ónákpáí	'that cup'	Demonstrative
h.	ákpánòwìsì	'a black cup'	Adjectival
i.	ákpánódé	'a cup that he bought'	Relative
j.	ákpáàkì	'a cup at market'	Locative
k.	àkpǎ xóná	'this is a cup'	Identification
l.	àkpá xóná	'this is a cup'	Identification
m.	àkpǎ xólí	'that is a cup'	Identification
n.	ìkpěké	'how many cups?'	Interrogative
o.	ónàkpà	'the cup'	Definite
p.	ónàkpá xóná	'this is the cup'	Identification
q.	ákpá mhè xóná	'this is my cup'	Identification
r.	ákpánòwìsí xóná	'this is a black cup'	Identification

Given the examples of (1), the phonological representation of the tones of the noun is not obvious. The same alternating tonal patterns of this noun are obtained for all such nouns. One possible solution would be to lexically represent each noun with its different allomorphs for various grammatical constructions (e.g., /àkpǎ/ 'cup' in isolation; /ákpá/ in the grammatical constructions of examples (a-j), etc.). Such an analysis would imply that there are no generalizations to be drawn. We will see below however that there are indeed generalizations.

1.0. Associative construction

The examples given in (2) illustrate the tonal changes which occur in possessive constructions in which N1 is the possessed noun and N2 the possessor. Column (1) gives the nouns as they occur in isolation with an associative morpheme occurring between the two tones. This associative morpheme is represented solely by a Tonal Matrix as [+HIGH]. It will be shown that the presence of this morpheme permits us to account for the tonal alternations in a way in which they cannot be accounted for otherwise. Column (2) gives the nouns before vowel deletion or glide formation occurs, and column (3) gives the phonetic representation of these 'associative constructions'.

(2)	1.	2.	3.
a.	/àmè/ // /èθà/ 'water' A 'father'	→ áméèθà	→ [ámèθà] 'father's water'
b.	/àmè/ // /òké/ 'water' A 'ram'	→ áméòké	→ [ámòké] 'a ram's water'
c.	/àmè/ // /ómò/ 'water' A 'child'	→ áméómò	→ [ámómò] 'a child's water'
d.	/àmè/ // /ódzì/ 'water' A 'crab'	→ áméódzì	→ [ámódzì] 'a crab's water'

	1.	2.	3.
e.	/únò/ // /èθà/ → 'mouth' A 'father'	únóèθà	→ [únêθà] 'father's mouth'
f.	/'únò/ // /òké/ → 'mouth' A 'ram'	únóòké	→ [únókê] 'a ram's mouth'
g.	/únò/ // /ómò/ → 'mouth' A 'child'	únóómò	→ [únómò] 'a child's mouth'
h.	/únò/ // /ódzì/ → 'mouth' A 'crab'	únóódzì	→ [únódzî] 'a crab's mouth'
i.	/ódzì/ // /èθà/ → 'crab' A 'father'	ódzìèθà	→ [ójêθà] 'father's crab'
j.	/ódzì/ // /òké/ → 'crab' A 'ram'	ódzìòké	→ [ójókê] 'a ram's crab'
k.	/ódzì/ // /ómò/ → 'crab' A 'child'	ódzìómò	→ [ójómò] 'a child's crab'
l.	/ódzì/ // /ódzì/ → 'crab' A 'crab'	ódzìódzì	→ [ójódzî] 'a crab's crab'
m.	/òté/ // /èθà/ → 'cricket' A 'father'	òtéèθà	→ [òtéθà] 'father's cricket'
n.	/òté/ // /òké/ → 'cricket' A 'ram'	òtéòké	→ [òtókê] 'a ram's cricket'
o.	/òté/ // /ómò/ → 'cricket' A 'child'	òtéómò	→ [òtómò] 'a child's cricket'
p.	/òté/ // /ódzì/ → 'cricket' A 'crab'	òtéódzì	→ [òtódzî] 'a crab's cricket'

The N₁'s in examples (a-l) occur in isolation with either LOW LOW, HIGH LOW or HIGH HIGH (HIGH FALLING) phonetically due to pre-pausal Low Tone Insertion Rule (11), (see Chapter III). In these constructions, however, both tones on N₁ occur as HIGH. Given only such examples one might suggest that the tonal 'associative' rule simply changes all the low tones on the N₁ to HIGH. Note, however, that examples (m-p) show that when a LOW HIGH noun occurs as N₁ the first tone remains LOW. The final HIGH therefore seems to block the change of the initial LOW.

The reason for this seemingly idiosyncratic rule can be found in historical changes which have occurred in the Niger Congo languages. A number of linguists have posited a high tone Associative marker for different languages in this family (Voorhoeve, Meeussen and de Blois, 1969; Welmers, 1970; and Hyman, 1974). At one time this Associative morpheme was realized both segmentally and tonally, and in some languages this is still the case. A tonal assimilation rule seems to have occurred in Etsako, such that all the low tones *immediately preceding* the HIGH tone associative morpheme assimilated. The assimilation did not extend to LOWs before HIGHs in the noun. It is possible that these tonal changes on the first noun signalled the syntactic relationship such that the segmental occurrence of the Associative marker became redundant and

was subsequently deleted, leaving only its tonal reflex.

It is interesting to note that a recent innovation in Etsako has reintroduced a segmental form of the associative or genitive marker, /tsí/ 'of'. This morpheme occurs rarely, only to prevent an ambiguity. The phrase /ʒmò + ' + òyìè/ → [ʒmòyyè] can mean either 'a loyal child' or 'a king's child'. The inclusion of /tsí/, however, resolves this ambiguity. /ʒmò + tsí + òyìè/ → [ʒmò tsòyyè] can mean only 'a king's child'. Even when /tsí/ is used, however, the associative tonal assimilation takes place as can be seen in the example given.

For the more common associative constructions, one may conclude that the Associative morpheme is still present as posited above.

The Associative 'tone-spreading' rule will apply only to the tone matrix of the surface structure and can be written as (3a) or as a TRANSFORMATIONAL RULE as in (3b). We will assume that the rule has the form of (3b).

(3) Low Tone Raising

a. $[- \text{HIGH}]_1 \rightarrow [+ \text{HIGH}] / \text{ ______ } [+ \text{HIGH}]_{\text{Assoc}}$

b. $[- \text{HIGH}]_1 \left[[+ \text{HIGH}]_{\text{Assoc}} \Rightarrow + H_1 \emptyset \right]$
 N

(the subscript $_1$ is used to mean one or more [- HIGH]'s will become [+ HIGH] when immediately preceding the associative morpheme).

In cases where the Low Tone Raising rule is inapplicable (i.e., where N_1 ends in a high tone as in example (2i-p)), a rule must be posited as given in (4) in order to derive the occurring phonetic tones. Alternatively, and probably better, is to express this 'absorption' by a convention such that two identical tones assigned to one segment are realized as one tone. Clearly, from a physical standpoint it could not be otherwise. We can therefore do away with the tone absorption rule (4), but will include it to show what is going on.

(4) Identical Tone Simplification/Tone Absorption Rule

$[\alpha \text{ HIGH}]_1 \rightarrow \emptyset / \left[\begin{array}{c} \text{______} \alpha \text{ High} \\ +\text{Vocalic} \end{array} \right]$

(the subscript $_1$ is used to mean one or more HIGH's)

The rules effecting the segments will not effect the tones. This is illustrated in the derivations given in (5). The downstep rule is omitted here since it is not crucial to the examples.

(5) a. Sample Derivation: 'father's water'

<u>SEGMENTAL MATRIX</u>			<u>STONE MATRIX</u>			
[[amɛ]	[]	[eθa]	[[L L]	[H]	[L L]	Surface Structure
NP N	Assoc	N	NP N	Assoc	N	

[[am∅]		[eθa]	[[H H]		[L L]	Low Tone Raising Rule (3)

						Vowel Deletion Rule (62)

b. Sample Derivation: 'a ram's cricket'

[[ɔtɛ]	[]	[oke]	[[L H]	[H]	[L H]	Surface Structure
NP N	Assoc	N	NP N	Assoc	N	

			INAPPLICABLE			Low Tone Raising Rule (3) (or vacuous application)

[[ɔt∅]	[]	[oke]	[[L H]	[H]	[L H L]	Pre-pausal Rule (11)

						Vowel Deletion Rule (62)

c. Sample Derivation: 'a child's crab'

[[odzi]	[]	[ɔmɔ]	[[H H]	[H]	[H L]	Surface Structure
NP N	Assoc	N	NP N	Assoc	N	

			INAPPLICABLE			Low Tone Raising Rule (3)

[[odzy]	[]	[ɔmɔ]				Glide Formation Rule (39)

[[oʝy]	[]	[ɔmɔ]				Palatalization Rule (41)

[[oʝ∅]	[]	[ɔmɔ]				Glide Deletion Rule (43)

The rules mapping tones onto segments will then apply as illustrated in (6).

(6) a.	TM	[[H H]	[L L]	Mapping Rule (30)
	SM	[[am]	[eθa]	
		[H H	L L]	Remove Brackets
		[am	eθa]	
		[H H	L L]	Mapping Rule (31)
		[am	eθa]	
		[áméθà]		'father's water'

b.	TM	[[L H] [H] [L H L]]	Mapping Rule (30)
	SM	[[ɔt] [] [oke]]	
		[L H H L H L]	Remove Brackets
		[ɔt oke]	
		[L H H L H L]	Mapping Rule (31)
		[ɔt oke]	
		L H L H L	Tone Absorption Rule (4)
		ɔt oke	
		[ɔtôkê]	'a ram's cricket'
c.	TM	[[H H] [H] [H L]]	Mapping Rule (30)
	SM	[[oɔ] [] [ɔmɔ]]	
		[H H H H L]	Remove Brackets
		[oɔ ɔmɔ]	
		[H H H H L]	Mapping Rule (31)
		[oɔ ɔmɔ]	
		H H L	Tone Absorption Rule (4)
		oɔ ɔmɔ	
		[oɔ'ɔmɔ]	'a child's crab'

1.1. Possessive pronoun construction

The noun + possessive pronoun construction is characterized by the same tonal alternations as those of the noun + noun associative construction (in section 1.0.), as illustrated in (7).

(7)	1.	2.	
a.	/ówà/ /' / /mhè/	→ [ówá mhè]	'my house'
	'house' A 'my'		
b.	/àkpà/ /' / /mhè/	→ [ákpá mhè]	'my cup'
	'cup' A 'my'		
c.	/àγòγò/ /' / /mhè/	→ [áγóγó mhè]	'my skull'
	'skull' A 'my'		
d.	/òké/ /' / /mhè/	→ [òké mhè]	'my ram'
	'ram' A 'my'		

Observe in column (1) of (7a-c) that the low tones of the nouns preceding the possessive pronoun are raised to the level of high in column (2) in a similar fashion to that of the noun + noun associative construction in Section 1.0. The low tone of N₁ in column (1) of (7d), on the other hand, remains unaffected in column (2). Such tonal alternations

were observed in the noun + noun associative construction to be effected by a high floating tone of association (A). If the same high tone associative morpheme occurs in the surface structure of noun + possessive pronoun constructions, the alternations are accounted for. Sample derivations are given in (8-10).

(8) Sample Derivation: 'my house'

TM [[H L] [H] [L]]
 NP N Assoc PN

[[H H] [L]]

SM [[owa] [] [mhɛ]]

Low Tone Raising Rule (3)

Vowel Deletion Rule (62)
 (inapplicable)

Mapping Rule (30)

TM [[H H] [L]]

SM [[owa] [mhɛ]]

[ówá mhè]

'my house'

(9) Sample Derivation: 'my skull'

TM [[L L L] [H] [L]]
 NP N Assoc PN

[[H H H] [L]]

SM [[ayoyo] [] [mhɛ]]

Low Tone Raising Rule (3)

Vowel Deletion Rule (62)
 (inapplicable)

Mapping Rule (30)

TM [[H H H] [L]]

SM [[áyoyo] [mhɛ]]

[áyóyó mhè]

'my skull'

(10) Sample Derivation: 'my ram'

TM [[L H] [H] [L]]
 NP N Assoc PN

Low Tone Raising Rule (3)
 (inapplicable)

SM [[oke] [] [mhɛ]]

Vowel Deletion Rule (62)
 (inapplicable)

TM [[L H] [H] [L]]

Mapping Rule (30)

SM [[oke] [] [mhɛ]]

Remove Brackets

[L H H L]
 [oke mhɛ]

Mapping Rule (31)

[L H H L]
 [oke mhɛ]

Tone Absorption Rule (4)

L H L
 | | |
 oke mhɛ

[òké mhɛ]

'my ram'

1.2. Possessive interrogative pronoun construction

The tones of nouns that immediately precede the interrogative pronoun 'whose' undergo tonal alternations that are identical to the noun + noun associative construction, as illustrated in (11).

- (11) a. /àkpà/ /' / /s̀wà/ → [ákpówà] 'whose cup?'
 'cup' A 'whose'
 b. /úkpò/ /' / /s̀wà/ → [úkpówà] 'whose cloth?'
 'cloth' A 'whose'
 c. /údzé/ /' / /s̀wà/ → [údzówà] 'whose axe?'
 'axe' A 'whose'
 d. /òké/ /' / /s̀wà/ → [òkówà] 'whose ram?'
 'ram' A 'whose'

It is not surprising that the tonal alternations of this construction are identical to the noun + noun associative construction, since the meaning of the possessive interrogative pronoun construction implies a genitive relationship. In fact /ts/ can occur between the noun and the possessive interrogative pronoun (e.g., ákpá ts̀wà 'whose cup?'), just as in the noun + noun associative construction (genitive). By recognizing the occurrence of the high tone associative morpheme (A) in the surface structure, examples of (11) can be accounted for in a unitary fashion, as seen in the sample derivations of (12-13).

(12) Sample Derivation: 'whose cup'

TM	[[L L] [H] [H L]]	
	NP N Assoc PN	
	[[H H] [H L]]	Low Tone Raising Rule (3)
	[[H H] [H L H]]	High Tone Insertion Rule (23)
	[[H H] [H L D]]	Downstep Rule (20)
SM	[[akpa] [ɔwa]]	
	[[akp∅] [ɔwa]]	Vowel Deletion Rule (62)
TM	[[H H] [H L D]]	Mapping Rule (30)
SM	[[akp] [ɔwa]]	
	[H H H L D]	Remove Brackets
	[akp ɔwa]	
	[H H H L D]	Mapping Rule (31)
	[akp ɔwa]	
	H H L D	Tone Absorption Rule (4)
	akp ɔwa	
	H H D	Tone Simplification Rule (35)
	akp ɔwa	
	[ákpɔwá]	'whose cup?'

(13) Sample Derivation: 'whose axe?'

TM	[[H H] [H] [H L]]	
	NP N Assoc PN	
	-----	Low Tone Raising Rule (3)
	[[H H] [H] [H L H]]	(inapplicable)
	[[H H] [H] [H L D]]	High Tone Insertion Rule (23)
	[[H H] [H] [H L D]]	Downstep Rule (20)
SM	[[udze] [] [ɔwa]]	
	[[udz∅] [] [ɔwa]]	Vowel Deletion Rule (62)
TM	[[H H] [H] [H L D]]	Mapping Rule (30)
SM	[[udz] [ɔwa]]	
	[H H H H L D]	Remove Brackets
	[udz ɔwa]	
	[H H H H L D]	Mapping Rule (31)
	[udz ɔwa]	
	H H L D	Tone Absorption Rule (4)
	udz ɔwa	
	H H D	Tone Simplification Rule (35)
	udz ɔwa	
	[údzɔwá]	'whose cup?'

1.3. *Adverbial time phrase construction*

It was noticed in previous sections that whenever a noun preceded another noun in some sort of association, the tones of the noun that preceded underwent tonal alternations. Similarly, it will be seen in this section that whenever a noun precedes another noun that indicates time (e.g., today, yesterday, etc.) the tones of the noun that precedes will undergo tonal alternations. Examples are given in (14).

- (14) a. /àkì/ /' / /áxùè/ → [ákyáxwè] 'tomorrow's market'
 'market' A 'tomorrow'
- b. /àkì/ /' / /éìè/ → [ákyéìè] 'today's market'
 'market' A 'today'
- c. /àkì/ /' / /énòdè/ → [ákyénòdè] 'yesterday's market'
 'market' A 'yesterday'
- d. /úkpò/ /' / /énòdè/ → [úkpénòdè] 'yesterday's cloth'
 'cloth' A 'yesterday'
- e. /údzé/ /' / /énòdè/ → [údzénòdè] 'yesterday's axe'
 'axe' A 'yesterday'
- f. /òké/ /' / /énòdè/ → [òkénòdè] 'yesterday's ram'
 'ram' A 'yesterday'

It should be noted that the tonal alternations of this construction are identical to those of the noun + noun associative construction. In fact, the meaning of this construction (when in isolation) is always translatable to a parallel meaning of the associative construction, as observed in (14). If this construction is, on the other hand, placed within a context, the meaning can remain that of an obvious associative construction (e.g., 'he went to yesterday's market', or 'he bought yesterday's ram'), or it can have a less obvious meaning of association (e.g., 'he went to market yesterday', or 'he bought a ram yesterday'). Furthermore, if a speaker wishes to distinguish these two meanings, he will insert /tsí/ between the first noun and the noun that indicates time (e.g., ákí tsénòdè) just as in the case of the noun + noun associative construction. In this instance, the meaning can only be that of "yesterday's noun" or "noun of yesterday". In any case, the evidence supports the occurrence of the high tone associative morpheme. The sample derivations of (15-17) illustrate this.

(15) Sample Derivation: 'yesterday's market'

TM	[[L L] [H] [H L L]]	
	NP N Assoc N	
	[[H H] [H L L]]	Low Tone Raising Rule (3)
SM	[[aki] [ɛnode]]	
	[[aky] [ɛnode]]	Glide Formation Rule (39)
TM	[[H H] [H L L]]	Mapping Rule (30)
SM	[[aky] [ɛnode]]	
	[H H H L L]	Remove Brackets
	[]	
	[aky ɛnode]	
	[H H H L L]	Mapping Rule (31)
	[]	
	[aky ɛnode]	
	H H L L	Tone Absorption Rule (4)
	aky ɛnode	
	[ákyɛ̀nòdè]	'yesterday's market'

(16) Sample Derivation: 'yesterday's cloth'

TM	[[H L] [H] [H L L]]	
	NP N Assoc N	
	[[H H] [H L L]]	Low Tone Raising Rule (3)
SM	[[ukpo] [ɛnode]]	
	[[ukp∅] [ɛnode]]	Vowel Deletion Rule (62)
TM	[[H H] H L L]	Mapping Rule (30)
SM	[[ukp] ɛnode]	
	[H H H L L]	Remove Brackets
	[]	
	[ukp ɛnode]	
	[H H H L L]	Mapping Rule (31)
	[]	
	[ukp ɛnode]	
	H H L L	Tone Absorption Rule (4)
	ukp ɛnode	
	[úkpɛ̀nòdè]	'yesterday's cloth'

(17) Sample Derivation: 'yesterday's axe'

TM [[H H][H] [H L L]]
 NP N Assoc N

 Low Tone Raising Rule (3)
 (inapplicable)

SM [[udze][] [enode]]

Vowel Deletion Rule (62)

[[udz∅][] [enode]]

TM [[H H][H] [H L L]]

Mapping Rule (30)

SM [[udz][] [enode]]

Remove Brackets

[H H H H L L]

[udz enode]

Mapping Rule (31)

[H H H H L L]

[udz enode]

Tone Absorption Rule (4)

H H L L
 | | | |
 udz enode

[údzénòdè]

'yesterday's axe'

1.4. *Definite article construction*

The same tonal alternations that characterize the noun + noun associative construction also characterize the definite article construction, as illustrated in (18).

- (18) a. /òná/ /'/ /àkpà/ → [ónákpà] or [ónàkpà] 'the cup'
 'the' A 'cup'
- b. /òná/ /'/ /àgbòpì/ → [ónàgbòpì] or [ónàgbòpì] 'the orange'
 'the' A 'orange'
- c. /òná/ /'/ /òyèdédé/ → [ónòyèdédé] or [ónòyèdédé] 'the banana'
 'the' A 'banana'
- d. /òná/ /'/ /òwà/ → [ónówà] 'the house'
 'the' A 'house'

It will be seen in the sample derivations of (20-21) that by adopting the rules given thus far, the surface forms of columns (2) are accountable for. Column (3), nevertheless, requires the addition of an optional tone simplification rule, as given in (19).

(19) Tone Simplification Rule

[+ HIGH] → ∅ / [+ HIGH] [- HIGH
 + Vocalic]

(20) Sample Derivation: 'the orange'

TM	[[L L] [H] [L L L]]	
	NP DA Assoc N	
	[[H H] [] [L L L]]	Low Tone Raising Rule (3)
SM	[[ɔna] [agbopɪ]]	
	[[ɔn∅] [agbopi]]	Vowel Deletion Rule (62)
TM	[[H H] [L L L]]	Mapping Rule (30)
SM	[[ɔn] [agbopi]]	
	[H H L L L]	Remove Brackets
	[ɔn agbopi]	
	[H H L L L]	Mapping Rule (31)
	[ɔn agbopi]	
	H(H) L L L	Tone Simplification Rule (19)
		(optional)
	ɔn agbopi	
	[ɔn̂agbòpì]	
	or	'the orange'
	[ɔn̂agbòpì]	

(21) Sample Derivation: 'the house'

TM	[[L L] [H] [H L]]	
	NP DA Assoc N	
	[[H H] [H L]]	Low Tone Raising Rule (3)
SM	[[ɔna] [owa]]	
	[[ɔn∅] [owa]]	Vowel Deletion Rule (62)
TM	[[H H] [H L]]	Mapping Rule (30)
SM	[[ɔn] [owa]]	
	[H H H L]	Remove Brackets
	[ɔn owa]	
	[H H H L]	Mapping Rule (31)
	[ɔn owa]	
	H L H L	Tone Absorption Rule (4)
	ɔn owa	
	[ɔn̂ówà]	'the house'

1.5. *Demonstrative construction*

The tones in demonstrative construction undergo alternations of the same sort as discussed above. Nouns entering into this construction must

already be in a state of definiteness (i.e., they must be accompanied by the definite article, as outlined in Section 1.4.). Illustrations of the demonstrative construction are given in (22).

- (22) a. /ónówà/ // /ònà/ → [ónówânà] 'this house'
 'the house' A 'this'
- b. /ónàkpà/ // /ònà/ → [ónàkpânà] 'this cup'
 'the cup' A 'this'
- c. /ónàtásà/ // /ònà/ → [ónàtásânà] 'this plate'
 'the plate' A 'this'
- d. /ónòyèdè/ // /ònà/ → [ónòyèdênà] 'this banana'
 'the banana' A 'this'
- e. /ónówà/ // /óíí/ → [ónówáíí] 'that house'
 'the house' A 'that'
- f. /ónàkpà/ // /óíí/ → [ónàkpáíí] 'that cup'
 'the cup' A 'that'
- g. /ónàtásà/ // /óíí/ → [ónàtásáíí] 'that plate'
 'the plate' A 'that'
- h. /ónòyèdè/ // /óíí/ → [ónòyèdèíí] 'that banana'
 'the banana' A 'that'

The demonstrative pronouns are /ònà/ 'this' in examples (a-d), and /óíí/ 'that' in examples (e-h). The intervocalic /l/ can be deleted in the forms given in (c-h) (e.g., ónówáíí → ónówái 'that house', etc.). For further discussion, see Chapter II.

In the previous discussions on the structure of the noun in Etsako, it was pointed out that a noun consists of a noun prefix and a stem. The correct bracketing then for a noun would be [[] []].

N Pref Stem

In the derivations given above, this bracketing was omitted because the output of the rules would have been the same with or without such a bracketing. In the derivation of certain constructions, it has been pointed out that the noun prefix is deleted rather than the preceding V of N₁. In these cases we can once more see the importance of syntactic brackets for the correct application of phonological rules. If the prefix is not bracketed, the mapping rules would assign the prefix tone to the first vowel of the stem rather than to the preceding vowel. Furthermore, given that the correct bracketing for nouns is as above, the tone mapping rules discussed previously will be shown to be some what more complex than originally suggested in that they must be applied cyclically. The use of cyclic application of tone mapping rules was omitted in the sample derivations given previously because the output of the rules would have been the same with or without the cyclic application. In any such events to come, the same method will be adopted. Only in the events when the need for clarity is involved will cyclic application of tone mapping rules be given.

Michael Brame (1974) has offered further evidence for the cycle to

account for stress phenomena in Palestinian, Maltese, and Spanish. There has been much discussion as to whether cyclic application of phonological rules is justified. The problem of accounting for the complex tonal phenomena in Ekpheli appears to support the need for the cycle. The correct bracketing and application of the rules is given in the sample derivations of (23-24).

(23) Sample Derivation: 'this cup'

TM [[[H] [L L]] [H] [[L] [L]]]
 NP NP PREF STEM ASSOC DPN PREF STEM

[[[H] [H H]] [[L] [L]]] Low Tone Raising Rule (3)

SM [[[ɔ] [nakpa]] [[ɔ] [na]]]

[[[ɔ] [nakpa]] [[∅] [na]]] Vowel Deletion Rule (64)

First Cycle

TM [[[H] [H H]] [[L] [L]]] Mapping Rule (30)

SM [[[ɔ] [nakpa]] [[] [na]]]

[[H H H] [L L]] Remove Brackets

[[ɔ nakpa] [na]]

----- Mapping Rule (31)
 (inapplicable)

Second Cycle

----- Mapping Rule (30)
 (inapplicable)

[H H H L L] Remove Brackets

[ɔ nakpa na]

[H H H L L] Mapping Rule (31)

[ɔ nakpa na]

[ɔnákpaâna]

'this cup'

(24) Sample Derivation: 'that plate'

TM	[[[H] [L H L]] [] [[H] [H]]]	
	NP NP PREF STEM ASSOC DPN PREF STEM	
	[[[H] [L H H]] [[H] [H]]]	Low Tone Raising Rule (3)
	[[[H] [L H H]] [[H] [H L]]]	Pre-pausal Rule (11)
SM	[[[ɔ] [natasa]] [[ɔ] [i i]]]	
	[[[ɔ] [natasa]] [[∅] [i i]]]	Vowel Deletion Rule (64)
		First Cycle
TM	[[[H] [L H H]] [[H] [H L]]]	Mapping Rule (30)
SM	[[[ɔ] [natasa]] [[] [i i]]]	
	[[H L H H] [H H L]]	Remove Brackets
	[[ɔ natasa] [i i]]	
	[[H L H H] [H H L]]	Mapping Rule (31)
	[[ɔ natasa] [i i]]	
		Second Cycle
		Mapping Rule (30) (inapplicable)
	[[H L H H H H L]]	Remove Brackets
	[[ɔ natasa i i]]	
	[[H L H H H H L]]	Mapping Rule (31)
	[[ɔ natasa i i]]	
	[[H L H H H L]]	Tone Absorption Rule (4)
	[[ɔ natasa i i]]	
	[ɔ̀nàtásáíí]	'that plate'

1.6. Adjectival construction

The tonal behavior in a noun + adjectival noun phrase also reveals the presence of the high tone associative morpheme. Illustrations are given in (25).

