ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE PHONOLOGY OF GIRIRRA

BY

ABDURAHIM ADEM

ADDIS ABABA
JUNE 1993

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A Thesis
Presented to
The School of Graduate Studies
Addis Ababa University

In Partial Fulfillment of
the Requirement for the
Degree Master of Arts in
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Table of Contents

ABSTRACT

Girirra is a language assumed to belong to the Cushitic language family, particularly to the Lowland East Cushitic sub-group. It is a newly "discovered" language and as far as the writer knows, this is the first attempt to describe it.

The main purpose of this study is to examine the sound system of this language.

In the study, twelve distinctive features are assumed to characterize all the sound segments of the language. The thesis has identified a total of 24 sound segments. Length in each segment is considered to be distinctive.

The segments are represented in terms of feature-hierarchy (or feature geometry). This means that individual features are organized hierarchically under superordinate autosegmental nodes known as class nodes. The class nodes are themselves dominated by yet a higher level class node which is referred to as the root node. This in turn is linked to the skeletal tier. This model is assumed to provide the motivation for the assimilatory processes in Girirra which includes, labialization, nasalization, place and voice assimilation, and glottalization.

The syllable structure of Girirra is also examined within the non-linear approach of phonology. The syllable structure provides an adequate explanation for certain phonological processes such as insertion, deletion and gemination. Thus, we insert a syllable in a word to break an unwanted cluster and delete a syllable to maintain the wellformedness condition of a word. Consonant or vowel lengthening (geminate) is also another phonological process that could be expressed with the help of syllable structure.

The writer hopes that the study is significant in providing a preliminary analysis of the language, undescribed up to now and in testing some of the assumptions of phonological theories proposed on the basis of other languages.

ACKNOWLEDGMENT

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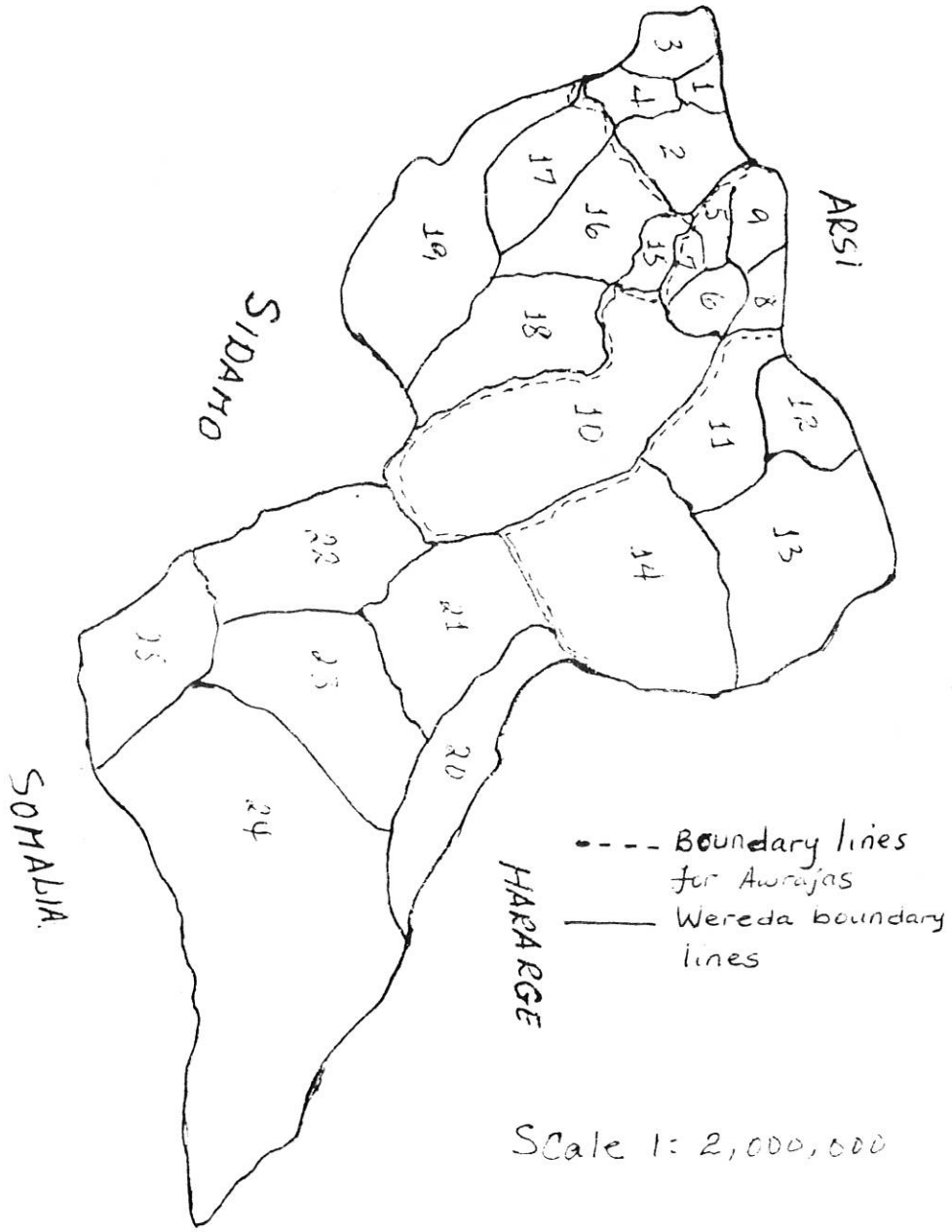
Last but not least, I convey my gratitude to W/t Mittin Beyene, a secretary, whose endurance has won my admiration.

List of tables, charts and map

MAP OF BALE ADMINSTRATIVE REGION

MAP-1



Taken from map prepared by Ethiopian Mapping Authority, [illegible]

Key to the map

WEREDAS

1. DODOLA
2. ADABBA
3. KOKKOSSA
4. NANSABO
5. DINSHO
6. SINANA
7. GOBBA
8. GASARA
9. AGARFA
10. GORO
11. GINNIR
12. GOLOLCHA
13. LABA HIDHA
14. RAYITU
15. BARBARRE
16. MANNA
17. ARANNA BULIK'
18. GURRA DHAMOLE
19. MADDA WALABU
20. WABESHABALE
21. SARAR
22. WAYIB
23. AFK'ER
24. BARRE

AWRAJAS

FROM 1 _____ 4 GANNALE
" 5 _____ 10 FASIL
" 11 _____ 14 WABE
" 15 _____ 19 DALLO
" 20 _____ 25 ELKARRE

NEIGHBOURING LANGUAGES OF GIRIRRA

LANGUAGE	No.
OROMO	10, & 14, 22 and 20
Somali	14, 22 and 23

Definition of diacritic marks and Symbols

Diacritic marks

k'	glottalized velar consonant
š	palatal, fricative consonant
n̥	" nasal "
ŋ	velarized n before velar segments
ɱ	labialized n " labial segments
β	fricativized b
C^w	raised w on consonant shows labialization.
ɗ	implosive consonant
C	consonant (or coda in syll.)
V	vowel (or nucleus in syll.)
~	on top of vowel, nasalization
C:	long (or geminate) consonant
V:	" " vowel
→	becomes or rewritten as
/	(slash) Phonological environment
___	the position of a sound in the environment
+	morpheme boundary
#	word boundary
σ	Greek sigma symbolizes syllable
∅	deletion
*	to show illformedness
/ /	slashes enclose phonemic representation
[ ]	square brackets enclose phonetic "
{ }	curly brackets enclose morpheme
- - -	to show relinking
# or =#-	to show delinking
C_c	to show devoiced consonant

English glosses

ant	anterior
cor	coronal
cont	continuant
gl	glottal
nas	nasal
obs	obstruent
son	sonorant
voc	vocoid
syll	syllable
pl	plural
im	imperative

CHAPTER ONE

1. Introduction

Girirra is assumed to belong to the Cushitic language family. Characteristically, it may be grouped under the Lowland East Cushitic sub-family along with languages like Oromo , Somali, Afar, and Saho.[1]

Girirra is spoken by people who call themselves Garirro, and they call their language ' af Garirro ' (which means the Girirra language). Out siders usually refer to this language as Girirra.

There is no statistics indicating the number of mother-tongue-speakers of Girirra, and according to informants (Abdi Muhammed, Ahmed Muhammed, and Sazid Abdulnasir) the estimate is 100,000 to 130,000.

The Girirra speaking people reside scattered in several Awrajas of Bale administrative region. The largest group of Girirra speaking people live in Elkerre Awraja at Sarar district.

Despite the linguistic heterogeneity in Elkerre Awraja, the Girirras living in sarar district retained their language. The sarar district is surrounded by somali speakers in the east and in the south east, and by Oromo speakers in the north and north west (see Map I). These two are the closest linguistic neighbours of the Girirra language.

Since Girirra is restricted to a very small area, there seems to be no significant dialects.

The main activity of the people is agriculture, and they Produce Corn, barley, maize, teff, sorghum, and different kinds of fruits. They also have domestic animals like goats, sheep, cows, oxen, horses, donkeys, dogs, cats, Camels, mules, and chicken. Their staple food is porridge prepared from corn or barley.

As mentioned above, the Girirras are mostly farmers, but some of them are tanners, blacksmiths, or potters. Due to their engagement in different hand crafts, and due to the stigma attached to hand crafts people around them underestimate and ostracize them. This forced them to shun the society that looks down upon them and formed their own identity isolated from their surrounding while some of them ended up in self-denial and identified themselves with either the Oromo or the Somali keeping their Girirra origin secret.

Marriage with a Girirra native is strictly forbidden for Oromos or Somalis and a Girirra boy or a girl has to look for his/her native spouse.

The social and economic inferiority forced them to submit to the surrounding superiors. As a consequence, they switch their language use, and adopt the Oromo or the Somali language when they interact with the Oromos, and Somalis out side their village respectively.

Modern education is a recent phenomenon in their area. Incidentally all Girirras are Moslems and traditionally, the Qur?an education was wide spread. Recently very few elementary schools, and one junior secondary school have been established and these may serve as centers of modernization for the area.

1.1. Aim and Significance of the Study

The aim of this study is to describe the sound system of Girirra. This study is significant mainly in two respects. First, it will give information on the phonology of Girirra. The writer believes that it is important to record this language before it is absorbed by the surrounding dominant languages, a process which has already began to show some signs. One among these signs is the fact that the new generation is shifting its language to the dominant ones. Even the elders have started using their mother - tongue for very limited purposes in very limited places. This is a clue to its possible extinction and before that happens, keeping a record of the language will be an important contribution to linguistics.

This research will also contribute to the better understanding of Cushitic languages, especially the Lowland East Cushitic subgroup.

It will also provide valuable information for educational purposes. Regardless of whether or not the Girirra language itself may become a medium of teaching, the research results will be useful for contrastive analysis which would help the Girirra speakers to learn any second language better.

In addition, the thesis attempts to apply recent phonological theories in describing the language and to show how autosegmental theory can best express phonological representations and processes of the language.

1.2. Research Methodology.

This study follows methods, procedures, and assumptions used in modern linguistic analysis which is based on the data elicited from

informants (cf. Appendix). From the elicited words and sentences, possible phonological information is abstracted.

The analysis provides a description of the sound systems of Girirra and a formal representation of the processes involved. The representations are based on the non-linear theory of phonology .

1.3. Limitation of the study

The data is elicited form informants living in Elkerre Awraja, Sarar district.

As the researcher is not a speaker of the language, it can in no way be claimed that the data is exhaustive and free from errors.

1. 4 Theoretical Framework.

Generative phonology is a subfield of generative grammar, and is interested in the study of the sound system of language. It mostly deals with the organization of speech sounds and their representation.

The representation is based on the phonetic properties of the segments. A fundamental tenet of generative phonology has been that utterances are best represented as strings of segments at the phonological level in the same way as they are represented at the phonetic level.

Although the theoretical framework of generative phonology started with the work of Moris Halle (1959), it was firmly established after Chomsky and Halle Produced the Sound Pattern of English (hence forth SPE) in (1968).

SPE phonology was revolutionized with new imputes and in order to suit current developments, generative phonology has shifted to a non-linear representation to handle the difficulties faced by the standard SPE type of theory.

Thus, according to Van der Hulst and Smith (1982) and (1985), Goldsmith (1990) and Durand (1990) nonlinear phonological representation may best be viewed as a development within the generative theory. About the continuation of modern approach from the classical generative phonology van der Hulst and Smith (1985:3) noted the following:

> Although there are many differences between
> the SPE approach and the current approaches,

> a number of fundamental assumptions
> have been maintained without change,
> such as the distinction between
> underlying and surface representation,
> rule ordering and the desire that
> linguistic generalizations be reflected in
> the notational system.

Unlike the standard theory, non-linear theory postulates that there are some features that can be represented as autonomous units and hence, can be represented as autosegments. This theory assumes that phonological representations are divided into independent tiers (see Goldsmith 1976, 1990, van der Hulst and Smith 1982, 1985, and Durand 1990 for details). Thus autosegmental phonology is a representation that is viewed as consisting of a number of independent levels that are linked to each other. According to Goldsmith (1976); van der Hulst and smith (1982) and Poser (1982), these different levels (i.e. tiers) in autosegmental representation are related to each other by association lines. The association between each feature tier and the segmental core is governed by wellformedness conditions originally proposed by Goldsmith (1976) and afterward modified by McCarthy (1979: 128) stated as follows:

> The Wellformedness Condition
> a) Every unit on one level must be associated with at least one unit on every other level.
> b) Association lines may not cross.

The standard theory of phonology may be thought of as comprising two interacting but distinct components: namely the theory of phonological representation and the theory of phonological rules (see, Mc Carthy 1988; for details). According to van der Hulst and Smith (1982, 1985), it was during the last ten years or so, that great progress has been made in phonological theory, towards the study of phonological representation. Prior to this, the standard theory gave precedence to the derivational aspect over the representational one. Regarding the shift of precedence McCarthy (1988:1) notes the following.

> --- primary emphasis should be placed
> on studying phonological representations
> rather than rules. Simply put, if the
> representations are right, then the rules
> will follow. The entire theory or research
> program known as non - linear phonology
> is based almost entirely on this idea.

In SPE, suprasegmentals are treated as if they were part of the segmental features. The phonological representation consists of a unilinear sequence of segments and boundary symbols.

In recent nonlinear models, on the other hand, suprasegmental and other features like syllable structure are treated in multi-tiered representations. This model incorporates the result of two independent theories namely autosegmental phonology and metrical phonology.

The realm of autosegmental theory (as part of non-linear phonology) was originally confined to tone but later it was extended to capture nasal features, vowel harmony, etc. (cf. van der Hulst and Smith 1982.

In this thesis an attempt is made to treat features as geometrical structures. The basic assumption of syllable structures, which is outlined below,is also employed in the thesis.

1.4.1 Feature Geometry.

The geometrical representation of features known as features geometry (see McCarthy 1988) is a very recent theory that deals with the hierarchical representation of distinctive features. The theory of feature geometry is defined by McCarthy (1988:1) as " - - - a theory of phonological representations, with a simple, almost minimal set of operations. The representations establish a classification of the features based on a hierarchical structure - - - - "

Linear phonology as examplified in SPE, assumes that features were unordered and unstructured phonetic properties. In recent years considerable research has been done on distinctive features and a theory which views the distinctive features as constituting internal structure was proposed. The theory assumes that distinctive features are organized into sets constituting natural classes, notationally mapped on the hierarchical tree. This effort has been advanced most notably by the work of Clements (1985), and Sagey (1986), and developed in McCarthy (1988); Pulleyblank (1988); Alemayehu (1991); Paradis and Prunet (1991); Rice and Avery (1991); Shaw (1991); Cho (1991) and others.

One of the most important factors for a hierarchical representation of distinctive features is the assumption that they are organized into sets of natural classes. In a geometrical representation every node of a tree represents a set of features designated by the theory as forming a natural class. In the tree, a distinct class is represented by terminal and non-terminal nodes which may constitute possible laws for phonological processes (or rules) of a language (see. Pulleyblank 1988; Mc Carthy

1988; Alemayehu 1991; Rice and Avery 1991; and Cho 1991 among others).

In recent autosegmental studies (cf. Al Mtenje 1991) abundant empirical evidence has been given to justify the claim that assimilatory processes are best expressed through feature- spreading. In the process only feature (s) characterizing a single node spread (s).

1.4.2. Syllable

In SPE, phonology was based on the notion that phonological representations consist of linear strings of segments with no hierarchical organization other than that provided by syntactic phrase structure. In particular, the syllable played no role in phonological organization. Research has made it clear that the exclusion of the syllable is a " serious omission in generative phonology and that many phonological rules only receive appropriate formulation in terms of this notion " (Clements and Keyser (1983:1). Hence, the syllable is integrated into phonological theory (cf. Clements and keyser 1983, for details).

It was after kahn (1976) that the syllable was considered to be phonologically important as a conditioning environment for sound changes, and other phonological rules.

According to Clements and keyser (1983), Kahn (1976) argues that the syllable is a necessary element in phonological descriptions by identifying aspects of phonology that seem to call for analysis in terms of syllabic structure and demonstrates the superiority of syllabic analysis over possible allternative solutions.

A number of phoneticians have pointed out that syllabicity is not an intrinsic characteristic of segments but rather involves the relationship between a segment and its neighbors on either side. Hence, it might be proposed that the syllabicity or non syllabicity of a segment is more aptly characterized in terms of its position in a syllable tree (cf. Clements and Keyser 1983; Selkirk 1984 for details).

According to the current theory of the syllable, a segment or a sequence of segments preceding the peak (or nucleus) of a syllable is called onset and a segment or a sequence of segments following it are referred to as the coda. The sequence of segments comprising the peak

and the coda are called the rhyme (cf. Lapointe and Feinstein 1982 Noske 1982; and Selkirk 1982).

Since Kahn (1976), several phonologists have offered compelling arguments for recognizing the syllable as a hierarchical unit in phonological representation. Important contributions include Clements and Keyser (1983); Harris (1983); Lapointe and Feinstein (1982); Noske (1982); Selkirk (1982 and 1984); etc. It is represented as being composed of three layers (tiers). These three dimensions of a syllable, according to Clements and Keyser (1983) are the syllable tier, the C-V (or skeletal) tier, and the segmental tier. Syllable trees are considered to be binary branching (cf. Clements and Keyser).

Syllabification is another point to be discussed in the theory of the syllable. Syllabification procedures, according to Lapointe and Feinstein (1982), and Clements and Keyser (1983), are devices which mechanically assign a syllabic structure to the sequence of segments. A core syllable is a base for the assignment of syllabic structure. Following Clements and Keyser (1983); Katamba (1989), among others states that, a core syllable can be defined as the class of well-formed syllable types.

