THE CONSONANTS OF KITHARAKA

by

KITHAKA WA MBERIA

JUNE, 1981

A dissertation submitted

in partial fulfilment

for the degree of Master of Arts

in General Linguistics

in the University of Nairobi

This dissertation is my original
work and has not been submitted
in any university.

_____
KITHAKA WA MBERIA

This dissertation has been written
under our supervision.

_____

MRS. LYNETTE NYAGGAH

_____

DR. KAREGA MUTAHI

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to all those who in one way or the other assisted me in the course of writing this dissertation. To them all I give my heart-felt thanks.

I would specifically like to thank my supervisors Mrs Lynette Nyaggah and Dr. Karega Mutahi who unselfishly provided me with an invaluable source of guidance, advice, and of course criticism. I also benefited from suggestions and criticism from the members of the academic staff in the Department of Linguistics and African Languages who attended student seminars in which my work was discussed. I thank them all for their assistance.

The spirit of friendship and co-operation which was characteristic of my classmates for all the time that we were together provided a good atmosphere conducive for the writing of this dissertation. For this reason, I owe them many thanks.

A number of friends in the university constantly wished me success and were a cource of inspiration and strength. I genuinely appreciate their encouragement and best-wishes.

Finally, but not last,   I thank
Mrs. Joyce Muthama who did not merely type this
dissertation but actually typed it so well.

ABSTRACT

This study tries to analyze and describe one aspect of the grammar of Kitharaka, an aspect that may appropriately be called 'consonantal phonology'. The study is carried out within the theoretical framework of Natural Generative Phonology.

The study begins with a chapter on the introduction to the language and its speakers. The actual analysis begins in Chapter Two. In this chapter we try to determine the underlying consonants in Kitharaka. The consonants are classified into five sets: voiceless stops, prenasalized voiced stops, voiced fricatives, liquid, and glides. Chapter Three discusses the role of markedness in determining the (underlying) consonant inventory of Kitharaka. A question is raised as to whether, in the case of Kitharaka consonant inventory, considerations of 'symmetry' do not override those of 'markedness'. Chapter Four deals with consonant processes under the sub-headings of: homorganic nasal assimilation, continuant strengthening, /k/ dissimilation (a form of Dahl's Law), identical consonant deletion, and /t/ deletion. Chapter Five discusses stem reanalysis in some verbs and derivational nouns formed from

such verbs. It is argued that stem reanalysis resulted in prefix replacement and that the new prefix was extended to borrowed words by analogy.

Chapter Six, which is the conclusion to the study, includes: summary of the findings, remarks on areas that require further investigation; and, the practical significance of the study.

TABLE OF CONTENTS

SYMBOLS USED IN THE STUDY

SYMBOL	DESCRIPTION
p	voiceless bilabial stop
t	voiceless alveolar stop
c	voiceless palatal stop
k	voiceless velar stop
b	voiced bilabial stop
d	voiced alveolar stop
ɟ	voiced palatal stop
g	voiced velar stop
^{m}b	prenasalized voiced bilabial stop
^{n}d	prenasalized voiced alveolar stop
^{n}ɟ	prenasalized voiced palatal stop
tʃ	voiceless Palatal affricate
dʒ	voiced Palatal affricate
β	voiced bilabial fricative
ð	voiced inter-dental fricative
r	non-lateral alveolar liquid
j	voiced palatal fricative
ɣ	voiced velar fricative
m	bilabial nasal
n	alveolar nasal
ɲ	palatal nasal
ŋ	velar nasal
m̥	voiceless bilabial nasal
n̥	voiceless alveolar nasal

SYMBOL	DESCRIPTION
ɲ̥	voiceless palatal nasal
ŋ̥	voiceless velar nasal
y	palatal glide
w	velar glide
i	high front vowel
e	tense, mid front vowel
ɛ	non-tense, mid front vowel
a	low vowel
ɔ	non-tense, mid back vowel
o	tense, mid back vowel
u	high back vowel

1.0 <u>INTRODUCTION</u>

1.1   <u>BACKGROUND INFORMATION.</u>

The majority of the speakers of Kitharaka live in the Meru District while others live in Kitui District. Tharaka Division which is wholly inhabited by Atharaka[1] is in the south-east of Meru District. Not all the Atharaka of Meru live within Tharaka Division; they also occupy two sub-locations outside the division. These are Kajuki and Mutino sub-locations of Nithi and Mwimbi divisions respectively.