- (25) a. /ɔ̀mò/ // /ɔ̀nòwìsì/ → [ɔ̀mò̀nòwìsì] 'a black child'
 'child' A 'black'
 b. /àkpà/ // /ɔ̀nìkéì/ → [àkpánìkéì] 'other cup'
 'cup' A 'other'
 c. /òwà/ // /ɔ̀dzíò/ → [òwòjò] 'an old house'
 'house' A 'old'
 d. /àkpà/ // /ògbòmhì/ → [àkpògbòmhì] 'a new cup'
 'cup' A 'new'

- e. /àtásà/ // /óvèvè/ → [àtásóvèvè] 'another plate'
 'plate' A 'another'
- f. /úmhèlè/ // /ótsòmhì/ → [úmhéíótsòmhì] 'some salt'
 'salt' A 'some'
- g. /àyòyò/ // /òdzèvá/ → [áyóyòdzèvá] 'second skull'
 'skull' A 'second'
- h. /òyèdè/ // /ónìkéθè/ → [òyèdénìkéθè] 'a small banana'
 'banana' A 'small'
- i. /éíàmhì/ // /énébú/ → [éíámhínébú] 'much meat'
 'meat' A 'much'
- j. /òké/ // /ónòkùà/ → [òkénòkwà] 'a big ram'
 'ram' A 'big'
- k. /ówà/ // /ódà/ → [ówódà] 'a different house'
 'house' A 'different'
- l. /àmè/ // /kpó → [ámékpó] 'all water'
 'water' A 'all'

Sample derivations are given in (26-29).

(26) Sample Derivation: 'a new cup'

TM [[L L] [H] [L L L]]
 NP N Assoc ADJ

[[H H] [L L L]]

Low Tone Raising Rule (3)

SM [[akpa] [ɔgbómhì]]

[[akp∅] [ɔgbómhì]]

Vowel Deletion Rule (62)

TM [[H H] [L L L]]

Mapping Rule (30)

SM [[akp] [ɔgbómhì]]

[H H [L L L]]

Remove Brackets

[akp ɔgbómhì]

[H H [L L L]]

Mapping Rule (31)

[akp ɔgbómhì]

[ákpógbómhì]

'a new cup'

(27) Sample Derivation: 'a new ram'

TM [[L H] [H] [L L L]]
 NP N Assoc ADJ

SM [[oke] [] [ɔgbɔmhi]]
 [[ok∅] [] [ɔgbɔmhi]]

TM [[L H] [H] [L L L]]
 [[ok] [] [ɔgbɔmhi]]

[L H H L L L]
 [ok ɔgbɔmhi]

[L H H L L L]
 [ok ɔgbɔmhi]

L H L L L
 | | | | |
 ok ɔgbɔmhi

[òkʷɔgbòmhì]

Low Tone Raising Rule (3)
 (inapplicable)

Vowel Deletion Rule (62)

Mapping Rule (30)

Remove Brackets

Mapping Rule (31)

Tone Absorption Rule (4)

'a new ram'

(28) Sample Derivation: 'a black cup'

TM [[[L] [L]] [H] [[H] [L L L]]]
 NP N PREF STEM ASSOC ADJ PREF STEM

[[[H] [H]] [[H] [L L L]]] Low Tone Raising Rule (3)

SM [[[a] [kpa]] [[ɔ] [nɔwisi]]]

[[[a] [kpa]] [[∅] [nɔwisi]]] Vowel Deletion Rule (64)

First Cycle

TM [[[H] [H]] [[H] [L L L]]] Mapping Rule (30)

SM [[[a] [kpa]] [[] [nɔwisi]]]

[[H H] [H L L L]] Remove Brackets

[[a kpa] [nɔwisi]]

Mapping Rule (31)
 (inapplicable)

Second Cycle

Mapping Rule (30)
 (inapplicable)

[H H H L L L] Remove Brackets

[a kpa nɔwisi]

[H H H L L L] Mapping Rule (31)

[a kpa nɔwisi]

H H L L L
 | | | | |
 a kpa nɔwisi

Tone Absorption Rule (4)

[ákpánòwìsì]

'a black cup'

(29) Sample Derivation: 'a black ram'

TM [[[L] [H]] [H] [[H] [L L L]]]
 NP N PREF STEM ASSOC ADJ PREF STEM

 Low Tone Raising Rule (3)
 (inapplicable)

SM [[[o] [ke]] [] [[ɔ] [nɔwisi]]]

[[[o] [ke]] [] [[∅] [nɔwisi]]] Vowel Deletion Rule (64)

First Cycle

TM [[[L] [H]] [H] [[H] [L L L]]] Mapping Rule (30)

SM [[[o] [ke]] [] [[] [nɔwisi]]]

[[L H] H [H L L L]] Remove Brackets

[[o ke] [nɔwisi]]

 Mapping Rule (31)
 (inapplicable)

Second Cycle

 Mapping Rule (30)
 (inapplicable)

[L H H H L L L] Remove Brackets

[o ke nɔwisi]

[L H H H L L L] Mapping Rule (31)

[o ke nɔwisi]

L H L L L Tone Absorption Rule (4)
 o ke nɔwisi

[òkénòwìsì]

'a black ram'

1.7. Relative clause construction

The head noun of a relative clause undergoes the identical tonal alternations that characterize the noun + noun associative construction. Examples are given in (30).

- (30)
- | | | |
|----|--------------------------------------|----------------------------|
| | 1. | 2. |
| a. | /àkpà/ // /ón + ì + dè/ → [ákpánìdè] | |
| | 'cup' A 'this one' 'I' 'buy' | 'a cup that I am buying' |
| b. | /ówà/ // /ón + ì + dè/ → [ówánìdè] | |
| | 'house' A 'this one' 'I' 'buy' | 'a house that I am buying' |
| c. | /òké/ // /ón + ì + dè/ → [òkénìdè] | |
| | 'ram' A 'this one' 'I' 'buy' | 'a ram that I am buying' |

In column (1) of (30), the underlying form is given. Note that the

relative clause is simply a verbal noun, consisting of /ɔna/ 'this one'; /i/ 'I'; and /dɛ/ 'buy'. If the pronoun is changed to the third person /ɔ/ (e.g., ákpánɔ̀dè 'a buyable cup' or 'a cup that he is buying'), the relative clause can be defined as an adjectival. If the tones are changed within the relative clause, then the tense will change (e.g., ákpáníḍé 'a cup that I bought'). Sample derivations are given in (31-32).

(31). Sample Derivation: 'a cup that I am buying'

TM	[[[L] [L]] [H] [[H] [L L]]]	
	NP N PREF STEM ASSOC REL PREF STEM	
	[[[H] [H]] [[H] [L L]]]	Low Tone Raising Rule (3)
SM	[[[a] [kpa]] [[ɔ] [nídɛ]]]	
	[[[a] [kpa]] [[∅] [nídɛ]]]	Vowel Deletion Rule (64)
		First Cycle
TM	[[[H] [H]] [[H] [L L]]]	Mapping Rule (30)
SM	[[[a] [kpa]] [[] [nídɛ]]]	
	[[H H] [H L L]]	Remove Brackets
	[[a kpa] [nídɛ]]	
	-----	Mapping Rule (31) (inapplicable)
		Second Cycle
	-----	Mapping Rule (30) (inapplicable)
	[H H H L L]	Remove Brackets
	[a kpa nídɛ]	
	[H H H L L]	Mapping Rule (31)
	[a kpa nídɛ]	
	H H L L	Tone Absorption Rule (4)
	a kpa nídɛ	
	[ákpáníḍé]	'a cup that I am buying'

(32) Sample Derivation: 'a ram that I am buying'

TM [[[L] [H]] [H] [[H] [L L]]]
 NP N PREF STEM ASSOC REL PREF STEM

----- Low Tone Raising Rule (3)
 (inapplicable)

SM [[[o] [ke]] [] [[ɔ] [niɛ]]]

[[[o] [ke]] [] [[∅] [niɛ]]] Vowel Deletion Rule (64)

First Cycle

TM [[[L] [H]] [H] [[H] [L L]]] Mapping Rule (30)

SM [[[o] [ke]] [] [[] [niɛ]]]

[[L H] H [H L L]] Remove Brackets

[[o ke] [niɛ]]

----- Mapping Rule (31)
 (inapplicable)

Second Cycle

----- Mapping Rule (30)
 (inapplicable)

[L H H H L L] Remove Brackets

[o ke niɛ]

[L H H H L L] Mapping Rule (31)

[o ke niɛ]

Tone Absorption Rule (4)

L H L L
 | |
 o ke niɛ

[òkénìdè]

'a ram that I am buying'

1.8. Locative construction

Historically, the locative construction probably had a high tone locative marker that came between the noun and the place noun (locative). At some later point in history, the segment of the high tone locative marker was lost, leaving behind a high floating tone that had already begun to effect a tonal alternation on the tones of the preceding noun. Synchronically, the locative construction is characterized by the same set of tonal alternations that characterize the noun + noun associative construction. Even though the high floating tone of these two constructions are from two different historical sources (e.g., high tone associative marker, and high tone locative marker), it is, synchronically, a single high floating tone associative morpheme that occurs between two nouns in association in the surface structure. Illustrations are given in (33).

- (33) a. /àkpà/ // /àkì/ → [ákpaákì] 'cup at market'
 'cup' A 'market'
- b. /úkpò/ // /àkì/ → [úkpóàkì] 'cloth at market'
 'cloth' A 'market'
- c. /údzé/ // /àkì/ → [údzéàkì] 'axe at market'
 'axe' A 'market'
- d. /òkí/ // /àkì/ → [òkéàkì] 'ram at market'
 'ram' A 'market'
- e. /àkpà/ // /ówà/ → [ákpaówà] 'cup at home'
 'cup' A 'home'
- f. /úkpò/ // /ówà/ → [úkpóówà] 'cloth at home'
 'cloth' A 'home'
- g. /údzé/ // /ówà/ → [údzéówà] 'axe at home'
 'axe' A 'home'
- h. /òké/ // /ówà/ → [òkéówà] 'ram at home'
 'ram' A 'home'

Sample derivations are given in (34-37).

(34) Sample Derivation: 'cup at market'

TM [[L L] [H] [L L]]
 NP N Assoc N/LOC

[[H H] [L L]]

SM [[akpa] [aki]]

Low Tone Raising Rule (3)

Vowel Deletion Rule
 (inapplicable)

TM [[H H] [L L]]
 | | | |
 [[ákpa] [ákì]]

Mapping Rule (30)

[ákpaákì]

'cup at market'

(35) Sample Derivation: 'ram at market'

TM [[L H] [H] [L L]]
 NP N Assoc N/LOC

Low Tone Raising Rule (3)
 (inapplicable)

SM [[oke] [] [aki]]

Vowel Deletion Rule
 (inapplicable)

TM [[L H] [H] [L L]]
 SM [[oke] [] [aki]]

Mapping Rule (30)

[L H H L L]
 [| | | |]
 [oke aki]

Remove Brackets

[L H H L L]
 [| | | |]
 [oke aki]

Mapping Rule (31)

L H L L
 | | | |
 oke aki

Tone Absorption Rule (4)

[òkéàkì]

'ram at market'

(36) Sample Derivation: 'cup at home'

TM [[L L] [H] [H L]]
 NP N Assoc N/LOC

Low Tone Raising Rule (3)

[[H H] [H L]]
 SM [[akpa] [owa]]

Vowel Deletion Rule
 (inapplicable)

TM [[H H] [H L]]
 SM [[akpa] [owa]]

Mapping Rule (30)

[ákpáówà]

'cup at home'

(37) Sample Derivation: 'ram at home'

TM [[L H] [H] [H L]]
 NP N Assoc N/LOC

SM [[oke] [] [owa]]

Low Tone Raising Rule (3)
 (inapplicable)

Vowel Deletion Rule
 (inapplicable)

TM [[L H] [H] [H L]]
 SM [[oke] [] [owa]]

Mapping Rule (30)

[L H H H L]
 [oke owa]

Remove Brackets

[L H H H L]
 [oke owa]

Mapping Rule (31)

L H H L
 | | | |
 oke owa

Tone Absorption Rule (4)

[òkéówà]

'ram at home'

2.0. Identification construction

The next construction to be considered is that of identification (term from Welmers). Nouns and noun phrases of this construction usually undergo a tonal alternation, as seen in (38).

- (38) a. /ówà # xóná/ → [ówǎ xóná] 'this is a house'
 'house' 'is this' [ówá xóná]
- b. /ówà # xólí/ → [ówǎ xólí] 'that is a house'
 'house' 'is that' [ówá xólí]
- c. /àkpà # xóná/ → [àkpǎ xóná] 'this is a cup'
 /'cup' 'is this' [àkpá xóná]
- d. /àkpà # xólí/ → [àkpǎ xólí] 'that is a cup'
 'cup' 'is that' [àkpá xólí]
- e. /àwòthò # xóná/ → [àwòthǒ xóná] 'this is a hoe'
 'hoe' 'is this' [àwòthó xóná]
- f. /àtásà # xóná/ → [àtásǎ xóná] 'this is a plate'
 'plate' 'is this' [àtásá xóná]
- g. /údzé # xóná/ → [údzé xóná] 'this is an axe'
 'axe' 'is this'
- h. /òké # xóná/ → [òké xóná] 'this is a ram'
 'ram' 'is this'

The first nouns in (38 a-f) all end in a LOW tone in isolation. In this identification construction, however, the final tone on the NOUN is either a rising tone (LOW HIGH) or a (DOWNSTEP). The forms with the rising tone will first be discussed. In examples (g-h), the NOUNS which end in a HIGH in isolation show a fall (HIGH LOW) in these constructions. Furthermore the initial tones on the VERB PHRASE in examples (a-f) which are HIGH in isolation occur as a DOWNSTEP showing that LOW tone must occur in the surface structure. From these examples, one can assume that the Identification morpheme is represented in the lexicon as a tonal matrix of [HIGH LOW] .

IDEN

In order to derive the occurring phonetic tones, the mapping rules must occur after the Downstep Rule (20). The Tone Absorption Rule (4) must apply. The Tone Simplification Rule (35) can optionally apply. And in addition, a rule must be posited as given in (39), which reflects the fact that these tones can not occur on one segment.

(39) Tone Simplification Rule

TONE $\rightarrow \emptyset / \left[\begin{array}{l} \text{TONE TONE} \text{_____} \\ + \text{Vocalic} \end{array} \right]$
 (Tone is a cover symbol for [\pm HIGH].)

The sequence of tone rules and tone mapping rules that are necessary to derive the Identification Construction are as in (40). Note that there are other rules which do not apply and are ordered in relation to the rule given.

- (40) 1. Downstep Rule (20) $[+ H] \rightarrow [+ D] / [- H] \text{_____}$
 2. Mapping Rule (30) Map tones onto segments within innermost brackets; map first tone onto first vowel, second tone onto second vowel, etc. If there is no vowel, let tone 'float'. Remove innermost brackets whether or not rule can apply. Map tone onto segments only where segments have not yet been specified by tone features.
 3. Mapping Rule (31) Map 'floating' tones onto closest immediate vowel (not separated by a consonant).
 4. Tone Absorption Rule (4) $[\alpha \text{ HIGH}]_1 \rightarrow \emptyset / \left[\begin{array}{l} \alpha \text{ HIGH} \\ + \text{Vocalic} \end{array} \right]$
 5. Tone Simplification Rule (39)
 6. Tone Simplification Rule (35) $[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{l} + \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$

Given these rules, (41) illustrates how the phonetic tones can be derived.

(41) a. Sample Derivation: 'this is a house'

TM [[H L] [H L] [H H]]
 S N ID VP

[[H L] [D L] [D H]]

Downstep Rule (20)

SM [[owa] [] [xɔna]]

TM [[H L] [D L] [D H]]

Mapping Rule (30)

SM [[owa] [] [xɔna]]

[H L D L D H]

Remove Brackets

[owa xɔna]

[H L D L D H]

Mapping Rule (31)

[owa xɔna]

Tone Absorption Rule (4)
 (inapplicable)

H L D D H
 | | | | |
 owa xɔna

Tone Simplification Rule (39)

[ówǎ xɔná]

'this is a house'

b. Sample Derivation: 'this is an axe'

TM [[H H] [H L] [H H]]
 S N ID VP

[[H H] [H L] [D H]]

Downstep Rule (20)

SM [[udze] [] [xɔna]]

TM [[H H] [H L] [D H]]

Mapping Rule (30)

SM [[udze] [] [xɔna]]

[H H H L D H]

Remove Brackets

[udze xɔna]

[H H H L D H]

Mapping Rule (31)

[udze xɔna]

H H L D H
 | | | | |
 udze xɔna

Tone Absorption Rule (4)

Tone Simplification Rule (39)
 (inapplicable)

[údzê xɔná]

'this is an axe'

The alternative forms in (38a-f) can be accounted for by the Tone Simplification Rule (35) as given originally in Chapter III, and repeated in (40). The Tone Simplification Rule (35) is clearly a case of tone deletion which can optionally apply after the Tone Simplification

Rule (39). Consequently, the input to Rule (35) are the final forms as given in (41). Sample derivations are given in (42).

- (42) a. $\begin{array}{cc} \text{H L} & \text{D} \\ | & / \\ \text{owá} & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (39)
- $\begin{array}{cc} \text{H (L)} & \text{D} \\ | & / \\ \text{owá} & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (35)
- $[\acute{o}wá \acute{x}óná]$ 'this is a house'
- b. $\begin{array}{cc} \text{L L} & \text{D} \\ | & / \\ \text{ákpa} & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (39)
- $\begin{array}{cc} \text{L (L)} & \text{D} \\ | & / \\ \text{ákpa} & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (35)
- $[\grave{a}kpa \acute{x}óná]$ 'this is a cup'
- c. $\begin{array}{ccc} \text{L L L} & & \text{D} \\ | | & & / \\ \text{awóthó} & & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (39)
- $\begin{array}{ccc} \text{L L (L)} & & \text{D} \\ | | & & / \\ \text{awóthó} & & \end{array} \quad \begin{array}{cc} \text{D H} \\ | & | \\ \text{xóná} & \end{array}$ Tone Simplification Rule (35)
- $[\grave{a}wóthó \acute{x}óná]$ 'this is a hoe'

Both the HIGH tone Associative morpheme and the HIGH-LOW Identification morpheme can occur in the surface structure as is shown in the examples under (43).

- (43) a. $\begin{array}{l} /ákpa/ \quad // \quad /mh\grave{e}/ \quad // \quad /xóná/ \\ \text{'cup'} \quad \text{A} \quad \text{'my'} \quad \text{ID} \quad \text{'is this'} \end{array} \rightarrow \left\{ \begin{array}{l} [ákpa \acute{m}h\grave{e} \acute{x}óná] \\ [ákpa \acute{m}h\grave{e} \acute{x}óná] \end{array} \right\}$
 'this is my cup'
- $\begin{array}{l} /ákpa/ \quad // \quad /ónòwìsì/ \quad // \quad /xóná/ \\ \text{'cup'} \quad \text{A} \quad \text{'black'} \quad \text{ID} \quad \text{'is this'} \end{array} \rightarrow \left\{ \begin{array}{l} [ákpa \grave{ò}wìsì \acute{x}óná] \\ [ákpa \grave{ò}wìsì \acute{x}óná] \end{array} \right\}$
 'this is a black cup'
- $\begin{array}{l} /ónà/ \quad // \quad /ákpa/ \quad // \quad /xóná/ \\ \text{DA} \quad \text{A} \quad \text{'cup'} \quad \text{ID} \quad \text{'is this'} \end{array} \rightarrow \left\{ \begin{array}{l} [ónàkpa \acute{x}óná] \\ [ónàkpa \acute{x}óná] \end{array} \right\}$
 'this is the cup'

A sample derivation is given in (44).

(44) Sample Derivation: 'this is a black cup'

TM [[[[L] [L]] [H] [[H] [L L L]]] [H L] [H H]]
 SNP N PREF STEM ASSOC ADJ PREF STEM ID VP
 [[[[H] [H]] [[H] [L L L]]] [H L] [H H]] Low Tone Raising Rule (3)
 [[[[H] [H]] [[H] [L L L]]] [D L] [D H]] Downstep Rule (20)

SM [[[[a] [kpa]] [[ɔ] [nɔwisi]]] [] [xɔna]]
 [[[[a] [kpa]] [[∅] [nɔwisi]]] [] [xɔna]] Vowel Deletion Rule (64)

First Cycle

TM [[[[H] [H]] [[H] [L L L]]] [D L] [D H]] Mapping Rule (30)
 SM [[[[a] [kpa]] [[] [nɔwisi]]] [] [xɔna]]

[[[H H] [H L L L] D L D H] Remove Brackets
 [[a kpa] [nɔwisi] xɔna]

Mapping Rule (31) (inapplicable)

Second Cycle

Mapping Rule (30) (inapplicable)

[[[H H H L L L D L D H] Remove Brackets
 [[a kpa nɔwisi xɔna]

[[[H H H L L L D L D H] Mapping Rule (31)
 [[a kpa nɔwisi xɔna]

[[[H H L L L D L D H] Tone Absorption Rule (4)
 [[a kpa nɔwisi xɔna]

[[[H H L L L D D H] Tone Simplification Rule (39)
 [[a kpa nɔwisi xɔna]

[ákpánòwìsí xóná]

'this is a black cup'

The alternative forms in (44) can, furthermore, be accounted for by the application of the Tone Simplification Rule (35) to the output of the final forms of (44), as seen in (45).

- (45) $\begin{array}{ccc} \text{H} & \text{H} & \text{L L L} \\ | & | & | \\ \text{akpa} & \text{nɔwisi} & \text{D} \end{array} \quad \begin{array}{cc} \text{D} & \text{H} \\ | & | \\ \text{xɔna} & \end{array}$ Tone Simplification Rule (39)
- $\begin{array}{ccc} \text{H} & \text{H} & \text{L L(L)} \\ | & | & | \\ \text{akpa} & \text{nɔwisi} & \text{D} \end{array} \quad \begin{array}{cc} \text{D} & \text{H} \\ | & | \\ \text{xɔna} & \end{array}$ Tone Simplification Rule (35)
- $[\text{ákpánòwìsì} \text{ xóná}]$ 'this is a black cup'

3.0 'How many' construction

As illustrated in (46), tonal alternations also occur in interrogatives involving 'how many'.

- (46) a. $/\acute{e}wà \# \acute{é}kè/ \rightarrow [\acute{é}wě́kè]$ 'how many houses'
 'houses' 'how many'
- $/\grave{ì}kpà \# \acute{é}kè/ \rightarrow [\grave{ì}kpě́kè]$ 'how many cups'
 'cups' 'how many'
- $/\grave{ì}wò\thetaò \# \acute{é}kè/ \rightarrow [\grave{ì}wò\thetaě́kè]$ 'how many hoes'
 'hoes' 'how many'
- $/\grave{ì}tásà \# \acute{é}kè/ \rightarrow [\grave{ì}tásě́kè]$ 'how many plates'
 'plates' 'how many'
- $/\acute{í}dzé \# \acute{é}kè/ \rightarrow [\acute{í}dzě́kè]$ 'how many axes'
 'axes' 'how many'
- $/\grave{è}ké \# \acute{é}kè/ \rightarrow [\grave{è}ké́kè]$ 'how many rams'
 'rams' 'how many'

As noted above in Section 3.0. of Chapter III, in interrogatives a HIGH tone morpheme occurs finally in the surface structure. In final position the rising tone simplification rule is obligatory. The derivations of these forms are illustrated in (47-48).

(47) Sample Derivation: 'how many houses'

TM [[[H L] [H L]]]
 Q NP N N

[[[H L] [H L H]]]

High Tone Insertion Rule (23)

[[[H L] [D L D]]]

Downstep Rule (20)

SM [[[ewa] [eke]]]

[[[ew∅] [eke]]]

Vowel Deletion Rule (62)

TM [[[H L] [D L D]]]

Mapping Rule (30)

SM [[[ew] [eke]]]

[[H L D L D]]

Remove Brackets

[[ew eke]]

[[H L D L D]]

Mapping Rule (31)

[[ew eke]]

Tone Absorption Rule (4)
 (inapplicable)

H (L) D D
 | | | |
 ew eke

Tone Simplification Rule (35)

[éwéke'] or [éwéke']

'how many houses?'

(48) Sample Derivation: 'how many rams'

TM [[[L H] [H L]]]
 Q NP N N

[[[L H] [H L H]]]

High Tone Insertion Rule (23)

[[[L D] [H L D]]]

Downstep Rule (20)

SM [[[eke] [eke]]]

[[[ek∅] [eke]]]

Vowel Deletion Rule (62)

TM [[[L D] [H L D]]]

Mapping Rule (30)

[[[ek] [eke]]]

[[L D H L D]]

Remove Brackets

[[ek eke]]

[[L D H L D]]

Mapping Rule (31)

[[ek eke]]

L H L D
 | | | |
 ek eke

Tone Absorption Rule (4)

L H D
 | | |
 ek eke

Tone Simplification Rule (35)

[èkéke']

'how many rams'

4.0. *Noun reduplication*

In the Ekpheli equivalent of the English NP with 'every' modifying a noun (e.g., 'every house'), the noun in Ekpheli is reduplicated. Noun reduplication is characterized by a full repetition of the segments of the noun, with tone alternations which are very regular. The examples in (49) are derived by the rules already given.

- (49) a. /ówà # ówà/ → { [ówǒwà] } 'every house'
 'house' 'house' [ówòwà] }
 b. /útsádè # útsádè/ → { [útsádútsádè] } 'every pot'
 'pot' 'pot' [útsádútsádè] }
 [útsádútsádè] }
 c. /áyòxò # áyòxò/ → { [áyòxǎyòxò] } 'every coco-yam'
 'coco-yam' 'coco-yam' [áyòxáyòxò] }
 d. /ídù # ídù/ → { [ídwǐdù] } 'every lion'
 'lion' 'lion' [ídwídù] }
 e. /údì # údì/ → { [údyǔdì] } 'every palm-tree'
 'palm-tree' 'palm-tree' [údyúdì] }
 f. /ólùmhì # ólùmhì/ → { [ólùmhyǒlùmhì] } 'every corpse'
 'corpse' 'corpse' [ólùmhyólùmhì] }

(49a-f) are straightforward. Vowel deletion, glide formation, mapping, and tone simplification rules apply as shown in (50-51).

(50) Sample Derivation: 'every house'

TM [[H L] [H L]]
 N N N

[[H L] [D L]]

Downstep Rule (20)

SM [[owa] [owa]]

[[ow∅] [owa]]

Vowel Deletion Rule (62)

TM [[H L] [D L]]

Mapping Rule (30)

SM [[ow] [owa]]

[H L D L]

Remove Brackets

[ow owa]

[H L D L]

Mapping Rule (31)

[ow owa]

Tone Absorption Rule (4)
 (inapplicable)

H (L) D L
 | |
 ow owa

Tone Simplification Rule (35)

[ówǒwà] or [ówòwà]

'every house'

(51) Sample Derivation: 'every lion'

TM [[H L] [H L]]
 N N N

[[H L] [D L]]

Downstep Rule (20)

SM [[udy] [udi]]

[[udy] [udi]]

Glide Formation Rule (39)

TM [[H L] [D L]]

Mapping Rule (30)

SM [[udy] [udi]]

[H L D L]

Remove Brackets

[udy udi]

[H L D L]

Mapping Rule (31)

[udy udi]

Tone Absorption Rule (4)
 (inapplicable)

H(L) D L
 | |
 udy udi

Tone Simplification Rule (35)

[údyúdi] or [údyúdi]

'every lion'

There are cases however where the Rise is simplified to a Low rather than to a High (DOWNSTEP), as illustrated in (52).

(52) /útsádè # útsádè/ → $\left\{ \begin{array}{l} [\acute{u}ts\acute{a}d\grave{u}ts\acute{a}d\grave{e}] \\ [\acute{u}ts\acute{a}d\grave{u}ts\acute{a}d\grave{e}] \\ H \quad H \quad L \quad H \quad L \end{array} \right\}$

This LOW-HIGH → LOW simplification is also evidenced when a reduplicated noun occurs in an associative construction as shown in (53).