The notion of a possible syllable is mainly constrained by the core syllable of a language. The possible syllable of a language can be taken as the maximum and/or minimum number of segments captured by an individual subpart of a syllable. For instance, English allows a maximum of three and a minimum of zero sequence of segments at an onset position and a maximum of two, and a minimum of zero sequence of segments at a coda position. Unlike English, Girirra allows a maximum of only one, and/or a minimum of zero segments at both positions.

Chapter - Two

2 - The Sound Segments of Girirra

An utterance is a sequence or a flow of entities which can be split up into slices or segments identifiable individually. In generative phonology, until very recently (cf.Clements and keyser 1983; and Goldsmith 1976; among others), the flow of sounds used to be represented as a linear string of segments with no internal or hierarchical organization.

In the representation, segments are arranged in a linear order each specified by features determined by either articulatory or acoustic characterstics. According to Chomisky and Halle (1968) a string of segments arranged or represented in a linear order make up the sound pattern of a language. SPE, divides utterances into segments charaterized by a complex of features.

The formal linear representation of segments as in SPE, was criticized and resulted in a radical development of phonological representation (cf.Goldsmith 1976, 1990, and Durand 1990 for details). In these works, the sound segments are represented non linearly on a saparate tier(s) independetly. The different tiers that are arranged hierarchically are interrelated (or linked to one another) with association lines.

Before discussing the different segments of Girirra, it might be helpful to identify the necessary features to specify each one of them.

2.1 The Necessary Distinctive Features

Distinctive features dichotomize sound into classes. Distinctive features are the phonetic properties that define each sound segment of a language. There are limited distinctive features for each language to characterize all the sound segments. According to Hawkin's (1984:73):

> The theory of distinctive features is based on that the phonemes of a language can be analysed or broken down into a small number of components or features, these being the minimal elements ('atoms') from which the phonemes (the 'molecules') are build up.

In short, distinctive features are phonological ingredients (Katamba, 1989:35) which phonemes are made up of. One can categorize some segments as a natural class on the basis of phonetic features and

phonological processes (Hawkins 1984). According to Hyman (1975:139) "Two or more segments are said to constitute a natural class if fewer features are required to specify the class than to specify any one member of the class". Hence, sounds which share certain phonetic properties form a natural class (cf.katamba 1989 for details). One of the uses of features is that they can easily specify natural classes.

Distinctive features are also required for Girirra as in any other language to classify speech sounds into natural classes and to specify each sound segment. The distinctive features are binary (i.e., two value systems) in which "+" sign indicates belonging to a class, and "-" sign means not belonging to a class (cf. Chomsky and Halle 1968; Ladefoged 1975; Hyman 1975; Katamba 1989; Durand 1990).

2.1.1. Major Class Features

The consonantality and vocalicity are the major class features that divided speech sounds into consonants and vowels. The feature [+ consonantal] specifies consonants as defined by Sommerstein (1977:98) as follows:

> consonantal sounds are those produced with a close constriction (at least close enough so that, other things being equal, friction would result) in the upper part of the vocal tract (excluding the glottal area).

The [+ consonantal] feature specifies obstruents, liquids and nasals separating them from vowels and glides (see page 16 for the definition of vocality). Vowels and glides are non consonantal segments or [- consonatal].

Sonority is another major class feature and the process of production is noted by Durand (1990:43) as follows:

> Sonorant sounds are produced with a vocal tract configuration sufficiently open for the intra-oral pressure to be approximately equal to the ambient air pressure. By contrast, obstruents are produced with a constriction sufficient to generate intra-oral pressure much greater than that of the surrounding air.

In Girirra the feature [+ sonorant] is needed to identify vowels, liquids, glides, and nasals, and [- sonorant] refers to all the other sounds.

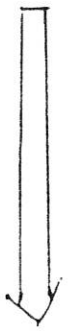
According to Hawkins (1984) sonority is a recent development necessary for the classification of sounds into a hierarchy called sonority hierarchy. Regarding the sonority hierarchy Hawkins (1984:99) has the following to say:

> Sonority is defind in a number of overlapping ways the more' sonorous' sound have greater carrying power and require less energy (acoustically), which corresponds in articulatory terms to the freedom of passage of air through the vocal tract.

Hooper (1976: 197-8) says that the most sonorous segment occupies the nucleus, and the farther from the nucleus on either margin the least sonorant sounds will be. Following Hooper, the ranking on the basis of sonority can be represented in a modified form (cf-also katamba 1989, selkirk 1984 b).

Sonority Hierarchy

Least Sonorant



1. Voiceless obstruents (e. g. t, s, k)
2. Voiced obstruents (e. g . b, d , g)
3. Nasals (e. g. m)
4. liquids (e.g. r)
5. glides (e. g. w)
6. vowels (e. g.a,o)

Greates Sonority

The sonority of a sound according to Durand (1990:210) is its loudness relative to that of other sounds with the same length, stress and pitch.

The phonological sonority hierachy has the phonetic correlates of openness and propensity for voicing.

According to selkirk (1982); Hawkins (1984); Durand (1990); and Goldsmith (1990) the sonority hierarchy has two margins (onset & coda) of sounds, the most 'vowel - like'; and the most 'consonant-like' sounds. As the hierarchy of sonority increases the more likely the sounds are to form the peak of a syllable, and as it decreases, the more likely the sounds are to form the onset or coda (cf.Schane 1973).

The Sonorants

	Obst.	nas.	liq.	glides	vowels
Cons.	+	+	+	-	-
Son.	-	+	+	+	+

TABLE I

2.1.2. Cavity Features

Anteriority and Coronality are cavity features (cf.katamba 1989: 43; Durand 1990:42 among others), and they refer to points of articulation. In Girirra they are required to sub-divide the natural class of [+ consonantal] into smaller classes. Sounds produced with the tip of the tongue or the apicals are identified as [+ anterior] whereas laminal sounds (i.e., sounds produced with the blade of the tongue) are distinguished as [+ coronal] (cf.Chomsky and Halle 1968; Schane 1973; Ladefoged 1975; Sommerstien 1977; Katamba 1989; Durand 1990 ; and paradis and Prunet 1991). They are the significant innovative features of SPE (See Durand 1990; Paradis and Prunet 1991 for details), applied to consonants. Schane (1973), and Durand (1990) describe anteriors as segments formed at the extreme front part of the mouth. Segments articulated in the area ranging from the lips to the alveolar ridge are [+ anterior] while segments made with the blade of the tongue are termed as [+coronal]. In Girirra the bilabials (b and m), the labio dental (f), and the alveolars (t,d,d̠,n, l,r, and s) are included in the class of [+anterior] where the feature [+coronal] includes all the alveolars, alveo-palatal (s̆)and palatal segments (Thus, as a recent development coronal was proposed to capture palatal segments (cf.Durand 1990; Paradis and Prunet 1991 for details) like (y and n̆). The following table shows specification of consonants.

The Anteriors and the Coronals

	b	m	d	d̠	n	l	r	y	n̆	f	s	s̆
Cons.	+	+	+	+	+	+	+	-	+	+	+	+
Ant.	+	+	+	+	+	+	+	-	-	+	+	-
Cor.	-	-	+	+	+	+	+	+	+	-	+	+

TABLE II

2.1.2.1 Tongue - body Features

The other cavity features are tongue - body features characterized by [' high] , [[± low], and [± back]. [+ High] sounds are made with the tongue raised from neutral position, while [-high] sounds are made without such raising of the body of the tongue (Chomsky and Halle 1968; Katamba 1989 among others).

In Girirra, it seems that the feature [+ high] distinguishes the palatal sounds (š, y, and ň) , and the velar sounds (k',k,g, and w) from all other sounds (the relevance of this feature in relation to vowels will be discussed later).

[+ Low] sounds are produced with the tongue depressed and lying at a level below similar to the position the tongue occupies when at rest; (the netural position according to SPE is that which is assumed by the tongue in the pronunciation of the English word ' bed', [-low] sounds are produced without depressing the level of the tongue (cf . Chomsky & Halle 1968; Katamba 1989).

In Girirra, this feature is needed to isolate the glottal segments [? and h] from other sounds.

Sounds produced with the body of the tongue retracted from neutral position are [+back]. Sounds produced with the body of the tongue either in neutral position or pushed forward are [-back] (cf. Chomsky and Halle 1968; Katamba 1989).

Of the Girirra Consonants, Velars and glottals are the only segments characterized by the feature [+back]. Therefore, the feature [+back] distinguishes the velar segments (k',k,g, and w) from the palatals (s, y ,and n).

	š	y	ň	k'	k	g	w	?	h
high	+	+	+	+	+	+	+	-	-
low	-	-	-	-	-	-	-	+	+
back	-	-	-	+	+	+	+	+	+

TABLE III

2.1.3 Manner Features

The features [±Continuant] , [± nasal] and [± vibrant] are among the manner features.

[+ Continuant] sounds are produced with the flow of air through a narrow passage resulting in a friction (cf. Kenstowcz and kessiberth 1979; Sommerstien 1977).

In Girirra [+ continuant] sounds are (f, s, š and h) which means that the feature identifies the fricative segments from obstruents.

[+ Nasality] is another feature which refers to manner of articulation. [+ Nasal] sounds are produced when the velum is lowered letting the air fully or partially out through the nose.

In Girirra the feature [+ nasal] is employed to separate the nasal sounds (m, n and ň) and nasalized vowels (i.e., vowel sounds produced with air escaping through both mouth & nose) from other oral sounds.

Another feature [+ vibrant] is an important feature introduced by Ladefoged. Trills and flaps are [+vibrant]; all other sounds are [- vibrant]. According to Ladefoged (1975:282) trill is produced with "An articulation in which one articulator is held loosely near another so that the flow of air between them sets them in motion, alternately sucking them together and blowing them apart."

2.1.4. Source Features

In Durand (1990:54) it was claimed that the features like [± voice], [± constricted] are grouped under the category source features. These features are employed to characterize oppositions based on glottal states.

Sounds produced with vibration of the vocal cords are voiced. Voiceless sounds on the other hand are produced with a wide glottal opening so wide that it will prevent vocal vibration if air flows through it (cf.Chomsky and Halle 1968; Katamba 1989; and Durand 1990, and others).

The feature [+ voice] is used to identify the Girirra liquids, nasals, and voiced obstruents from voiceless obstruents which are specified as [- voice].

In Girirra there are two other features which may be categorized under the feature constricted. These are [±egressive], and [± glottal]. The feature [± egressive] refers to the direction of air stream mechanism. Therefore, in the production of ingressive or implosive sounds (as opposed to egressive sounds) the flow of air is inwards. Such sounds are

specified as [-egressive]. In Girirra, /ɗ/ is the only [- egressive] segment while the rest are [+ egressive].

[+ Glottal] sounds have a secondary closure at the glottis in addition to the primary one (see Schane 1973:23). In Girirra, /k'/ is the only [+glottal] sound produced with the velar and glottal closure at the same time. Hence, when the compressed air blocked off in such a way is released the segment /K'/ is formed.

Thus, ejectives and implosives are characterized by the feature [+ constricted].

The Constricted Sounds

	ejective	implosive
glottal	+	-
agressive	+	-

TABLE IV

On the whole, the above features specify the consonants of Girirra as shown below in Table V.

The Consonant Sounds of Girirra

	β	b	p	d	t	k	g	m	ɱ	n	ŋ	ň	l	r	ɻ	s	š	ʃ	k'	w	y	h	?
± Cons.	+	−	+	+	+	−	+	+	+	+	−	−	+	+	−	−	+	+	+	−	−	−	−
± ant.	+	+	+	+	+	−	−	+	+	+	−	−	+	+	+	+	−	+	−	+	−	−	−
± cor.	−	−	−	+	+	−	−	−	−	+	−	+	+	+	−	+	+	+	−	−	+	−	−
± nas.	−	−	−	−	−	−	−	+	+	+	+	+	−	−	−	−	−	−	−	−	−	−	−
± voice	+	+	−	+	−	−	+	+	+	+	+	+	+	+	−	−	−	+	−	+	+	−	−
± cont.	+	−	−	−	−	−	−	−	+	−	−	−	−	−	+	+	+	−	−	−	−	+	−
± son.	−	−	−	−	−	−	−	+	+	+	+	+	+	+	−	−	−	−	−	+	+	−	−
± high	−	−	−	−	−	+	+	−	−	−	+	+	−	−	−	−	+	−	+	−	+	−	−
± back	−	−	−	−	−	+	+	−	−	−	+	−	−	−	−	−	−	−	+	+	−	+	+
± low	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+
± glott	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	−	−	−	−	−
± egressive	+	−	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	−	+	−	+	+
± vibrant	−	−	−	−	−	−	−	−	−	−	−	−	+	−	−	−	−	−	−	−	−	−	−

TABLE V

The Vowel Sounds

The sounds of a language can be classified into two major classes, that is, [± consonantal] and [±vocalic]. True consonants are identified by the feature [+ consonantal] and [- vocalic] while the vowels are [+ vocalic] and [- consonantal] (see Hyman 1975 for details). According to Chomsky and Halle (1968:302)

> Vocalic sounds are produced with an oral cavity in which the most radical constriction doesn't exceede that found in high vowels [i] and [u] and with vocal cords that are positioned so as to allow spontaneous voicing; in producing non-vocalic sounds one or both of these conditions are not satisfied.

Recognizing the problems arising from the use of these two major classificatory features ([+ consonantal], and [+ vocalic]), Chomsky and Halle (1968) have proposed the feature [± syllabic] to replace the traditional [±vocalic]. But, the feature [±syllabic] is criticized in recent studies (see Goldsmith 1976 and 1990; Clements and Keyser 1983; Hawkins 1984; and Durand 1990 for details) as it does not have a phonetic definition. It is claimed that the syllable is defined on the basis of function. According to Hawkins 1984:97):

> .....the featue sylllabic is not really a distinctive feature at all - it is, infact, a way of showing how each segment is going to behave in the sequence of segments: will it be at the peak of the syllable, or at the margin? syllabic is then a sequence of feature, not a distinctive feature .....

Thus, ignoring the SPE's [± syllabic] as a feature we may stick to the feature [± vocalic] for identifying the natural class of vowels.

The distinctive features employed in identifying the consonant sounds of Girirra such as [±high], [±back] and [± low] are also required to specify the vowels. [i] and [u] are isolated as [+ high]. The feature [+back] separates [a], [o] and [u] from other vowels which are [- back]. The vowel [a] is specified with the featue [+low].

[+ Round] refers to segments produced with a protrusion of the lips. [- Round] are those with a spread or neutral lip position. The feature [+ round] (as it is also a featue required for consonants) is used not only for rounded vowels (u,o) but also for labialized consonants (t^{w} k^{w} g^{w} etc) in agreement with Lass 1984; Ladefoged 1975; Durand 1990).

Length is indicated by the featue [± long] . Lengthening refers to the duration of time taken in the production of a sound and it is observed in both consonants as well as vowels. In Girirra length differences in both vowels and consonants distinguish meaning as in words like /il:is/ 'heavy' , and /o:lis/ ' skimmed milk ' ; /er:i/ ' soil ' and / eri / ' sun ' ; / u:n / ' smoke ; and / un / ' eat' ; and / ɗe:l / ' play' , and / ɗel / ' pot ' .

On the whole, the features listed above seem to be the only necessary ones to specify all vowels as shown below.

The Vowel (or + Vocalic) segments of Girirra

	i	i:	e	e:	a	a:	o	o:	u	u:
High	+	+	-	-	-	-	-	-	+	+
Back	-	-	-	-	+	+	+	+	+	+
Low	-	-	-	-	+	+	-	-	-	-
Round	-	-	-	-	-	-	+	+	+	+
Long	-	+	-	+	-	+	-	+	-	+

TABLE VI

Phonetic Sounds of Girirra Consonants

		Bilabial	Labio - Dental	Alveolar	Alveo - Palatal	Palatal	Velar	Glottal
STOPS	Vd	b		d			g	
	V1	b(p)		d (t)			g (k)	?
	Ejective						k'	
IMPLOSIVE				ɗ				
FRICATIVES	Vd	B						
	V1		f	s	ʃ (š)			h
NASALS		m	m̥	n		ɲ	ŋ	
LIQUIDS	Trill			r				
	Flap			ɾ				
	Lateral			l				
SEMI-VOWELS		w				y		

Chart 1

Phonemic Sounds of Girirra Consonants

		Bilabial	Labio - Dental	Alveolar	Alveo - Palatal	Palatal	Velar	Glottal
STOPS	Vd	b		d			g	
	V1			t			k	?
	Ejective						k'	
IMPLOSIVE				ɗ(D)				
FRICATIVES	Vd							
	V1		f	s	ʃ(š)			h
NASALS		m		n		ɲ(ň)		
LIQUIDS	Trill							
	Flap			r				
	Lateral			l				
SEMI-VOWELS		w				y		

Chart II

Phonemic Sounds of Girirra Vowels.

	FRONT CENTRAL BACK	FRONT CENTRAL BACK
	SHORT VOWELS	LONG VOWELS
HIGH	i u	i: u:
MID	e o	e: o:
LOW	ə	ə:

Chart III

Chapter - Three

3.0. Assimilation in Girirra - A Nonlinear Representation

Almost all languages of the world are believed to show certain kinds of phonological processes and the processes may or may not be part of universal principles. One of the most common phonolgical processes is assimilation (cf. for examples Hayes 1986; Katamaba 1989; Charlotte' 1982 and others). According to Schein (1986); Katamaba (1989); Alemayehu (1991) it is a very natural process in languages to find assimilation in contiguous segments.

3.1 Assimilatory processes in Girirra.

According to Alemayehu (1991) assimilation is a phonetic process where by a sound changes its properties because of the influence of a neighbouring sound.

Assimilation in Girirra is regressive. In a regressive assimilation a segment assumes some or all of the features of the following segment (see Hayes 1986; Katamba 1989; Pulleyblank 1988 among others).

Partial and complete assimilation are also the two types of assimilatory processes which are common in Girirra. According to Charlotte' (1982:310) " In partial assimilation, some but not all, of the feature values of a segment agree with those of a neighbouring segment. In complete assimilation the feature values are changed so that the segment becomes identical to a neighbouring segment." (cf- examples 5 and 7 given below).

Labialization (or Rounding), nassalization, place and voice assimilation, and glottalization are assimilatory processes one may find in Girirra.

This paper attempts to use recent theories of phonology to provide a formal representation of assimilation. The theory adopted in this paper is autosegmental phonology particularly the feature geometry discussed in McCarthy (1988); Pulleyblank (1988); Alemayehu (1991); Shaw (1991) and Paradis and Prunet (1991). However, for ease of explanation the writer believes it might be better to give a linear representation before a nonlinear one.