(53) Sample Derivation: 'every house of yesterday'

TM	[[[[H] [L]] [[H] [L]]] [H] [[H] [L L]]]	
	NP N N PREF STEM N PREF STEM ASSOC N PREF STEM	
	[[[[H] [L]] [[H] [H]]] [[H] [L L]]]	Low Tone Raising Rule (3)
	[[[[H] [L]] [[D] [H]]] [[H] [L L]]]	Downstep Rule (20)
SM	[[[[o] [wa]] [[o] [wa]]] [[ε] [node]]]	
	[[[[o] [w∅]] [[o] [w∅]]] [[ε] [node]]]	Vowel Deletion Rule (62)
		First Cycle
TM	[[[[H] [L]] [[D] [H]]] [[H] [L L]]]	Mapping Rule (30)
SM	[[[[o] [w]] [[o] [w]]] [[ε] [node]]]	
	[[[H L] [D H]] [H L L]]	Remove Brackets
	[[[o w] [o w]] [ε node]]	
		Mapping Rule (31) (inapplicable)
		Second Cycle
		Mapping Rule (30) (inapplicable)
	[[H L D H] H L L]	Remove Brackets
	[[o w o w] ε node]	
	[[H L D H] H L L]	Mapping Rule (31)
	[[o w o w] ε node]	
		Third Cycle
		Mapping Rule (30) (inapplicable)
	[H L D H H L L]	Remove Brackets
	[o w o w ε node]	
	[H L D H H L L]	Mapping Rule (31)
	[o w o w ε node]	
	[H L D H H L L]	Tone Absorption Rule (4)
	[o w o w ε node]	
	[H L (D) H L L]	Tone Simplification Rule (56)
	[o w o w ε node]	
	[ówǒwénòdè] or [ówòwénòdè]	'every house of yesterday'

In the earlier examples showing a simplification of a rising tone to HIGH (DOWNSTEP) the following tone was either a LOW or DOWNSTEP. In these

examples the following tone is a non-downstepped HIGH. It appears then that in order to preserve the underlying presence of the LOW the simplification rules must be changed. Before we formulate the new rule, some examples of the type in (54) will show that a simplification of a falling tone (HIGH LOW) can also occur, with the deletion of the LOW part.

(54) /òʎèdédé # òʎèdédé/ → $\left\{ \begin{array}{l} [\text{òʎèdédóʎèdédé}] \\ [\text{òʎèdédóʎèdédé}] \end{array} \right\}$ 'every banana'
'banana' 'banana'

The final low tone results from a rule which adds a LOW to pre-pausal HIGH (by Rule 11). There appears to be a principle of 'polarity' at work to preserve the effect of the underlying tones. That is, a HIGH-LOW becomes HIGH before a following LOW, and LOW-HIGH becomes LOW before a following non-downstepped HIGH. We can therefore formulate the contour tone simplification rule as in (55).

(55) Tone Simplification Rule:

$$\left[\begin{array}{l} [\alpha \text{ HIGH}] \quad [-\alpha \text{ HIGH}] \\ + \text{Vocalic} \end{array} \right]_1 \left[\begin{array}{l} [-\alpha \text{ HIGH}] \\ - \text{DOWNSTEP} \end{array} \right]_2 \Rightarrow \left[\begin{array}{l} [-\alpha \text{ HIGH}] \\ + \text{Vocalic} \end{array} \right]_1 \quad 2$$

Another case where the LOW portion of a falling tone is deleted is when it occurs before a DOWNSTEPPED HIGH, as seen in (56).

(56) a. /òkéké # òkéké/ → $\left\{ \begin{array}{l} [\text{òkòkéké}] \\ [\text{òkókéké}] \end{array} \right\}$ 'every ram'
'ram' 'ram'
b. /òʎtsédédé # òʎtsédédé/ → $\left\{ \begin{array}{l} [\text{òʎtsédédóʎtsédédé}] \\ [\text{òʎtsédédóʎtsédédé}] \end{array} \right\}$ 'every sunrise'
'sunrise' 'sunrise'

Such examples can be accounted for by a rule of the form in (57).

(57) Low Tone Deletion Rule:

$$[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{l} [+ \text{HIGH}] \quad \underline{\quad} \\ + \text{Vocalic} \end{array} \right] [+ \text{DOWNSTEP}]$$

Rule (57) must be ordered after the Downstep Rule (20).

5.0. Summary of tone rules

(1) Low Tone Insertion/Pre-pause Tone Rule (Rule 11 of Ch. III):

$$\emptyset \rightarrow [- \text{HIGH}] / [+ \text{HIGH}] \underline{\quad} \% \text{ (where \% = pause)}$$

(2) Downstep Rule (Rule 20 of Ch. III):

$$[+ \text{H}] \rightarrow [+ \text{D}] / [- \text{H}] \underline{\quad}$$

(3) High Tone Insertion Rule (Rule 23 of Ch. III):

$$\emptyset \rightarrow [+ \text{HIGH}] / [- \text{HIGH}] \left[\begin{array}{l} \underline{\quad} \\ \text{N} \end{array} \right] \#?$$

- (4) Tone Simplification Rule (Rule 35 of Ch. III):

$$[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{c} \text{---} + \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$$
- (5) Low Tone Raising Rule (Rule 3 of Ch. IV):
 (a)
$$[- \text{HIGH}] \rightarrow [+ \text{HIGH}] / \text{---} [+ \text{HIGH}]_{\text{Assoc}}$$

 (b)
$$\left[\begin{array}{c} 1 \\ [- \text{HIGH}] \\ N \end{array} \right] [+ \text{HIGH}] \xRightarrow{\text{Assoc}} H_1 \emptyset$$
- (6) Tone Absorption Rule (Rule 4 of Ch. IV):

$$[\alpha \text{ HIGH}]_1 \rightarrow \emptyset / \left[\begin{array}{c} \text{---} \alpha \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$$
- (7) Tone Simplification Rule: (Rule 19 of Ch. IV):

$$[+ \text{HIGH}] \rightarrow \emptyset / [+ \text{HIGH}] \left[\begin{array}{c} \text{---} - \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$$
- (8) Tone Simplification Rule (Rule 39 of Ch. IV):

$$\text{TONE} \rightarrow \emptyset / \left[\begin{array}{c} \text{TONE TONE ---} \\ + \text{Vocalic} \end{array} \right]$$
- (9) Tone Simplification Rule (Rule 55 of Ch. IV):

$$\left[\begin{array}{c} [\alpha \text{ HIGH}] [-\alpha \text{ HIGH}] \\ + \text{Vocalic} \end{array} \right]_1 \left[\begin{array}{c} [-\alpha \text{ HIGH}] \\ - \text{DOWNSTEP} \end{array} \right]_2 \Rightarrow \left[\begin{array}{c} [-\alpha \text{ HIGH}] \\ + \text{Vocalic} \end{array} \right]_1 \quad 2$$
- (10) Low Tone Deletion (Rule 57 of Ch. IV):

$$[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{c} [+ \text{HIGH}] \text{---} \\ + \text{Vocalic} \end{array} \right] [+ \text{DOWNSTEP}]$$

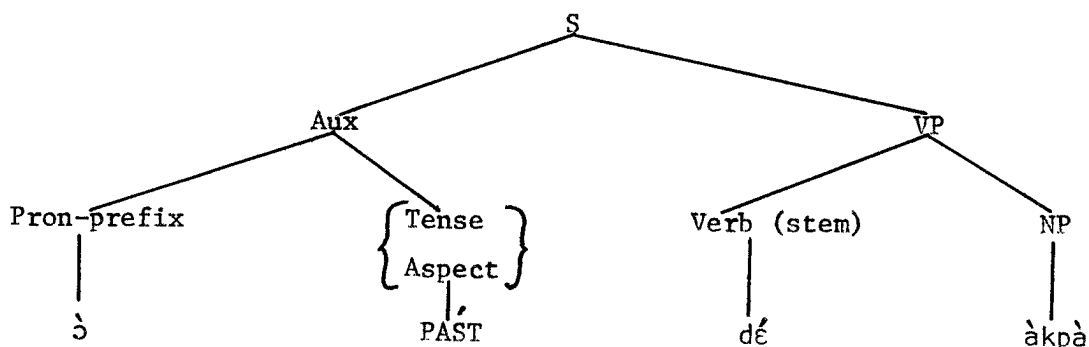
CHAPTER V

Tonal Alternations in Verbs and Verb Phrases

0.0. *Introduction*

This chapter is concerned with the complexity of morphotonemic alternations in the verb phrase of Ekpheli. Tone bears a great syntactic functional load, particularly in the verb phrase. In many cases, only tonal alternations of the pronominal prefix, the verb stem, and the noun object reveal the tense and aspect. In order to understand what is going on, it is necessary to briefly describe the structure of the verb phrase. This discussion will be limited to transitive verbs.

The derived surface structure of the sentence [ʒdâkpà] 'he bought a cup' would be, roughly:



This bracketing is crucial when we attempt to map the tones of the TM onto the segments of the SM.

The reason why the pronoun is posited as a prefix on the verb is because in a sentence with a non-pronominal subject the prefix still occurs, as for example [ìyóyò ǝ dâkpà] 'Iyogho bought a cup'.

Furthermore, the tense aspect tonal morphemes are realized by their tonal influence on this prefix which argues for the bracketing of the Pron-Prefix and the Tense/Aspect under one node.

I will discuss the non-negative verb phrase in its different tense/aspect forms, followed by a discussion of the negative. But before going into either of these discussions, a discussion of tonal alternations in noun objects will precede.

1.0. Noun object

Nouns when occurring as objects of a verb in some verb tenses undergo tone changes. Such tonal alternations originate from contraction between a verb and its noun object, where the vowel of the verb deletes but its tone remains as an influence on the noun object. Illustrations of nouns occurring as an object of a verb in the PAST TENSE, PRESENT PROGRESSIVE, FUTURE TENSE, PAST HABITUAL, and NEGATIVE are given in (1-5).

(1) Past Tense:

	1.		2.
a.	/ǝ + dé # àkpà/ he buy cup	→	[ǝdâkpà] 'he bought a cup'
b.	/ǝ + dé # òyèdé/ he buy banana	→	[ǝdôyèdê] 'he bought a banana'
c.	/ǝ + dé # àtásà/ he buy plate	→	[ǝdâtásà] 'he bought a plate'
d.	/ǝ + dé # útékù/ he buy chair	→	[ǝdútékù] 'he bought a chair'

In column (1), verbs + noun objects are given in their citation forms. Note that the verb tone affects the initial tone of the noun object in example (1a-c).

(2) Present Progressive:

1.		2.
a. /ò + dé # àkpà/ he buy cup	→	[òdàkpá] 'he is buying a cup'
b. /ò + dé # òyèdé/ he buy banana	→	[òdòyèdé] 'he is buying a banana'
c. /ò + dé # àtásà/ he buy plate	→	[òdátásà] 'he is buying a plate'
d. /ò + dé # útékùì/ he buy chair	→	[òdùtékùì] 'he is buying a chair'
e. /ò + dé # úkpò/ he buy cloth	→	[òdúkpò] 'he is buying cloth'

Note that not only is there a tonal alternation involving the initial tone of a noun object but the final tone of a noun object is observed to alternate in example (a). Nouns of this sort require an explanation as will be given below, following the examples of the NEGATIVE.

(3) Future Tense:

1.		2.
a. /ò + 0á + dé # àkpà/ he FUT buy cup	→	[ò0á dákpa] or [ò0á dàkpá] 'he will buy a cup'
b. /ò + 0á + dé # òyèdé/ he FUT buy banana	→	[ò0á dòyèdé] 'he will buy a banana'
c. /ò + 0á + dé # útékùì/ he FUT buy chair	→	[ò0á dùtékùì] or [ò0á dùtékùì] 'he will buy a chair'
d. /ò + 0á + dé # úkpò/ he FUT buy cloth	→	[ò0á dúkpò] 'he will buy cloth'

The tonal alternations between the verb and its noun object of the FUTURE TENSE are observed to be similar to those of the PRESENT PROGRESSIVE TENSE, except for the tonal influence of the low tone portion of the future tense morpheme onto the verb phrase.

(4) Past Habitual:

1.		2.
a. /ò + yá + dé # àkpà/ he PAST HAB buy cloth	→	[ò yá dákpa] or [ò yá dàkpá] 'he used to buy a cup'
b. /ò + yá + dé # òyèdé/ he PAST HAB buy banana	→	[ò yá dòyèdé] 'he used to buy a banana'
c. /ò + yá + dé # útékùì/ he PAST HAB buy chair	→	[ò yá dùtékùì] or [ò yá dùtékùì] 'he used to buy a chair'
d. /ò + yá + dé # úkpò/ he PAST HAB buy cloth	→	[ò yá dúkpò] 'he used to buy cloth'

The tonal alternations of the PAST HABITUAL are identical to those of the FUTURE TENSE.

(5) Present Progressive Negative:

1.	2.
a. /ŝ + dé # àkpà/ NEG/he buy cup	[ŝ dàkpá] 'he is not buying a cup'
b. /ŝ + dé # òyèdé/ NEG/he buy banana	[ŝ d'oyèdé] 'he is not buying a banana'
c. /ŝ + dé # útékù/ NEG/he buy chair	[ŝ dùtékwì] 'he is not buying a chair'
d. /ŝ + dé # úkpò/ NEG/he buy cloth	[ŝ dúkpò] 'he is not buying cloth'

The tonal alternations of the NEGATIVE are identical to those of the PRESENT PROGRESSIVE TENSE (affirmative).

As observed in examples (1-5), most of the tonal alternations of the noun object are caused by the tone of the verb. There are, nevertheless, a class of nouns with all LOW tones that are effected by the Tense/Aspect in non-negative verb phrases. In negative verb phrases, nouns of this class undergo identical tonal alternations irrespective of Tense/Aspect. Such tonal alternations are triggered by the presence of NEG. When such low tone nouns occur as an object of a verb in some Tense/Aspect non-negative verb phrases, and all negative verb phrases, all low tones of the nouns are raised to high. After being raised to high, such raised low tones are subject to the influence of the tone of the verb in the same manner as any two high tones occurring after a verb (cf. (2a) and (2d)). Further illustrations are given in (6).

(6)	1.	2.	3.	4.	5.
a.	/ò + dé # àkpà/ he buy cup	òdéákpá	òdèákpá	òdǎkpá	[òdàkpá] 'he is buying a cup'
b.	/ò + dé # àgbòpì/ he buy orange	òdéágbópí	òdèágbópí	òdǎgbópí	[òdàgbópí] 'he is buying an orange'

The underlying form is given in column (1). The low tones are raised to high in column (2). The high tone of the verb is lowered to low in column (3). In column (4), the vowel of the verb is deleted. The rising tone of column (4) is simplified to a low tone in column (5). The low tone raising suggests a rule of the form in (7).

(7) Low Tone Raising

$$[- \text{HIGH}]_1 \rightarrow [+ \text{HIGH}]_1 \left[\begin{array}{c} \text{Future} \\ \text{Present Progressive} \\ \text{Past Habitual} \\ \text{NEGATIVE} \end{array} \right] / \left[\begin{array}{c} [+ \text{HIGH}]_1 \\ \text{V} \\ \text{VP} \end{array} \right] \left[\begin{array}{c} \text{N} \\ \text{N} \end{array} \right]$$

This rule states that low tones of a noun are raised to high in FUTURE, PRESENT PROGRESSIVE, PAST HABITUAL, and in the presence of NEGATIVE.

2.0. *Present progressive*

Examples of mono-syllabic and bi-syllabic verbs, followed by noun objects in the present tense, are given in (8).

(8)	1.	→	2.
a.	/ò + dé # útsádè/ he buy pot	→	[ò dùtsádè] 'he is buying a pot'
b.	/ò + dé # àkpà/ he buy cup	→	[ò dàkpá] 'he is buying a cup'
c.	/ò + dé # òyèdé/ he buy banana	→	[ò dóyèdé] 'he is buying a banana'
d.	/ò + dé # àtásà/ he buy plate	→	[ò dátásà] 'he is buying a plate'
e.	/ò + dé # úkpò/ he buy cloth	→	[ò dúkpò] 'he is buying cloth'
f.	/ò + kélé # útsádè/ he look-for pot	→	[ò kèlùtsádè] 'he is looking for a pot'
g.	/ò + kélé # àkpà/ he look-for cup	→	[ò kèlàkpá] 'he is looking for a cup'
h.	/ò + kélé # òyèdé/ he look-for banana	→	[ò kèlóyèdé] 'he is looking for a banana'
i.	/ò + kélé # àtásà/ he look-for plate	→	[ò kèlàtásà] 'he is looking for a plate'
j.	/ò + kélé # úkpò/ he look-for cloth	→	[ò kèlúkpò] 'he is looking for cloth'

In column (1) of (8a-j), the underlying forms are given. The surface phonetic forms are given in column (2). Note that the forms given in column (2) show alternations from the tones of the forms given in column (1). That is, while mono-syllabic and bi-syllabic verbs are observed in column (1) to have lexical high tone, this isn't at all obvious in column (2). For example, in column (2a-b), the mono-

syllabic verb has low tone; but it has high tone in the forms of (c-e). In column (2f-g), the bi-syllabic verb has low tone, but in the forms of (h-j), it has a tone sequence of low followed by high. The same alternating tonal patterns of these verbs are obtained for all such verbs occurring in the Present Progressive, Future Tense, Past Habitual and Negative (all aspects), as will be illustrated throughout this chapter. Furthermore, it will be observed in this chapter, that the verb has a non-alternating high tone in the Past Tense, Past Perfect, and the Present Habitual. One possible solution would be to lexically represent each verb with its different allomorphs in various paradigms (e.g., /dɛ́/ 'buy' in isolation; /dɛ́/ or /dɛ̀/ (depending on the following noun object) in the Present Progressive, Future Tense, Past Habitual, and Negative. Such an analysis would make the claim that there is no generalization to be drawn. There are, however, regularities as to tonal alternations as will be seen below.

From the examples of (8a-j), one can assume that the tense/aspect of the present progressive tense is characterized by polarization of the verb tone in respect to the tones of the noun object. In order to maintain this polarization, the underlying tones of both verbs and nouns are affected. To derive the surface phonetic tones, three additional rules of the form given in (9-11) are posited.

(9) Tone Lowering of Mono-syllabic Verb:

$$[+ \text{ HIGH}] \rightarrow [- \text{ HIGH}] \quad / \quad \left[\begin{array}{c} \text{---} \\ \text{V} \quad \text{N} \\ \text{VP} \end{array} \right] [+ \text{ HIGH}]_2$$

Present Progressive
Future
Past Habitual
NEGATIVE

(10) Tone Lowering of Bi-syllabic Verb:

$$[+ \text{ HIGH}]_2^2 \rightarrow [- \text{ HIGH}] \quad / \quad \left[\begin{array}{c} \text{---} \\ \text{V} \quad \text{N} \\ \text{VP} \end{array} \right] [+ \text{ HIGH}]_1$$

Present Progressive
Future
Past Habitual
NEGATIVE

(11) Tone Dissimilation of Bi-syllabic Verb:

$$[+ \text{ HIGH}]_1^1 \rightarrow [- \text{ HIGH}] \quad / \quad \left[\begin{array}{c} \text{---} + \text{ HIGH} \\ \text{V} \quad \text{N} \\ \text{VP} \end{array} \right] [- \text{ HIGH}]_1$$

Present Progressive
Future
Past Habitual
NEGATIVE

Given these rules and rules from previous chapters, (12-21) illustrate how the phonetic tones can be derived.

(12) Sample Derivation: 'he is buying a pot'

TM	[[[L]] [[H] [H H L]]]	
	S AUX PN VP V N	
	[[[L]] [[L] [H H L]]]	Tone Lowering Rule (9)
SM	[[[ɔ]] [[dɛ] [utsadɛ]]]	
	[[[ɔ]] [[d∅] [utsadɛ]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L] [H H H]]]	Mapping Rule (30)
SM	[[[ɔ]] [[d] [utsadɛ]]]	
	[[L] [L H H H]]	Remove Brackets
	[[ɔ] [d utsadɛ]]	
	[[L] [L H H H]]	Mapping Rule (31)
	[[ɔ] [d utsadɛ]]	
	L L H H	Tone Simplification Rule (55)
	ɔ d utsadɛ	
	[ɔ̀ d̀ùtsáɛ̀]	'he is buying a pot'

(13) Sample Derivation: 'he is buying a cup'

TM	[[[L]] [[H] [L L]]]	
	S AUX PN VP V N	
	[[[L]] [[H] [H H]]]	Tone Raising Rule (7)
	[[[L]] [[L] [H H]]]	Tone Lowering Rule (9)
SM	[[[ɔ]] [[dɛ] [akpa]]]	
	[[[ɔ]] [[d∅] [akpa]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L] [H H]]]	Mapping Rule (30)
SM	[[[ɔ]] [[d] [akpa]]]	
	[[L] [L H H]]	Remove Brackets
	[[ɔ] [d akpa]]	
	[[L] [L H H]]	Mapping Rule (31)
	[[ɔ] [d akpa]]	
	L L H	Tone Simplification Rule (55)
	ɔ d akpa	
	[ɔ̀ dàkpá]	'he is buying a cup'

(14) Sample Derivation: 'he is buying a banana'

TM	[[[L]] [[H] [L L H]]]	
	S AUX PN VP P N	
	[[[L]] [[H] [L L H L]]]	Pre-pausal Rule (11)
SM	[[[ɔ]] [[dɛ] [ɔyɛdɛ]]]	
	[[[ɔ]] [[d∅] [ɔyɛdɛ]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[H] [L L H L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[d] [ɔyɛdɛ]]]	
	[[L] [H L L H L]]	Remove Brackets
	[[ɔ] [d ɔyɛdɛ]]	
	[[L] [H L L H L]]	Mapping Rule (31)
	[[ɔ] [d ɔyɛdɛ]]	
	L H L H L	Tone Simplification Rule (55)
	ɔ d ɔyɛdɛ	
	[ɔ dɔyɛdɛ]	'he is buying a banana'

(15) Sample Derivation: 'he is buying a plate'

TM	[[[L]] [[H] [L H L]]]	
	S AUX PN VP V N	
	[[[L]] [[D] [L D L]]]	Downstep Rule (20)
SM	[[[ɔ]] [[dɛ] [atasa]]]	
	[[[ɔ]] [[d∅] [atasa]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[D] [L D L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[d] [atasa]]]	
	[[L] [D L D L]]	Remove Brackets
	[[ɔ] [d atasa]]	
	[[L] [D L D L]]	Mapping Rule (31)
	[[ɔ] [d atasa]]	
	L D D L	Low Tone Deletion Rule (57)
	ɔ d atasa	
	[ɔ dátasà]	'he is buying a plate'

(16) Sample Derivation: 'he is buying cloth'

TM [[[L]] [[H][H L]]]
 S AUX PN VP V N

SM [[[ɔ]] [[dɛ][ukpo]]]
 [[[ɔ]] [[d∅][ukpo]]]

Vowel Deletion Rule (62)

TM [[[L]] [[H][H L]]]

Mapping Rule (30)

SM [[[ɔ]] [[d][ukpo]]]

[[L] [H H L]]

Remove Brackets

[[ɔ] [d ukpo]]

[[L] [H H L]]

Mapping Rule (31)

[[ɔ] [d ukpo]]

L H L
 | | |
 ɔ d ukpo

Tone Absorption Rule (4)

[ɔ́ dúkpò]

'he is buying cloth'

(17) Sample Derivation: 'he is looking for a pot'

TM [[[L]] [[H H][H H L]]]
 S AUX PN VP V N

[[[L]] [[L L][H H L]]]

Tone Lowering Rule (10)

SM [[[ɔ]] [[kele][utsadɛ]]]

[[[ɔ]] [[ke|∅][utsadɛ]]]

Vowel Deletion Rule (62)

TM [[[L]] [[L L][H H L]]]

Mapping Rule (30)

SM [[[ɔ]] [[ke|][utsadɛ]]]

[[L] [L L H H L]]

Remove Brackets

[[ɔ] [ke| utsadɛ]]

[[L] [L L H H L]]

Mapping Rule (31)

[[ɔ] [ke| utsadɛ]]

L L L L
 | | | |
 ɔ ke| utsadɛ

Tone Simplification Rule (55)

[ɔ̀ kè|ùtsá'dè̀]

'he is looking for a pot'

(18) Sample Derivation: 'he is looking for a cup'

TM	[[[L]] [[H H] [L L]]]	
	S AUX PN VP V N	
	[[[L]] [[H H] [H H]]]	Tone Raising Rule (7)
	[[[L]] [[L L] [H H]]]	Tone Lowering Rule (10)
SM	[[[ɔ]] [[kele] [akpa]]]	
	[[[ɔ]] [[kel∅] [akpa]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L L] [H H]]]	Mapping Rule (30)
SM	[[[ɔ]] [[kel] [akpa]]]	
	[[L] [L L H H]]	Remove Brackets
	[[ɔ] [kel akpa]]	
	[[L] [L L H H]]	Mapping Rule (31)
	[[ɔ] [kel akpa]]	
	$ \begin{array}{c} L \quad \quad L \quad L \quad \quad H \\ \quad \quad \quad \quad \\ \text{ɔ} \quad \quad \text{kel} \quad \quad \text{akpa} \end{array} $	Tone Simplification Rule (55)
	[ɔ̀ kèl`àkpá]	'he is looking for a cup'

(19) Sample Derivation: 'he is looking for a banana'

TM	[[[L]] [[H H] [L L H]]]	
	S AUX PN VP V N	
	[[[L]] [[L H] [L L H]]]	Tone Dissimilation Rule (11)
	[[[L]] [[L H] [L L H L]]]	Pre-pausal Rule (11)
SM	[[[ɔ]] [[kele] [ɔ̀yɛdɛ]]]	
	[[[ɔ]] [[kel∅] [ɔ̀yɛdɛ]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L H] [L L H L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[kel] [ɔ̀yɛdɛ]]]	
	[[L] [L H L L H L]]	Remove Brackets
	[[ɔ] [kel ɔ̀yɛdɛ]]	
	[[L] [L H L L H L]]	Mapping Rule (31)
	[[ɔ] [kel ɔ̀yɛdɛ]]	
	$ \begin{array}{c} L \quad \quad L \quad H \quad \quad L \quad H \quad L \\ \quad \quad \quad \quad \quad \quad \\ \text{ɔ} \quad \quad \text{kel} \quad \quad \text{ɔ̀yɛdɛ} \end{array} $	Tone Simplification Rule (55)
	[ɔ̀ kèl`ɔ̀yɛdɛ̀]	'he is looking for a banana'

(20) Sample Derivation: 'he is looking for a plate'

TM	[[[L]] [[H H] [L H L]]]	
	S AUX PN VP V N	
	[[[L]] [[L H] [L H L]]]	Tone Dissimilation Rule (11)
	[[[L]] [[L D] [L D L]]]	Downstep Rule (20)
SM	[[[ɔ]] [[kele] [atasa]]]	
	[[[ɔ]] [[ke ∅] [atasa]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L D] [L D L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[ke] [atasa]]]	
	[[L] [L D L D L]]	Remove Brackets
	[[ɔ] [ke atasa]]	
	[[L] [L D L D L]]	Mapping Rule (31)
	[[ɔ] [ke atasa]]	
	L L D D L	Low Tone Deletion Rule (57)
	ɔ ke atasa	
	[ɔ kèl'átàsà]	'he is looking for a plate'

(21) Sample Derivation: 'he is looking for cloth'

TM	[[[L]] [[H H] [H L]]]	
	S AUX PN VP V N	
	[[[L]] [[L L] [H L]]]	Tone Lowering Rule (10)
SM	[[[ɔ]] [[kele] [ukpo]]]	
	[[[ɔ]] [[ke ∅] [ukpo]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[L L] [H L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[ke] [ukpo]]]	
	[[L] [L L H L]]	Remove Brackets
	[[ɔ] [ke ukpo]]	
	[[L] [L L H L]]	Mapping Rule (31)
	[[ɔ] [ke ukpo]]	
	L L H L	Tone Simplification Rule (35)
	ɔ ke ukpo	
	[ɔ kèl'úkpo]	'he is looking for cloth'

3.0. Future tense

The FUTURE tense is characterized by the presence of /θá`/ 'future tense morpheme' and the same set of tonal alternations between the verb and its noun object that characterizes the present progressive tense. One further addition is the tonal effect on the verb that is influenced by the tones of the future tense morpheme. Illustrations of mono-syllabic and bi-syllabic verbs, followed by noun objects are presented in (22).

- (22)
- | | | | |
|----|--|---|---|
| a. | 1.
/ò + θá` + dé # útsádè/
he FUT buy pot | → | $\left\{ \begin{array}{l} [\grave{o} \theta\acute{a} \overset{2.}{d\acute{u}ts\acute{a}d\grave{e}}] \\ [\grave{o} \theta\acute{a} d\grave{u}ts\acute{a}d\grave{e}] \end{array} \right\}$
'he will buy a pot' |
| b. | /ò + θá` + dé # àkpà/
he FUT buy cup | → | $\left\{ \begin{array}{l} [\grave{o} \theta\acute{a} d\acute{a}kp\acute{a}] \\ [\grave{o} \theta\acute{a} d\grave{a}kp\acute{a}] \end{array} \right\}$
'he will buy a cup' |
| c. | /ò + θá` + dé # òyèdè/
he FUT buy banana | → | [ò θá d\acute{o}y\grave{e}d\acute{e}]
'he will buy a banana' |
| d. | /ò + θá` + dé # àtásà/
he FUT buy plate | → | [ò θá d\acute{a}t\acute{a}s\grave{a}]
'he will buy a plate' |
| e. | /ò + θá` + dé # úkpò/
he FUT buy cloth | → | [ò θá d\acute{u}kp\grave{o}]
'he will buy cloth' |
| f. | /ò + θá` + kélé # útsádè/
he FUT look-for pot | → | [ò θá k\grave{e}l\acute{u}ts\acute{a}d\grave{e}]
'he will look for a pot' |
| g. | /ò + θá` + kélé # àkpà/
he FUT look-for cup | → | [ò θá k\grave{e}l\acute{a}kp\acute{a}]
'he will look for a cup' |
| h. | /ò + θá` + kélé # òyèdè/
he FUT look-for banana | → | [ò θá k\grave{e}l\acute{o}y\grave{e}d\acute{e}]
'he will look for a banana' |
| i. | /ò + θá` + kélé # àtásà/
he FUT look-for plate | → | [ò θá k\grave{e}l\acute{a}t\acute{a}s\grave{a}]
'he will look for a plate' |
| j. | /ò + θá` + kélé # úkpò/
he FUT look-for cloth | → | [ò θá k\grave{e}l\acute{u}kp\grave{o}]
'he will look for cloth' |

Again, note that the forms given in column (2) show alternations from the tones of the forms given in column (1). While both mono-syllabic and bi-syllabic verbs have lexical high tone, this isn't at all obvious in column (2). The surface phonetic tones of the forms given in column (2) are accounted for by the rules already posited. Sample derivations are given in (23-28).

(23) a. Sample Derivation: 'he will buy a pot'

TM	[[[L][H L]] [[H][H H L]]]	
	S AUX PN FUT VP V N	
	[[[L][H L]] [[L][H H L]]]	Tone Lowering Rule (9)
	[[[L][D L]] [[L][D H L]]]	Downstep Rule (20)
SM	[[[ɔ][θa]] [[dɛ][utsadɛ]]]	
	[[[ɔ][θa]] [[d∅][utsadɛ]]]	Vowel Deletion Rule (62)
TM	[[[L][D L]] [[L][D H L]]]	Mapping Rule (30)
SM	[[[ɔ][θa]] [[d] [utsadɛ]]]	
	[[L D L] [L D H L]]	Remove Brackets
	[[ɔ θa] [d utsadɛ]]	
	[[L D L] [L D H L]]	Mapping Rule (31)
	[[ɔ θa] [d utsadɛ]]	
	L D L D H L	Tone Simplification Rule (35)
	ɔ θa d utsadɛ	
	L D D H L	Low Tone Deletion Rule (57)
	ɔ θa d utsadɛ	
	[ɔ θá d̀utsáɛ̀]	'he will buy a pot'

The alternative form in (22a) can be accounted for by the application of Tone Simplification Rule (55) in place of Tone Simplification Rule (35) and Low Tone Deletion Rule (57) as seen in (23b).

(23) b. Sample Derivation: 'he will buy a pot'

TM	[[L D L] [L D H L]]	Mapping Rule (31)
	[[ɔ θa] [d utsadɛ]]	
	L D L L H L	Tone Simplification Rule (55)
	ɔ θa d utsadɛ	
	L D L H L	Tone Simplification Rule (55)
	ɔ θa d utsadɛ	
	[ɔ θá d̀utsáɛ̀]	'he will buy a pot'

(24) a. Sample Derivation: 'he will buy a cup'

TM	[[[L] [H L]] [[H] [L L]]]	
	S AUX PN FUT VP V N	
	[[[L] [H L]] [[H] [H H]]]	Tone Raising Rule (7)
	[[[L] [H L]] [[L] [H H]]]	Tone Lowering Rule (9)
	[[[L] [D L]] [[L] [D H]]]	Downstep Rule (20)
SM	[[[ɔ] [θa]] [[dɛ] [akpa]]]	
	[[[ɔ] [θa]] [[d∅] [akpa]]]	Vowel Deletion Rule (62)
TM	[[[L] [D L]] [[L] [D H]]]	Mapping Rule (30)
	[[[ɔ] [θa]] [[d] [akpa]]]	
	[[L D L] [L D H]]	Remove Brackets
	[[ɔ θa] [d akpa]]	
	[[L D L] [L D H]]	Mapping Rule (31)
	[[ɔ θa] [d akpa]]	
	L D L D H	Tone Simplification Rule (35)
	ɔ θa d akpa	
	L D D H	Low Tone Deletion Rule (57)
	ɔ θa d akpa	
	[ɔ θá dákpa]	'he will buy a cup'

The alternative form in (22b) can be accounted for by the application of Tone Simplification Rule (55) in place of Tone Simplification Rule (35) and Low Tone Deletion Rule (57) as seen in (24b).

(24) b. Sample Derivation: 'he will buy a cup'

TM	[[L D L] [L D H]]	Mapping Rule (31)
SM	[[ɔ θa] [d akpa]]	
	L D L L H	Tone Simplification Rule (55)
	ɔ θa d akpa	
	L D L H	Tone Simplification Rule (55)
	ɔ θa d akpa	
	[ɔ θá dákpa]	'he will buy a cup'

(25) Sample Derivation: 'he will buy a banana'

TM	[[[L] [H L]] [[H] [L L H]]]	
	S AUX PN FUT VP V N	
	[[[L] [H L]] [[H] [L L H L]]]	Pre-pausal Rule (11)
	[[[L] [D L]] [[D] [L L D L]]]	Downstep Rule (20).
SM	[[[ɔ] [θa]] [[de] [ɔyɛde]]]	
	[[[ɔ] [θa]] [[d∅] [ɔyɛde]]]	Vowel Deletion Rule (62)
TM	[[[L] [D L]] [[D] [L L D L]]]	Mapping Rule (30)
SM	[[[ɔ] [θa]] [[d] [ɔyɛde]]]	
	[[L D L] [D L L D L]]	Remove Brackets
	[[ɔ θa] [d ɔyɛde]]	
	[[L D L] [D L L D L]]	Mapping Rule (31)
	[[ɔ θa] [d ɔyɛde]]	
	L D L D L	Tone Simplification Rule (55)
	ɔ θa d ɔyɛde	
	L D D L	Low Tone Deletion Rule (57)
	ɔ θa d ɔyɛde	
	[ɔ θá dɔyɛ̀dɛ́]	'he will buy a banana'

(26) Sample Derivation: 'he will buy a plate'

TM	[[[L] [H L]] [[H] [L H L]]]	
	S AUX PN FUT VP V N	
	[[[L] [D L]] [[D] [L D L]]]	Downstep Rule (20)
SM	[[[ɔ] [θa]] [[de] [atasa]]]	
	[[[ɔ] [θa]] [[d∅] [atasa]]]	Vowel Deletion Rule (62)
TM	[[[L] [D L]] [[D] [L D L]]]	Mapping Rule (30)
SM	[[[ɔ] [θa]] [[d] [atasa]]]	
	[[L D L] [D L D L]]	Remove Brackets
	[[ɔ θa] [d atasa]]	
	[[L D L] [D L D L]]	Mapping Rule (31)
	[[ɔ θa] [d atasa]]	
	L D D L	Low Tone Deletion Rule (57)
	ɔ θa d atasa	
	L D D L	Low Tone Deletion Rule (57)
	ɔ θa d atasa	
	[ɔ θá datásà]	'he will buy a plate'

(27) Sample Derivation: 'he will buy cloth'

TM	[[[L] [H L]] [[H] [H L]]]	
	S AUX PN FUT VP V N	
	[[[L] [D L]] [[D] [H L]]]	Downstep Rule (20)
SM	[[[ɔ] [θa]] [[dɛ] [ukpo]]]	
	[[[ɔ] [θa]] [[d∅] [ukpo]]]	Vowel Deletion Rule (62)
TM	[[[L] [D L]] [[D] [H L]]]	Mapping Rule (30)
SM	[[[ɔ] [θa]] [[d] [ukpo]]]	
	[[L D L] [D H L]]	Remove Brackets
	[[ɔ θa] [d ukpo]]	
	[[L D L] [D H L]]	Mapping Rule (31)
	[[ɔ θa] [d ukpo]]	
	$\begin{array}{ccc} L & D L & D & L \\ & / & \backslash & \\ ɔ & θa & d & ukpo \end{array}$	Tone Absorption Rule (4)
	$\begin{array}{ccc} L & D & D & L \\ & & \backslash & \\ ɔ & θa & d & ukpo \end{array}$	Low Tone Deletion Rule (57)
	[ɔ θá d'ukpò]	'he will buy cloth'

(28) Sample Derivation: 'he will look for a pot'

TM	[[[L] [H L]] [[H H] [H H L]]]	
	S AUX PN FUT VP V N	
	[[[L] [H L]] [[L L] [H H L]]]	Tone Lowering Rule (10)
SM	[[[ɔ] [θa]] [[kele] [utsadɛ]]]	
	[[[ɔ] [θa]] [[kel∅] [utsadɛ]]]	Vowel Deletion Rule (62)
TM	[[[L] [H L]] [[L L] [H H L]]]	Mapping Rule (30)
SM	[[[ɔ] [θa]] [[kel] [utsadɛ]]]	
	[[L H L] [L L H H L]]	Remove Brackets
	[[ɔ θa] [kel utsadɛ]]	
	[[L H L] [L L H H L]]	Mapping Rule (31)
	[[ɔ θa] [kel utsadɛ]]	
	$\begin{array}{ccc} L & H L & L L & H H L \\ & / & \backslash & \\ ɔ & θa & kel & utsadɛ \end{array}$	Tone Simplification Rule (55)
	$\begin{array}{ccc} L & H & L L & H L \\ & & \backslash & \\ ɔ & θa & kel & utsadɛ \end{array}$	Tone Simplification Rule (55)
	[ɔ θá kèl'ùtsádè]	'he will look for a pot'

4.0. Past tense

The PAST tense is the only aspect that is represented on the surface by a rising tone on the pronominal prefix. That is, in all other tense/ aspects, the pronominal prefix has low tone. The high tone portion of the rising tone in the PAST tense can be derived from the TM of the PAST tense morpheme which is represented as [+ HIGH]. The rising tone on the

Past

pronominal prefix and the preservation of the underlying tone of the verb and the noun object distinguishing the PAST tense from other tense/ aspect can be derived in this way. Examples of mono-syllabic and bi-syllabic verbs with noun objects are given in (29).

- (29) a. /ò + ' + dé # útsádè/ → [ǒ dútsádè]
 he PAST buy pot 'he bought a pot'
- b. /ò ' dé àkpà/ → [ǒ dákpà]
 he PAST buy cup 'he bought a cup'
- c. /ò + ' + dé # àtásà/ → [ǒ dátásà]
 he PAST buy plate 'he bought a plate'
- d. /ò + ' + kélé # útsádè/ → [ǒ kélútsádè]
 he PAST look-for pot 'he looked for a pot'
- e. /ò + ' + kélé # àkpà/ → { [ǒ kélâkpà] }
 he PAST look-for cup { [ǒ kélàkpà] }
 'he looked for a cup'
- f. /ò + ' + kélé # àkpà/ → { [ǒ kélâtásà] }
 he PAST look-for plate { [ǒ kélàtásà] }
 'he looked for a plate'

Observe that the high tone PAST tense morpheme is attached to the pronominal prefix effecting a rising tone. Note, also, that the underlying tones of the mono-syllabic verb, bi-syllabic verb, and noun objects are preserved. That is, it is somewhat obvious here that these verbs belong to a single class of high tone verbs. Slight modification of the tone of the bi-syllabic verb is, however, observed in (e-f). That is, the final high tone of a bi-syllabic verb is optionally deleted. Sample derivations of the PAST tense are given in (30-33).

(30) Sample Derivation: 'he bought a pot'

TM [[[L] [H]] [[H] [H H L]]]
 S AUX PN PAST VP V N

SM [[[ɔ] []] [[de] [utsadɛ]]]
 [[[ɔ] []] [[d∅] [utsadɛ]]]

Vowel Deletion Rule (62)

TM [[[L] [H]] [[H] [H H L]]]

Mapping Rule (30)

SM [[[ɔ] []] [[d] [utsadɛ]]]
 [[L H] [H H H L]]
 [[ɔ] [d utsadɛ]]

Remove Brackets

[[L H] [H H H L]]
 [[ɔ] [d utsadɛ]]

Mapping Rule (31)

L H H H L
 | | | |
 ɔ d utsadɛ

Tone Absorption Rule (4)

[ɔ̣ dútsádɛ̀]

'he bought a pot'

(31) Sample Derivation: 'he bought a cup'

TM [[[L] [H]] [[H] [L L]]]
 S AUX PN PAST VP V N

SM [[[ɔ] []] [[de] [akpa]]]
 [[[ɔ] []] [[d∅] [akpa]]]

Vowel Deletion Rule (62)

TM [[[L] [H]] [[H] [L L]]]

Mapping Rule (30)

SM [[[ɔ] []] [[d] [akpa]]]
 [[L H] [H L L]]
 [[ɔ] [d akpa]]

Remove Brackets

[[L H] [H L L]]
 [[ɔ] [d akpa]]

Mapping Rule (31)

[ɔ̣ dâkpà̀]

'he bought a cup'

(32) Sample Derivation: 'he looked for a pot'

SM [[[L] [H]] [[H H] [H H L]]]
 S AUX PN PAST VP V V

SM [[[ɔ] []] [[kele] [utsadɛ]]]
 [[[ɔ] []] [[kel∅] [utsadɛ]]]

Vowel Deletion Rule (62)

TM [[[L] [H]] [[H H] [H H L]]]

Mapping Rule (30)

SM [[[ɔ] []] [[kel] [utsadɛ]]]
 [[L H] [H H H H L]]
 [[ɔ] [kel utsadɛ]]

Remove Brackets

[[L H] [H H H H L]]
 [[ɔ] [kel utsadɛ]]

Mapping Rule (31)

L H H H L
 | | | |
 ɔ kel utsadɛ

Tone Absorption Rule (4)

[ɔ̣ kélútsádɛ̀]

'he looked for a pot'

(33) Sample Derivation: 'he looked for a cup'

TM	[[[L] [H]] [[H H] [L L]]]	
	S AUX PN PAST VP V N	
SM	[[[ɔ] []] [[kele] [akpa]]]	
	[[[ɔ] []] [[kel∅] [akpa]]]	Vowel Deletion Rule (62)
TM	[[[L] [H]] [[H H] [L L]]]	Mapping Rule (30)
SM	[[[ɔ] []] [[kel] [akpà]]]	
	[[L H] [H H L L]]	Remove Brackets
	[[ɔ] [kel akpà]]	
	[[L H] [H H L L]]	Mapping Rule (31)
	[[ɔ] [kel akpà]]	
	L H H L L	Tone Simplification Rule (19)
	∩	(optional)
	ɔ kel akpà	
	[ǔ kélâkpà] or [ǔ kélàkpà]	'he looked for a cup'

5.0. Past perfect

The PAST PERFECT is distinguished from the PAST tense only by the presence of the aspectual morpheme /xé`/ which occurs between the pronominal prefix and the verb. Examples are given in (34).

- (34) a. /ǔ + ' + xé` + dé # útsádè/ → [ǔ xè dútsádè]
 he PAST PER buy pot 'he has bought a pot'
- b. /ǔ + ' + xé` + dé # àkpà/ → [ǔ xè dákpà]
 he PAST PER buy cup 'he has bought a cup'
- c. /ǔ + ' + xé` + dé # àtásà/ → [ǔ xè dátásà]
 he PAST PER buy plate 'he has bought a plate'
- d. /ǔ + ' + xé` + kélé # útsádè/ → [ǔ xè kélútsádè]
 he PAST PER look-for pot 'he has looked for a pot'
- e. /ǔ + ' + xé` + kélé # àkpà/ → { [ǔ xè kélâkpà] }
 he PAST PER look-for cup { [ǔ xè kélàkpà] }
 'he has looked for a cup'
- f. /ǔ + ' + xé` + kélé # àtásà/ → { [ǔ xè kélâtásà] }
 he PAST PER look-for plate { [ǔ xè kélàtásà] }
 'he has looked for a plate'

Note that the PAST PERFECT morpheme /xé`/ undergoes a tonal alternation. That is, the falling tone is simplified to a low tone after the rising tone of the pronominal prefix. Evidence in support of positing an underlying sequence of high followed by low will be given under the discussion of the NEGATIVE. Since the tonal alternations of the PAST PERFECT are

identical to those of the PAST tense, only one sample derivation is given in (35) to illustrate the PAST PERFECT morpheme.

(35) Sample Derivation: 'he has bought a pot'

TM	[[[L][H][HL]] [[H][HHL]]]	
	S AUX PN PAST PER VP V N	
SM	[[[ɔ] [] [xe]]] [[dɛ] [utsadɛ]]]	
	[[[ɔ] [] [xe]]] [[d∅] [utsadɛ]]]	Vowel Deletion Rule (62)
TM	[[[L][H][HL]] [[H][HHL]]]	Mapping Rule (30)
SM	[[[ɔ] [] [xe]]] [[d] [utsadɛ]]]	
	[[L H HL] [H HHL]]	Remove Brackets
	[[ɔ xe] [d utsadɛ]]	
	[[L H HL] [H HHL]]	Mapping Rule (31)
	[[ɔ xe] [d utsadɛ]]	
	L H HL H HHL	Tone Absorption Rule (4)
	ɔ xe d utsadɛ	
	L H L H HHL	Tone Simplification Rule (19)
	ɔ xe d utsadɛ	
	[ɔ xè dútsádè]	'he has bought a pot'

6.0. Habitual

On the surface, the HABITUAL (HAB) differs from the PAST tense only in respect to the tone of the pronominal prefix. While the HABITUAL has a low tone pronominal prefix, the PAST tense has a rising tone. Since the surface tone of the verb in the HABITUAL is always high, the tonal alternations between the verb and the noun object that characterize the HABITUAL are identical to those of the PAST tense. Illustrations are given in (36).

(36) a.	/ɔ + dɛ # útsádè/	→	[ɔ dútsádè]
	he buy pot		'he buys a pot'
b.	/ɔ + dɛ # àkpà/	→	[ɔ dákpà]
	he buy cup		'he buys a cup'
c.	/ɔ + dɛ # àtásà/	→	[ɔ dátásà]
	he buy plate		'he buys a plate'
d.	/ɔ + kélé # útsádè/	→	[ɔ kélútsádè]
	he look-for pot		'he looks for a pot'
e.	/ɔ + kélé # àkpà/	→	{ [ɔ kélâkpà] }
	he look-for cup		{ [ɔ kélàkpà] }
			'he looks for a cup'
f.	/ɔ + kélé # àtásà/	→	{ [ɔ kélâtásà] }
	he look-for plate		{ [ɔ kélàtásà] }
			'he looks for a plate'

A sample derivation is given in (37).

(37) Sample Derivation: 'he buys a pot'

TM	[[[L]] [[H] [H H L]]]	
	S AUX PN VP V N	
SM	[[[ɔ]] [[de] [utsade]]]	
	[[[ɔ]] [[d∅] [utsade]]]	Vowel Deletion Rule (62)
TM	[[[L]] [[H] [H H L]]]	Mapping Rule (31)
SM	[[[ɔ]] [[d] [utsade]]]	
	[[L] [H H H L]]	Remove Brackets
	[[ɔ] [d utsade]]	
	[[L] [H H H L]]	Mapping Rule (31)
	[[ɔ] [d utsade]]	
	L H H L	Tone Absorption Rule (4)
	ɔ d utsade	
	[ɔ dútsádè]	'he buys a pot'

7.0. Past habitual (used to)

The PAST HABITUAL is characterized by the aspectual morpheme /yá`/. This construction is translated into English as 'used to'. Not like other PAST tense constructions, the PAST HABITUAL takes a low tone pronominal prefix. The tonal alternations of this construction are identical to those of the FUTURE tense. Examples are given in (38).

(38) a.	/ɔ + yá` + dé # útsádè/ he PAST HAB buy pot	→	{ [ɔ yá dútsádè] } { [ɔ yá dútsádè] } 'he used to buy a pot'
b.	/ɔ + yá` + dé # àkpà/ he PAST HAB buy cup	→	{ [ɔ yá dàkpá] } { [ɔ yá dàkpá] } 'he used to buy a cup'
c.	/ɔ + yá` + dé # ɔyèdé/ he PAST HAB buy banana	→	[ɔ yá dɔyèdé] 'he used to buy a banana'
d.	/ɔ + yá` + dé # úkpò/ he PAST HAB buy cloth	→	[ɔ yá dúkpò] 'he used to buy cloth'
e.	/ɔ + yá` + kélé # útsádè/ he PAST HAB look-for pot	→	[ɔ yá kèlútsádè] 'he used to look for a pot'

Since the PAST HABITUAL is identical to the FUTURE construction in terms of tonal alternations, only one sample derivation is given in (39).

(39) Sample Derivation: 'he used to buy cloth'

TM	[[[L] [H L]] [[H] [H L]]]	
	S AUX PN PAST HAB VP V N	
	[[[L] [D L]] [[D] [H L]]]	Downstep Rule (20)
SM	[[[ɔ] [ya]] [[dɛ] [ukpo]]]	
	[[[ɔ] [ya]] [[d∅] [ukpo]]]	Vowel Deletion Rule (62)
TM	[[[L] [D L]] [[D] [H L]]]	Mapping Rule (30)
SM	[[[ɔ] [ya]] [[d] [ukpo]]]	
	[[L D L] [D H L]]	Remove Brackets
	[[ɔ ya] [d ukpo]]	
	[[L D L] [D H L]]	Mapping Rule (31)
	[[ɔ ya] [d ukpo]]	
	L D L D L	Tone Absorption Rule (4)
	ɔ ya d ukpo	
	L D D L	Low Tone Deletion Rule (57)
	ɔ ya d ukpo	
	[ɔ́ yá dúk̀pò]	'he used to buy cloth'

8.0. *Negative*

The NEGATIVE construction is generally characterized by a falling contour tone over the pronominal prefix, a complete tone reversal of any aspectual morphemes occurring between the pronominal prefix and the verb (e.g., [ɔ́ θǎ dákpá] 'he will not buy a cup'), and verb tone polarization in respect to the noun object (i.e., all tonal alternations between the verb and the noun object are identical to those of the PRESENT PROGRESSIVE (affirmative)).

Only in the PAST NEGATIVE do we find a segmental representation. /wa/ is added as a suffix immediately after the pronominal prefix (e.g., /ɔ + wa/). The /w/ of /wa/ is optionally deleted when occurring between two vowels (e.g., /ɔ wa/ → [ɔa]). Furthermore, /wa/ takes the low tone portion of the falling contour tone of the pronominal prefix (e.g., ɔ́ + wa → ɔ́ wà). This can be handled very easily by the mapping of TM onto SM. Any aspectual morphemes will follow /wa/ and precede the verb (e.g., ɔ́ wà xě dákpá 'he hasn't bought a cup').

8.1. *Present progressive negative and habitual negative*

The Present Progressive Negative and the Habitual Negative are homophonous. Illustrations are given in (40).

- (40) a. / $\hat{\text{S}}$ + d $\acute{\text{e}}$ # $\acute{\text{u}}$ ts $\acute{\text{a}}$ d $\grave{\text{e}}$ / → [$\hat{\text{S}}$ d $\grave{\text{u}}$ ts $\acute{\text{a}}$ d $\grave{\text{e}}$]
 NEG/he buy pot 'he is not buying a pot'
 'he doesn't buy a pot'
- b. / $\hat{\text{S}}$ + d $\acute{\text{e}}$ # $\grave{\text{a}}$ kp $\grave{\text{a}}$ / → [$\hat{\text{S}}$ d $\grave{\text{a}}$ kp $\acute{\text{a}}$]
 NEG/he buy cup 'he is not buying a cup'
 'he doesn't buy a cup'
- c. / $\hat{\text{S}}$ + d $\acute{\text{e}}$ # $\grave{\text{o}}$ y $\grave{\text{e}}$ d $\acute{\text{e}}$ / → [$\hat{\text{S}}$ d $\acute{\text{o}}$ y $\grave{\text{e}}$ d $\acute{\text{e}}$]
 NEG/he buy banana 'he is not buying a banana'
 'he doesn't buy a banana'
- d. / $\hat{\text{S}}$ + d $\acute{\text{e}}$ # $\acute{\text{u}}$ kp $\grave{\text{o}}$ / → [$\hat{\text{S}}$ d $\acute{\text{u}}$ kp $\grave{\text{o}}$]
 NEG/he buy cloth 'he is not buying cloth'
 'he doesn't buy cloth'
- e. / $\hat{\text{S}}$ + k $\acute{\text{e}}$ l $\acute{\text{e}}$ # $\acute{\text{u}}$ ts $\acute{\text{a}}$ d $\grave{\text{e}}$ / → [$\hat{\text{S}}$ k $\grave{\text{e}}$ l $\acute{\text{u}}$ ts $\acute{\text{a}}$ d $\grave{\text{e}}$]
 NEG/he look-for pot 'he is not looking for a pot'
 'he doesn't look for a pot'

Note that the pronominal prefix has a falling tone when NEG is present. This is the only difference between the Present Progressive Negative, the Habitual Negative and the Present Progressive affirmative. Given that the tonal alternations of the verb phrase of the NEGATIVE are identical to the Present Progressive affirmative, the surface phonetic tones of the NEGATIVE are accounted for by the same tone rules and mapping rules already given. Since the tonal alternations of the NEGATIVE are identical to those of the Present Progressive affirmative, only one sample derivation is given in (41) to illustrate the mapping of the falling contour tone onto the pronominal prefix.