3-1-1 Labialization (or Rounding)

Labialization is one of the vowel features which can be acquired by consonants. It may be defined as " — rounding of the lips accompanying the articulation of consonants. " (Alemayehu 1991:3). In the formation of labialization, the roundness of the back vowels (u and o) is transfered to the consonants preceding them. The following samples may help to demonstrate this.

(1)

/r o r/→	[r͡or]	' run (imp)
/h o r/→	[h͡or]	' ancient '
/r u g/→	[r͡uk]	' massage '
/fur/ →	[f͡ur]	' divorce / untie (imp)'

Labialization is therefore, a process by which vowels with [+ round] feature influence or superimpose their properties on a preceding consonants

Rounding Rule

(2) $C \rightarrow [+\text{round}] \; / - \overset{V}{[+\text{round}]}$

3 - 1 - 2 - Nasalization

One of the common phonological processes in languages is nasalization. Nasalization is observed when a sound is produced with a lowered velum, so that the air flows through the mouth and the nose. However, according to Alemayehu (1991:3) " — one may distinguish between nasal and nasalized sounds. Nasal sounds may be defined as those produced with a complete closure of the oral cavity allowing the air only through the nose, and nasalized sounds may be taken to be those produced with air passing simultaneously through the nose and the mouth. " Nasalization in Girirra is only caused by the successive occurrence of a vowel segment followed by nasal consonants . The following examples show nasalization in Girirra.

(3)	a)	/n a n/	→	[n ã n]	'husand '
		/w a n/	→	[w ã n]	' milk '
	*b)	/r u g/	→	[r u ĸ]	' massage '
		/h i r/	→	[h i r]	' tie '

The Nasalization rule may be represented as in (4) below:

(4) $V \rightarrow [+\text{nasal}] / \underset{C}{\text{—}} [+\text{nasal}]$

3 - 1 - 3 Nasal assimilation

Nasal assimilation is another extremely common phenomenon in languages (cf. Charlotte' 1982). In Girirra, the alveolar nasal sound has various manifestations due to the influence of the neighbouring sounds. It assimilates to approximate the place of articulation of the following consonant segment by losing its own place of articulation. For instance, in the word / sanbad/ ' lung ' / n / assimilates with the place of articulation of / b / and is realized as [m]. In the word / hunguru/ ' throat ' / n / approximates the place of articulation of / g / and becomes the velar nasal [ŋ] sound. The phoneme / n / in the word / gonfa / ' trousers ' changes its place of articulation and takes that of the following labial segment / f /, to become a labio - dental nasal sound [m̪].

As a whole, the nasal assimilation in Girirra may be summarized as an agreement in place of the alveolar nasal sound with that of the following consonant by the process of regressive assimilation. The following are a few examples:

(5) / sanbab / → [sə̃mbap] ' lung '
/ hunguru / → [h̃ũŋgŭrŭ] ' throat '
/ gonfa / → [gʷõ m̪ f a] ' trousers '
/ hundur / → [h̃ʷû n dʷu r] ' sleep (Imp)
/ inta / → [ĩnta] ' here '

Rule (6) represents the above fact.

(6) [+ nasal] → [α place] / — [α place].

In Girirra there is also complete regressive assimilation in which the nasal segment changes to become identical with the following [r]. This process results in the gemination of trill segments as can be seen in (7) below.

(7) / hunro / → [h̃ʷurrʷõ] ' fog '
/ enrab / → [errap] ' tongue '
/ k'eyer numan / → [k ' eyerrũmân] ' thinness '

In fact, these may be expressed as feature changing of a segment (Hayes 1986), by the influence of the neighbouring sound, in which a nasal sound becomes a vibrant (i.e., trill) sound segment. Rule (8) may represent this complete assimilation.

(8) $\begin{bmatrix} +\text{coronal} \\ +\text{nasal} \end{bmatrix} \rightarrow$ [+ vibrant] / — [+ vibrant].

Rule 8 may be considered as a subrule within (6).

3-1-4 Glottalization

Glottalization is another phonological process in which the velar segment / K / becomes glottalized when it precedes the glottalized velar segment / k'/. Thus :

	a -	/ sobag / →	[s̆obak]	'butter'
		/ sobag + k' i/→	[s̆obak'k'i]	'the butter'
(9)	b -	/ hadig/ →	[hadik]	'rope'
		/ hadig+k'i/ →	[hadik'k'i]	'the rope'
	c -	/ liba:g/ →	[liba:k]	'lion'
		/ liba:g/ →	[liba: k 'k']	'the lion.

In Girirra / -ki/ is definite article marker. The definite article marker /-ki/ has an allomorph /-ki /. When ever, the velar segment / k/ occurs preceding an allomorph / -ki./ it becomes glottalized. The process could be summarized as in (10) below.

(10) [+ back] → [+ glottal] /— [+glottal]

Thus, because of the assimilation process the velar segment / k / becomes glottalized. This could happen only in the environment in (10). Elsewhere the suffix / - ki/ occurs instead of / -ki/ as in / dad / ' person ; dat + ki → datki ' the person' ; /kob/ ' shoe ' kop+ki → kopki ' the shoe ' etc.[3]

3.1.5 - Voice Assimilation

At given evironments, certain segments become voiceless where as the others become voiced. In Girirra instances involving voicing are farily common. Devoicing of obstruents is more common than voicing. In this language the obstruents / b, d, g / become voiceless at final positions as shown in / 11/ below.

(11)	/ k o b/ →	[k̆o p]	'shoe'
	/ lug / →	[l̆u k]	'foot'
	/ g e : d / →	[ge: t]	'wood'

Voicing is distinctive in initial position, while word finally the difference is neutralized (cf. 4.6. for details). The neutralization process may be represented in (12) below.

(12) [-sonorant] → [-voice] /- #

These obstruents (i. e., the devoiced ones) don't change when followed by a vowel as demonstrated below.

(13) a- /id/ → [it] 'a sheep'
/id+aa/ → [idaa] 'sheep (pl)
b- /mod/ → [mot] 'pass (imp)'
/madi/ → [madi] 'head'
c- /kob/ → [kop] 'shoe'
/kob+aa/ → [kobaa] 'shoes'
d- /ga:b/ → [ga:p] 'short'
/ga:b+us/ → [ga:bus] 'shortness
e- /da:g/ → [da:k] 'graze'
/da:g+is/ → [da:gis] 'look after lattle'
f- /he:g/ → [he:k] 'sweep (imp)'
/he:ga/ → [he:ga] 'broom'

The segments may remain voiced if they are followed by voiced segments as demonstrated below in (14).

(14) a) /dag/ → [dak] 'ear'
/dag/ → [dagdak] 'jewel'
b) /gad/ → [gat] 'buy'
/gad+ni] → [gadni] 'will buy'
c) hargab/ → [hargap] 'mucus'
/hargab + lew/ → [hargablew]
'one with mucus (an insult)

In Girirra obstruent clusters agree in voice; that is, voiced segments lose their voicing if followed by voiceless obstruents.

(15) a- /rob+ki/ → [ropki] 'the rain'
/ko:b+ki/ → [ko:pki] 'the cup'
b- /libod+ki → [libotki] 'the male'
/k'od+tey/ → [k'ottey] 'she dag'
c- /la?ag+ti/ → [la?akti] 'the money'
/washag+ti/ → [washakti/ 'the sand.

(16)Devoicing Rule
[-son] → [-voice]/ — [-voice]

Generally rule (12 and 16) can be summarized as:

$$[-\text{Sonorant}] \rightarrow [-\text{voice}] / - \left\{ [-\text{voice}] \; \overset{\#}{} \right\}$$

3.2 The nonlinear phonological Representation of Assimilation

The assimilatory processes of Girirra may be represented notationally linearly or on a hierarchical tree following work which argues that the hierarchichal representation of features better expresses the assimilatory processes of the language as exemplified by Alemayehu (1991) for Amharic.

3.2 Feature Geometry[3]

The nonlinear phonological theory is for the most part an extended theory of distinctive features which vividly demonstrates the internal constituents of their organization and hierarchical representation on trees (cf. McCarthy 1988; Pulleyblank 1988, Pardis and Prunet 1991; Alemayehu 1991, among others).

Linear phonology as examplified in SPE, assumes that features are unbounded and unstructured phonetic properties. It was in classical autosegmental phonology that the notion of unordered phonetic properties of features started to be criticized by scholars like Goldsmith (1976).

In recent years, considerable research has been done on distinctive features with a view to developing a theory that distinctive features constitute an internal structure.

One may assume that features are the primitive units of segmental structures, organized into sets constituting natural classes and group class nodes together and these may be represented by feature geometry (McCarthy 1988; Pulleyblank 1988; Cho 1991; Paradis and Prunet 1991).

The features of Girirra segments can also be organized on hierarchical trees by the interdependence of class nodes (or organizing structures) and distinctive features (or content structures). The organizing structures constitute the class tiers where as the content structures are considered as dependents of the class nodes in the feature geometry (cf. also, Beland and Favreau 1991; Cho 1991; Rice and Avery 1991; Shaw 1991). Every terminal and non - terminal node of the tree is also represented by a separate tier.

Following McCarthy (1988); Pulleyblank (1988); Paradis and Prunet (1991); Rice and Avery (1991); Alemayehu (1991), and Shaw (1991) we

assume that each tier or class node in the feature geometry of Girirra constitutes a monovalent (or privative) feature indicating the presence or absence of a certain feature. For instance, the presence of a coronal node, indicates what would have been interpreted in a binary system as [+ coronal].[4]

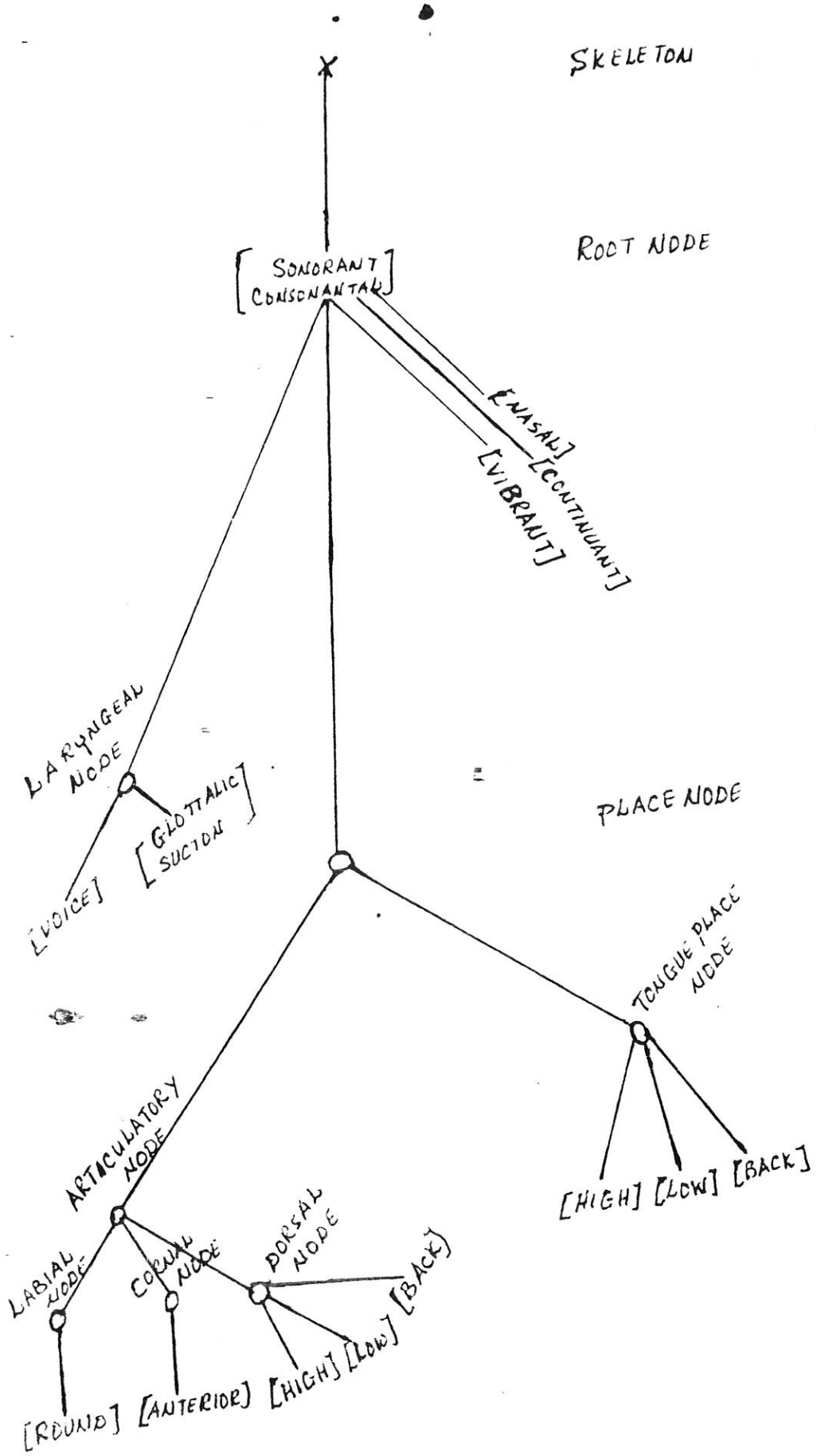
Though further research will contribute a lot to more characterization of certain components of the feature hierarchy, the model that is adopted, by combining different models is shown in (17) below.

The representation of Girirra segments in a hierarchical tree is assumed to consist of a number of tiers. The Skeletal tier is the highest level of segmental representation of the timing unit which encodes segmental length (Paradis and Prunet 1991:4). The Root Node (or tier), composed of the major classificatory features (i.e., sonorant and consonantal), dominates the Laryngeal and Place Nodes as well as the terminal manner features namely, [continuant], [nasal], and [vibrant] (cf. McCarthy 1988; Shaw 1991; Beland and Favreau 1991 among others). The Laryngeal Node dominates the feature [voice] and [glottalic suction]. The Articulatory and Tongue Place Nodes are considered to be the daughters of the Place Node. The three major articulatory features, namely the Labial Node, the Coronal Node and the Dorsal Node are dependents of the Articulatory Node. Tongue Place Node which is sister to Articulatory Node, dominates the feature [high], [low] , and [back] (cf. Lahiri and Evers 1991:89 for details). In the hierarchy shown above the feature [round] is dominated by Labial Node where as [anterior] is dominated by Coronal Node. The Dorsal Node has three daughters [high], [low], and [back]. Such relations or feature dependencies entail that segments distinctively characterized by dependent features must be specified by the nodes on which they depend (cf. McCarthy 1988:13; Lahiri and Evers 1991).

In the feature hierarchy, the Place Node is supposed to dominate two class nodes, namely the Articulatory and Tongue Place Nodes. In other words, consonants are categorized under Articulatory Node while vowels are grouped under Tongue Place Node. This dichotomy is used simply to characterize consonants and vowels under different class nodes and this may help to analyze the process of assimilation.[5]

On the whole, McCarthy (1988: 8-9) predicts that each terminal and non-terminal node that is specified on the tree may spread and delink subject to the projection operations and constraints of the nonlinear phonological representation.[6]

(17)

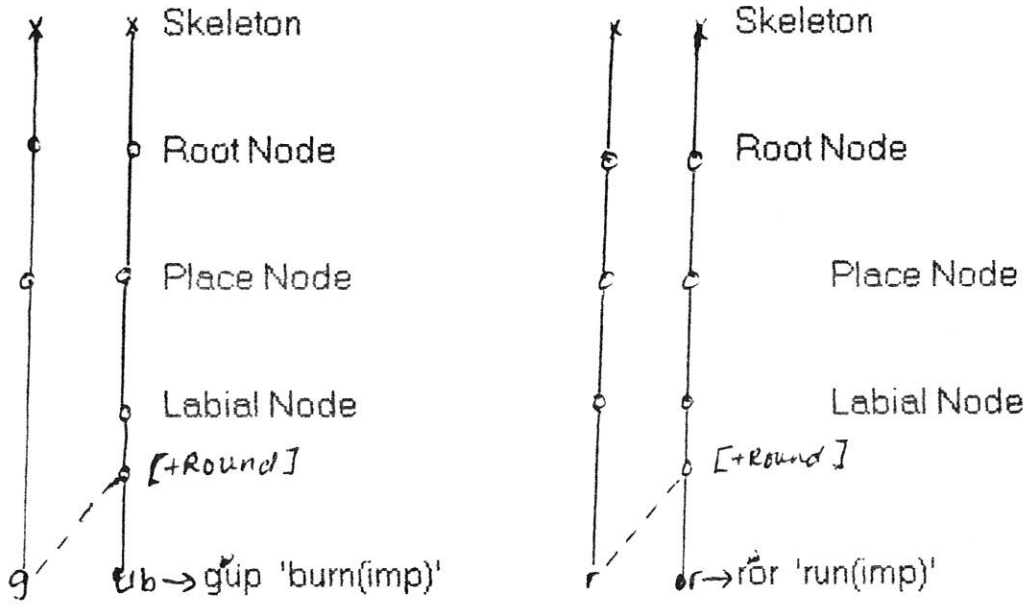

SKELETON
X
ROOT NODE
[SONORANT CONSONANTAL]
[NASAL]
[CONTINUANT]
[VIBRANT]
LARYNGEAL NODE
[GLOTTALIC SUCTION]
[VOICE]
PLACE NODE
TONGUE PLACE NODE
[HIGH] [LOW] [BACK]
ARTICULATORY NODE
LABIAL NODE
CORONAL NODE
DORSAL NODE
[BACK]
[ROUND] [ANTERIOR] [HIGH] [LOW]

With the help of feature geometry sketched above, we may proceed with the mapping of assimilatory processes in Girirra. Features that are not relevant to specific issues are suppressed.