(41) Sample Derivation: 'he is not buying a pot'
 'he doesn't buy a pot'

TM	[[[H L]] [[H] [H H L]]]	
	S AUX PN/NEG VP V N	
	[[[H L]] [[L] [H H L]]]	Tone Lowering Rule (9)
SM	[[[ɔ]] [[d $\acute{\text{e}}$] [uts $\acute{\text{a}}$ d $\acute{\text{e}}$]]]	
	[[[ɔ]] [[d \emptyset] [uts $\acute{\text{a}}$ d $\acute{\text{e}}$]]]	Vowel Deletion Rule (62)
TM	[[[H L]] [[L] [H H L]]]	Mapping Rule (30)
SM	[[[ɔ]] [[d] [uts $\acute{\text{a}}$ d $\acute{\text{e}}$]]]	
	[[[H L]] [[L H H L]]]	Remove Brackets
	[[[ɔ]] [[d uts $\acute{\text{a}}$ d $\acute{\text{e}}$]]]	
	[[[H L]] [[L H H L]]]	Mapping Rule (31)
	[[[ɔ]] [[d uts $\acute{\text{a}}$ d $\acute{\text{e}}$]]]	
	$\begin{array}{c} \text{H L} \\ \diagdown \\ \text{ɔ} \end{array}$ $\begin{array}{c} \text{L} \quad \text{H L} \\ \diagdown \quad \diagup \\ \text{d} \quad \text{uts} \quad \text{d} \quad \text{e} \end{array}$	Tone Simplification Rule (55)
	[$\hat{\text{S}}$ d $\grave{\text{u}}$ ts $\acute{\text{a}}$ d $\grave{\text{e}}$]	'he is not buying a pot' 'he doesn't buy a pot'

8.2. Future negative

The FUTURE maintains its aspectual morpheme /θa/ in the NEGATIVE, with some modification of the tone. But /θa/ serves to distinguish the FUTURE aspect from others. Examples are given in (42).

- (42) a. /ŝ + θǎ + dé # útsádè/ → [ŝ θǎ dùtsádè]
 NEG/he FUT buy pot 'he will not buy a pot'
- b. /ŝ + θǎ + dé # àkpà/ → [ŝ θǎ dàkpá]
 NEG/he FUT buy cup 'he will not buy a cup'
- c. /ŝ + θǎ + dé # òyèdè/ → [ŝ θǎ d'òyèdè]
 NEG/he FUT buy banana 'he will not buy a banana'
- d. /ŝ + θǎ + dé # úkpò/ → [ŝ θǎ dúkpò]
 NEG/he FUT buy cloth 'he will not buy cloth'
- e. /ŝ + θǎ + kélé # útsádè/ → [ŝ θǎ kèlùtsádè]
 NEG/he FUT look-for pot 'he will not look for a pot'

Since the tonal alternations in the verb phrase are identical to those of the PREsent PROgressive NEGative, only one sample derivation is given in (43).

(43) Sample Derivation: 'he will not buy a pot'

- TM [[[H L] [L H]] [[H] [H H L]]]
 S AUX PN/NEG FUT VP V N
- [[[H L] [L H]] [[L] [H H L]]] Tone Lowering Rule (9)
- SM [[[ɔ] [θa]] [[dɛ] [utsadɛ]]]
- [[[ɔ] [θa]] [[d∅] [utsadɛ]]] Vowel Deletion Rule (62)
- TM [[[H L] [L H]] [[L] [H H L]]] Mapping Rule (30)
- SM [[[ɔ] [θa]] [[d] [utsadɛ]]]
- [[H L L H] [L H H L]] Remove Brackets
- [[ɔ θa] [d utsadɛ]]
- [[H L L H] [L H H L]] Mapping Rule (31)
- [[ɔ θa] [d utsadɛ]]
- H L L H L H L
 ↓ ↓ ↓ ↓ ↓
 ɔ θa d utsadɛ
- [ŝ θǎ dùtsádè] Tone simplification Rule (55)
- 'he will not buy a pot'

8.3. Past habitual negative

The PAST HABITUAL NEGATIVE remains distinct from the other aspects of the NEGATIVE by retaining its aspectual morpheme /ya/. Examples are given in (44).

- (44) a. /ŏ + yǎ + dé # útsádè/ → [ŏ yǎ dùtsádè]
 NEG/he PAST HAB buy pot 'he didn't used to buy a pot'
- b. /ŏ + yǎ # dé # àkpà/ → [ŏ yǎ dàkpá]
 NEG/he PAST HAB buy cup 'he didn't used to buy a cup'
- c. /ŏ + yǎ + dé # òyèdè/ → [ŏ yǎ dóyèdè]
 NEG/he PAST HAB buy banana 'he didn't used to buy a banana'
- d. /ŏ + yǎ + dé # úkpò/ → [ŏ yǎ dúkpò]
 NEG/he PAST HAB buy cloth 'he didn't used to buy cloth'
- e. /ŏ + yǎ + kélé # útsádè/ → [ŏ yǎ kèlùtsádè]
 NEG/he PAST HAB look-for pot 'he didn't used to look for a pot'

A sample derivation is given in (45).

(45) Sample Derivation: 'he didn't used to buy a pot'

TM [[[H L] [L H]] [[H] [H H L]]]
 S AUX PN/NEG PAST/HAB VP V N

[[[H L] [L H]] [[L] [H H L]]] Tone Lowering Rule (9)

SM [[[ɔ] [ya]] [[dɛ] [utsadɛ]]]

[[[ɔ] [ya]] [[d∅] [utsadɛ]]] Vowel Deletion Rule (62)

TM [[[H L] [L H]] [[L] [H H L]]] Mapping Rule (30)

SM [[[ɔ] [ya]] [[d] [utsadɛ]]]

[[H L L H] [L H H L]] Remove Brackets
 [[ɔ ya] [d utsadɛ]]

[[H L L H] [L H H L]] Mapping Rule (31)
 [[ɔ ya] [d utsadɛ]]

[[H L L H] [L H H L]] Tone Simplification Rule (55)
 [[ɔ ya] [d utsadɛ]]

[ŏ yǎ dùtsádè] 'he didn't used to buy a pot'

8.4. Past negative

The PAST NEGATIVE is distinguished from other forms of the NEGATIVE by the addition of /wa/. Illustrations are given in (46).

- (46) a. /ɔ̀wà + dé # útsádè/ → [ɔ̀wà dùtsádè]
 NEG/he/PAST buy pot 'he didn't buy a pot'
- b. /ɔ̀wà + dé # àkpà/ → [ɔ̀wà dàkpá]
 NEG/he/PAST buy cup 'he didn't buy a cup'
- c. /ɔ̀wà + dé # òyèdé/ → [ɔ̀wà dòyèdé]
 NEG/he/PAST buy banana 'he didn't buy a banana'
- d. /ɔ̀wà + dé # úkpò/ → [ɔ̀wà dúkpò]
 NEG/he/PAST buy cloth 'he didn't buy cloth'
- d. /ɔ̀wà + kélé # útsádè/ → [ɔ̀wà kèlùtsádè]
 NEG/he/PAST look-for pot 'he didn't look for a pot'

A sample derivation is given in (47).

(47) Sample Derivation: 'he didn't buy a pot'

TM	[[[H L]] [[H] [H H L]]]	
	S AUX PN/NEG/PAST VP V N	
	[[[H L]] [[L] [H H L]]]	Tone Lowering Rule (9)
SM	[[[ɔ̀wà]] [[dé] [utsadé]]]	
	[[[ɔ̀wà]] [[d∅] [utsadé]]]	Vowel Deletion Rule (62)
TM	[[[H L]] [[L] [H H L]]]	Mapping Rule (30)
SM	[[[ɔ̀wà]] [[d] [utsadé]]]	
	[[H L] [L H H L]]	Remove Brackets
	[[ɔ̀wà] [d utsadé]]	
	[[H L] [L H H L]]	Mapping Rule (31)
	[[ɔ̀wà] [d utsadé]]	
	H L L H L	Tone Simplification Rule (55)
	ɔ̀wà d utsadé	
	[ɔ̀wà dùtsádè]	'he didn't buy a pot'

8.5. Past perfect negative

The PAST PERFECT NEGATIVE differs from the PAST NEGATIVE by the aspectual morpheme /xe/. Illustrations are given in (48).

- (48) a. /ɔ̀wà + xě + dé + útsádè/ → [ɔ̀wà xě dùtsádè]
 NEG/he/PAST PER buy pot 'he hasn't bought a pot'
- b. /ɔ̀wà + xě + dé + àkpà/ → [ɔ̀wà xě dákpá]
 NEG/he/PAST PER buy cup 'he hasn't bought a cup'
- c. /ɔ̀wà + xě + dé + òyèdé/ → [ɔ̀wà xě dóyèdé]
 NEG/he/PAST PER buy banana 'he hasn't bought a banana'
- d. /ɔ̀wà + xě + dé + úkpò/ → [ɔ̀wà xě dúkpò]
 NEG/he/PAST PER buy cloth 'he hasn't bought cloth'
- e. /ɔ̀wà + xě + kélé + útsádè/ → [ɔ̀wà xě kèlùtsádè]
 NEG/he/PAST PER look-for pot 'he hasn't looked for a pot'

Note that on the surface, /xe/ has a RISING tone in the NEGATIVE, whereas it has a LOW tone in the AFFIRMATIVE. Since only FALLING tone aspectual morpheme of the AFFIRMATIVE (cf. /yá/ and /θá/) are observed to reverse to a RISING tone in the NEGATIVE, this supports the positing of an underlying FALLING tone for /xe/ in the AFFIRMATIVE in Section 5.0. A sample derivation of the PAST PERFECT NEGATIVE is given in (49).

(49) Sample Derivation: 'he hasn't bought a pot'

TM [[[H L] [L H]] [[H] [H H L]]]
 S AUX PN/NEG PAST PER VP V N

[[[H L] [L H]] [[L] [H H L]]] Tone Lowering Rule (9)

SM [[[ɔ̀wà] [xě]] [[dɛ] [utsadɛ]]]
 [[[ɔ̀wà] [xě]] [[d∅] [utsadɛ]]] Vowel Deletion Rule (62)

TM [[[H L] [L H]] [[L] [H H L]]] Mapping Rule (30)

SM [[[ɔ̀wà] [xě]] [[d] [utsadɛ]]]

[[H L L H] [L H H L]] Remove Brackets
 [[ɔ̀wà xě] [d utsadɛ]]

[[H L L H] [L H H L]] Mapping Rule (31)
 [[ɔ̀wà xě] [d utsadɛ]]

[[H L L H] [L H H L]] Tone Simplification Rule (55)
 [[ɔ̀wà xě] [d utsadɛ]]

[ɔ̀wà xě dùtsádè] 'he hasn't bought a pot'

9.0. Summary of all of the rules discussed in the text

1. Pluralization (Rule 15 of Ch. II):

$$V \rightarrow [+ \text{mid}] / \left[\begin{array}{c} \text{---} \\ + \text{ PL} \end{array} \right] : \text{ where } \left[\begin{array}{c} \mathbf{V} \\ + \text{ mid} \\ + \text{ Sg} \end{array} \right]$$

1'. Pluralization (Rule 15' of Ch. II):

$$\begin{bmatrix} V \\ + PL \end{bmatrix} \rightarrow \begin{bmatrix} + high \\ - back \\ \alpha mid \end{bmatrix} / \begin{bmatrix} \alpha mid \end{bmatrix}$$

2. Pluralization (Rule 18 of Ch. II):

$$a. PL \rightarrow a / \begin{bmatrix} + exception \\ + body part \end{bmatrix}_{Sg}$$

$$b. PL \rightarrow i / \begin{bmatrix} + exception \\ + human \end{bmatrix}_{Sg}$$

3. /l/ Deletion (Rule 22 of Ch. II):

$$\begin{bmatrix} + con \\ + voc \\ + cont \end{bmatrix} \rightarrow \emptyset / [+ voc] ____ [+ voc]$$

4. /i/ Assimilation (Rule 26 of Ch. II):

$$\begin{bmatrix} V \\ + high \\ - back \\ - mid \end{bmatrix} \rightarrow [\alpha F] / \begin{bmatrix} V \\ \alpha F \end{bmatrix} ____ \#$$

5. Glide Deletion (Rule 29 of Ch. II):

$$\begin{bmatrix} - con \\ - voc \\ (y,w) \end{bmatrix} \rightarrow \emptyset / [+ voc] ____ [+ voc]$$

6. Lateral and Glide Deletion (Rule 30 of Ch. II):

$$\begin{bmatrix} \alpha con \\ \alpha voc \\ + cont \\ (l,w,y) \end{bmatrix} \rightarrow \emptyset / [+ voc] ____ [+ voc]$$

7. /i/ Assimilation (Rule 33 of Ch. II):

$$\begin{bmatrix} V \\ + high \\ - back \\ - mid \end{bmatrix} \rightarrow [\alpha F] / \begin{bmatrix} V \\ \alpha F \end{bmatrix} \begin{bmatrix} \leftarrow + Stem \end{bmatrix} \quad (\#) \text{ Condition: } \langle + Stem \rangle = \text{obligatory.}$$

8. Vowel Deletion (Rule 34 of Ch. II):

$$\begin{bmatrix} + voc \\ - con \\ \alpha F \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} + voc \\ - con \\ \alpha F \end{bmatrix} ____$$

9. Glide Formation (Rule 39 of Ch. II):

$$V_1 \rightarrow [-\text{voc}] / C \begin{bmatrix} +\text{voc} \\ +\text{high} \end{bmatrix} V_2$$

Condition: $V_1 \neq V_2$

10. Palatalization (Rule 40 of Ch. II):

$$/ts/ \rightarrow [\text{č}] / ___ i$$

11. Palatalization (Rule 41 of Ch. II):

$$\begin{array}{l} ts \\ dz \\ s \\ n \end{array} \rightarrow \begin{array}{l} \text{č} \\ \text{j} \\ \text{š} \\ \text{n} \end{array} / ___ y$$

12. Palatalization (Rule 42 of Ch. II):

$$\begin{bmatrix} +\text{cor} \\ +\text{del rel} \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{retracted} \\ +\text{high} \\ -\text{back} \end{bmatrix} / ___ y$$

13. Glide Deletion (Rule 43 of Ch. II):

$$[+\text{seg}] \rightarrow \emptyset / [+ \text{retracted}] ___$$

14. Labialization (Rule 46 of Ch. II):

$$\begin{bmatrix} +\text{nasal} \\ +\text{long} \\ +\text{ant} \end{bmatrix} \rightarrow [+ \text{round}] / ___ \begin{bmatrix} +\text{high} \\ +\text{round} \end{bmatrix}$$

15. Regressive Vowel Deletion (Rule 49 of Ch. II):

$$\begin{bmatrix} V_1 \\ <+\text{high}> \end{bmatrix} \rightarrow \emptyset / ___ \begin{array}{l} \text{Verb} \\ \text{Prefix} \end{array} \begin{bmatrix} V_2 \end{bmatrix}$$

Condition: $\langle V_1 = V_2 \rangle$

16. Regressive Vowel Deletion (Rule 53 of Ch. II):

$$\begin{bmatrix} V_1 \\ <+\text{high}> \end{bmatrix} \rightarrow \emptyset / ___ \begin{array}{l} \text{V} \\ \text{N} \end{array} \begin{bmatrix} V_2 \\ \text{Prefix} \end{bmatrix}$$

Condition: $\langle V_1 = V_2 \rangle$

17. Vocalization (Rule 56 of Ch. II):

$$C \begin{bmatrix} -\text{voc} \\ +\text{high} \\ \alpha \text{back} \\ \alpha \text{round} \end{bmatrix} \rightarrow [+ \text{voc}] / ___ \begin{bmatrix} +\text{voc} \\ +\text{high} \\ \alpha \text{back} \\ \alpha \text{round} \end{bmatrix}$$

18. Long Vowel Shortening (Rule 57 of Ch. II):

$$\begin{bmatrix} +\text{voc} \\ +\text{long} \end{bmatrix} \rightarrow [-\text{long}]$$

19. Regressive Vowel Deletion (Rule 61 of Ch. II):

$$V_1 \rightarrow \emptyset / \text{---} \left[\begin{array}{l} V_2 \\ \text{Prefix} \end{array} \right]$$

20. Regressive Vowel Deletion (Rule 62 of Ch. II):

$$\left[\begin{array}{l} V_1 \\ \langle + \text{high} \rangle \end{array} \right] \rightarrow \emptyset / \text{---} \left[\begin{array}{l} V \\ N \\ DA \end{array} \right] \left[\begin{array}{l} V_2 \\ \text{Prefix} \end{array} \right]$$

Condition: $\langle V_1 = V_2 \rangle$

21. Progressive Vowel Deletion (Rule 64 of Ch. II):

$$V \rightarrow \emptyset / \left[\begin{array}{l} V \\ N \end{array} \right] \left[\begin{array}{l} \text{---} \\ \text{Dem} \\ \text{Adj} \\ \text{Rel} \end{array} \right]$$

22. Low Tone Insertion/Pre-Pause Tone Rule: (Rule 11 of Ch. III):

$$\emptyset \rightarrow [- \text{HIGH}] / [+ \text{HIGH}] \text{---} \% \text{ (where \% = pause)}$$

23. Downstep (Rule 20 of Ch. III):

$$[+ \text{H}] \rightarrow [+ \text{D}] / [- \text{H}] \text{---}$$

24. High Tone Insertion (Rule 23 of Ch. III):

$$\emptyset \rightarrow [+ \text{HIGH}] / [- \text{HIGH}] \left[\begin{array}{l} \text{---} \\ N \end{array} \right] \#?$$

25. Mapping Rule (Rule 30 of Ch. III):

Map tones onto segments within innermost brackets; map first tone onto first vowel, second tone onto second vowel, etc. If there is no vowel, let tone 'float'. Remove innermost brackets whether or not rule can apply. Map tone onto segments only where segments have not yet been specified by tone features.

26. Mapping Rule (Rule 31 of Ch. III):

Map 'floating' tones onto closest immediate vowel (not separated by a consonant).

27. Tone Simplification (Rule 35 of Ch. III):

$$[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{l} \text{---} [+ \text{HIGH}] \\ + \text{Vocalic} \end{array} \right]$$

28. Low Tone Raising (Rule 3 of Ch. IV):

$$\text{a. } [- \text{HIGH}]_1 \rightarrow [+ \text{HIGH}] / \text{---} [+ \text{HIGH}]_{\text{Assoc}}$$

$$\text{b. } \left[\begin{array}{l} [- \text{HIGH}]_1 \\ N \end{array} \right] [+ \text{HIGH}]_{\text{Assoc}} \Rightarrow H_1 \emptyset$$

29. Tone Absorption Rule (Rule 4 of Ch. IV):

$$[\alpha \text{ HIGH}]_1 \rightarrow \emptyset / \left[\begin{array}{l} \text{---} \alpha \text{ HIGH} \\ + \text{Vocalic} \end{array} \right]$$

30. Tone Simplification (Rule 19 of Ch. IV):
 $[+ \text{HIGH}] \rightarrow \emptyset / [+ \text{HIGH}] \left[\begin{array}{c} \text{---} - \text{HIGH} \\ + \text{Vocalic} \end{array} \right]$
31. Tone Simplification (Rule 39 of Ch. IV):
 $\text{TONE} \rightarrow \emptyset / \left[\begin{array}{c} \text{TONE TONE} \text{---} \\ + \text{Vocalic} \end{array} \right]$
32. Tone Simplification (Rule 55 of Ch. IV):

$$\left[\begin{array}{c} [\alpha \text{ HIGH}] \quad [-\alpha \text{ HIGH}] \\ + \text{Vocalic} \end{array} \right]_1 \quad \left[\begin{array}{c} -\alpha \text{ HIGH} \\ - \text{Downstep} \end{array} \right]_2 \Rightarrow \left[\begin{array}{c} -\alpha \text{ HIGH} \\ + \text{Vocalic} \end{array} \right]_1$$
2
33. Low Tone Deletion (Rule 57 of Ch. IV):
 $[- \text{HIGH}] \rightarrow \emptyset / \left[\begin{array}{c} [+ \text{HIGH}] \text{---} \\ + \text{Vocalic} \end{array} \right] [+ \text{DOWNSTEP}]$
34. Low Tone Raising (Rule 7 of Ch. V):
 $[- \text{HIGH}]_1 \rightarrow [+ \text{HIGH}]_1 / \left[\begin{array}{c} [+ \text{HIGH}]_1 \quad [\text{---}] \\ \text{V} \quad \text{N} \end{array} \right]_{\text{VP}}$
Future
Present Progressive
Past Habitual
NEGATIVE
35. Tone Lowering of Mono-syllabic Verb (Rule 9 of Ch. V):
 $[+ \text{HIGH}] \rightarrow [- \text{HIGH}] / \left[\begin{array}{c} [\text{---}] [+ \text{HIGH}]_2 \\ \text{V} \quad \text{N} \end{array} \right]_{\text{VP}}$
Present Progressive
Future
Past Habitual
NEGATIVE
36. Tone Lowering of Bi-syllabic Verb (Rule 10 of Ch. V):
 $[+ \text{HIGH}]_2 \rightarrow [- \text{HIGH}] / \left[\begin{array}{c} [\text{---}] [+ \text{HIGH}]_1 \\ \text{V} \quad \text{N} \end{array} \right]_{\text{VP}}$
Present Progressive
Future
Past Habitual
NEGATIVE
37. Tone Dissimilation of Bi-syllabic Verb (Rule 11 of Ch. V):
 $[+ \text{HIGH}]_1 \rightarrow [- \text{HIGH}] / \left[\begin{array}{c} [\text{---} + \text{HIGH}] [- \text{HIGH}]_1 \\ \text{V} \quad \text{N} \end{array} \right]_{\text{VP}}$
Present Progressive
Future
Past Habitual
NEGATIVE

APPENDIX A.

A COMPARATIVE WORDLIST

This is a comparative wordlist of 542 forms -- nouns, verbs, adjectivals, adverbs, and particles in the eight dialects examined for this study. The transcription is in phonetics. A description of the segments are given in Chapter II, and of the tones in Chapter III.

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
1. able, to be	ùmàtí	ùmàtí	ùmàtí	úmáábì
2. afraid	ópè	ópè	ófè	ófwè
3. afternoon	úwámhì	òtà	òtà	élotà
4. age – grade	òtù	òtù	òtù	òtù
5. agree, to	úlámámhì	úlámámhì	úlámhá	úyamá
6. albino	ákèçì	ákèçì	ákèçì	ájá
7. all	èθèbékpó	èθèbé	èṣèlé	èṛèbé
8. alligator pepper	áçé	áçé	áçé	ásògyà
9. and	làgí	làgí	làgí	màbílé
10. anger	ófù	ófù	ófù	ófù
11. answer	òwájè	òwájè	éwáyè	úyáyè
12. ant	àsì	àsì	ásìsì	ádòdólò
13. animal	élámhì	éámhì	élámhì	élámhì
14. anthill	òlólò	òlólò	òlólò	úsómésè
15. arm	óbò	óbò	óbò	óbò
16. armpit	áfýèlè	áfwè	áfúlélè	áfúlélé
17. arrest	úmwúmhì	úmwúmhì	únwú	únwú
18. ashes	èmwè	ènwè	èmwé	ènwè
19. axe	údzé	údzé	údzé	ùzé
20. back	ítsìkè	ítsìkè	ítsìkè	íyèxè
21. bag	èkpà	èkpà	èkpà	èkpà
22. banana	ᵔᵔᵔᵔᵔᵔ	ᵔᵔᵔᵔᵔᵔ	ᵔᵔᵔᵔᵔᵔ	ᵔᵔᵔᵔᵔᵔ
23. bargain, to	úvémhì	úvémhì	uvé	uvé
24. belch, to	úvémhì	úvémhì	uvé	uvé
25. basket	ókphàlì	ókphàà	ókphàlì	ókphàà

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
1. able, to be	ùmàtí	ùmàtí	ùmabó	únátì
2. afraid	ópè	ófè	ófè	ófè
3. afternoon	òtà	òtà	òtà	ódaámhì
4. age – grade	òtù	òtù	òtù	òtù
5. agree, to	úlámhámhì	úlámhâ	údeóúò	ìsàgbê
6. albino	ákèǎì	ákèǎì	ékèsi	ékèǎì
7. all	èrèkpó	èrèkpó	èrèbè	èthègbê
8. alligator pepper	áčê	áčê	áčê	ásóγyèlè
9. and	làgí	làgí	làgí	ǎsàgbé
10. anger	ófù	ófù	ófù	ófù
11. answer	èwàyè	èyàyè	òwàyè	ònwàjè
12. ant	ásìsì	ásìsì	ásìsì	ásìsì
13. animal	élàmhì	élàmhì	élàmhì	énàmhì
14. anthill	òlólò	òlólò	ítètémá	òlólò
15. arm	óbò	óbò	óbò	óbò
16. armpit	áfwêlé	ífwêlè	áfulélé	áfílelé
17. arrest	únwúmhì	únwúmhì	únwúmhì	ínwúmhì
18. ashes	ènwè	ènwè	ènwè	émò
19. axe	údzé	údzé	údzé	úze
20. back	íǎìkè	íǎìkè	íǎìkè	úkè
21. bag	èkpà	èkpà	èkpà	èkpà
22. banana	òγédè	òγédè	òγédè	òγédè
23. bargain, to	úvémhì	úvémhì	ívémhì	ídómhì
24. belch, to	úvémhì	úvémhì	úvémhì	úvémhì
25. basket	ókphàì	ókphàì	ókphàà	úkphàlì

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
26. bat	ákògâ	ákògá	ákògá	ákògá
27. bathe, to	ùkwèyâ	úkwémhì	úxwê	úxwê
28. beans	éfyè	ìkètè	éfyè	ézilé
29. beat, to	úgbémhì	úgbémhì	úgbê	úkphélê
30. beauty	ótsè	ótsè	ótsè	ósè
31. begin, to	ùgbàré	ùgbàré	ùgbàré	ùgbàré
32. bell	àkàbà	àkàbà	àkàbà	àgògò
33. big	úkókómhì	úkókómhì	úkókô	úgbâ
34. bird	ápyámhì	ápyámhì	áfyámhì	áfyámhì.
35. bitter, to be	úyálámhì	úyáámhì	úyálâ	úyálâ
36. blacksmith	àgbèdô	àgbèdó	ósámhì	àgbèdê
37. blood	áθàlì	óθàà	áràì	áràà
38. boat	ókédà	ókédà	ókédà	ókédà
39. body	égbè	égbè	égbè	égbè
40. bone	úgwà	úgwà	úgwà	úgwà
41. book	óbè	óbè	óbè	óbè
42. bow	úsè	úsè	úsè	úsè
43. box	èkpàtì	àkpàtì	òkpètì	èkpètì
44. bread	úkpêkò	úkpèkò	èkò	èkò
45. breasts	épnè	épnè	épnè	épnè
46. breathe, to	úmwémhì	úwéémhì	úyéšê	óyéšê
47. bribe, to	ùfâ	ùfá	ùfê	ùvâ
48. bridge	ékphâ	ékphá	ékphâ	èkphá
49. broom	óxàpê	ùtsátsò	ùtsátsô	úxáázi
50. buffalo	àlèyè	àlèyè	èdè	èyó