3.2.1. Labialization (or Rounding)

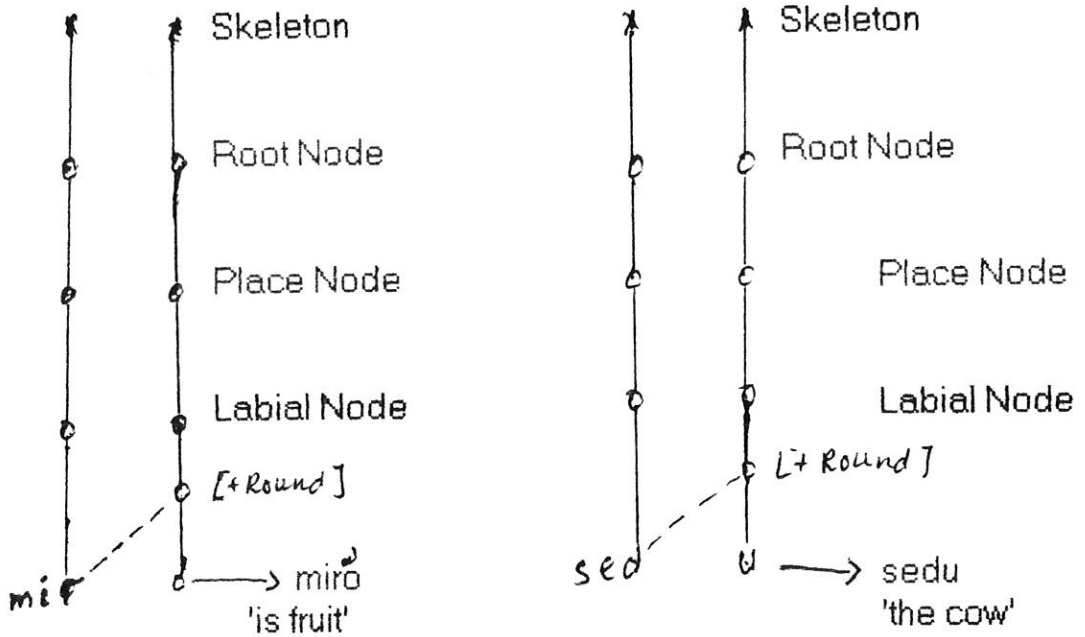
As we have concluded earlier in examples given in (1), labialization (or rounding) is the spreading of the feature [round] to a preceding segment. Labialization is indicated in a phonetic transcription by using the raised " w " after a consonant (cf. Lahiri and Evers 1991; Katamba 1989). The following are some samples.

(18) Labialization



Labialization can take place word internally (18) and across word boundaries as shown in (19) below.

(19)



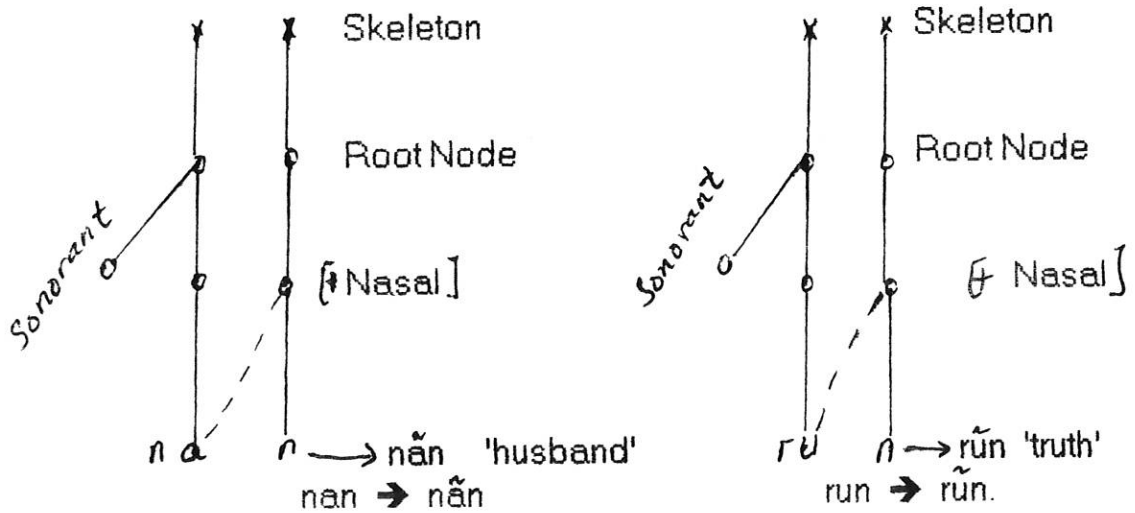
mir + o → miro.

sed + u → sedu.

3. 2. 1. 2 Nasalization

Nasalization is not an inherent characterstic of vowels in Girirra. Vowels get this feature from a nasal segment that follows them. This might be what one will find whenever vowels occur with nasal sounds (cf. Rule 4). In all other environments the vowels of Girirra remain non nasalized. The feature [nasal] spreads to vowels as the following processes demonstrate in (20) below.

(20) Nasalization



nan → nãn

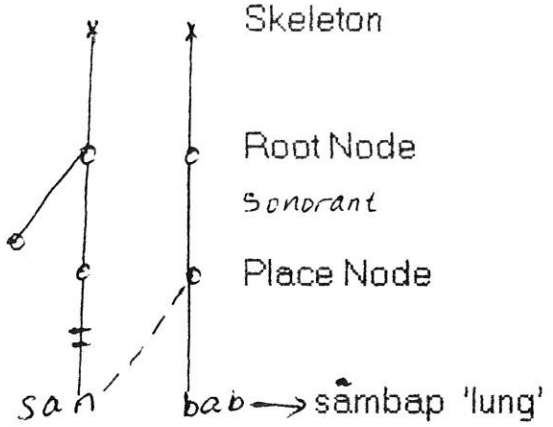
run → rũn.

3.2.3 Nasal Consonant Assimilation

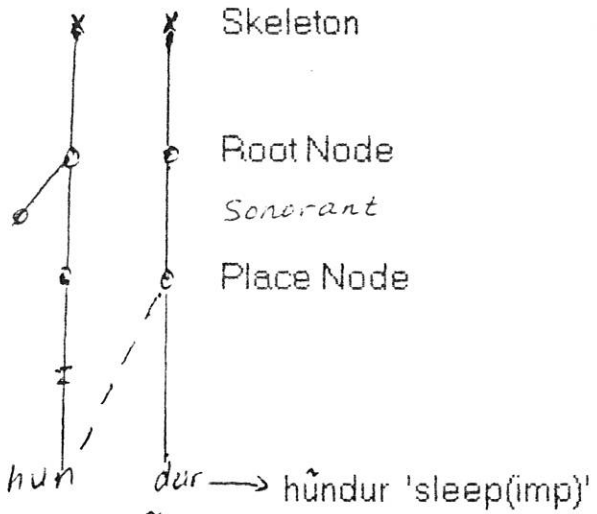
In the process of nasal consonant assimilation, the Place Node of the consonant spreads to the same node of the nasal segment that

precedes it. This was discussed as place assimilation of the alveolar nasal consonants to the following segment (see examples given in (5)). The representation is as follows:

(21) Nasal consonant assimilation



sanbab ➔ sãmbap



hundur ➔ hũndur

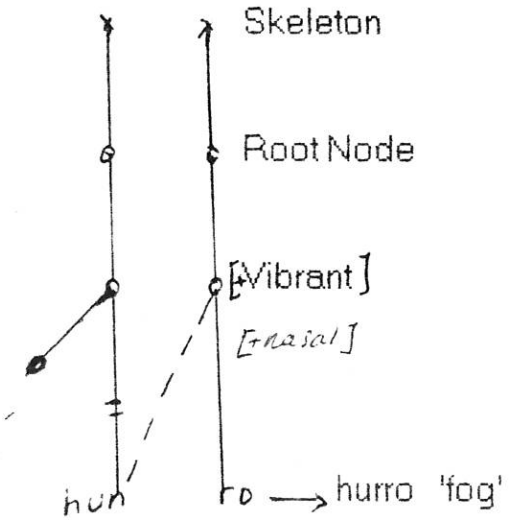
According to Alemayehu (1991) to meet the structural description for the spreading in (21) the Root Node of the target segment must have the manner feature [nasal] as its daughter in addition to the Place Node. It is only when this condition is met that nasal consonant assimilation may take place as shown below in (22).

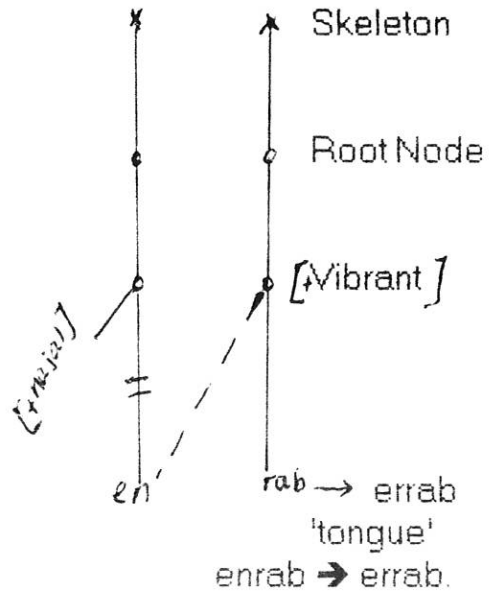
22. a) / gonfa / ➔ [gõmfa] 'trousers'
/ šin bir / ➔ [šĩmbir] 'bird'
/ k' onbar / ➔ [k'õmbar] 'chair'

b) / inta /→ [inta] ' here '
/ hindid /→ [hindit] ' root'
/ indib /→ [indip] ' give to me '

c) / sonkar /→ [sonkar] ' sugar cane '
/ minki /→ [minki] ' the house '
/ a:nka /→ [a: nka] ' now '

In Girirra the sequence of a nasal and a vibrant sound will result in a long or geminate [r] . This seems to be the result of spreading of the vibrant node to the preceding nasal segment as shown below (23).



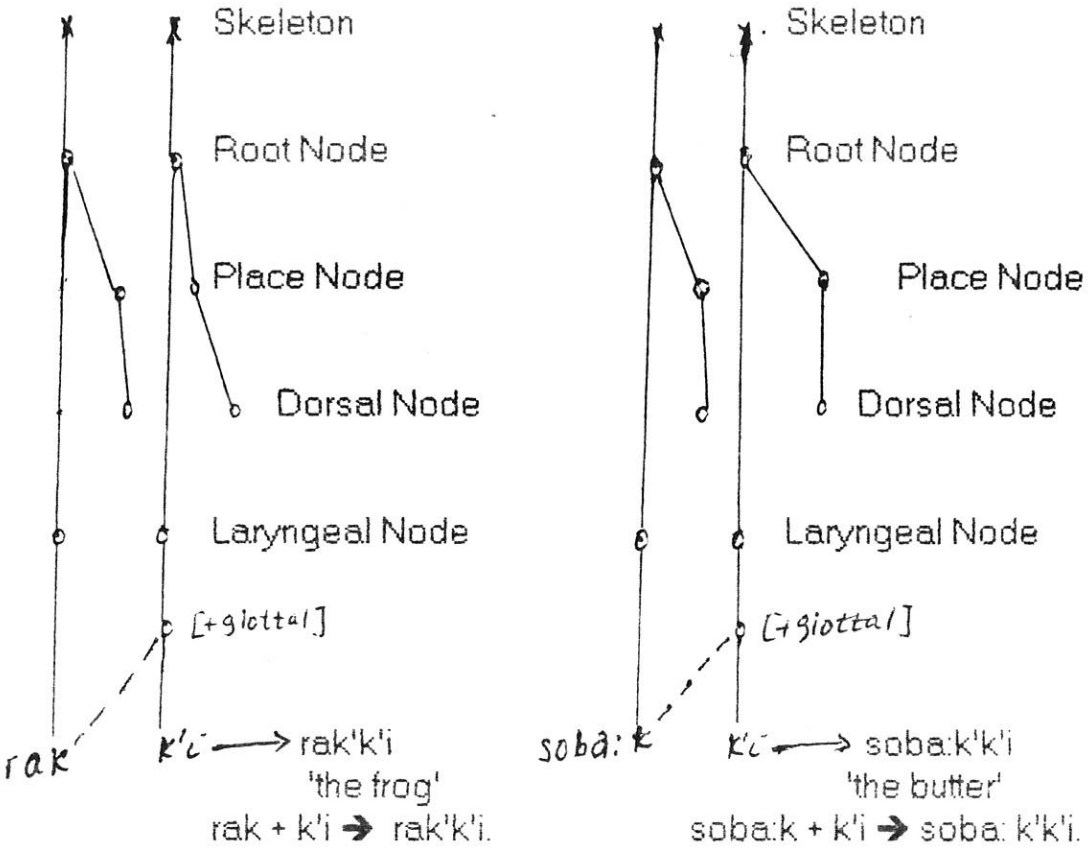


The structural description for such spreading to take place is that the Root Node of the triggerer must have [vibrant] as its daughter in addition to the Root Node of the target segment which must have the [nasal] feature. If these conditions are met, vibrant consonant assimilation may take place as illustated above (cf. also example 7 above).

3.2.4 Glottalization

Glottalization takes place whenever a voiceless velar consonant is in contiguous environment with a glottalized velar segment. This usually happens across morpheme boundaries. And it regressively spreads to the preceding segment as shown below in (24).

(24) Glottalization

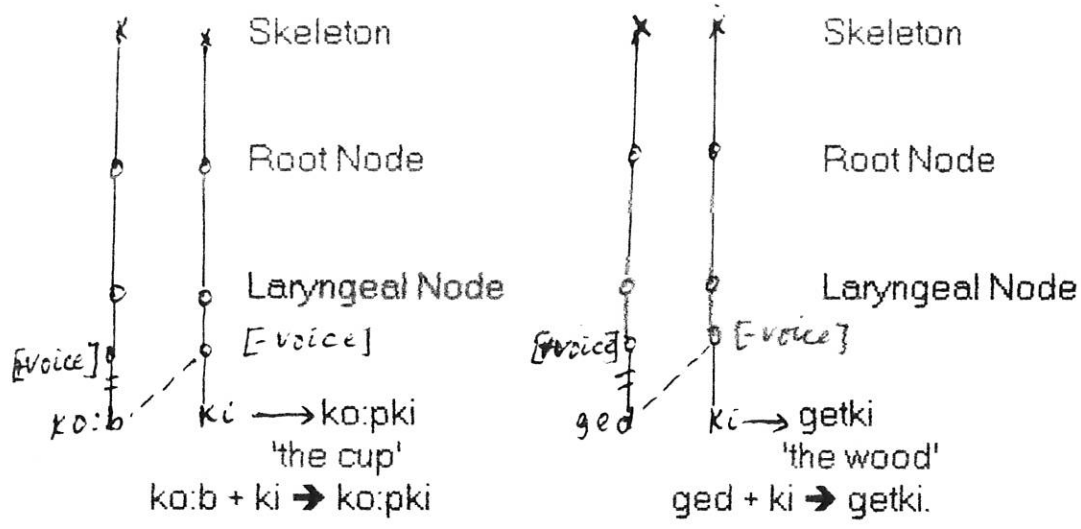


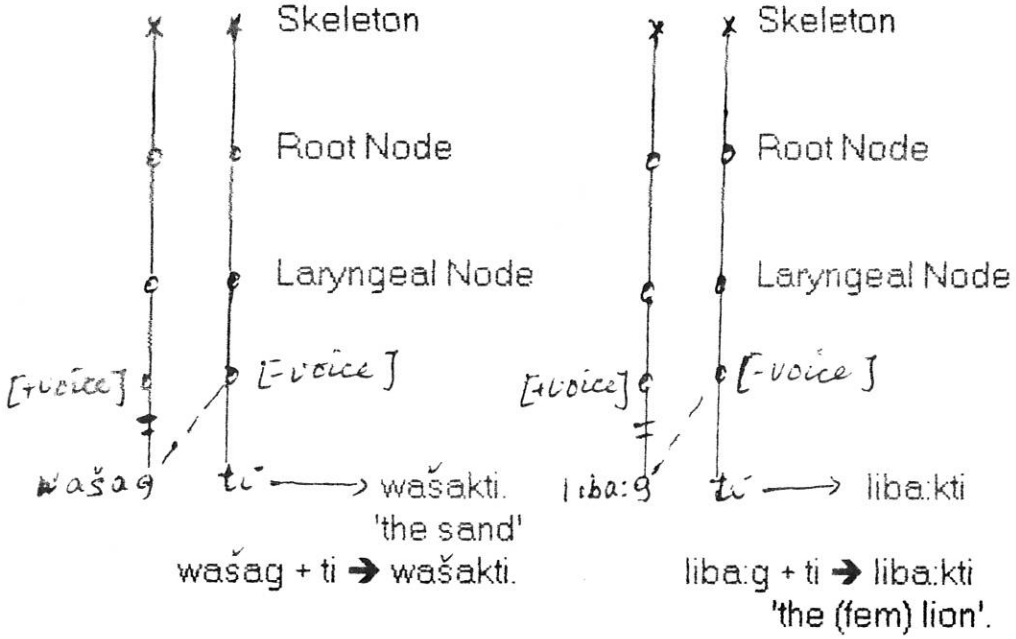
In (24) what spreads is the feature [+glottal] to [-glottal] feature without affecting anything else. As a result /k/ becomes an ejective /k'/.

3.2.5 Voice Assimilation

In Girirra devoicing or voicing of segments to agree with a segment in a given environment is a common phenomenon. An underlying voiced segment may be devoiced with the spread of [-voice] feature from a following voiceless segment. The spreading of the feature [-voice] may be demonstrated as follows:

(25) [- voice] feature spreading





In voice assimilation, the Laryngeal node spreads to the same Laryngeal node (ie.,-voice) of a preceding Root Node, resulting in devoicing of a voiced segment since it is the feature [- voice] that spreads regressively.

Voice assimilation seems to be blocked whenever the target segment is a sonorant as shown below in (26).

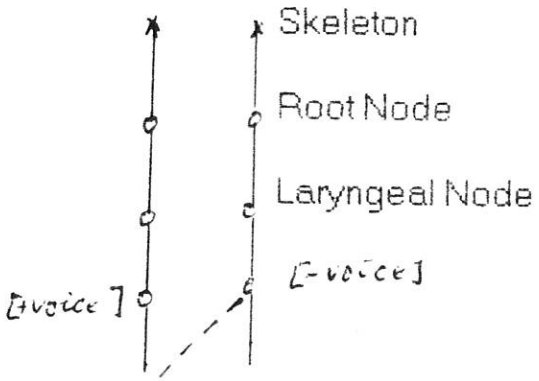
26.

a.	/ inta / ➔	[ínta]	' here '
b.	/ halka / ➔	[halka]	' one '
c.	/ harti / ➔	[harti]	' old man'
d.	/ e:yki / ➔	[e: yki]	'the dog '

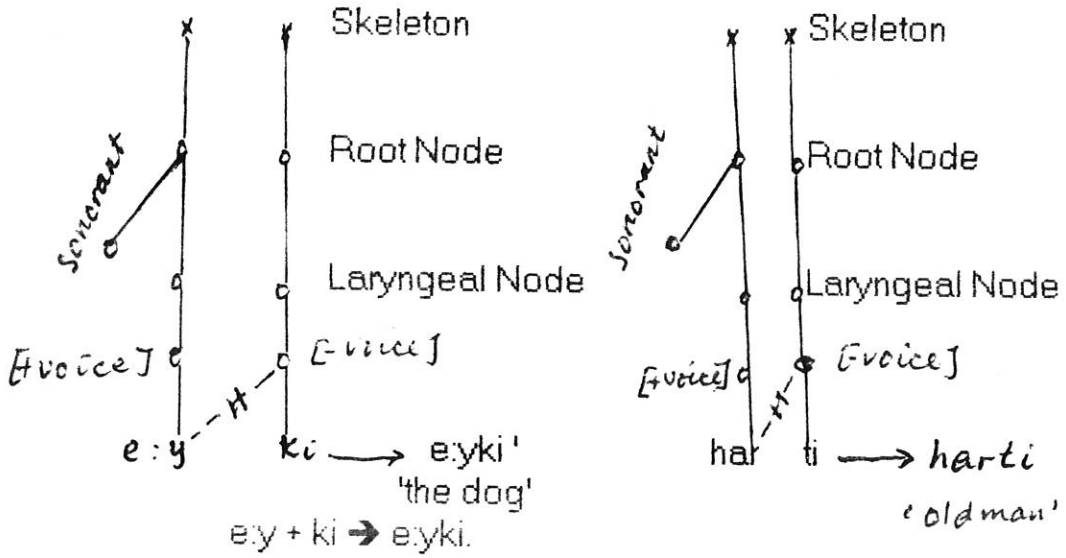
e. /a:wka/ ➔ [a:wka] 'your father'

The hierarchical representations in the above examples (25) predict that any voiced segment becomes voiceless if it occurs adjacent to a voiceless consonant. However, example (26) provides evidence which shows contrary instances results to this predication. These samples show that voice assimilation is blocked by the sonorant segments n, l, r, w, and y. Thus, the spreading of the feature [- voice] which is the dependent of the Laryngeal Node does not take place if the target segment is one of the members of the segments located here. This can be represented as in (27) below.

(27) Conditions of Voice Assimilation blocking
Target sonorant does not have a spreading from the Laryngeal node (i.e., [-Voice])
Hence.



Because of (27) the following sreading is not possible.



As a whole, assimilation in Girirra may be considered to be unidirectional (i.e., regressive) and the effect may be partial or complete.

In these nonlinear phonological representations almost all of the nodes are governed by the operations and constraints of the nonlinear phonological representation.

Chapter Four

4.0. The Role of Syllable in Girirra

In any language speech is organized into syllable, and syllables are hierachically organized phonological units (cf.van der Hulst and smith 1982; Selkirk 1982; Perlmutter 1992).

Based on the above assumptions, every segment in an utterance will be syllabified according to the structural condition of the language in question. According to Van der Hulst and smith (1982); Lapointe and Feinstein (1982); and Selkirk (1982) morphemes of many languages are sequences of possible syllables and the parsability of medial clusters in terms of possible syllable onsets and offsets is a requirement for the well-formedness of morphemes.

From a descriptive point of view, utterances have a specifiable internal structure that is roughly constant across the language. In a structure that is well-formed, a segment will belong to at least one syllable, except word initial or word-final consonants in some languages which may be extra syllabic (Van der Hulst and smith 1985; Selkirk 1982).

Traditionally, though there were works one the syllable (cf. Pike and Pike 1947; and Hockett 1955), the syllable was ignored in the standard theory of phonology as expanded in SPE. In SPE, it was assumed that segments, boundaries, and rules stating permissible combination of segments in morphemes and words were sufficient to describe the sound system of languages (cf. Kahn 1976; Clements and Keyser 1983; Haris 1983 for detailed comments). Consequently, certain basic assumptions such as syllable-based approach for phonological descriptions, and syllable related phenomena such as length, complex segment, and syllable weight were left out.

It was Kahn (1976) who established the fact that "... the exclusion of the syllable was a serious omission in generative phonology, and that many phonological rules only receive approximate formulation in terms of this notion " (Clements and Keyser 1983:1). Hence, the motivation for the renewed interest in the syllable in current generative phonology was considered as a break through in phonological theory.

On the whole, it seems that the following weaknesses of SPE seem to have indicated the need for the notion of the syllable.

a) a segment - based description is inadequate to express rules which are syllable - based;

b) the specification of the phonotactics of a language can be complicated if the syllable is ignored; and consequently many important generalizations would be ignored (cf. Kahn 1976; Clements and Keyser 1983; Selkirk 1984; van der Hulst and smith 1985 among others, for details).

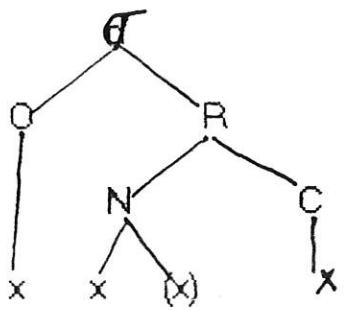
In Girirra, the recognition of the syllable as a phonological unit is believed to be relevant since it provides a syllable based description and a more adequete explanation of the phonological processes and the phonological wellformedness conditions of the language. About the necessity of a sylable which was ignored by SPE van der Hulst and smith (1982: 37-8) notes:

> The standard theory makes no use of the notion of syllable ... motivation for introducing the syllable was that so called phonotactic restrictions(i.e., wellformedness conditions) are most appropraitely formulated in terms of the notion of wellformed syllable or rather wellformed parts of a syllable.

4.1. The internal structure of Girirra Syllable.

In its internal structure, the syllable is organized hierarchically. The syllable according to this hierarchical representation is composed of subparts, namely onset (O), nucleus (N), and coda (C). The nucleus and the coda together form a rhyme (R). The nucleus is an obligatory subpart while the other two constituents may or may not appear in the syllable structure of Girirra. The following diagram shows the representation of the possible Girirra syllable structure. The x's, which are featureless are similar to C-V elements and are used to represent the timing slots and/or may replace the skeletal (or C-V) level.

(1)



It is assumed that the onset-rhyme bipartition is universal. The nation of possible syllable plays an important role in the assignment of syllable structure (see Noske 1982:259; and Selkirk 1982).

Even though the bipartition of the onset - rhyme is a universal principle, there is a restriction on how many segments (and which ones) can appear in these positions in particular languages. That is the

assignment of segments to these positions depends on language specific constraints which follow the syllabification rule of each language. The syllabification rule in turn is based on the notion of possible syllable organization of the language.

Before moving to syllabification rules, we may perhaps have to look at the internal structure of Girirra syllables. The syllable in this language is constrained by the following sub-rules (2).

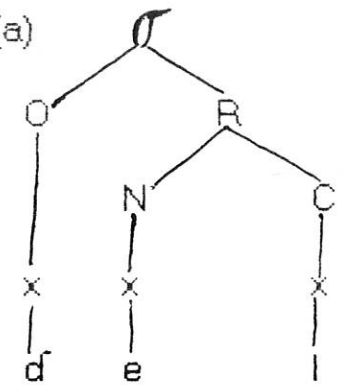
a) A nucleus node has to dominate at least one and at most two vowel segments.
b) The onset node dominates zero and at most one consonant. [?] does not appear in onset position.

c) The coda node dominates zero and at most one consonant.

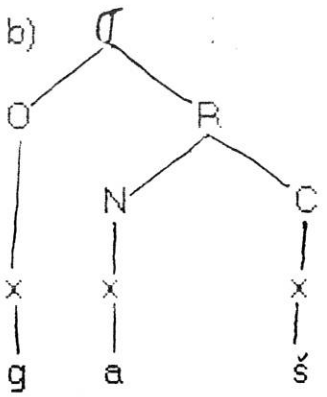
Because of the above restrications, Girirra has no syllable initial or syllable final consonant clusters as shown in the following examples.

(3)						
	hir	'tie'	gaš	'cut'	ti:r	'pole'
	ɗel	'pot'	run	'truth'	ɗa:m	'change'
	lug	'foot'	ror	'run'	so:r	'porridge'
	tol	'clan'	rag	'chase'	be:n	'lie'
	gub	'burn	rar	'bed'	ɗe:r	'long'

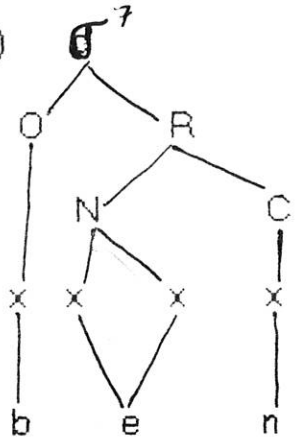
(3) (a)



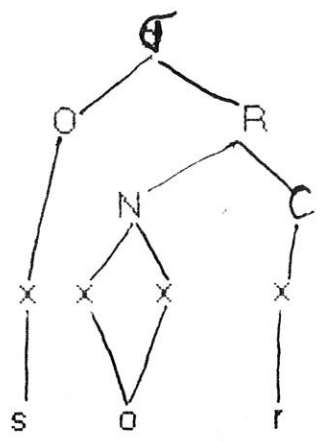
b)



c)



d)

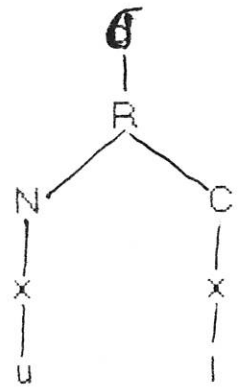


In Girirra, there is a possibility of having onsetless or codaless syllables shown in the examples below:

(4) Onsetles syllables

ul	'stick	id	'claw'
if	'light'	o:n	'thirst'

(4) a)



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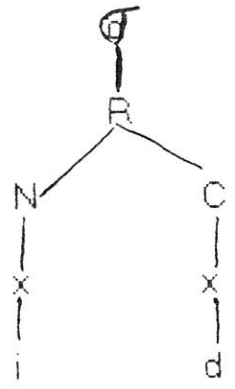

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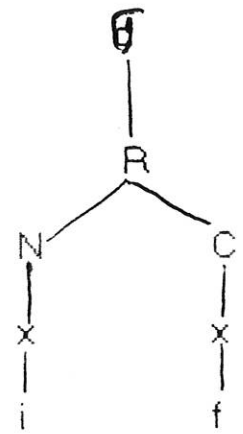
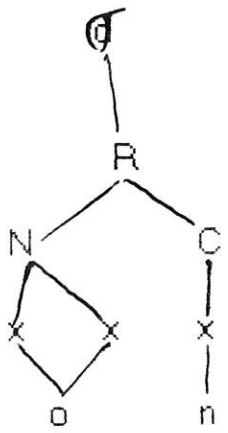


d)



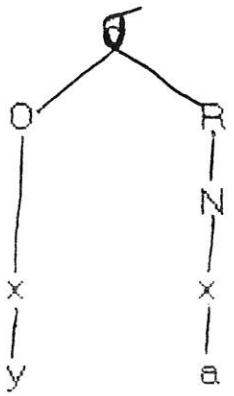
(5) Codaless syllables

-ya	'is'	ha:	'yes'
-ma	'not		

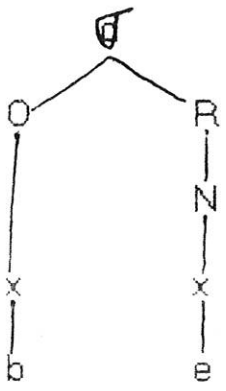
Normally in Girirra such syllables (i.e., Codaless syllables) do not have consonants at coda position. But one may find an epenthetic consonant (i.e., the glotlal stop /ʔ/) in the surface form. The glottal stop inserted at a final position is purely for phonetic reasons (i.e., pronunciation). The following . . . . . are some examples.

6) beʔ 'come out' šeʔ 'stand up' ɗeʔ 'say'
The underlying representation of (a and b) are as below:

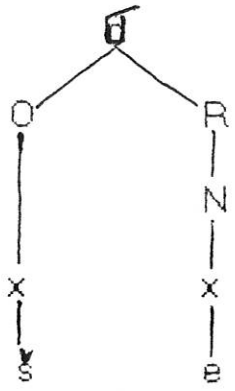
(6) a)



b)



c)



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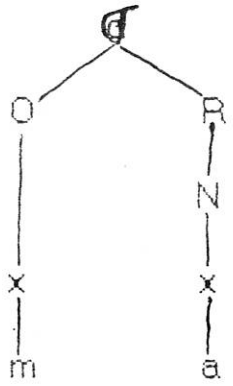


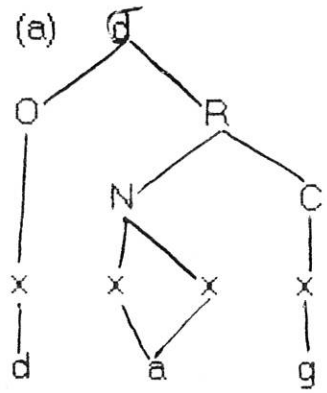
As can be observed in the examples in (3), the syllable of Girirra onset and coda may each dominate a consonant segment. The nucleus is an obligatory constitutent of the syllable and it may constitute either a short or a long vowel as represented in the following samples:

(7) da:g 'graze' wa:n 'frustration'

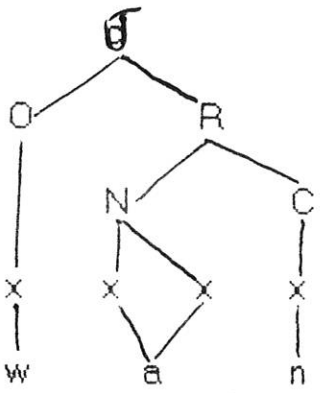
e:y 'dog' ha: 'yes'

The syllable structure of these long vowels may be represented as follows

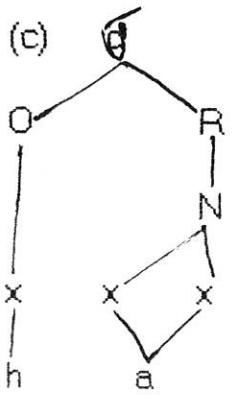
(7) (a)



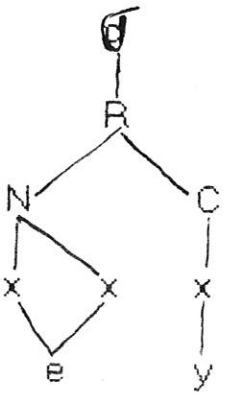
b)



(c)



(d)



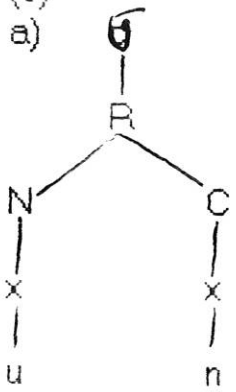
The long vowels are associated with two timing slots (x's) in the nucleus. The short vowels, on the other hand are assigned to a single slot in the nucleus as can be seen in (8) bellow.

(8) *un* 'eat' hor 'ancient' tuf 'spit'

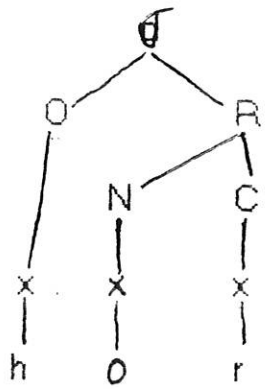
The syllable structure may be represented as follows:

(8)

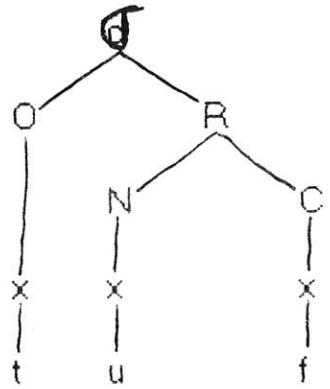
a)



b)



c)

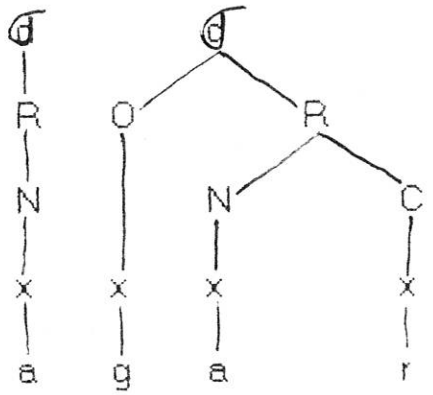


In Girirra, as in all other languages the nucleus plays an important role in the syllable. The nucleus, on its own can make a syllable as shown in the following samples:

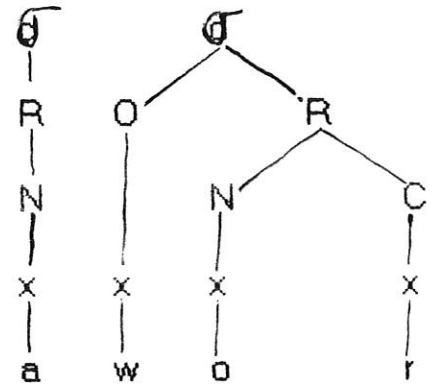
(9) a gar 'to see' a wor 'bull'
'i lig' 'tooth' idu 'sheep'

The syllable representation is illustrated as can be seen below:

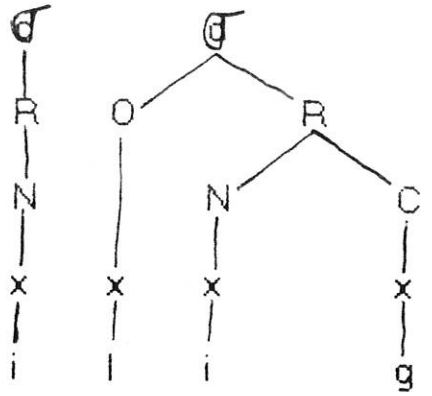
(9) a) a+gar



b) a+wur



c) i+lig



Thus, as can be seen in the above examples, the syllable made up of only a nucleus may not be found in isolation but as part of disyllabic words as shown above. Even then a nucleus in Girirra may constitute a single vowel and a nucleus may form a syllable.

4.2 Syllabification in Girirra.

To syllabify utterances it is important to follow certain universally attested algorithms or formal step-by- step procedures. In the attempt to syllabify Girirra words the following procedures may be applied. The procedures are adopted from Katamba (1989:162); and Clements and Keyser (1983:38), and they are given in (10) below.

(10)
a) Underlyingly every v(owel) on the CV-tier is linked to a syllable.

b) Link each C (onsonant)-element to the nearest V-element to its right provided the resulting sequence of segments does not violate any language specific rules.
c) Repeat the procedure in (b), this time link the c-elements to the nearest v to its left.

These algorithms follow, the ONSET FIRST PRINCIPLE of kahn (1976); Clements and Keyser (1983), and " the all nuclei first approach" of Goldsmith (1990:117).