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
26. bat	ákògá	ákògá	ákògá	ákògá
27. bathe, to	úxwémhì	úkwémhì	úxwémhì	ìxòwá
28. beans	éfyé	éfyé	éfyé	ísìlélé
29. beat, to	úgbémhì	úgbémhì	úgbémhì	ígbémhì
30. beauty	ótsè	ótsè	ótsè	ósè
31. begin, to	ùgbàré	ùgbàré	ùgbàré	ìgbazé
32. bell	àkàbà	àkàbà	àkàbà	àkàbà
33. big	úkókómhì	úkókómhì	úkókómhì	ífúmhì
34. bird	ápyámhì	áfyámhì	áfyámhì	áfyámhì
35. bitter, to be	úyáámhì	ófúfúmhì	úyálámhì	úyálámhì
36. blacksmith	àgbèdó	àgbèdó	àgbèdó	àgbèdè
37. blood	óráì	óráì	aráà	íthàì
38. boat	ókédà	ókédà	ókédà	ókédò
39. body	égbè	égbè	égbè	égbè
40. bone	úgwà	úgwà	úgwà	úgwò
41. book	óbè	óbè	óbè	ébè
42. bow	úsè	úsè	úsè	úsè
43. box	èkpètì	èkpètì	èkpètí	èkpètì
44. bread	úkpékò	úkpékò	èkò	èkòlì
45. breasts	épnè	épnè	épnè	épnè
46. breathe, to	úyéémhì	úyéémhì	ówéšé	íhášémhì
47. bribe, to	ùfwá	ùfwá	ùfá	ùfâ
48. bridge	ékphá	ékphá	ékphá	ékphâ
49. broom	ùtsátsò	ùtsátsò	ùtsátsò	ùgàsè
50. buffalo	àlèyè	àlèyè	àyèyè	àèyè

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
51. build, to	úgbámhì	úmámhì	úmâ	úyî
52. bullet	èkúkù	àkpòò	òkúkù	òkúkù
53. bundle	úkwìlì	ùxwì	ùkùlì	úyánó
54. burn, to	útonámhì	útonámhì	útonâ	úgɔ̂
55. bury, to	ùθétɔ̂	ùθétɔ̂	ùrétɔ̂	ùrétɔ̂
56. butcher, to	úvámhì	úvámhì	úvâ	úvâ
57. buy, to	údémhì	údémhì	údé	údé
58. cake	àkàlà	àkàà	àkàrà	àkàlà
59. calabash	ùbènè	ùbènè	ùbènè	ùbènè
60. cap	áθù	áθù	árù	árù
61. carnel	úkpúvì	úkpùvì	úkpúvì	ívî
62. carry, to	údúmhì	údúmhì	údû	údû
63. carve, to	úxálemhì	úxáémhì	úxáé	úxalé
64. case	èdzɔ̂	èdzɔ̂	èdzɔ̂	èzɔ̂
65. cat	ànôgbò	ànógbò	ànôgbò	ànógbò
66. catch	úmwúmhì	úmwúmhì	únwû	únwû
67. catarrh	ífìì	ífìì	ífìlì	ífìlì
68. celebrate, to	úθwámhì	úθwámhì	úrwâ	úrwe
69. chain	àya	àya	àya	ígâ
70. chair	utékwì	utékwì	utékwì	àgá
71. chameleon	álokwi	áokwi	álolókphì	álolòxwì
72. change	údenémhì	údonómhì	údonô	údenɔ̂
73. cheap, to be	úkpómhì	úkpómhì	úkpɔ̂	ùlɔ̂xɔ̂ré
74. cheek	èsà	ìsà	úkpàsà	èsà
75. chest	ùdù	ùdù	ákámùdù	ùdù

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
51. build, to	úmámhì	úyímhì	uýmìhì	úzímhì
52. bullet	àkúkù	èkúkù	èkúkù	ùkpígè
53. bundle	ùxwì	úkwì	ùxwìlì	ìgbámhì
54. burn, to	útónámhì	útónámhì	útónámhì	ítómhì
55. bury, to	ùrètó	ùrètó	útómhì	ìθètó
56. butcher, to	úvámhì	úvámhì	úvámhì	ívámhì
57. buy, to	údémhì	údémhì	údémhì	ídémhì
58. cake	ìkàà	àkàrà	àkàlà	àkàlà
59. calabash	ùbènè	ùbènè	ùbènè	ùgbà
60. cap	áru	áru	áru	áθu
61. carnel	ìvì	ùvì	ùvì	ìvì
62. carry, to	údúmhì	údúmhì	údúmhì	ídúmhì
63. carve, to	úxámhì	úxámhì	úxámhì	íxámhì
64. case	èdzó	èdzó	èdzó	èzó
65. cat	ànógbò	ànógbò	ànógbò	ànógbò
66. catch	únwúmhì	únwúmhì	únwúmhì	ínwúmhì
67. catarrh	ífìlì	ífìlì	ífìlì	ífìlì
68. celebrate, to	úrwmhì	úrwmhì	úrwmhì	ìθwmhì
69. chain	ìyà	àyà	ìyà	ìgà
70. chair	utékwì	utékwì	ítsákperà	ògènáθ
71. chameleon	álàòkwì	àlòkwì	àlòlòkphì	àlòlòkwì
72. change	úmhéémhì	údonómhì	úmémhì	ídénómhì
73. cheap, to be	ùkpómhì	ùkpómhì	ùlòxòré	ìkpómhì
74. cheek	àsà	àsà	èsà	èkpámhì
75. chest	ùdù	ùdù	ùdù	ùdù

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
76. chew, to	úúyémhì	úúyémhì	úúyê	úúyê
77. chew stick	úkpàkò	úkpàkò	úkpàkò	úkpàkò
78. chief	ògyè	ògyè	ògyè	ògyè
79. child	ómò	ómò	ómò	ómò
80. chin	àgbà	àgbà	àgbà	àgbà
81. choose, to	údzémhì	údzémhì	údzê	údzê
82. circumcise	úθwélémhì	úθwélémhì	úr _o wélê	úr _o wélê
83. civit cat	éθàì	éθà	-----	ér _o àà
84. clear, to	úfyámhì	úfyámhì	úfyâ	úfyâ
85. climb, to	úselemhì	úseémhì	úsee	úzélé
86. climb down, to	ùčémhìré	ùčémìré	ùkyèré	ùzèlèré
87. clock	èrèyè	àgògò	àgògò	àgògò
88. close (door), to	úxunómhì	úxunómhì	úxunò	úxúgyê
89. close (book), to	ùgbèvwê	úvwémhì	úvwê	úxúgyê
90. cloth	úkpò	úkpò	úkpò	úkpò
91. cock	òkpà	òkpà	òkpà	òkpà
92. coco-yam	áyòxò	íwòkó	íyaxò	íyòxó
93. come, to	ùwàré	ùv _u àré	ùv _u àré	ùv _u àré
94. command, to	ùmhamhànâ	úmhaámhì	ùmhanâ	úmhá
95. conceive, to	úsámhémhì	úsámhémhì	úsámhí	úzámhí
96. contribute, to	údzólómhì	údzólómhì	údzòlò _o ré	àdàsí
97. cook	úpémhì	úpémhì	úpê	úpê
98. copper	èlúmhì	èlúmhì	-----	èlómhì
99. corpse	ólúmhì	ólímhì	ólímhì	ólímhì
100. corrupt, to be	úθyámhì	úθyámhì	úryâ	úryâ

	<u>ish</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
	to	úyémhì	úyémhì	úyúémhì	ídúmhì
	new stick	úkpàkò	úkpàkò	úkpàkò	úkpàkò
	chief	ògyè	ògyè	ògyè	ògyè
	child	ómò	ómò	ómò	ómò
80.	chin	àgbà	àgbà	àgbà	àgbà
81.	choose, to	údzémhì	údzémhì	údzémhì	ízémhì
82.	circumcise	úrweémhì	úrweémhì	úrweémhì	íθélémhì
83.	civit cat	érai	érai	éra	éθà
84.	clear, to	úpyémhì	úfyémhì	úfyámhì	ífyémhì
85.	climb, to	úseémhì	úseémhì	úseémhì	íselémhì
86.	climb down, to	ùtyèré	ùçèré	ùkyèré	šizé
87.	clock	òkùlòkù	éreyèi	àgògò	èreyè
88.	close (door), to	úxúnómhì	úxúnómhì	úvwémhì	íkwémhì
89.	close (book), to	úvwémhì	úvwémhì	úvwémhì	ívwémhì
90.	cloth	úkpò	úkpò	úkpò	úkpò
91.	cock	òkpà	òkpà	òkpà	òkpà
92.	coco-yam	íyokó	íyokó	íyòxó	íyòxò
93.	come, to	ùvái	ùvále	ùvare	ìvazé
94.	command, to	-----	úmháámhì	úmhaná	-----
95.	conceive, to	úsámhímhì	úsámhémhì	úsámhímhì	úsámhémhì
96.	contribute, to	údzómhì	údzólómhì	ùsàgbé	ìzèkókò
97.	cook	úpémhì	úpémhì	úpémhì	ípémhì
98.	copper	-----	èlúmhì	-----	ènùmhì
99.	corpse	ólimhì	ólimhì	ólimhì	ónimhì
100.	corrupt, to be	ùryàyé	úryámhì	úryámhì	ìsakà

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
101. cost, to	útwémhì	útwémhì	útwê	útwê
102. cough	ówè	ówè	óyè	ókèèfù
103. cover, to	úvwémhì	úvwémhì	úvwámhì	úvwémhì
104. cow	ámèná	èná	èná	émèná
105. count, to	úkálómhì	úkáámhì	úkálô	úkálô
106. crab	ódzî	ódzî	ódzî	òzî
107. crawl, to	úgánómhì	úgánómhì	úgánô	úgánô
108. cricket	òtê	òtsémhì	òtsémhì	ùsémhì
109. cripple	àxìlì	-----	àxìlì	àxìlì
110. crocodile	òpè	òpè	ópò	ópè
111. crowd	àgbàlì	ègbâ	ìgbâ	-----
112. cry	évyè	évyè	úvyè	úgô
113. cup	àkpà	àkpà	àkpà	úkómhì
114. cut, to	úfyámhì	úfyámhì	úfyâ	úfyámhì
115. cutlass	òpyà	-----	ùvèrê	ìdègè
116. darkness	ébìlì	ébìlì	ébìlì	ébìlùkì
117. day	úkpélè	òthòyó	úkpélè	úkpélè
118. dear, to be	útwémhì	útwémhì	útwê	útwê
119. death	éywilì	éywilì	éywilì	éywilì
120. debt	ótà	ótà	ótsà	ósà
121. debtor	òluètà	òuòtà	òluòtsà	òlúsà
122. deceive, to	úlélémhì	úlélémhì	úléléê	úléléê
123. decrease, to	ùtsèòré	ùtsèòré	ùtsèòré	-----
124. deep, to be	úgódómhì	úgódómhì	-----	-----
125. deer	éθwè	-----	érwè	érwè

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
101. cost, to	údzémhì	útsémhì	útwémhì	íyálemhì
102. cough	ówè	ókòfwò	ówè	óxò
103. cover, to	úvwémhì	úvwémhì	úvwémhì	ívwémhì
104. cow	èná	èná	émèná	èná
105. count, to	úkaámhì	úkálómhì	úkálómhì	íkálómhì
106. crab	ójí	ódzì	ózi	ójí
107. crawl, to	-----	úgánómhì	úgánómhì	ígánómhì
108. cricket	òtsémhì	òtsémhì	òtsémhì	óšè
109. cripple	-----	áxì	àxìlì	-----
110. crocodile	òpè	òpè	òpè	òpè
111. crowd	àgbàì	àgbàì	ìgbà	ègbàì
112. cry	úvyémhì	évyè	égò	évyè
113. cup	àkpà	àkpà	àkpà	àkpà
114. cut, to	úfyámhì	úfyámhì	úfyámhì	ífyámhì
115. cutlass	òpyà	ùwèrè	òpyà	òpyà
116. darkness	ébìì	ébìì	ébìlì	ébìlì
117. day	òróyó	éìè	úkpéìè	ódaámhì
118. dear, to be	útwémhì	útwémhì	útsémhì	íyálemhì
119. death	égwìì	éywìì	éywìlì	éhwìlì
120. debt	ótsà	ótsà	ótsà	ósà
121. debtor	òlòtsà	òlùètsà	òlùòtsà	òlùòsà
122. deceive, to	úlélémhì	úlélémhì	úlélémhì	íyáyámhì
123. decrease, to	-----	ùtsèjùré	-----	ìyòtò
124. deep, to be	-----	úgódómhì	úgólómhì	ígódómhì
125. deer	érwè	érwè	-----	éθwè

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
126. defecate, to	únémhì	únémhì	únê	únê
127. demolish, to	ùgwòyòyâ	ùgwòyòyá	úgwòyò	úgwòyò
128. deny, to	účímhì	útsímhì	účí	úší
129. dew	ágwìlì	áwìlì	áwìlì	áwìlì
130. die, to	úyúmhì	úyúmhì	úyû	úyû
131. dig, to	úgwámhì	útómhì	útô	útónô
132. dirty, to be	úkómhì	úkómhì	úrô	urô
133. divide, to	úkémhì	úkémhì	úkê	úkê
134. do, to	úlúmhì	úlúmhì	ulû	ulû
135. doctor	óbò	óbò	ôbo	ôbo
136. dog	áywà	áywà	áywà	áywà
137. door	ódê	ódê	-----	-----
138. draw(water)	úvómhì	úvómhì	úvû	úvû
139. draw(picture)	úvímhì	úvímhì	úví	úví
140. dream	éwònà	éwònà	éwònà	éwònà
141. drink, to	úyómhì	úwómhì	úyô	úyô
142. drink(wine)	údamhì	údamhì	údâ	údâ
143. drinkable	émâyò	émáwò	émâyò	émâyò
144. drive(away)	ùxurâ	ùxurâ	úxwaxò	úxû
145. drunkard	òdàpò	òdàpò	òdàpò	òdàpò
146. dry (meat) , to	úkálámhì	úkáámhì	úkákâ	úkákâ
147. dry season	ékà	ékékâ	ékà	ékâ
148. duck	òdògwò	àdògwò	àdògwò	àdògwò
149. dust	àdàbù	òdàbù	ìdàbù	ìdàbù
150. ear	élò	éwò	éuò	ésò

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
126. defecate, to	únémhì	únémhì	únémhì	ùdùkâ
127. demolish, to	ùgwòǵòá	ùgwòǵòá	ùgwòǵòá	ìsàkâ
128. deny, to	účímhì	-----	účímhì	ísímhì
129. dew	áwìì	áwìì	áwìì	èlì
130. die, to	úǵúmhì	úǵúmhì	úǵúmhì	-----
131. dig, to	útómhì	útómhì	úgwámhì	úgwánómhì
132. dirty, to be	úkómhì	úkómhì	úrómhì	íθómhì
133. divide, to	úkémhì	úkémhì	úkémhì	íkémhì
134. do, to	úlúmhì	úlúmhì	úlúmhì	ílúmhì
135. doctor	óbò	óbò	óbò	óbò
136. dog	áǵwà	áǵwà	áǵwà	áǵwà
137. door	èxù	èxù	ódè	èxù
138. draw(water)	úvómhì	úvómhì	úvómhì	ívúmhì
139. draw(picture)	úvímhì	úvímhì	úvímhì	íkékémhì
140. dream	évònà	éwònà	évònà	éwòšè
141. drink, to	úwómhì	úwómhì	úyómhì	íhómhì
142. drink(wine)	údámhì	údámhì	údámhì	ídámhì
143. drinkable	émàwò	émàwò	émàyò	émahò
144. drive(away)	ùxukwá	úxúmhì	ùxurâ	íxúmhì
145. drunkard	òdàpò	òdàpò	òdàpò	òdàpò
146. dry(meat), to	úkákámhì	úkákámhì	úkákámhì	íkámhì
147. dry season	éka	éka	éka	ékâ
148. duck	àdògwò	àdògwò	àdògwò	ìdàgù
149. dust	àdàbù	àdàbù	ìdàbù	ìdàbù
150. ear	éwò	éwò	éuò	ésò

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
151. earn, to	úmyémhì	-----	úmyê	úmyê
152. earring	àyèlí	ìyèí	àyèlí	ìyèrí
153. edible	émalè	émalè	émâlè	émalè
154. egg	ékèlí	ékè	ékèè	ékèí
155. elephant	ínì	ínì	ínì	ínì
156. enemy	ébèlí	-----	òbè	òbè
157. enter, to	úlómhì	úlómhì	úlô	úlô
158. eat, to	úlemhì	úlemhì	ulé	ulé
159. entertain, to	úyóyómhì	úyóyómhì	-----	-----
160. error	ídòbó	-----	ùdòbòlè	-----
161. escape, to	únímhì	únímhì	úní	úní
162. European	òbò	òbó	òbó	òbò
163. evening	óyòdê	óyòdê	óyèdê	-----
164. face	àlò	ào	àlò	àlò
165. faint, to	únílamhì	unámhì	-----	-----
166. fall, to	údemhì	údemhì	ùdèré	ùdèré
167. family	ápè	ápè	àfè	àfè
168. famine	òsámhì	-----	òsámhì	òsámhì
169. far, to be	úrélemhì	úréemhì	órélé	úrélé
170. farm	ímè	ímè	ímè	ímè
171. fat, to be	úkókómhì	úkókómhì	úkókò	úgbá
172. fat (meat)	ùlà	ùlà	ílà	ílià
173. fatigued, be	úlómhì	úlómhì	uléé	uléé
174. father	èθà	èθà	èrà	èrà
175. feathers	ígbîlòlò	-----	-----	úlólô

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
151. earn, to	-----	úmyémhì	-----	ímyémhì
152. earring	ìyèlí	ìyèlí	ìyèlí	ìyèlí
153. edible	émalè	émalè	émalè	émalè
154. egg	ékèè	ékèi	ékèè	ékèlì
155. elephant	ínì	ínì	ínì	ínì
156. enemy	ébèè	ébèi	ébèè	ébèlì
157. enter, to	ùgwèré	úlómhì	úlómhì	ùgwèzé
158. eat, to	ulémhì	ulémhì	ulémhì	ílémhì
159. entertain, to	úyáyámhì	úyáyámhì	úyámhì	-----
160. error	ìdòbó	ìdòbó	ìdòbó	ìdòbó
161. escape, to	únímhì	únímhì	únímhì	-----
162. European	òbó	òbó	òbó	òbò
163. evening	óyòdê	óyòdê	óyòdê	égbénwà
164. face	àlò	àlò	àlò	èlòlì
165. faint, to	únámhì	únílamhì	únílamhì	ínínómhì
166. fall, to	údemhì	údemhì	údemhì	ùdèzé
167. family	àpè	àfè	àfè	ówáfè
168. famine	úxùmhì	òsámhì	úxùmhì	úxùmhì
169. far, to be	úréémhì	úrélemhì	úrélemhì	ízélemhì
170. farm	ímè	ímè	ímè	ígwè
171. fat, to be	úkókómhì	úkókómhì	úkókómhì	íkókómhì
172. fat (meat)	író	ìrò	ílà	ánè
173. fatigued, be	ólídómhì	úlómhì	òlémhè	íléémhì
174. father	èrà	èrà	èrà	èθà
175. feathers	ìlò	ùlò	ìlòlò	ùlòlò

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
176. feces	ìtò	-----	ítsò	ítsò
177. female	òkpòtsò	âmhì	ómòsì	ómòsì
178. fence	ògbà	ògbà	ògbà	úgbà
179. fetch, to	úvómhì	úvómhì	úvû	úvû
180. few, to be	íkèkémhì	íkèkémhì	úšĚ	úkwúkwô
181. finish, to	úpómhì	úpómhì	ófô	ófô
182. fire	èθàlì	èθàà	èràì	èràà
183. fish	èsèlì	èsèè	èsèè	èsèì
184. flow, to	únámhì	únámhì	únâ	únâ
185. flower	ìdòdô	àdòdó	òdòdô	ídòdó
186. fly	áxyà	áxyà	áxyà	íxyà
187. fly, to	údamhì	údamhì	údâ	útî
188. foam	ófùù	ófùù	ófulì	éfulì
189. foam, to	úfúmhì	úfúmhì	úfû	úfû
190. follow, to	ùθèxáì	ùθèxáí	ùrèxáí	ùrèxáí
191. food	émâlè	emâ	émâlè	émâlè
192. foolish	àdèkĚ	-----	àdèkĚ	-----
193. foot	étâwĚ	òwĚ	òvĚ	òwĚ
194. forehead	únûgbò	unûgbò	únûgbò	ùgbò
195. forest	ógwà	ógwà	ógwà	ógwà
196. forget, to	ùyèyâ	ùyeyá	ùyeleyâ	ùyeleyâ
197. fowl	òxò	òxò	òxò	òxòxò
198. fresh	ògbòmhì	ògbòmhì	ògbòmhì	ògbòmhì
199. front	àlâló	úgyàò	ugyàlò	úgyàlò
200. fry, to	úlamhémhì	úlamhémhì	úlamhî	úlamhî

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
176. feces	ìtsò	ìtsò	ìtsò	ìsò
177. female	óamhì	óamhì	ámhì	ósamhì
178. fence	ògbà	ògbà	ògbà	úgbà
179. fetch, to	úvómhì	úvómhì	úvómhì	íwámhì
180. few, to be	íkèkémhì	íkúkúmhì	ìkèré	ísémhì
181. finish, to	úpómhì	úfómhì	ùgbéfwê	ífómhì
182. fire	èràì	èràì	èràì	èthàlì
183. fish	èsèè	èsèì	èsèè	èsèlì
184. flow, to	únámhì	únámhì	únámhì	ínómhì
185. flower	ìdòdó	òdòdó	òdòdó	ìdòdó
186. fly	áxyà	áxyà	áxyà	íxyò
187. fly, to	údamhì	údamhì	údamhì	ídámhì
188. foam	ófuù	ófwìì	ófwìlì	éfùlì
189. foam, to	úfumhì	úfumhì	úfumhì	ífumhì
190. follow, to	ùrèxáí	ùrèxáí	ùrèxá	ìthèxáí
191. food	émàè	émàè	émàlè	émàlè
192. foolish	-----	ìdèkè	ìdèkè	àdèkè
193. foot	òwè	étâwè	òvè	úkphàthî
194. forehead	únùgbò	únùgbò	únùgbò	ùgbhógbhó
195. forest	ógwà	ógwà	ógwà	òhólì
196. forget, to	ùyèyá	ùyèlá	ùyèléá	ìyèlá
197. fowl	òxò	òxò	òxò	òxòxò
198. fresh	ògbòmhì	ògbòmhì	ògbòmhì	ègbò
199. front	òdàlò	úgyàlò	úgyàlò	àlâlò
200. fry, to	úlamhímhì	úlamhémhì	úlamhímhì	ítóséémhì

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
201. full, to be	úvómhì	úvómhì	úvᵔ	úvᵔ
202. gather, to	úkókómhì	úkókómhì	ùkòkòrê	ùkòkòré
203. germinate, to	úgyémhì	úgyémhì	úgyê	úgyê
204. gin	ᵔkaíkái	ᵔkaíkái	ìkaíkái	ìkaíkái
205. give, to	ùθèná	ùθèná	ùrèná	ùrèná
206. give birth, to	úuyámhì	úuyámhì	úuyâ	úyúa
207. goat	éɣwè	éɣwè	éɣwè	éɣwè
208. God	ᵔɣèná	ᵔɣèná	ᵔɣèná	ᵔɣèná
209. good, to be	úsómhémhì	úsómhémhì	úsᵔ	-----
210. grass	ùlùmhì	ìùmhì	ìlùmhì	ùlùmhì
211. cutting grass	ívà	ívwa	ívwa	ívwa
212. grave	ìdì	ìdì	ìdì	-----
213. greet, to	úθwémhì	úθwémhì	úrᵔwê	úrᵔwê
214. grey hair	édè	édè	édè	édè
215. grind, to	úmhélemhì	umheémhì	umhée	umhélé
216. ground	òtᵔ	òtᵔ	òtᵔ	òtᵔ
217. ground nuts	ìsâgbhè	ìsâywè	ìsâgwè	ìsâgwè
218. guinea fowl	óθᵔlᵔ	óθᵔᵔ	órᵔlᵔ	órᵔlᵔ
219. gun	áva	áva	òtsítsì	òsísì
220. hair	étò	étò	étò	étò
221. half	ùbèle	úbèè	ùbê	ùbélᵔ
222. hand	óbᵔ	óbᵔ	óbᵔ	óbᵔ
223. hard, to be	úkákámhì	útótómhì	úkakâ	útótᵔ
224. harmattan	óθwà	óθwà	ᵔkphàkphà	ᵔkphákphà
225. hat	áθù	áθù	áru	áru

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
201. full, to be	úvómhì	úvómhì	úvómhì	ívómhì
202. gather, to	úkokómhì	úkòkòré	úkomhì	úkùgbé
203. germinate, to	úgyémhì	úgyémhì	úgyémhì	ízémhì
204. gin	ìkàíkàí	ìkàíkàí	-----	-----
205. give, to	ùréná	ùréná	ùréná	ùθénáì
206. give birth, to	úuyámhì	úuyámhì	úyuámhì	íbyómhì
207. goat	éywe	éywe	éywe	éwe
208. God	òsìnégbà	òsìnégbà	òyéná	ósínégbá
209. good, to be	úsómhímhì	úsómhímhì	-----	úmhéémhì
210. grass	ìlùmhì	ìlùmhì	ìlùmhì	ùlùmhì
211. cutting grass	ívwa	ívwa	ívwa	ívwo
212. grave	ìdì	ìdì	ìdì	ìdì
213. greet, to	úrwémhì	úrwémhì	úrwémhì	íθwémhì
214. grey hair	édé	édé	édé	édé
215. grind, to	úmhéémhì	úmhéémhì	úmhéémhì	éhómhì
216. ground	òtò	òtò	òtò	òtò
217. ground nuts	ìsâgwè	ìsâgwè	ìsâgwè	ìsâgwè
218. guinea fowl	óròò	óròò	óròlò	úθòlò
219. gun	òcííí	ùcííí	ócííí	áva
220. hair	étò	étò	étò	étò
221. half	úbéè	úbè	úbé	-----
222. hand	óbò	óbò	óbò	óbò
223. hard, to be	úkákámhì	-----	úkákámhì	ítótómhì
224. harmattan	óràì	órwa	òkphàkphà	óθwà
225. hat	árù	árù	árù	áθu

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
226. have, to	úmḥólémhì	úmḥóómhì	úmḥóô	-----
227. hawk	àdâkpa	àkpa	àkpa	ódegbé
228. head	úsómhì	úsómhì	úsò	úsómhì
229. hear, to	úsómhì	úsómhì	úsô	úzélímhì
230. heart	ùkphò	ùkphò	ùdù	ùdù
231. heavy, to be	úxwámhì	úxwámhì	uxáâ	úkwâ
232. heal	édzeágwè	édzeàwè	édzélòù è	ézélòù è
233. help, to	ùkpaòbô	ùkpaòbô	ìkpaòbô	ìkpaòbô
234. here	ánê	ána	ána	alâ
235. hide, to	ùθéwélè	ùθéwé	úúélè	-----
236. hide (person)	ùnàwê	ùnàvè	-----	ùnàvè élè
237. hill	ègélì	ègè	ègè	ègè
238. hit, to	ùθégbê	úpímhì	ùrègbê	úfí
239. hoe	àwòθò	ègwé	ègwè	ègwé
240. hoe, to	úwónómhì	úwónómhì	úwónò	-----
241. hole	ùlòlò	ùlò	èyè	éyè
242. home	ápè	íxò	áfè	ówà
243. honey	élò	éwò	évò	éyò
244. horn	ùkphàlì	ùkphàà	òkphàlì	ùkphàà
245. horse	àkàčí	àkàtsí	àkàčí	àkàsí
246. hot, to be	útógyámhì	útógyámhì	útô	útô
247. house	ówà	ówà	óvâ	ówà
248. hunger	òsámhì	òsámhì	òsámhì	òsámhì
249. hunter	àgyédè	àgyódè	àgyòdè	àgyòdè
250. husband	ódò	ódò	ódò	ámhì