These algonithms can have relevance to Girirra syllabification. They help to determine the organization of consonants and vowels (see,Lapointe and Feinstein 1982; Clements and Keyser 1983; Noske 1982 and others for other languages). They provide solution to problems of syllabification in that they disambiguate the position of each segment within the syllable by the help of the above procedures as illustrated in examples (13). Before going to the mapping procedures, it seems

worthnoting the relevant syllable structure (or the set of core syllable types) of the language.

(II) The Core Syllable types of Girirra

a) V	i lig	'tooth'	e) CV	ma	'not'
b) VV	ii gu	'valley'	f) CVV	haa	'yes'
c) VC	ul	'stick'	g) CVC	bil	'month'
d)VVC	eey	'dog'	h) CVVC	daag	'graze'

One can abstract the following generalized syllable type from all the above examples and posit that as the possible syllable of the language with maximum constituents within each node.

(12) The Possible syllable structure of Girirra.

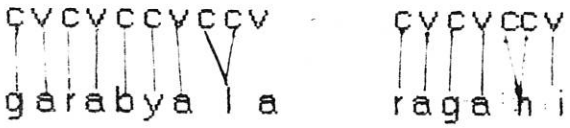
(c) v (v) (c)

As has been discussed above the syllable structure condition of Girirra is that the onset and coda are optional constituents where as the nucleus is obligatory and can have one or two vowels in its timing slot.

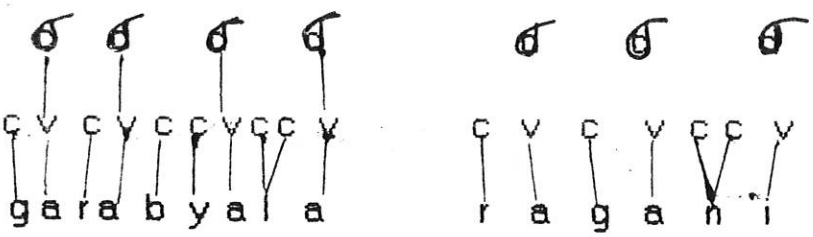
By using the principles given in (10a-c) and the syllable structure condition given in (11), one may syllabify the following utterances as in (13) below:

(13) (a) - garabyalla (b) raganni

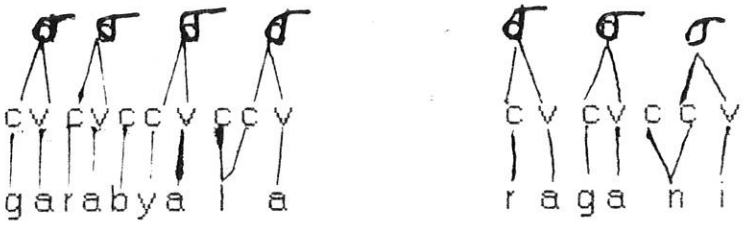
13.1. CV-templete



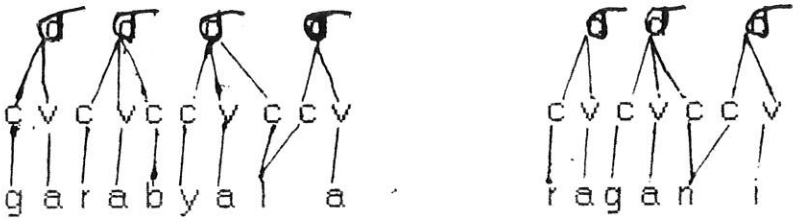
13.2 V - elements prelinking to syllables.



13.3. adjoining c- elements (Onset First Principles) to V on their right one at a time



13.4. adjoining remaining C - elements to the V on their left.

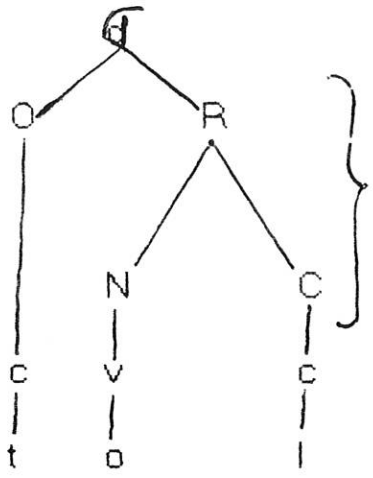


Hence, the procedures help to isolate the syllable of the words /garabyalla/ 'shoulders' and /raganni/ 'will chase' as to be cv+cvc+cvc+cv, cv+cvc+cv, respectively.

In the representation, the syllable of Girirra follows the three tiered theory of the syllable approach of Clements and Keyser (1983) which shows some extension of the hierarchical approach developed by Kahn (1976). In organizing the syllable constituents on a tree, Clements and Keyser have introduced a level called C-V tier, which mediates the syllable constituents and the terminal elements or segments or bundles of distinctive features specifying segments one finds within the internal structure of a syllable (cf. also van der Hulst and smith 1985: 44-5). There are scholars who have included a level above the syllable referred to as meterical feet (See Van der Hulst and Smith 1985; Selkirk 1984; among others, for further information). For our purpose here, we will limit ourselves to the level of syllable tier without referring to the level above.

Following Clements and Keyser (1983), we may therefore consider syllable trees consisting of three tiers as the following trees illustrate:

(15) a)



syllable tier

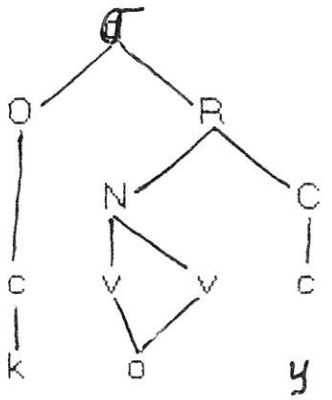
Syllable Structure

CV - tier

Segmental tier

tol 'clan'

b)



Syllable tier

Syllable Structure

cv - tier

Segmental tier

ko:y 'Come'

In Girirra, a syllable is always expanded in terms of these nodes, even when certain nodes are not filled with materials at the level of the skeletal tier.

The syllable structure of this language may be defined by the following set of syllable formation rules.

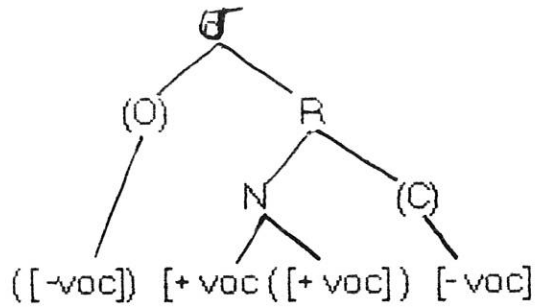
(16) Girirra Syllable Formation Rule (GSFR).

a) σ → (O) R
b) O → [-voc]
c) R → N (C)

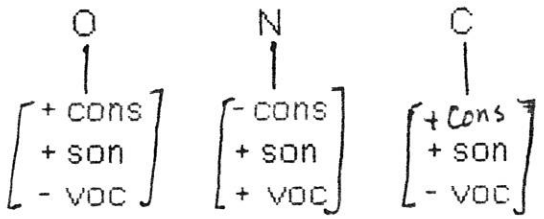
d) N → PK [+ voc]
e) C → [- voc]

These can be represented schematically as shown in (17) below.

(17) a)



b)

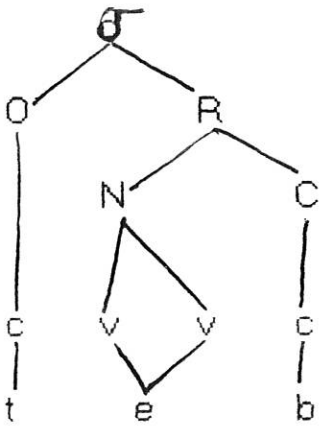


All the terminal nodes in (17) can dominate consonantal and vocalic segments (see Rule 2a- c). The following samples illustrate for the GSFR.

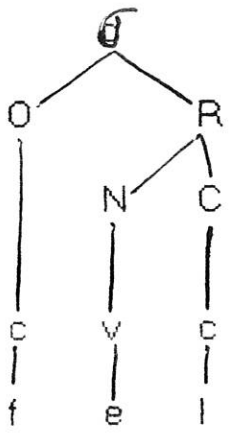
(18) a) te:b 'bark of a tree' b) fel 'weeds' c) gub 'burn'

b) a d 'white' e) se? 'cow'

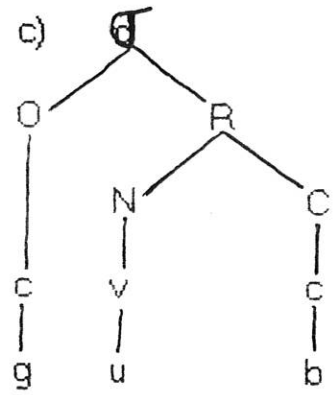
a)



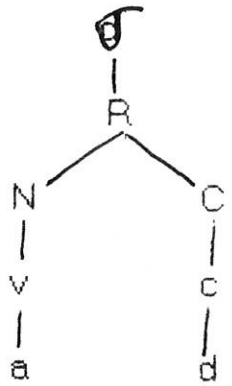
b)



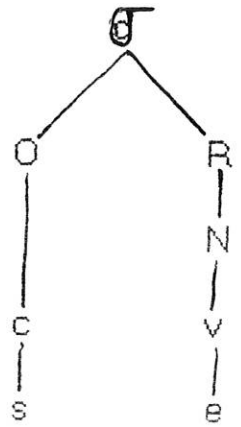
c)



d)

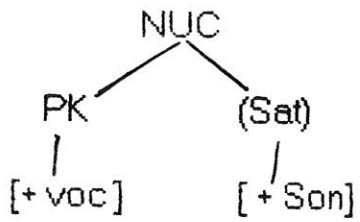


e)



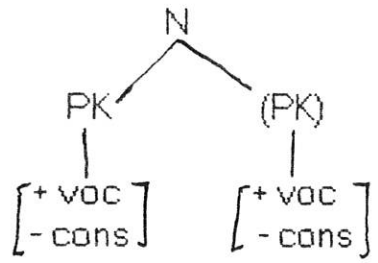
The nucleus of Girirra branches to accomodate long vowel, which means that a long vowel is treated as a sequence of identical segments that occupies two timing slots on the skeletal tier (or cv tied in our about case)as assumed by Lapointe and Feinstein (1982: 76) shown in (19) below:

(19) Universally Possible Nuclei.



Girirra nucleus consists of either a single vocalic peak (pk), or two identical vowels and this may be represented by the diagram shown below.

(20) Girirra Nucleus

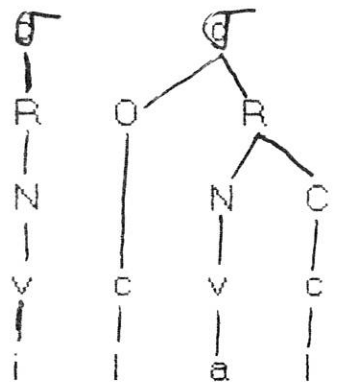


The representation suggests that the nucleus in Girirra may or may not branch and this optionality is indicated by the bracket on the second vocalic constituent. Hence,

(21) a) N may or may not branch
b) A branching N is associated with a sequence of identical vowels.

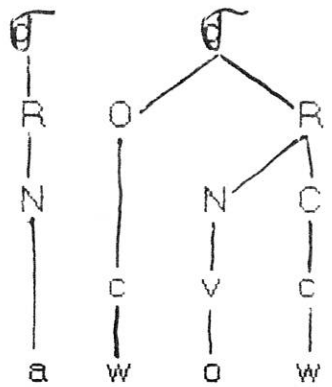
The following are examples of non- branching nucleus in Girirra.

a)



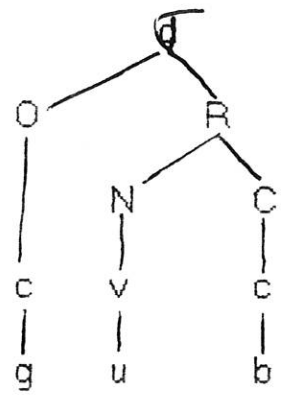
ilal = ' look '

b)



awow = ' grandfather '

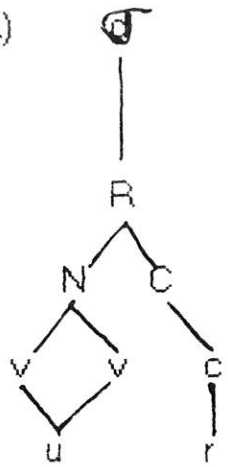
c)



gub = ' burn (imp) '

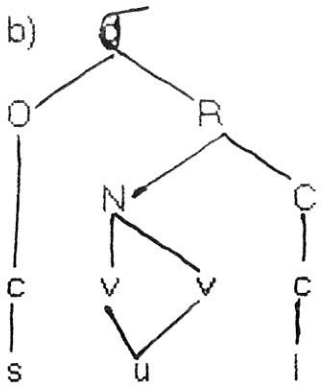
The following examples provide a branching nucleus.

(23) a)



u:r = pregnancy

b)

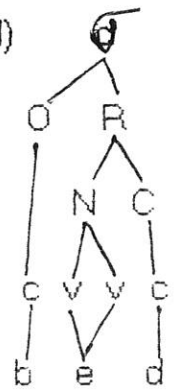


su:l = thumb

c)

ha: = yes

d)



be: d = wound

4.3. Resyllabification

In the above discussion we attempted to adopt the theory of syllable representation which characterizes the syllable as a three-tiered structure having the formal properties of an autosegmental system. It has been claimed that the units C - V define position in syllable structure that particular consonants and vowels may occupy. Each members of either tier is mapped or syllabified independently. Thus, the insertion or deletion of an element may affect the system in which the elements are already associated or syllabified.

Hece, resyllabification is a process in which reassociation takes place, when new elements are inserted in or old ones are deleted from the already syllabified word. In both cases resyllabification or relinking[6] will

take place to give well-formed structures (cf Lapointe and Feinstein 1982; Goldsmith 1990).

In the following section we will examine the cases of insertion and deletion in Girirra.

4 . 3 . 1. Insertion

Insertion is a phonological process in which new elements, usually vowels are added to break unwanted cluster(s). Regarding the insertion of vowels Lapointe and Feinstein (1982: 108) suggest the following.

> a) If one or more Cs in the segmental string of a word cannot be attached to be a well-formed syllable structure, construct a new syllable structure in which at least one PK in the new structure dominates and until all of the Cs in the segmental string are attached.

Girirra disallows constant cluster at the onset and the coda positions. To avoid clusters epenthetic vowels are inserted. As one would expect the least sonorant (usually the central vowels) are to be considered as epenthetic vowels in languages like Amharic. Girirra does not have the central vowel and hence /i/ serves as an epenthetic unit, as it is used to be in Oromo.

The following examples show that / i / is inserted to break unwanted consonant cluster.

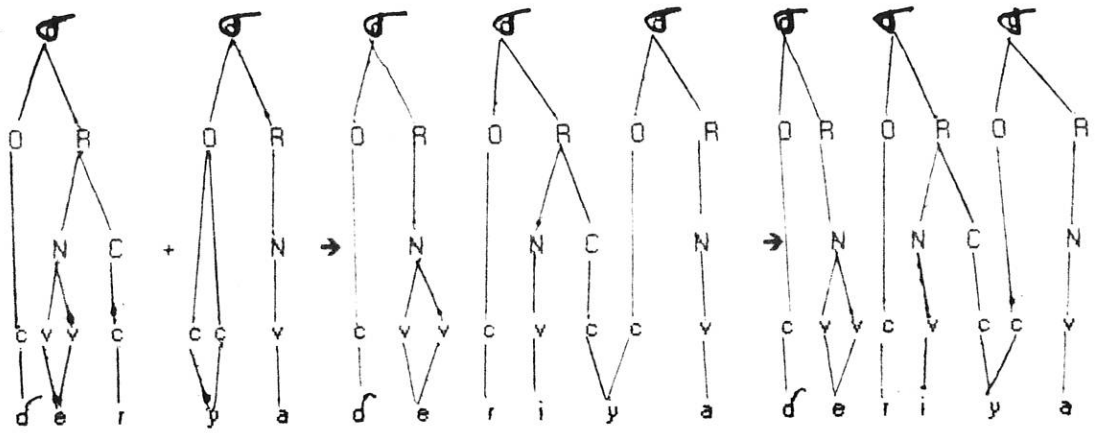
24. a) ɗe:r+yya = UR
ɗe:r+i+yya = epenthetic vowel insertion
ɗe:riyya = SR 'is long'

b) libag + ki = UR
libag + i+ki = epenthetic vowel insertion
libagiki = SR 'the lion'

c) herer + yya = UR
herer + i + yya = epenthetic vowel insertion
hereriyya = SR 'is bitter'

The sample hierarchical representation can be shown as follows:

25 -



In Girirra we have also consonant epenthesis. The consonant epenthesis in the language seems to be the glottal stop /ʔ/. The reason for assuming this segment to be an epentetic one is that it is the only segment inserted everywhere by purely phonological rules. (This is in agreement with Goldsmith 1990). Thus, it is analysed as an empty coda position underlyingly in the following samples. [seʔ] 'cow', [beʔ]. comeout [dɨ́ʔ] ' come down'.

In this language, a sequence of two different vowels is broken by the insertion of the glottal stop as can be seen from the examples given below.

26) a) ka?imo ' is young ' ho?u 'take'
ha?ur ' let it gets bad smell '

Structures like the following are illformed as they contain a sequence of two different vowels.

b) * kaimo
haur
hou

Hence, it appears that the language has the following rule.

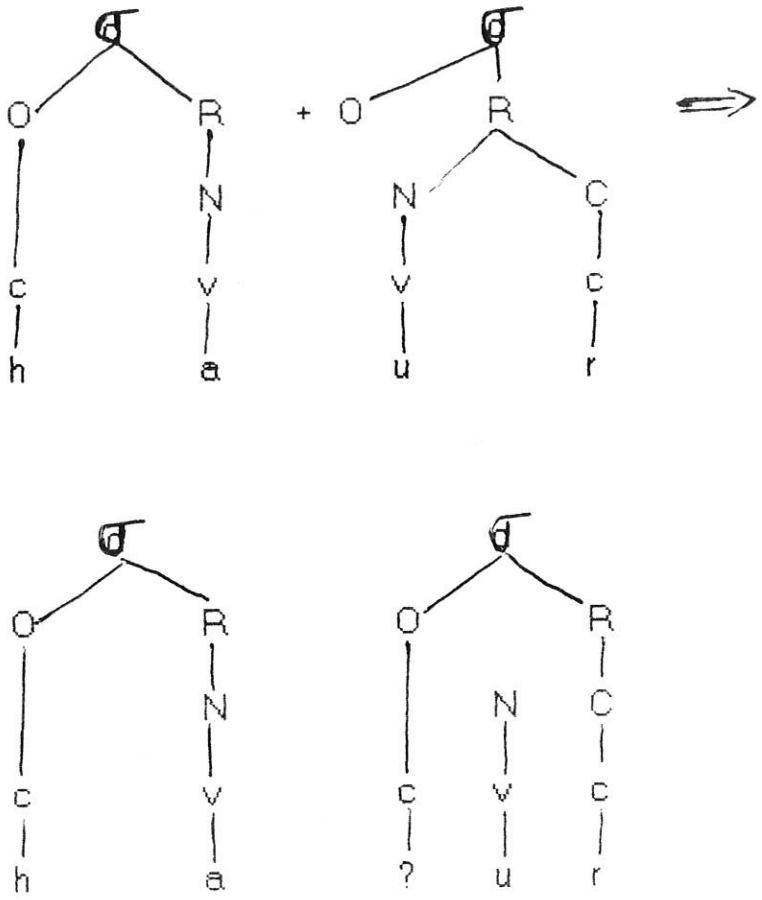
27) A sequence of two different vowels in a word or which is formed by juxtaposing two morphemes is broken by the insertion of a glottal stop.[9]

Rule (27) can apply as follows.

28)	ha	'let'	ha + ur	= UR
	ur	' bad smell	ha+?+ur	= insertion of ?
			ha?ur	=SR

The hierarchical representation of this process looks like the following.

29)



' let it gets bad smell '

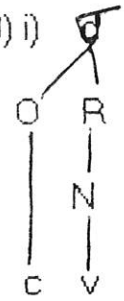
4.3.2. Vowel Deletion

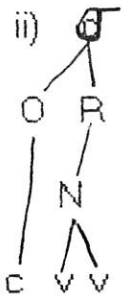
Vowel deletion is another phonological process by which a segment is deleted (or dropped) in the surface structure, because its presence will result in illformed syllable structures.

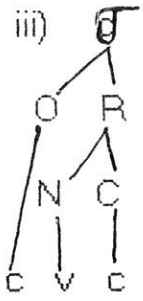
Girirra, like some other languages, makes use of the distinction between light and heavy syllables. In this language light syllables are open syllables where as closed syllables are supposed to be heavy (cf. Clements and Keyser 1983: 12-3; Lapointe and Feinstein 1982 : 78; Van der Hulst and Smith 1982:35). The following are the possible syllable types of Girirra.

Light syllables		heavy syllables
V	VC	CVVC
CV	VVC	CVC
	CVV	

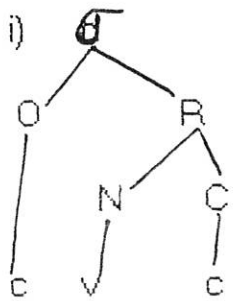
Hierarchically the syllable structures may be represented as follows:

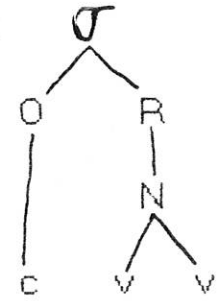
30) i) 

ii) 

iii) 

The syllable in (i) consists of an onset and a rhyme and the rhyme consists of a nucleus dominating only a short vowel. The internal structure of syllable (ii) is different from (i) in that it has a branching nucleus dominating two short vowels. According to Hyman (1985:7) branching rhymes are of two types. One is a rhyme which branches starting from its node, and the other is that which branches at the neucleus level. These two types may be represented as follows.

31) i) 

ii) 

In both cases, the rhymes are branching rhymes and hence, they are considered as heavy syllables (Hyman 1985: 7).

The consideration of branching and non branching rhyme will lead us to the determination of the weight of the syllable (Hyman 1985). Just by looking at the representation (30 -i), is considered as a light syllable, while the others are heavy syllables. Notice that the rhymes in these structures are branching. Having drawn the distinction light and heavy between syllables, let us now look at examples of deletion in the following examples.

32) a) migi ' name '

migi + es	= 'UR
migØ + es	= vowel deletion
miges	= ' SR
	'his name'

b) idalla 'sheep (pl)'

idu+alla	= UR
idØ+alla	= Vowel deletion
idalla	= SR
	'sheep (pl)'

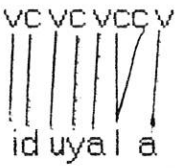
The following rule may help us to predict the process of deletion shown in the above examples.

33) A sequence of two light syllables can not precede a heavy syllable especially if the heavy syllable is word initial. Such structures if and when they occur will result in the deletion of the light syllable that immediately precedes the heavy syllable.

The following samples may help to clarify the rule.

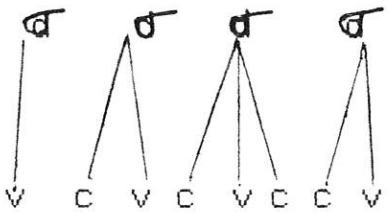
34) a) Underlying string idu+yalla ' sheep (pl)

b) C-V templete



c) Syllable structure assignment

*

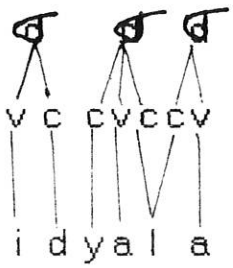


= Light - Light - Heavy - Light

This syllable structure has the sequence of two light syllables before heavy syllable at the initial position of the word. According to rule (32) such structure is illformed. Deletion of the second light syllable will result in the correct syllable structure. Therefore, following rule (32) problems like (33) may be corrected as (34) shown below.

35) a) idu + yalla = UR v-cv - cvc - cvc
idØ+ yalla = syllable deletion v - c Ø - cvc - cv
idyalla = SR vc - cvc - cv

36) The syllable structure assignment



Heavy - Heavy - Light

'sheep (pl)

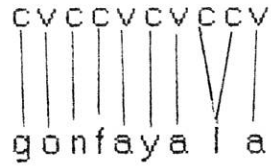
Based on this process of deletion, we may say a few words about Girirra plural formation without going into details. It is assumed that there are two plural markers (i.e., the long{a} and {yalla}. The morpheme { -

yalla } has an allomorph { - alla }. { yalla} and{ - alla}) participate in process of deletion we are trying to see. Let us see the following examples:

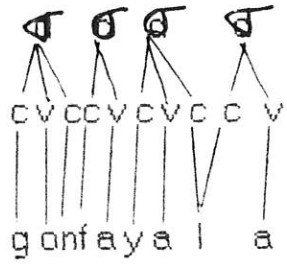
37) gonfa 'trousers'

a. underlying string gonfa + yalla

b. c-v templete



c. Syllable structure assignment

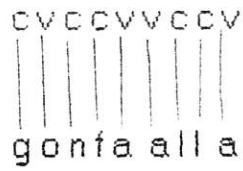


Heavy - Light - Heavy - Light

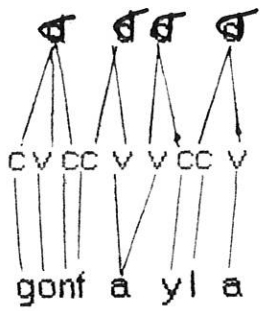
But if we contrast the same word with an affix { - alla } the structure will be out. See (38) below:

38) a. gonfa + alla = UR

b. c - v templete



c - syllable structure assignment



→cvc - cv- vc- cv.
Heavy-Light-Heavy-Light.

According to rule (33) example (38) should have been wellformed. But, rule (39) which doesn't allow a cluster of vowels across word boundaries makes the structure illformed.

On the whole, rule (39) may handle the case properly.

(39) If a vowel at the end of a word is affixed to a morpheme which starts with a vowel delete the last vowel of the base.[10]

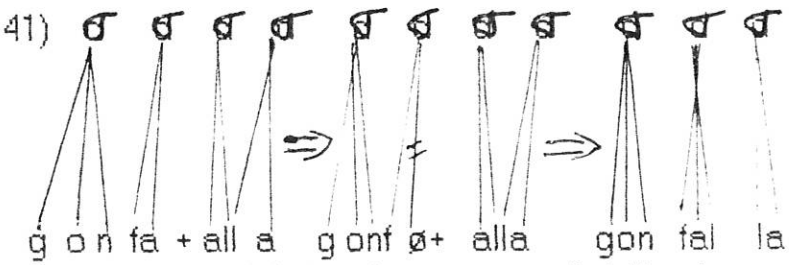
Hence, problems like (38) and the others which are not solved by rule (27) and rule (33) may get a solution by rule (39) as illustrated below:

(40) a. gonfa + alla =UR
gonf ∅ + alla = vowel deletion (Rule 39)
gonfalla = SR

b. heega + alla = UR
heeg∅ + alla = vowel deletion (Rule 39)
heegalla = SR 'brooms'

The hierarchical representation of the process of deletion in (40) is shown below.

41)

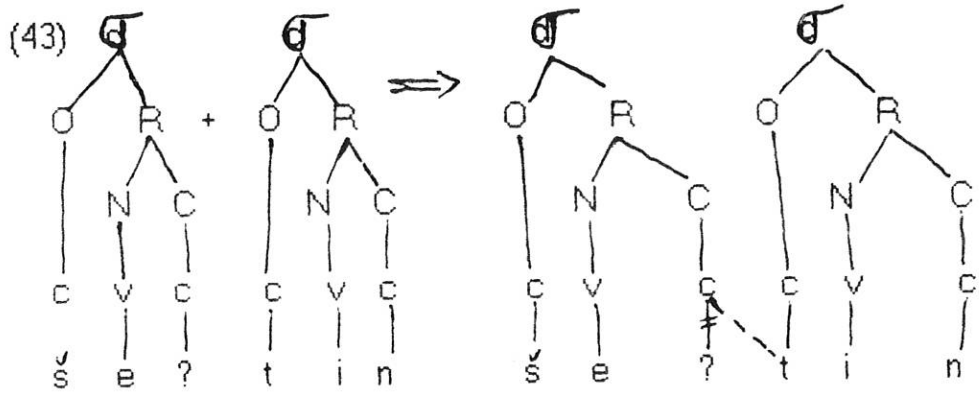


In this language a glottal deletion is also an observable phenomenon. A word final glottal stop is not realized if a suffix with an initial consonant is attached to the base. However, the glottal stop that is deleted at syllable final position is compensated by lengthening the onset of the second syllable (or the suffix) as shown below.

(42) Še? 'stand up'
Še? + tin = UR
Še∅ + tin = deletion of glottal stop
Še + ttin = compensatory lengthening.
Šettin = SR 'the process of standing up'

The hierarchical representation of the process is illustrated as follows:

(43)



The following is additional sample for glottal stop deletion and the accompanying compensatory lengthening.

(44)

be?	' come out '
be? + tin	= UR
be∅ + tin	= deletion of glottal stop
be + ttin	= Compensatory lengthing of consonant
bettin	= SR ' the process of coming out '

Therefore, in this language, vowel and consonant segments are inserted to break vowel or consonant clusters except in the case of true geminates or underlying geminates.

4.4. Length (or geminate) in Girirra

As we have mentioned earlier the syllable, the consonant and the vowel tiers must be associated to show that they are synchronized.

There are two systems of association : a) the unmarked association principle , and b) the marked association principle which must be stipulated. In other words, there is normal one - to - one association and there is double association or many to one association. Goldsmith (1990:49) has the following to say about association to indicate length, " If autosegment representation allows for many-to-one associations, then geminate segments count as two-to-one association in one direction. " Goldsmith continues his explanation of the multiple association as an association where two successive segments on a single tier are associated to a single position (or slot) on the skeletal tier.

Length in Girirra is phonemic. Girirra has five short and five long vowels. The short vowels contrast with the long vowels as in (45) below.

(45)

un	'eat'	ey	' well/hole'
u:n	' smoke	e:y	' dog'
wan	' milk '	hiro	' wear
wa:n	' frustration '	hi:ru	' balu '

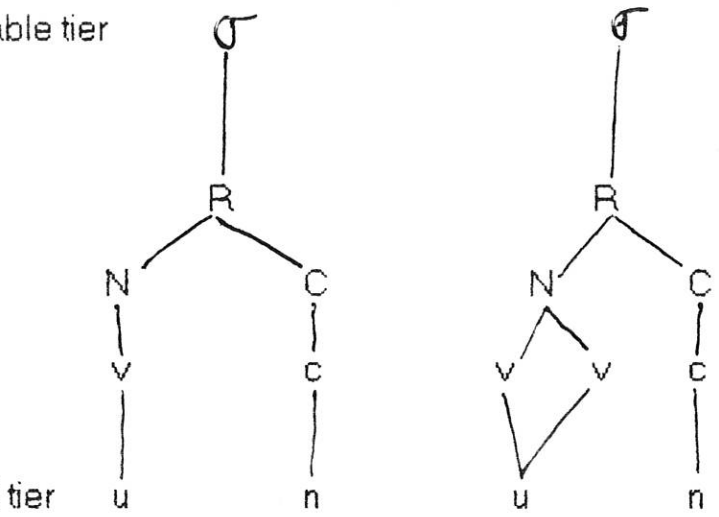
hor 'ancient'
ho:r 'to rain'

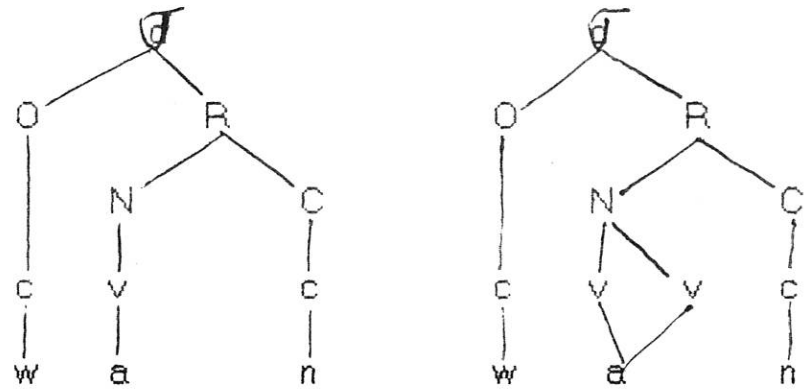
The following are samples to show how these words require a multiple association.

(46) Syllable tier

cv - tier

Segmental tier





Hence underlying long vowels are said to require a multiple association while short ones follow the universal association principle of one-to-one left to right.

In this language consonant length is also phonemic. That is words can be distinguished on the bases of length of consonants. This is shown in (47) below.

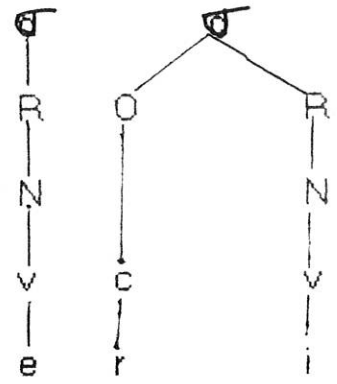
(47)

migi	'name'	eri	'sun'
mig:i	'fruit'	er:i	'soil'
rago	'chase'	rag:o	'frog'

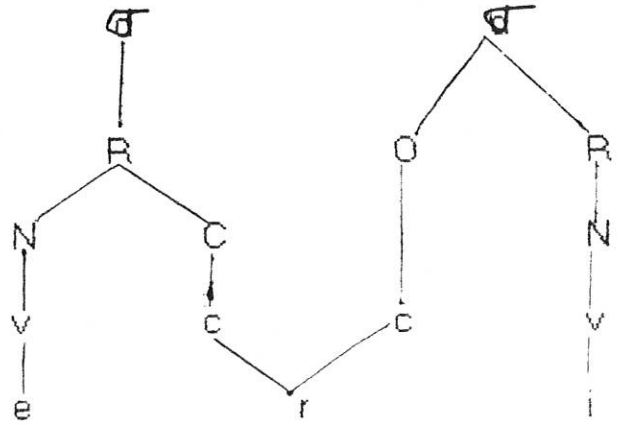
The nonlinear representation of two of these examples is given below.

48)

(i)



(ii)



Since consonant clusters (geminates) are not permitted at the onset and coda position in Girirra, long consonants are only found word medially and are ambisyllabic in the sense that half of the geminates is the onset of the second syllable in a word as shown in (48 ii) above. The example shows that underlying geminates (or true geminates) follow from language specific association principles which may be referred to a multiple association. In all other cases, the universal principle of association is adhered to.

4.5. Spirantization

Spirintization is the process of weakening in which a non-continuant sound becomes continuant or a stop becomes a fricative. (cf. Hooper 1976; Hayes 1982, Lass 1984; Goldsmith 1990). In Girirra the voiced non - continuant bilabial /b/, and the voiceless non - continuant glottal stop /?/ become continuant intervocalically. For example:

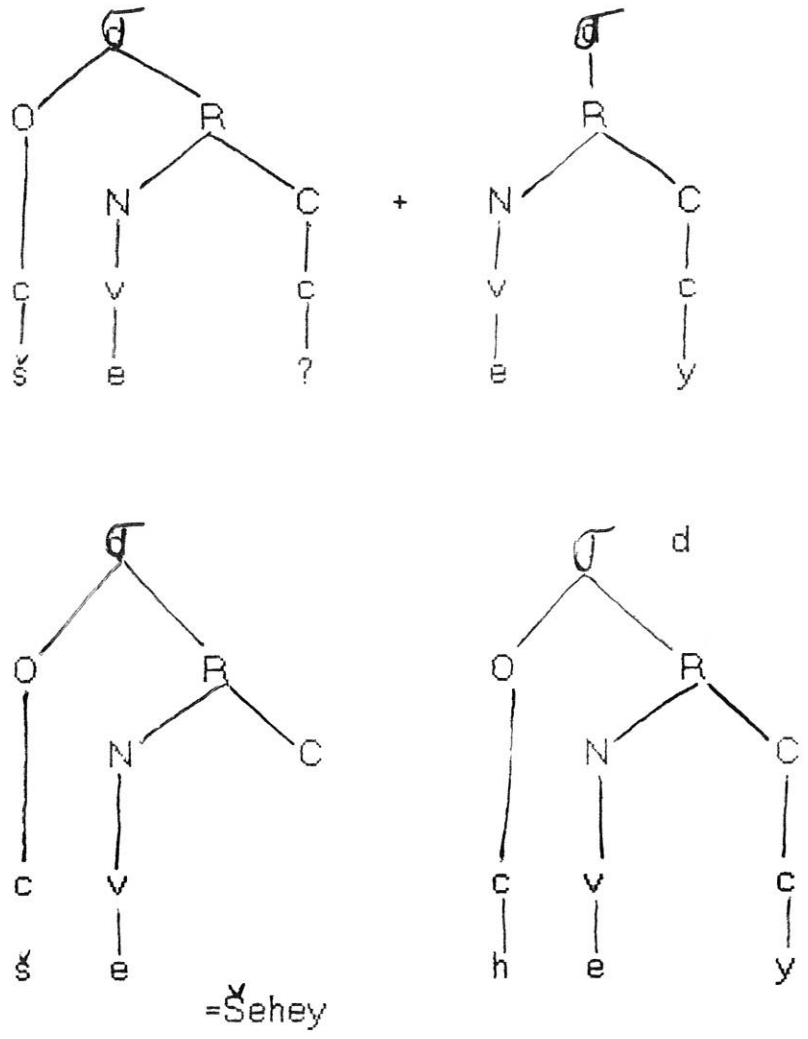
(49)	i -	/habo/	→	[haβo]	'need'
		/libod/	→	[liβod]	'male'
		/hiben/	→	[hiβen]	'night'

ii - li? + aton = UR
li + haton = spirantization of ? →h.
l i h a to n = SR 'sixty'

šе? + ey = UR
Še + hey =spirantization of ? → h
Šehey =SR 'he stood up'

The sample hierarichlcal representation of glottal fricativization is shown below.