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
226. have, to	umhɔ́ɔ́mhi	umhɔ́émhi	umhɔ́ɔ́mhi	imhɔ́í
227. hawk	ákpa	ákpa	ódegbé	-----
228. head	úsò	úsò	úsòmhi	úsòmhi
229. hear, to	úsómhi	úsómhi	úsómhi	ífé lé mhi
230. heart	ùkphò	ùkphò	ùdù	ùdù
231. heavy, to be	úxwámhi	úxwámhi	úkwámhi	íxwámhi
232. heel	édzéáwè	édzéòwè	édzélou è	étalu è
233. help, to	ùkpaòbɔ́	ìkpaòbɔ́	ìkpaòbɔ́	ìkpaòbɔ́
234. here	ána	ána	àlà	sìwànà
235. hide, to	-----	ùrèu.é	úu élémhi	-----
236. hide (person)	ùnàv é	-----	ùnàv élè	ínògbhà
237. hill	ègè	ègè	ègè	ákpakè
238. hit, to	ùrègbé	ùrègbé	ùrègbé	ìgbémhi
239. hoe	ègwé	ègwé	ègwé	ègwé
240. hoe, to	úgwámhi	úwónómhi	úgwámhi	ègwà
241. hole	ùlò	èyèi	è vè	ùwòlò
242. home	àpè	àfè	àfè	ówà
243. honey	éwò	éwò	é vò	éhwìlì
244. horn	òkphàì	òkphàì	ùkphàà	ùkphàlì
245. horse	àkàčí	àkàčí	àkàčí	àγàsí
246. hot, to be	útómhi	útómhi	útómhi	ítómhi
247. house	óvà	élo	óvà	ówà
248. hunger	òsámhi	òsámhi	òsámhi	òsámhi
249. hunter	ágyòdè	ágyòdè	ágyòdè	ágyòdè
250. husband	òdò	òdò	ámhi	ìsómhi

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
251. hut	àtsɛ̀	àtsɛ̀	àtsɛ̀	àsɛ̀
252. illness	uɣwámhì	uɣwámhì	uɣwâ	uɣwâ
253. imitate, to	ulólómhì	uloómhì	ulólô	-----
254. inside	émhémhɔ̂	émhɔ̂	ékéìɔ̂	ékéìɔ̂
255. intestines	éfali	éfa	iléfài	éfài
256. iron	áxwì	áxwì	áxwìlì	áxwìlì
257. Ishan	étsà	étsà	étsà	ésà
258. itch, to	utónómhì	utónómhì	utónɔ̂	utónɔ̂
259. jaw	àgbà	àgbà	àgbà	àgbà
260. join, to	ùsàgbê	ùtómhá	ùtsómhá	-----
261. journey	óxyà	óxyà	óxyà	óxyà
262. jump, to	údámhì	údámhì	úúɔ̂	úwɔ̂
263. judge, to	úgwémhì	úgwémhì	úgwê	úgwê
264. kill, to	úgbémhì	úgbémhì	úgbê	úgbê
265. king	ògyè	ògyè	ògyè	ògyè
266. kitchen	íníyù	íníyù	égbídíyù	íníghù
267. kneel, to	ùdìgwâ	ùdìgwá	ùdìgwâ	ùdègyá
268. knife	áyálò	ùwèθé	áyálò	áyálò
269. know, to	uléémhì	uléémhì	ulééê	ulééê
270. knowledge	òlé	uléémhì	ulééê	ulééê
271. kola nut	éwòlì	éúòò	éúòò	éúé lé
272. ladder	ígbàṅàkà	ígbàṅàkà	ígbàṅàkà	ígbàṅàkà
273. laugh, to	úgyémhì	úgyémhì	úgyê	úgyê
274. laughter	ógyè	ógyè	ógyè	ógyè
275. law	ùsì	ùsì	ùsì	ùsì

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
251. hut	àtsɛ̀	àtsɛ̀	áyàtsɛ̀	óxòlô
252. illness	ígwámhì	úgwámhì	úɣwámhì	ɛ̀xúmhì
253. imitate, to	úlóómhì	ulólómhì	ulólómhì	ítalómhì
254. inside	êmhò	êmhò	éfalô	ɛ̀kɛ̀lólì
255. intestines	éfai	éfai	ílefà	éfai
256. iron	áxwìì	áxwì	áxwìì	-----
257. Ishan	étsà	étsà	étsà	ésà
258. itch, to	útónómhì	útónómhì	-----	ítónómhì
259. jaw	àgbà	àgbà	àgbà	àgbà
260. join, to	ùsàgbé	ùtsómhá	usamá	ìkwègbê
261. journey	óxyà	óxyà	óxyà	ìyàsà
262. jump, to	údamhì	údamhì	údamhì	ídámhì
263. judge, to	úgwémhì	úgwémhì	úgwémhì	ígúmhì
264. kill, to	ùgbèá	ùgbémhì	ùgbémhì	ùgbémhì
265. king	ògyè	ògyè	ògyè	ògyè
266. kitchen	ígbíyù	ígb ídíyù	íníyù	ùwémhà
267. kneel, to	ùdígwá	ùdígwá	ídígwá	ídígwá
268. knife	ùvèré	ánwê	áyálò	ùwèθé
269. know, to	úléémhì	úléémhì	úléémhì	únémhì
270. knowledge	òlɛ̀	òlɛ̀	òlɛ̀	únémhì
271. kola nut	é vòò	é vòò	é vò	ɛ̀wèlà
272. ladder	ígbànàkà	ígbànàkà	ígbànàkà	ígbànàkà
273. laugh, to	úgyémhì	úgyémhì	úgyémhì	ígyémhì
274. laughter	ógyè	égyè	ógyè	égyè
275. law	ùsì	ùsì	ùsì	ùsì

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
276. lazy, to be	úyélémhì	úyélémhì	úlémhê	úyélélê
277. leaf	umaabè	ébe	umaabè	umaabè
278. learn, to	úmwénámhì	úwénámhì	úwénâ	úwénâ
279. left	ògòbò	ògòbò	ògòbò	-----
280. leg	òwè	òwè	òuè	òwè
281. lick	únánómhì	únánómhì	úmísì	-----
282. lie down, to	údègwé	údègwé	údègwê	údègwé
283. life	òrèyè	òrèyè	òrèyè	òrèyè
284. light(lantern)	úfyò	ófyò	ífyò	úru
285. light(to wear)	údápéé	údápéé	uféyè	eméféyè
286. lion	ídu	ídu	òdumhâ	òdumhâ
287. live, to	úyeemhì	úyeemhì	úyelê	úyòwò
288. liver	ídu	ídu	-----	ídu
289. lizard	ómhélémhì	ómhélémhì	òu.élémhì	òwélémhì
290. load	íswà	íswà	íswà	íswà
291. long, to be	únuamhì	únuamhì	úrelê	emherélê
292. look for, to	úkélemhì	úkeemhì	úkelê	úkelê
293. louse	àrù	àrù	àrù	àrù
294. locust bean	úgbà	-----	ílitso	ílitso
295. mad, to be	úmhemhê	úmhemhémhì	úmhemhê	úmhemhê
296. madman	ómhemhê	ómhemhê	ómhemhê	ómhemhê
297. main road	àgbàlà	àgbàà	àgbàlà	òkò
298. maize	òkà	òkà	òkà	òkà
299. make, to	úsésémhì	úsésémhì	úsésê	úsésê
300. malaria	éba	éba	éba	éba

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
276. lazy, to be	úúy'émhì	úúy'élémhì	-----	-----
277. leaf	óbè	óbè	úmabè	uméebè
278. learn, to	úwénámhì	úwénámhì	òwènà	únwénámhì
279. left	ògòbó	ògòbó	ògòbó	ógòbó
280. leg	òwè	òwè	òu è	úkphàthì
281. lick	únánómhì	únánómhì	únánómhì	-----
282. lie down, to	údègwé	údègwé	údègwè	ìgwèsi
283. life	òrèyè	òrèyè	òrèyè	uzèyè
284. light (lantern)	úfyò	ífyò	úfyò	éfwà
285. light (to wear)	údàp'ée	údàf'ée	-----	òdap'ée
286. lion	ídù	ídù	òdumá	ídù
287. live, to	úyéémhì	úyéémhì	úyélémhì	ínélémhì
288. liver	ídù	ídù	ídù	-----
289. lizard	ómh'è	ómh'è	óu'élémhì	úmhámhì
290. load	íswà	íswà	íswà	íse
291. long, to be	únúámhì	únulámhì	únúámhì	uzélémhì
292. look for, to	úkèlò	úkéémhì	úkélémhì	ífolómhì
293. louse	àrù	àrù	àrù	àrù
294. locust bean	úgbà	ùgbá	ùgbá	ùgbá
295. mad, to be	úm'hém'hémhì	úm'hém'hémhì	úm'hém'hémhì	ém'hém'hé
296. madman	óm'hém'hé	óm'hém'hé	óm'hém'hé	ónóm'hém'hé
297. main road	àgbàà	àgbàlà	àgbàlà	àgbàlà
298. maize	òkà	òkà	òkà	òwòkpá
299. make, to	úsésémhì	úsésémhì	úsésémhì	ísésé
300. malaria	ébà	ébà	ébà	ibà

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
301. male	òdzawólì	òdzaô	ómóì	ágèné
302. man	òdzawólì	òdzaô	ómóì	ágèné
303. mango	umáyo	umáyo	umágo	-----
304. many, to be	úbúmhì	úbúmhì	úbú	úbú
305. market	àkì	àkì	àkì	àkì
306. market stall	àtsè	égbhá	ògwákì	ówákì
307. masquerade	àkpélè	áimhì	ílo	-----
308. mat	ìyá	ìyá	ébo	ìyúíá
309. mature, to be	úyómhì	úwómhì	úyô	úyógyá
310. measure, to	umhálamhì	umháamhì	umháá	umháá
311. meat	élámhì	éámhì	élámhì	élmahì
312. medicine	ùxúmhì	ùxúmhì	ìxúmhì	ùxúmhì
313. melon	éywoì	úkpyòì	íkpyòlì	íkpelimhì
314. melon seeds	-----	íkpyòì	íkpyòlì	íkpelimhì
315. melt, to	údálámhì	údaámhì	-----	-----
316. messenger	íkò	íkò	àgyusò	àgyusómhì
317. metallic	élùmhì	èùmhì	élùmhì	èlòmhì
318. mix, to	ùkuwéyè	údonómhì	údonògbè	údenò
319. mold, to	umámhì	umámhì	umá	umá
320. money	íkpeýòlò	íkpeýò	íkpeýòlò	íkpiyó
321. monkey	èkà	èkà	óvelè	óvelè
322. month	ùkì	ùkì	ùkì	ùkì
323. moon	ùkì	ùkì	ùkì	ùkì
324. morning	ògbédè	ògbédè	égyá	élegbyá
325. mortar	ókò	ókò	ókò	ókò

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
301. male	òkpó	ómóì	ómó	òkpó
302. man	ómóì	ómóì	òdzavó	òzawóì
303. mango	umágo	umágo	ògyóbó	umágo
304. many, to be	úbúmhì	úbúmhì	úbúmhì	íbúmhì
305. market	àkì	àkì	àkì	àkì
306. market stall	óvakì	àtsè	ògwá	égbhàkò
307. masquerade	ílò	ílò	ìbanà	áìmhì
308. mat	égbhàì	égbhàì	ìyúa	ìwó
309. mature, to be	úwómhì	-----	úyómhì	ìhómhì
310. measure, to	úmháámhì	úmháámhì	úmháámhì	ímháámhì
311. meat	éìámhì	éìámhì	éìámhì	éìámhì
312. medicine	ìxúmhì	ìxúmhì	ùxúmhì	ìxúmhì
313. melon	èwò	èwòì	ìkpòlì	ógwò
314. melon seeds	ìkpèwò	èwòì	ìkpòlì	ìkpémhì
315. melt, to	údaámhì	údaámhì	údalámhì	ìdalámhì
316. messenger	úkò	íkò	àgyusómhì	àgìkò
317. metallic	éìúmhì	éìúmhì	-----	éìúmhì
318. mix, to	ùdònògbé	údonómhì	ùkùgbé	ìdénómhì
319. mold, to	úmámhì	úmámhì	úmámhì	ímámhì
320. money	ìkpéyò	ìkpéyò	ìkpéyò	ìkpéyò
321. monkey	ékà	-----	óvelè	ìmhèlì
322. month	ùkì	ùkì	ùkì	ùkì
323. moon	ùkì	ùkì	ùkì	ùkì
324. morning	égbyà	égbyâ	égbyà	ògbédé
325. mortar	ókò	ókò	ókò	ókò

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
326. mosquito	áúáúà	áúáúà	áúáúà	áúáúà
327. mother	ìyò	ìyò	ìyò	ìyò
328. mount, to	úséémhì	úséémhì	úséê	úséê
329. mourn, to	úvyémhì	úvyémhì	úvyê	úgô
330. mouse	ópè	úxáà	ófè	ófè
331. mouth	únò	únò	únò	únò
332. much	úbúmhì	úbúmhì	úbû	úbùgbé
333. mud	òkétè	òxèthè	òkétè	òwèrè
334. name	élìlì	éìlì	énìlì	énìlì
335. narrow, to be	úkphyé- kphyémhì	úkphyémhì	úkphélè	úféle
336. navel	ùxò	ùxò	ùxò	-----
337. near, to be	ùtsikélè	ùtsiké	ùçìrè	ùsikélè
338. neck	ùθwìlì	áì	úrwlíî	ùrwìlì
339. needle	àgbèdê	àgbèdé	àgbèdê	àgbèdé
340. net	àgà	àgà	-----	ízàgà
341. new	ògbòmhì	ògbòmhì	ògbòmhì	ògbòmhì
342. night	ídáà	ídáá	énwá	élenwá
343. noise	òmè	òmè	ómè	ómè
344. noon	úwámhì	òtà	òtà	élotà
345. nose	íswè	íswè	íswè	íswè
346. not, it is	òwàkí	òákí	òákýá	-----
347. now	énìxáì	óyáwá	éyélà	éélà
348. oath	élò	éma	éma	-----
349. obtain, to	úmyémhì	úmyémhì	úmyê	úmyê
350. oil	ávìlì	ávìlì	ávìlì	ávìlì

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
326. mosquito	áúáúà	áúáúà	áúáúà	íwáwà
327. mother	ùwò	ùwò	ìyò	ìpò
328. mount, to	úséémhì	úséémhì	úséémhì	ísélemhì
329. mourn, to	úvyémhì	úvyémhì	úvyémhì	úwévyé
330. mouse	ópè	ófè	ófè	ófè
331. mouth	únò	únò	únò	únù
332. much	úbúmhì	úbúmhì	úbúmhì	íbúmhì
333. mud	-----	òxòrò	òkètè	òwèthè
334. name	éììì	éììì	énììì	énììì
335. narrow, to be	úpeémhì	úfélemhì	úkphéíémhì	íkphéíémhì
336. navel	ùxò	ùxò	ùxò	ùxò
337. near, to be	ùçìnrè	ùçìnrè	ùçìkélé	ìsìkélé
338. neck	ùrwìì	ùrwìì	ùrwìì	éhàlì
339. needle	àgbèdé	àgbèdé	àgbèdé	údìlè
340. net	àgà	àgà	àgà	àgà
341. new	ògbòmhì	ògbòmhì	ògbòmhì	ègbò
342. night	énwá	énwá	énwá	ásù
343. noise	òpò	òfò	òmè	úθulumhì
344. noon	òtà	òtà	òtà	ódáámhì
345. nose	íswè	íswè	íswè	íswè
346. not, it is	òákí	òákí	íxìlò	-----
347. now	óγwá	óγwá	ééìà	énèná
348. oath	ewò	éma	éma	éhò
349. obtain, to	úmyémhì	úmyémhì	úmyémhì	úmyémhì
350. oil	ávìì	ávìì	ávìì	ávìì

	<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
351.	oil (from fried palm)	ùdémhì	ùdémhì	ùdémhì	ùdémhì
352.	okra	úxyàwò	úxyàɔ	úxyàwɔ̂	íxyàwɔ̂
353.	on, on top	úsómhɔ̂	úsómhì	úsómhɔ̂	úsómhɔ̂
354.	opportunity	èrèyè	-----	èfè	èyèyè
355.	orange	àgbòpì	àgbòpì	àpàgwà	ànimò
356.	outside	átò	átò	ódatò	ótafɛ́
357.	owe (debt)	ótà	ótà	ótsà	ósà
358.	paddle (boat), to	úgwámhì	úgwámhì	úgwá	úgwá
359.	paint, to	uralómhì	uraámhì	uralɔ̂	uralɔ̂
360.	palace	úkpɛ́dɔ̂	úkpɛ́dɔ̂	égwálôgyè	égwálôgyè
361.	palm (hand)	étabò	átábò	átalóbò	átalóbò
362.	palm branch	òsàlì	èsà	èsàlì	èsà
363.	palm oil	ávìlì	ávìlì	ávìlì	ávìlì
364.	paper	úmaábè	àkpùkpò	úmaábè	úmaábè
365.	parrot	òxwèdíde	òxwèdíde	òkwèdíde	-----
366.	pass, to	ùnòdɛ́	ùnòdɛ́	ùnòdɛ́	urâ
367.	path	ùgyè	ùgyè	ùgyè	ùgyè
368.	pay. to	úfálémhì	úfaámhì	úfaá	úfalê
369.	peel (by hand), to	úbénómhì	úbénómhì	úbénɔ̂	ubálâ
370.	peel (by knife), to	úbénómhì	úbénómhì	úbénɔ̂	úkpâ
371.	penis	úkpêvè	úkpêvè	úkpêvè	úkpêvè
372.	people	âgyà	âyà	âiyà	êyà
373.	pepper	atsókà	ítsókà	íkpàgbà	ísɛ́
374.	person	ògyà	òyà	òyà	òyà

	<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
351.	oil (from fried palm)	ùdémhì	-----	-----	ùdémhì
352.	okra	úxyà ^v ó	úxyàó	íxyà ^v ó	íxyàwô
353.	on, on top	úsómhî	úsómhî	-----	úsómhîlì
354.	opportunity	èrèyè	èrèyèì	èfèì	èlèyèlì
355.	orange	àgbòpì	àgbòfì	ònwà ^y wà	àgbòfì
356.	outside	átò	átò	ódatò	owáfè
357.	owe (debt)	ótsà	ótsà	ótsà	ósà
358.	paddle (boat), to	úgwámhì	úgwámhì	úgwámhì	úgwámhì
359.	paint, to	úraámhì	úraémhì	úralómhì	ísímhì
360.	palace	ápògyè	ègwá	úkpédî	àkpàdèzè
361.	palm (hand)	étábò	étábò	átàlóbò	étábò
362.	palm branch	òsáì	òsáì	-----	-----
363.	palm oil	ávìì	ávìì	ávìì	ávìì
364.	paper	ébè	óbè	óbè	ébè
365.	parrot	òkwèdíde	òkwèdíde	òkwèdíde	òkwèdíde
366.	pass, to	ùnòdé	ùnòdé	ínòdé	làfà
367.	path	ùgyè	ùyyè	ùyyè	ódòdé
368.	pay, to	úfaémhì	úfaémhì	úfaámhì	úfá émhì
369.	peal (by hand), to	úbáámhì	úbáálámhì	úmháálámhì	úfónómhì
370.	peel (by knife), to	úbénómhì	úbénómhì	úbáálámhì	ìgbháámhì
371.	penis	íkpámévé	úkpevé	úkpevé	úkpevélì
372.	people	âyà	âyàì	âyà	èthà
373.	pepper	íkpagbà	íkpagbà	ítsókà	ásè
374.	person	ôyà	ôyàì	ôyà	ôthà

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
375. picture	àθóθò	àθóθò	àróró	àróró
376. pierce, to	úyáámhì	úwáámhì	úyáá	-----
377. pig	ìǎì	ètsì	èǎì	èsì
378. pit	ìfìlì	èèyè	èyè	ùlòlò
379. plait (hair)	úbámhì	úbámhì	úbâ	úbâ
380. plait (rope)	údomhì	úwáámhì	údô	úyúá
381. plank	útsémhóθà	ótsémhóθà	ótsémhórá	ósámhórá
382. plant, to	úkómhì	úkómhì	ùrèkô	úkô
383. plaster, to	úçímhì	úçímhì	úrálô	úrálô
384. plate	átásà	ùgbágbámhì	átásà	átásà
385. plenty, to be	úbúmhì	úbúmhì	úbû	úbû
386. pluck, to	úkphámhì	úkphámhì	úfánô	úfâ
387. pocket	èkpà	èkpà	-----	èkpà
388. polish, to	únúyámhì	-----	úrálô	únû
389. porcupine	ǎxà	-----	ǎxàì	ǎxàà
390. pot	áxè	áxè	áxè	áxè
391. pound, to	úlumhímhì	úlumhímhì	úlumhî	úlumhî
392. pour, to	úkwôwô	ùdukwô	úkwôô	úkû
393. praise, to	úsélémhì	úséémhì	ùrèkpè	ùrèkpé
394. present, to be	úyô	úyôô	úyô	-----
395. press, to	úrimhì	urínómhì	útôô	-----
396. price, to	úvemhì	úvemhì	uvé	uvé
397. profit	èlèlì	èlèlì	élelé	èlèlè
398. proverb	ità	ità	ità	ità
399. pull, to	útwámámhì	útsímhì	úçî	úwô

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
375. picture	àrórò	àrórò	-----	ádùdúmhì
376. pierce, to	úyánómhì	úwáámhì	úyáámhì	ésóísámhì
377. pig	èçì	èçì	èçì	èsi
378. pit	ókùlò	èèyèì	ùlòlò	ùwòlò
379. plait (hair)	úbámhì	úbámhì	úbámhì	íbámhì
380. plait (rope)	údomhì	úkpémhì	úvámhì	íkpmhì
381. plank	ótsémhórà	ótsémhórà	ótsémhórà	ótsémhóthà
382. plant, to	úkómhì	úkómhì	úkómhì	íkómhì
383. plaster, to	-----	uráémhì	urálómhì	ísímhì
384. plate	átàsà	átàsà	átàsà	ùgbágbámhì
385. plenty, to be	úbúmhì	úbúmhì	úbúmhì	úbúmhì
386. pluck, to	úkphámhì	úkónómhì	úkphámhì	ífámhì
387. pocket	èkpà	èkpà	èkpà	èkpà
388. polish, to	únómhì	únómhì	únúmhì	-----
389. porcupine	óxàì	-----	óxàì	óxàlì
390. pot	áxè	áxè	áxè	áxè
391. pound, to	úlumhímhì	úlumhímhì	úlumhímhì	ínúmémhì
392. pour, to	úkwòò	úkwòò	úkwòò	ìkèéwò
393. praise, to	úséémhì	úséléémhì	ùrèkpé	ìθèkpé
394. present, to be	ùyòò	ùyò	ùyòò	ósìwò
395. press, to	úpéémhì	ùdèpé	urímhì	ìdèpólì
396. price, to	úvémhì	úvémhì	úvémhì	úvémhì
397. profit	éle	èlèì	èlèlè	èlèlì
398. proverb	ità	ità	ità	ità
399. pull, to	úçímhì	úçímhì	úyómhì	ísímhì

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
400. push, to	úkpróyómhì	útɔ́ɔ́mhì	útɔ́ɔ́	útɔ́ɔ́
401. quiver, to	úbɔ́mhímhì	úbɔ́mhímhì	-----	úbɔ́mhì
402. question	ɔ̀gbɔ̀	ɔ̀gbɔ̀	ɔ̀gbɔ̀	ɔ̀gbɔ̀
403. quench, to	ùpùnòá	ùpùnòyá	ùfùnòá	ùfùnò
404. rabbit	évyɔ̀	évyɔ̀	évyɔ̀	évyɔ̀
405. rainy season	éθwámÉ	éθwámÉ	érwámÉ	érwámÉ
406. ram	òkê	òké	òkê	òké
407. rat	ópè	ópè	ófè	ófè
408. raw	ɔ̀gbɔ̀mhì	ɔ̀gbɔ̀mhì	ɔ̀gbɔ̀mhì	ɔ̀gbɔ̀mhì
409. read, to	údzémhì	údzémhì	údzÉ	úzÉ
410. receive, to	úmyémhì	úmyémhì	úmyÉ	úmyÉ
411. red, to be	úlúémhì	úlúémhì	úlúÉ	úlúÉ
412. remember, to	ùyeré	ùyeré	ùyelèrÉ	ùyèyèrÉ
413. repair, to	úsésémhì	úsésémhì	úsésÉ	úsésÉ
414. reply, to	úwápémhì	úwápémhì	úwayÉ	úyáyÉ
415. resemble, to	uxɔ́mhì	uxɔ́mhì	uxɔ́	uxɔ́
416. rest, to	ùmwéyá	ùwétó	ùfúmyá	ùfúmyá
417. rice	àgbàfèlè	ìtsìkàpà	ìçìkàfà	ìsìkàfà
418. riches	èpwè	èpwè	èfwè	èfè
419. right hand	óbèθà	óbèθà	óberà	óberà
420. riot	òxɔ̀lì	òxɔ̀ɔ̀	òxɔ̀ɔ̀	òxɔ̀ɔ̀
421. ripe, to be	úlúémhì	úlúémhì	úlúÉ	-----
422. river	édà	édà	édà	édà
423. road	ùgyè	ùgyè	ùgyè	ùgyè
424. roast, to	útɔ́mhì	útɔ́mhì	útɔ́	-----

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
400. push, to	úṭṭómhì	úṭṭómhì	úṭṭómhì	-----
401. quiver, to	úgwómhì	-----	úbómhímhì	ígwómhì
402. question	ògbò	ògbò	ògbò	-----
403. quench, to	úpúnómhì	ùfùnòá	ùfùnòyá	ìfùnòá
404. rabbit	évyò	évyò	évyò	éluò
405. rainy season	érwámé	érwámé	érwámé	eθwámé
406. ram	òké	òké	-----	-----
407. rat	ópè	ófè	ófè	ófè
408. raw	ògbòmhì	ògbòmhì	ògbòmhì	ògbò
409. read, to	úneémhì	údzémhì	údzémhì	ínémhì
410. receive, to	úmyémhì	úmyémhì	úmyémhì	ímyémhì
411. red, to be	úlúémhì	úlúémhì	úlúémhì	úwalemhì
412. remember, to	ùyèré	ùyèré	ùyèlèré	ìyèrèzé
413. repair, to	úsesémhì	úsesémhì	úsesémhì	ísésè
414. reply, to	úwayémhì	úwayémhì	úwayémhì	únwápémhì
415. resemble, to	úxómhì	úxómhì	úxómhì	ìxòxómhì
416. rest, to	ùfòmhiyá	ìsòmhiyá	ùfòmhiyá	ìhàšèkwá
417. rice	ìtsìkàpà	ìtsìkàfwà	ìçìkàpà	òsìkàpà
418. riches	èpwè	èfwè	èfwè	èfè
419. right hand	óberà	óberà	óberà	obeθà
420. riot	óxòì	óxòì	óxòò	óxòìì
421. ripe, to be	úlúémhì	úlúémhì	úlúémhì	ínúémhì
422. river	éda	éda	éda	édò
423. road	úgyè	úgyè	úgyè	ódódè
424. roast, to	útómhì	-----	ùrètò	ítómhì