(50)



4-6- Girirra voicing

Voice alternations, most frequently characterizing obstruent systems, are a familiar phenomenon in a variety of languages. Girirra appears to display the common phenomenon of obstruent devoicing in

word final position, as well as voice assimilations (cf. 3.2.1.5 for details) in consonant clusters, both within words and at word boundaries.

Basically, one may find that there are at least three distinct processes in voice alternations affecting obsttruents: word final devoicing, regressive assimilation within words and across word boundaries.

The processes may be treated by nonlinear analyses by establishing the connections between the three processes namely syllabification, autosegmental spreading and delinking .

In general word final obstruents or obstruent clusters (i.e., voiced stop obstruents): a) lo se their voice quality or b) assume the voice quality of the obstruent that begins the next syllable. The following are examples for word final devoicing.

(51) /gub/ → [gup] 'burn (Imp)'
/rug/ → [ruk] 'massage (imp)'
/dad/ → [dat] 'a person'

The above examples (51) lead one to conclude that voiced obstruents are neutralized or devoiced syllable finally in Girirra,. Hence, voiced obstruents that we find at syllable final position are unspecified for voice . As a solution, all consonants that lack this specification may be specified by a rule called default rule (cf . Gussman 1992)[11]. Therefore, the unspecified segments become [- voice] by the default rule. Gussman (1992: 43) has formulated this rule as follows:

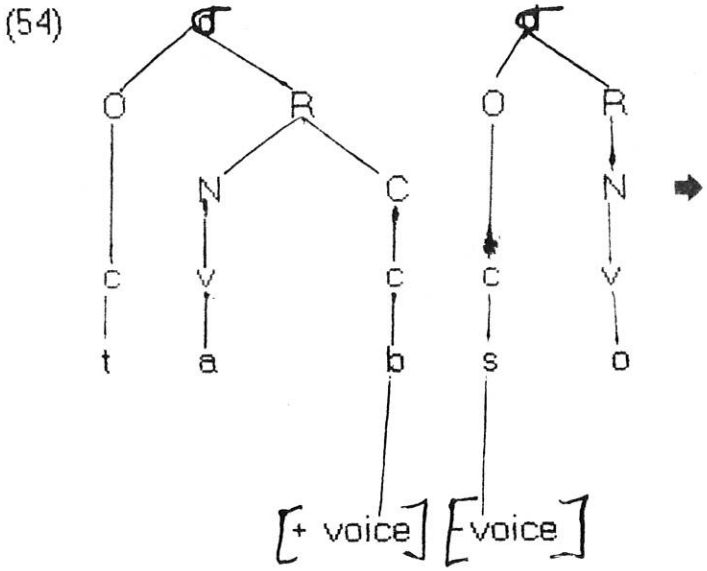
(52) (c) → [- voice], where (c) stands for a consonant unspecified for voicing.

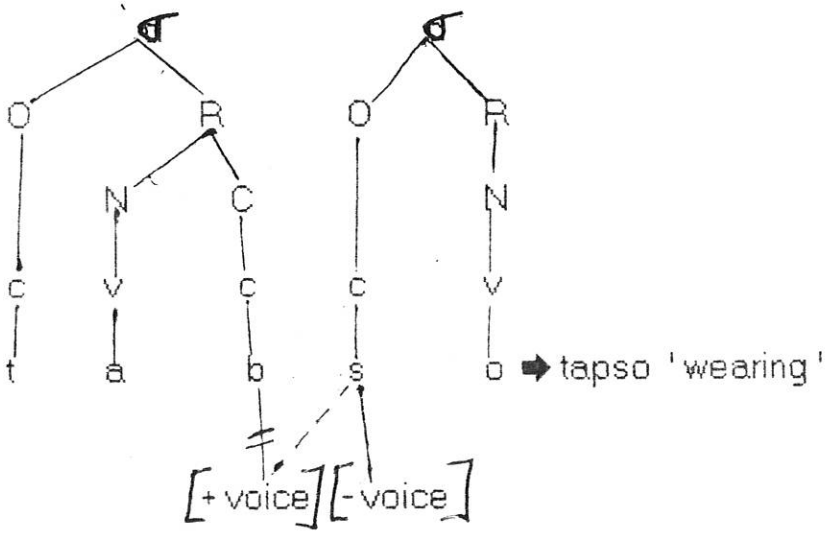
Obstruent clusters assume the voice quality of the obstruent that begins the next syllable. For instance:

(53) /tabso/ → [tapso] 'wearing'
/dadagso/ → [dadakso] 'be in hurry'
/libodki/ → [libotki] 'the males'
/kobki/ → [kopki] 'the shoes'

A hierarchical representation of these examples may be given as follows:

(54)





The above example (54) is a sample representation in which the feature [+ voice] is delinked and the feature [- voice] relinkes with the preceding syllable position.

Summary and Conclusion

For descriptive purposes, it is customary to break utterances into atomic segments. In classical generative phonology SPE for instance, these flow of sounds are broken down into strings of segments each of which is made up of unordered sets of distinctive features.

In this study the model adopted for analyzing the sound pattern of Girirra is a non-linear approach particularly the autosegmental one. In this approach there are autosegments which are represented on separate levels and these autosegments are linked with association line (s) subject to the Universal Association Convention and Well-formedness Condition.

In Girirra there are about twelve distinctive features which characterize the sound segments of the language. These features may be classified under the following four categories.

a. Major classificatory features (e.g., Consonantal, Sonorant and Vocalic);
b. Cavity features of major articulatory features (e.g., anteriority, coronality, and tongue body features, i.e., high, low, and back);
c. Manner features (e.g., continuant, and nasal features); and
d. Source features (e.g., voice, glottal and ingressive features).

In this thesis, we assume that the language is made up of 19 consonants and 5 vowels (see chart I,II and III), and we do not believe that this is an exhaustive analysis.

Sound segments are identified in terms of distinctive features and in autosegmental approach distinctive features are organized hierarchically. In this model of feature representation, phonological processes such as assimilation are said to be more naturally expressed through feature - spreading.

Assimilation in non-linear representation is a process by which a segment tends to be more like its neighboring segment because of the spreading of a feature. Assimilation in Girirra can be expressed as feature spreading and feature changing. The former is partial assimilation while the later is complete assimilation. Assimilation in this language is regressive.

In this representation spreading and deletion of features may affect only one set of feature to the exclusion of the others. For instance,

the phonological process that affect laryngeal feature may not affect place feature. Even when it might be possible for both of these features to take place, one becomes dominant and the other will be suppressed. Thus, if two features, for example [±voice] and [±continuant] were to assimilate simultaneously the feature [±continuant] becmes dominant while [±voice] is suppressed (cf. also Al Mtenji 1991).

In these representations, almost all of the nodes are governed by the basic operations and constraints such as spreading and delinking; obligatory contour principles, etc., maintained in nonlinear phonological representation.

In this thesis the notion of the syllable is also introduced as a hierarchically organized element with internal structures. Girirra syllable is made up of three constituents, namely, onset (O), nucleus (N), and coda (C). The nucleus together with coda form a rhyme (i.e., in agreement with Clements and Keyser 1983, and Goldsmith 1990). The onset and coda are optional where as the nucleus is an obligatory constituent of the syllable.

Girirra rhyme can be simple or complex. A simple rhyme is a rhyme that does not branch while a branching one is complex. In this language a syllable with a branching rhyme is said to be heavy where as a non-branching one is a light syllable.

As mentioned above syllabicity is not an intrinsic characteristic of segments but rather it is based on the relationship between a segment and its neighbors on either side. In accordance with this, it might be proposed that the syllabicity or non-syllabicity of a segment is more aptly characterized in terms of its position in a syllable tree.

In Girirra phonology, syllable is employed for the description of certain phonological processes like insertion, deletion, and gemination of segments etc. In these processes we follow certain universal and language specific conventions ; especially in resyllabification. Resyllabification is a process in which reassociation may take place after the insertion or deletion of a segment in an utterance.

The relevance of syllable structure is not restricted only to insertion, deletion, and regulating the combination of segments in the language. Girirra syllable plays another important role as a proper domain for the application of certain phonological rules, such as, syllable weight, stress assignment, etc., which are to be studied in the feature.

Notes

1. The classification of Girirra is not dealt here, for the reason that it is beyond the scope of this paper.

2. In Girirra words that end with velar segments only take the suffix /-k'i/ while /-ki/ is attached to any nonvelar segments (see e.g., 15 for details).

3. The geometric version that I adopt here is that argued for by McCarthy (1988), who proposes that the root node consists of [son, cons] .

4. In the hierarchical representation of features while class nodes are assumed to be unary, features are usually binary (see Paradis and Prunet 1991: 4-5). For example the feature [+voice] versus [-voice] where the presence of a Laryngeal node (class node) contrasts with its absence.

5. See Lahiri and Evers 1991: 87-88 for detailed information.

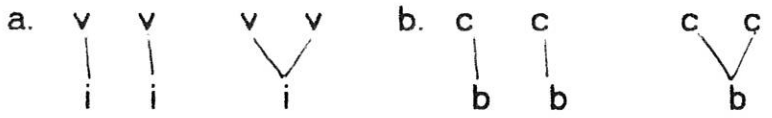
6. McCarthy (1988:8-9) noted that the two basic operations that nonlinear phonological representation recognizes are spreading and delinking where as the constraints are obligatory contour principle and line-crossing prohibition.

7. Leben's (1973) original principle of Obligatory Contour Principle was revised by McCarthy (1979:131) as follows:

Obligatory Contour Principle (revised)

In a given autosegment tier, adjacent identical autosegments are prohibited.

Based on this principle Girirra adjacent identical vowels and consonats will be represented as below:



8. See McCarthy (1988)

9. A sequence of two vowels that permit an epenthetic segment may considered to be psudo-geminates or lengthenings. For example, [la?ak] 'money' allows insertion where as [waan] 'frustration' does not, and referred as to be true geminates (see Goldsmith 1990 for details).

10. According to rules 27 and 39 there are two options basically one has to follow in the processes of word formation in Girirra. These are insertion or deletion of a segment according to the wellformedness condition of a word.

11. See Gussman (1992:43).

Appendecies: Word list

List of Girirra data are given in phonemic transcription.

Girirra	English	Girirra	English
absi	fear	badan	many
ab:aday	sister	barar	sea
ab:o	hello!	bakayle	rabbit
abur	dust	bal	leaf
ad	white	bala:r	shoulder
adada	forehead	bala:ran	wede
adi	you	banbad	ash
af	mouth/language	baraf	ice
afis	excuse	baran	news
af:ar	four	barar	swell
af:arton	fourty	baris	fly
agal	green	ba:han	bad
agar	see	ba:l	feather
agi:r	poor	beg	measure
agro	antelop	ber	grain
al:o	God	be:bi	climb
ama:go	borrow	be:g	wound
am:a	may	be:n	lie
angag	dry	be:ydis	hung
ani	I	bideda	left side
an:ay	father	bidi	left
arin	goat	bil	moon/mogth
awor	bull	bila:n	woman
ay:o	what	bilday	mirror
a?ilo	fiber	biyu	water
a:f:ur	lunch	bod	jump
a:ru	aunt(mother's sister)	bogol	hundred
a:y:o	mother	bor	ground
a:w	father	boroh	yellow
		bun	coffee
		bu:g	full
		bu:r	dust

dab	fire	dadamis	testacle
daba:l	swim	dag	ear
dabel	wind	dagdag	jewellery
bad	person	dagiwin	snails
dadak	hurry up	dal	give birth
dag	hide	dallo	bottle
damin:o	dull	dar	coth
darur	cloud	daw	hit
da:ger	monkey	da:f	disappear

da:gis	look after
da:le	forget
da:r	touch
daw:or	beg
demer	donkey
den	credit
derer	walk
dibi	ox
din	lie
dir:r	warm
dogon	full
don	back
dub	rear
dud	bark
dugag	animal(wild)

da:m	change
da:r	swear
da:y	melt
del	pot
delen	chracol
dey	see
de?	say
de:l	play
de:n	freeze
de:r	long
dib	trouble
dig	wash
dik:o	stand
din	near
dis	build
di?	comedown
di:g	blood
do:b	dung
dufan	lubrican
dul	hand
dundug	suck
dungo	kiss
dusug	dirty

edal	all
eg	smooth
elal	chew
elen	(he) goat
enrab	tongue
eren	thorn
eri	sun
er:i	soil
es	grass
esbo	salt
ey	well/hole
e:dug	curd
e:g:o	locust
e:y	dog

fad:iso	sit
falan	sopoon
far	finger
farad	horse
fel	weed
fik:ir	idea
fik':u	whistling
fi:d	flower

gad	buy
gal	enter
galasa	can
galma	forest
gan	shoot
gange	mule
gari	graf
garo	know

habad	chest
habar	wife
habla	girl
had	share
hadig	rope
had:o	salty soil
hafan	rest
hag:a	at/there

gas	cut	haham:osh	yawn
ga:l	camel	hal	one
ga:s	horn	halkali	another
geni	hand	hamer	force
germo	when	hankana	again
gewo	today	hangaf:o	elder
ge:d	tree	har	stay
gi	if	harag	not clean
gid	pull	hargab	mucuse
gila:l	dry season	harow	rotten
gilib	knee	haw:a	mountain
gobo:d	heap	ha:bo	search
golado	cave	ha:d	half
gonfa	trousers	hebal:o	some body
gore	old	hego	itch
gub	burn	halko	some
gubal	skin	hen	back bite
gudo	in	he:g	sweep
gudud	red	he:ga	broom
gun	buttuck	he:lu	cattle
gurib	vomite	he:ri	lip
		he:s	dance
		hidgin	star
		hidgini	moon
		hido	how
		hilow	home sick
		hindid	root
		hir	tie
		hired	beard
		hiro	clothing
		hiski	worm
		holod	road
		hor	early
		horda:n	vanguard
		ho:l	work
		ho:s	shadow

id	wait	ka	your
idgir	louse	kadi	urine
idgow	good smell	kalgel	love
idin	stove	kar	piece of cloth
idu	sheep	karbun	battery
if	light	karis	cook
igas	kill	ka?im	young
ilal	look	ka:g	crow
il	eye	ka:s	that
ili	teeth	ka:y	this
ilim	tear	ke	her

il:is	heavy
insubis	mend
inta	here
int:o	where
ir	sky
iriro	cough
iri:d	door
isla	with
is:i	she
iy:o	and
i:gu	stream

kes	his
key	mine
keynod	ours
kisod	their
kis:i	bastard
kob	shoe
kobar	sip
kor	body
kore?i	ape
korka	above
kormaw	bull(of camel)
ko:b	cup
ko:lu	wing
ko:y	come
ku	with
kuber	blanket
kulow	skin
kun	thousand
kureb	avoid
kut:en	bug

k'abri	cemetry
k'adad	spinal cord
k'afo	storage
k'amad	wheat
k'anin	bite
k'anyar	thin
k'ak'aw	soot
k'ark'ab	pack
k'awin	fat/big
k'a:d	pick
k'el:i	not straight
k'ibis	break
k'ifiso	lie
k'il	send
k'ilibis	split
k'obo	catch
k'od	dig
k'ofal	bark
k'of:o	beehive
k'olow	shirt
k'ombar	stool
k'or	jaw
k'os:ol	laugh
k'o:d	talk
k'o:r	neck
k'ubob	cold
k'ulof	thick bark

laf	bone
lag	river
la?ak	money
la:n	branch
les:i	bottom
li	six
litam	sixty
libod	male
lod	sharp
lug	foot
luk:u	hen

k'uman	right/correct
ma	not
madi?	head
mag	debt
magal	hear
magda	dark
mal:an	beauty
mandi	knife
manugis	squeeze
margis	chock/strangle
marti	guest
ma:lin	day
mel	place
merad	on
mid:ig	right
mid:ig ta	right side
migi	name
min	house
mir	filter
miray	slon
miro	fruit
mod	turn
moru	garment
mo:d	pass
mudow	green
muro:di	elephant
mustir	merchant
namad	how are you?
namaton	twenty
nama:d	second
namo	two
nan	husband
na:s	breast
nef	breathe
nug	suk
olis	rat
ol:o	belly
om:al	birth
oros	bride
owar	uncle
o:g:o	which
o:lis	skimmed milk
o:y	wipe

rag	frog
re:g	after
re:r	family
rid	shoot
ri:d	(she) goat
ri:g	push
ror	load
ro:b	rain
ro:r	run
rug	massage
ruk:ow	fruit
rumay	brush
run	truth
sag	worning
saga:l	nine
saga:ltam	ninty
san	nose
se:n	tail
soba:g	butter
sodon	thirty
sodo'kay	father- in-law
sodok'tay	mother-in-law
sonkor	sugar
sor	porridge
sow	meat
so:r	insect
sid:i	three
sis	give
sisla	together
si?ed	eight
sun	belt

su:l	thumb
su:rin	narrow
san	five
santan	fifty
seley	yesterday
sen	bring
se?	stand up
se:g	tell
sibel	tiger
simbir	bird
sin:i	bee
si:d	stone
sur:u	cat

tab	go
tag	open
ta?ab	farm
te:b	bark
te:g	spilled
tin	hair
tiraw	liver
tiris	count
ti:r	pole
toban	ten
todobo	seven
tol	clan
tuf	spit
turug	stab/pierce

uk:un	egg
ul	stick
un	eat
un:o	we
unwer	call
ur	bad smell
us:od	they
us:u	he
us:ub	new
u:n	smoke

wad:no	heart
wala	some
walal	brother
walis	sing
wan	milk
wara:b	flow
wara:ba	hyna
warab	drink
waran	spear
wasa	sand
wa:n	frustration
wer:o	small goat
win	grow

yahas	crocodile
yamud	die
yar	small
yarad	bride- wealth
yo:n	fight

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