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
425. roll, to	úyǵémhì	úyǵémhì	úyǵé1É	úgyé1É
426. rope	úli	úli	úli	úli
427. rotten, to be	úyǵǵómhì	úyǵǵómhì	úyǵǵǵ	úlálá
428. rub, to	úrálómhì	únúmhì	úrálǵ	úrálǵ
429. run, to	únámhì	únámhì	únâ	únâ
430. salt	úmhele	umheè	úmheè	úmheè
431. salute, to	úθwémhì	úθwémhì	úrwe	úrwe
432. sand	èkè	èkè	èkè	èkè
433. scorpion	ákpì	ákpì	ákpì	ákpì
434. scratch, to	útónómhì	útónómhì	útónǵ	útónǵ
435. sea	òkú	òkú	òkú	òkú
436. see, to	únyémhì	únyémhì	únyé	únyé
437. sell, to	ùθédé	-----	ùrédé	ùrédé
438. senior	ǵǵǵ	ǵǵǵ	òdíǵ	òkpišâ
439. separate, to	ùvayâ	ùvayá	ùvayâ	ùvayá
440. set (trap), to	úkphámhì	úkphámhì	-----	-----
441. sew, to	útomhì	útomhì	útsô	úsé
442. shadow	àθóθò	àθóθò	àrórò	àrórò
443. shake, to	ùrèǵǵ	ùrèǵémhì	úyéyé	úvyégè
444. shame	èxǵli	èxǵǵ	èxǵ	èxǵ
445. share, to	úkémhì	úkémhì	úké	úké
446. sharp, to be	úmwámhì	únwámhì	únwâ	údǵ
447. sheep	ómali	omaà	ómali	ómali
448. shine, to	úluámhì	úluámhì	úluà	úluà
449. shirt	òtógbò	òtógbò	àwulú	àwulú

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
425. roll, to	úgyéémhì	úgyéémhì	úgyéémhì	ígghénómhì
426. rope	úlì	úlì	úlì	úlì
427. rotten, to be	úkénámhì	úkénámhì	úyóyómhì	ípóyómhì
428. rub, to	únómhì	úraémhì	únúmhì	ísímhì
429. run, to	únámhì	únámhì	únámhì	ínómhì
430. salt	úmhèè	úmhèè	úmhèè	umhèlì
431. salute, to	úr _o wémhì	úr _o wémhì	úr _o wémhì	íθwémhì
432. sand	ékè	ékè	ékè	èkè
433. scorpion	ákpì	ákpì	ákpì	ákpì
434. cratch, to	útónómhì	útónómhì	útónómhì	ítónómhì
435. sea	òkú	òkú	òkú	òkú
436. see, to	úmyémhì	úmyémhì	úmyémhì	ímyémhì
437. sell, to	úr _o édé	úr _o édé	úr _o édé	íθédé
438. senior	ódíó	ódíó	údíómhì	ídíómhì
439. separate, to	únwèkpá	úvalá	úvayá	ívaa
440. set (trap), to	úkphámhì	úkphámhì	úkphámhì	-----
441. sew, to	útsómhì	útsómhì	útsémhì	íyáámhì
442. shadow	àr _o r _o	àr _o r _o	àr _o r _o	ádudúmhì
443. shake, to	úyeyémhì	úyeyémhì	úyeyémhì	ízégémhì
444. shame	èxò	ómhámhà	èxò	èxòlì
445. share, to	úkémhì	úkémhì	úkémhì	íkémhì
446. sharp, to be	únwámhì	únwámhì	úxaámhì	únwúmhì
447. sheep	ómáì	ómáì	ómáì	óhwà
448. shine, to	úgémhì	úluámhì	úluámhì	ífwámhì
449. shirt	òtógbò	àwulú	àwulú	àfè

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
450. shoe	ófyà	ófyà	éfyà	éfyà
451. short, to be	úšémhì	úšémhì	úšĕ	-----
452. shoot, to	úpímhì	úpímhì	úfî	úfî
453. show, to	ùθémýĕ	ùθémýĕ	ùrémýĕ	ùrémhá
454. sick, to be	úγwámhì	úγwámhì	úγwâ	úγwâ
455. side	èpĕ	èpĕ	èfĕ	égbégbó
456. sit	ùdètô	ùγγètó	ùγγètô	ùγγètó
457. skin	ófyégbè	ófyégbè	ófyégbè	ófyégbè
458. sky	òxwìlì	-----	òxwìlì	òxwìlì
459. slave	òγùmhà	òγùmhà	òγùmhà	òγùmhà
460. sleep, to	úγwémhì	úγwémhì	úγwĕ	úγwĕ
461. small, to be	úšémhì	úšémhì	úšĕ	-----
462. smell, to	úγwáámhì	úwáámhì	úyáâ	-----
463. smoke, to	účímhì	účímhì	účí	úsî
464. snail	úθĕlè	úduǵbì	úrĕ	úrĕ
465. snake	épnĕ	épnĕ	épnĕ	épnĕ
466. soap	ótà	ótà	ótsà	ósà
467. soil	òtò	òtò	òtò	òtò
468. sore	émàlì	émàà	émài	émài
469. soup	òòmhì	òòmhì	òòmhì	òòmhì
470. sour, to be	úxéxémhì	úxéxémhì	úxéxĕ	údagyĕ
471. stand, to	ùmwùdzá	ùmwùdzá	ùmìdzá	ùmìjá
472. steal, to	útwémhì	útwémhì	útwĕ	-----
473. stir, to	údenémhì	údonómhì	údonô	úkyĕ
474. stomach	òkpàkô	òkpàkó	ùxíxî	ùkpàkó

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
450. shoe	éfyà	éfyà	ófyà	ófyà
451. short, to be	úšémhì	úšémhì	úšémhì	íšémhì
452. shoot, to	úpímhì	úfímhì	útsámhì	ífímhì
453. show, to	ùrémýé	ùrémýé	ùrémýé	ìθémhá
454. sick, to be	úgwámhì	úgwámhì	úγwámhì	éxumhì
455. side	èpè	èfè	ósèbà	èfè
456. sit	ùgyètó	ùdètó	-----	ìlòtó
457. skin	ófyégbè	ófyégbè	-----	ófyégbè
458. sky	òxwìì	òxwìì	òxwìlì	òxwìlì
459. slave	òγùmhá	òγùmhá	-----	ùγùmhá
460. sleep, to	úgwémhì	úgwémhì	-----	-----
461. small, to be	úšémhì	úšémhì	-----	íšémhì
462. smell, to	úwáámhì	úwáámhì	-----	íyámhì
463. smoke, to	účímhì	účímhì	-----	ísímhì
464. snail	úrě	úrě	úrě	úθèì
465. snake	épnè	épnè	épnè	épnè
466. soap	ótsà	ótsà	ótsà	ósà
467. soil	òtò	òtò	òtò	òtò
468. sore	émàì	émàì	-----	émhàlì
469. soup	òòmhì	òòmhì	òòmhì	òsámhì
470. sour, to be	úxéxémhì	úxéxémhì	-----	íkékémhì
471. stand, to	ùmùdzá	ùmùdzá	-----	ùmùzâ
472. steal, to	útwémhì	útwémhì	-----	ólídómhì
473. stir, to	údonómhì	údonómhì	-----	ídénómhì
474. stomach	ùkpàkó	ùkpàkó	-----	òkpàkó

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
475. stone	údo	údo	údo	údo
476. story	óxali	óxàà	óxài	óxài
477. straight, to be	údzámhì	údzámhì	údzâ	úyémhî
478. stranger	órèrè	òrèrè	órèrè	òrèrè
479. stretch, to	ùnìnoà	ùnìnoá	ùnìnoà	ùnìno
480. strong, to be	útótómhì	útótómhì	útótô	útótô
481. suffer	ècè	ècè	ècè	èscè
482. sun	élè	élè	élè	élè
483. surpass, to	ùnègbè	únémhì	únè	únè
484. swamp	òxòò	-----	òxòrò	òxòrò
485. sweep, to	úfómhímhì	úfómhímhì	úfómhî	úbyálî
486. sweet, to be	úmhelémhì	úmhiímhì	úmhiî	úlélé
487. swell, to	úfwémhì	úfwémhì	úfúmhî	úfúmhî
488. swim, to	úgwédâ	úgwámhì	úgwâ	úgwè
489. sword	àtākòbî	àtākòbî	ìtākòbî	ìtākòbî
490. take, to	úθwémhì	úθwémhì	úrwe	úryè
491. teach, to	úmwénámhì	úwénámhì	úwénâ	úwénâ
492. tell, to	úgwèrè	úgwèré	úgwèrè	útámhè
493. termite	ádo	ádo	ódo	-----
494. that	ólì	òì	ólâ	ólâ
495. thief	òyàtî	òyàtî	òyàtî	òdoyí
496. thing	émànà	émànà	émínâ	élimhì
497. think, to	úgbhálemhì	úgbháámhì	úgbhálâ	-----
498. this	ònà	ònà	ònà	ònà
499. thorn	úgbà	-----	úgbà	úgbà

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
475. stone	údo	údo	údo	údo
476. story	óxàì	óxà	óxà	óxà
477. straight, to be	údzámhì	údzámhì	-----	údyámhì
478. stranger	órére	órére	-----	óze
479. stretch, to	únínómhì	únínómhì	-----	ínínómhì
480. strong, to be	útótómhì	útótómhì	-----	ítótómhì
481. suffer	éçé	éçé	-----	ééçó
482. sun	éìé	éìé	éìé	òhèlì
483. surpass, to	únémhì	únémhì	-----	ínémhì
484. swamp	-----	òxòrò	-----	òxòòò
485. sweep, to	úfómhímhì	úfómhímhì	-----	íghbénómhì
486. sweet, to be	úmhímhì	úlélémhì	úlélémhì	ínénémhì
487. swell, to	úfúmhímhì	úfúmhímhì	-----	ífúmémhì
488. swim, to	úgwámhì	úgwéda	-----	úgwámhì
489. sword	àtakòbí	àtakòbí	-----	ìtakòbí
490. take, to	úrémhì	úrémhì	-----	ímyémhì
491. teach, to	úwénámhì	úwénámhì	-----	úwénámhì
492. tell, to	ùgwèré	ùgwèré	-----	ìguzé
493. termite	ídò	ídò	ádò	ídòdò
494. that	óli	óli	ólí	ònhí
495. thief	ògyató	ògyatò	ògyató	ólì
496. thing	émínà	ógwè	émímá	émhìlì
497. think, to	úgbháámhì	úgbháémhì	-----	ígbhálémhì
498. this	òná	òná	òná	òná
499. thorn	úgbà	úgbà	-----	ìgbò

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
500. throw, to	úpímhì	úpímhì	úfí	úfí
501. thunder	ávôxwìlì	ávà	ávà	ávà
502. tiger	èkpè	èkpè	èkpè	èkpè
503. time	èrèyè	èrèyè	èyèyè	èyèyè
504. today	êlè	êlè	êlè	êlè
505. tomorrow	áxwè	áxwè	áxwè	áxwè
506. tongue	ólémhì	ólémhì	ólémhì	ólémhì
507. tooth	èkòlì	èkò	èkò	úyékò
508. tortoise	éyì	éyì	éyì	éyì
509. touch, to	ùθéçí	ùθéçí	ùrèçí	ùrèçí
510. town	èwòlì	èwòò	èwòò	èwòò
511. trap	úpì	úpì	úfì	úfì
512. tree	óθà	óθà	óra	óra
513. urinate, to	úpenámhì	úpenámhì	ùfènáò	ùfèná
514. urine	áfyè	áfyè	áfyè	áfyè
515. vehicle	ókò	ókò	ókò	ókò
516. vein	úlià	úlià	úlià	úlià
517. vomit, to	úkpámhì	úkpámhì	úkpâ	úkpâ
518. vulture	úywìlì	úywi	úywìlì	úywìlì
519. wait for, to	úxéémhì	-----	úxéé	úxéé
520. walk, to	úxyámhì	úxyámhì	úxyâ	úxyâ
521. wall	òbè	òbè	òbè	òbèké
522. war	óxòlì	óxòò	óxòlì	óxòò
523. water	àmè	àmè	àmè	àmè
524. wealth	èpwè	èpwè	èfwè	úfè

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
500. throw, to	úpímhì	úfímhì	-----	úfímhì
501. thunder	ávà	ávà	-----	ávà
502. tiger	èkpè	èkpè	èkpè	èkpè
503. time	èrèyè	èrèyèì	-----	èlèyèlì
504. today	êlé	êlé	-----	éìè
505. tomorrow	áxwè	áxwè	áxwè	áxò
506. tongue	ólémhì	ólémhì	ólémhì	ónémhì
507. tooth	èkòì	èkòì	-----	àkò
508. tortoise	éyì	éyì	éyì	éhù
509. touch, to	-----	ùrècí	-----	ìθèsí
510. town	édè	éwòò	éwòò	éwòlì
511. trap	úpì	úfì	-----	úfì
512. tree	óra	óra	óra	óθà
513. urinate, to	úpénámhì	úfénámhì	-----	-----
514. urine	áfyè	áfyè	áfyè	ífamhè
515. vehicle	ókò	ókò	-----	ókò
516. vein	úlià	úlià	úlià	ínìò
517. vomit, to	úkpánómhì	úkpámhì	úkpámhì	íkúpámhì
518. vulture	úgwí	úgwí	-----	úgwílì
519. wait for, to	úxéémhì	úxéémhì	-----	íkéémhì
520. walk, to	úxyámhì	úxyámhì	-----	íxyámhì
521. wall	òdí	òdí	-----	òbè
522. war	óxòì	óxòì	-----	óxòì
523. water	àmè	àmè	àmè	àmè
524. wealth	èpwè	èfwè	-----	èfè

<u>English</u>	<u>Ekpheli</u>	<u>Weppa-Wano</u>	<u>Auchi</u>	<u>Aviele</u>
525. weave, to	údomhì	údomhì	údô	údô
526. wet, to be	úpómhì	-----	úfô	-----
527. wide, to be	úwémhì	úlémhímhì	úwê	úwê
528. wife	ìsómhì	ámhì	ámhì	ámhì
529. wind	áfófò	áfófò	éfófò	áfófò
530. wine	ápò	ápò	ápò	ápò
531. wing	ífa	ífa	ífwà	ífwà
532. wish, to	úkélémhì	úkéémhì	-----	úkélê
533. woman	òkpòtsò	òkpòtsò	òkpòtsò	òkphòsò
534. word	émhòlì	émhòò	émhòò	émhòò
535. work	àkàrà	àkàrà	àkàrà	òkpòkpò
536. world	àgbò	àgbò	àgbò	àgbò
537. worm	òxòlì	òxòò	òxòò	òxòò
538. worship, to	úgámhì	úgámhì	úgâ	úgâ
539. write, to	úkékémhì	úkékémhì	úkékê	úkékê
540. yam	émì	émhì	élumhì	émhà
541. year	úkpè	úkpè	úkpè	úkpè
542. yesterday	énòdè	énòdè	énénòdè	énòdè

<u>English</u>	<u>Avianwu</u>	<u>Uzairue</u>	<u>S. Ibie</u>	<u>S. Uneme</u>
525. weave, to	údomhì	údomhì	-----	ídómhì
526. wet, to be	úpómhì	úfómhì	-----	ífómhì
527. wide, to be	úwémhì	úwémhì	-----	ínémhímhì
528. wife	úámhì	ìsómhì	-----	ìsómhì
529. wind	áfófo	áfófo	éfófo	áfefè
530. wine	ápò	ápò	ápò	ápò
531. wing	ífwà	ífwà	-----	ábìfò
532. wish, to	úkéémhì	úkéémhì	-----	ífolómhì
533. woman	òkpòtsò	òkpòtsò	-----	òkphòsò
534. word	-----	émhòò	-----	émhòlì
535. work	àkàrà	àkàrà	-----	àkàrà
536. world	àgbò	àgbò	àgbò	àgbò
537. worm	òxòlì	-----	-----	òxòlì
538. worship, to	ùgbègá	úgámhì	-----	-----
539. write, to	úkékémhì	úkékémhì	-----	íkékémhì
540. yam	émhì	èmi	élumhì	òuyà
541. year	úkpè	úkpè	úkpè	úkpè
542. yesterday	énòdè	énénòdè	énòdè	énòdè

Bibliography

- Anderson, Stephen R. (1974) *The Organization of Phonology* New York: Academic Press.
- Anderson, Stephen R. (1976) 'On the description of multiply-articulated consonants' *Journal of Phonetics* 4:17-27.
- Aoki, Paul K. (1974) 'An observation of vowel contraction in Xhosa' *Studies in African Linguistics* 5.2:223-243.
- Brame, Michael K. (1974) 'The cycle in phonology: stress in Palestinian, Maltese, and Spanish' *Linguistic Inquiry* 5.1:39-61.
- Cheng, C. C. (1968) 'Mandarin phonology' Ph.D. Dissertation, University of Illinois, Urbana, Illinois.
- Chomsky, Noam and Morris Halle (1965) 'Some controversial questions in phonological theory' *Journal of Linguistics* 1.2:97-138.
- Chomsky, Noam and Morris Halle (1968) *The Sound Pattern of English*. New York: Harper and Row.
- Courtenay, Karen (1968) 'A generative phonology of Yoruba' Ph.D. Dissertation, University of California, Los Angeles.
- Dwyer, David (1971) 'Mende tone' *Studies in African Linguistics* 2:117-130.
- Elimelech, Baruch (1974a) 'Tone alternations in the Etsaq̄ verb' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Elimelech, Baruch (1974b) 'On the reality of underlying contour tones' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Elugbe, B. (1973) 'Comparative Edo phonology' Ph.D. Dissertation, University of Ibadan, Ibadan, Nigeria.
- Elugbe, B. and J. M. Hombert (1975) 'Nasals in Ghotuo: /Lenis/ or [Short]?' In Charles A. Ferguson, Larry M. Hyman, and John J. Ohala (eds.) *Proceedings of the NASALFEST* 167-175.
- Fivaz, Derek (1969) 'Shona morphophonemics and morphosyntax' Ph.D. Dissertation, University of the Witwatersrand, Johannesburg.
- Fresco, Edward M. (1970) 'Topics in Yoruba dialect phonology' *Studies in African Linguistics* Supplement 1.
- Fromkin, Victoria (1972) 'Tone features and tone rules' *Studies in African Linguistics* U.C.L.A.

- Fromkin, Victoria (1974) 'On the phonological representation of tone' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Gandour, Jack (1974a) 'Consonant types and tone in Siamese' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Gandour, Jack (1974b) 'On the representation of tone in Siamese' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- George, Isaac (1970) 'Nupe tonology' *Studies in African Linguistics* 1:100-122.
- Goldsmith, John (1974) 'An Autosegmental typology of tone: and how Japanese fits in' *Proceedings of the Fifth Annual Meeting of North Eastern Linguistic Society* Harvard University.
- Greenberg, Joseph (1963) *The Languages of Africa* Bloomington: Indiana University Press.
- Hombert, Jean-Marie. (1974) 'Universals of downdrift: their phonetic basis and significance for a theory of tone' In Leben, W., (ed) *Proceedings of the Fifth Annual Conference on African Linguistics, Studies in African Linguistics, Supplement* 5:169-183.
- Hooper, Joan (1972) 'The syllable in generative phonology' *Language* 48.
- Hooper, Joan B. (1973) 'Aspects of natural generative phonology' Ph.D. Dissertation, University of California, Los Angeles.
- Hyman, Larry M. (1970a) 'The role of borrowing in the justification of phonological grammars' *Studies in African Linguistics* 1:1-48.
- Hyman, Larry M. (1970b) 'How concrete is phonology?' *Language* 46:1:58-76.
- Hyman, Larry M. (1972a) 'Nasals and nasalization in Kwa' *Studies in African Linguistics* 3:167-205.
- Hyman, Larry M. (1972b) 'A phonological study of Fe?fe?- Bamileke' *Studies in African Linguistics Supplement* 4.
- Hyman, Larry M. (1973a) 'The role of consonant types in natural tonal assimilations' In Hyman, 1973b, 151-179.
- Hyman, Larry M. (ed) (1973b) *Consonant Types and Tone* Southern California Occasional Papers in Linguistics No. 1. University of Southern California, Los Angeles.
- Hyman, Larry M. (1974) 'The great Igbo tone shift' In Voeltz, Erhard (ed) *Proceedings of the Third Annual Conference on African Linguistics, 1972*. Bloomington: Indiana University Press.

- Hyman, Larry M. (1975) *Phonology: Theory and Analysis* San Francisco: Holt, Rinehart and Winston.
- Hyman, Larry M. and Daniel J. Magaji (1970) *Essentials of Gwari Grammar* Ibadan: Ibadan University Press. Occasional Publication No. 27 of the Institute of African Studies.
- Hyman, Larry M., and Russell G. Schuh. (1974) 'Universals of tone rules: evidence from West Africa' *Linguistic Inquiry* 5:81-115.
- Ladefoged, Peter (1964) *A Phonetic Study of West African Languages* West African Language Monographs No. 1. Cambridge: Cambridge University Press.
- Ladefoged, Peter (1971a) *Preliminaries to Linguistic Phonetics* Chicago: University of Chicago Press.
- Ladefoged, Peter (1971b) 'Phonological features and their phonetic correlates' *Working Papers in Phonetics* 21:3-12, University of California, Los Angeles.
- La Velle, Carl (1974) 'An experimental study of Yoruba tones' In Leben, W. (ed), *Proceedings of the Fifth Annual Conference of African Linguistics, Studies in African Linguistics*, Supplement 5:185-194.
- Laver, John (1967) 'A preliminary phonology of the Ayele dialect of Esako' *The Journal of West African Languages* 4.2:53-57.
- Laver, J.D.M. (1969) 'Etsako: Aywele dialect' In Dunstan, Elizabeth (ed) *Twelve Nigerian Languages* 47-57. London England: Longmans, Green and Co. LTD.
- Leben, William R. (1971a) 'The morphophonemics of tone in Hausa' In Chin-Wu Kim and Herbert Stahlke (eds) *Papers in African Linguistics* 201-218. Edmonton, Alberta: Linguistic Research, Inc.
- Leben, William R. (1971b) 'Suprasegmental and segmental representation of tone' *Studies in African Linguistics* Supplement 2:183-200.
- Leben, William R. (1973a) 'The role of tone in segmental phonology' In Hyman, 1973b, 115-149.
- Leben, William R. (1973b) 'Suprasegmental phonology' Ph.D. Dissertation M.I.T.
- Lehiste, Ilse (1970) *Suprasegmentals* Cambridge, Mass.: M.I.T. Press.
- Maddieson, Ian (1970) 'The inventory of features' In Maddieson, Ian (ed) *Tone in Generative Phonology* Research Notes 3.2 and 3.3, Department of Linguistics and Nigerian Languages, University of Ibadan, Ibadan, Nigeria, 3-21.

- Maddieson, Ian (1974a) 'A note on tone and consonants' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Maddieson, Ian (1974b) 'A possible new cause of tone-splitting -- evidence from Cama, Yoruba and other languages' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- McCawley, James D. (1970) 'A note on tone in Tiv' *Studies in African Linguistics* 1.2:123-131.
- Meyers, Laura (1974) 'Tone patterns in Hausa: a re-analysis of Hausa downdrift' *Working Papers in Phonetics* 27, University of California, Los Angeles.
- Peters, Ann M. (1973) 'A new formalization of downdrift' *Studies in African Linguistics* 4.2:139-154.
- Pike, K. L. (1948) *Tone Languages* Ann Arbor: University of Michigan Press.
- Pratt, Mary (1972) 'Tone in some Kikuyu verb forms' *Studies in African Linguistics* 3:325-378.
- Schachter, Paul (1969) 'Natural assimilation rules in Akan' *International Journal of American Linguistics* 35.4:342-355.
- Schachter, Paul and Victoria Fromkin (1968) 'A phonology of Akan: Akuapem, Asante and Fante' *Working Papers in Phonetics* 9, University of California, Los Angeles.
- Schadenberg, Thilo C. (1973) 'Kinga: a restricted tone language' *Studies in African Linguistics* 4:23-48.
- Silverstein, R. (1973) 'Igala historical phonology' Ph.D. Dissertation University of California, Los Angeles.
- Stahlke, Herbert (1971a) 'Topics in Ewe phonology' Ph.D. Dissertation, University of California, Los Angeles.
- Stahlke, Herbert (1971b) 'The noun prefix in Ewe' In *Papers from the Second Conference on African Linguistics*, U.C.L.A. Supplement 2 to *Studies in African Linguistics* 141-159.
- Stahlke, Herbert F.W. (1976) 'Segment sequences and segmental fusion; *Studies in African Linguistics* U.C.L.A.
- Stanley, Ricahrd (1967) 'Redundancy rules in phonology' *Language* 43.2: 393-436.
- Stevenson, K. J. V. (1974) 'Comparative word lists from Etsako Division of the Mid-western State of Nigeria' *Research bulletin of Ife African Studies*, University of Ife, Ife, Nigeria 1.1:44-53.
- Strub, E. P. (1915) 'Essai d'une grammaire de la langue Kukuruku (Nigeria, Afrique Occidentale)' *Anthropos* 10-11, 450-465, 888-907.

- Tadadjeu, Maurice (1974) 'Floating tones, shifting rules, and downstep in Dschang-Bamileke' In Leben, W. (ed) *Proceedings of the Fifth Annual Conference on African Linguistics, Studies in African Linguistics*, Supplement 5:283-290.
- Thomas, Northcote W. (1910) *Edo-speaking People of Nigeria* London: Harrison and sons. Reprinted in 1969, Negro Universities Press, New York.
- Thomas, N.W. (1917) 'Notes on Kukuruku' *Man* 17 No. 32.
- Vennemann, Theo (1972) 'On the theory of syllabic phonology' *Linguistische Berichte* 18:1-18.
- Vennemann, Theo and Peter Ladefoged (1971) 'Phonetic features and phonological features' *Working Papers in PHonetics* 21:13-24, University of California, Los Angeles.
- Voorhoere, Jan (1971) 'Tonology of the Bamileke noun' *Journal of African Languages* 10:44-53.
- Voorhoere, Jan (1973) 'Safwa as a restricted tone system' *Studies in African Linguistics* 4:1-22.
- Voorhoere, Jan, A.E. Meeussen, and Kees de Blois (1969) 'New proposals for the description of tone sequences in the Igbo completive phrase' *Journal of West African Languages* 6:79-84.
- Wang, W.S-Y. (1967) 'The phonological features of tone' *International Journal of American Linguistics* 33.2:93-105.
- Warnier, Jacqueline, and Jan Voorhoeve (1975) 'Vowel contraction and vowel reduction in Mankon' *Studies in African Linguistics* 6.2:125-151.
- Welmers, W. E. (1962) 'The phonology of Kpelle' *Journal of African Languages* 1:69-93.
- Welmers, William E. (1963) 'Associative 'a' and 'ka' in Niger-Congo' *Language* 39.3:432-447.
- Welmers, William E. (1969) 'Structural notes on Urhobo' *J.W.A.L.* VI 2: 85-107.
- Welmers, William E. (1970) 'Igbo tonology' *Studies in African Linguistics* 1:255-278.
- Welmers, W. E. (1973) *African Language Structures* University of California Press, Berkeley.
- Williamson, Kay (1970) 'Downdrift/downstep' In Maddieson, Ian (ed) *Tone in Generative Phonology* Research Notes (University of Ibadan) 3.2-3:22-33.

- Williamson, Kay (1971) 'The Benue-Congo languages and Ijo' In Sebeok, Thomas A. (ed) *Current Trends in Linguistics* Vol. VII. The Hague: Mouton. 245-306.
- Woo, N. H. (1969) 'Prosody and phonology' Ph.D. Dissertation, M.I.T. Available from Indiana University Linguistics Club.
- Woo, N. H. (1970) 'Tone in Northern Tepehuan' *International Journal of American Linguistics* 36:18-30.