The Atharaka are both agriculturalists and pastoralists. They keep cattle, goats and sheep. Three settlement schemes: Nkondi, Tunyai and Irereni are the key farming areas where food-crops such as millet, maize, green-grams and peas are grown. The major cash-crop is cotton. Outside the three settlement schemes one finds subsistence farming and selling of cattle and goats is the main source of income.

Like several other areas of Eastern Province the area inhabited by Atharaka is sparsely populated. The following table shows how Atharaka are distributed over the area they occupy (see pp.2). According to these figures the density of population for the area under consideration is approximately 28 people per square kilometre. The density of population inside

PLACE	AREA (SQ. KM.)	POPULATION	DENSITY/ SQ. KM.
NORTH THARAKA	800	17,105	21
SOUTH THARAKA	700	33,413	48
KAJUKI & MUTINO	300	7,413	25
THAGICU	391	6,069	16

POPULATION DISTRIBUTION OF ATHARAKA

Tharaka Division is, however, higher than this with about 30 people per square kilometre. The three settlemt schemes mentioned above are the most densely populated areas in the division. The population of the division in 1969 was 37,031 people. The figure had risen to 50,518 people in 1979. The difference between the figures for the two population census-takings shows that over the ten years period there was an annual population growth rate of about 3.6%

Following on the foot-steps of the colonial administrators Kitharaka has been considered by some people as a variety of Kimeru. The language is however distinct from Kimeru despite their structural and lexical similarity. The two could be referred to as

dialects of the same language - whose name we would have
to invent - if one uses only the vague criterion of
'mutual intelligibility'. We are not willing to use
this criterion because we feel it is inadequate. How
intelligible, for example, should two speech-systems
be for one to conclude that they are 'mutually intelligible'?
Nobody calls Kikuyu and Kikamba dialects of the same
language although they are probably more 'mutually
intelligible' than the Kingwana and Kiamu dialects of
Kiswahili. Such cases demonstrate how inadequate the
criterion is in deciding on the status of speech-systems.

Another criterion of deciding whether a speech-
system is to be called a language or a dialect is the
one based on political considerations. For example,
the various related languages spoken in China are
labelled 'dialects of Chinese' for political strategy
and nationalistic reasons. The political criterion has
also been used in the case of Dutch and German. Although
they are 'mutually intelligible' they are called by
different names and considered different languages
because, we think, they lie on different sides of a
political border. This criterion is not applicable to
the case of Kitharaka and Kimeru.

We propose a third criterion that incorporates
the notion of 'mutual intelligibility', political
considerations, as well as the opinion of the people
regarding the status of their speech-system. Inherent

in our criterion is the vagueness of 'mutual intelligibi-
lity' but we feel that, this notion, together with
political considerations and people's opinion, gives
the criterion enough credibility to be maintained. It
seems to us that it is this criterion that has been
implicitly alluded to in categorizing Kikuyu, Kikamba,
Kimeru and Kiembu as different languages. If only the
notion of 'mutual intelligibility' is considered it
would probably be implausible not to regard all the
four as dialects of the same language. We shall use
the criterion we have proposed above to argue that
Kitharaka is not a dialect of Kimeru but a language
distinct from it.

Neither Atharaka nor Ameru[2] consider Kitharaka
and Kimeru to be the same language. Their observation
in this regard and the fact that the two peoples do not
have a very recent shared history makes us consider the
two speech-systems as different languages although they
are 'mutually intelligible'. Fadiman (1936)[3] describes
the history of the Ameru from the coast to their present
home in Meru District. Atharaka are not part of the
group he describes. He writes:

> Before the colonial era, the name 'Meru'
> referred only to five of the present nine
> sections: the Igembe, Tigania, Imenti,
> Miutini and Igoji. British administrators,
> however chose to include the Tharaka who

live on the adjoining eastern plains and later the Mwimbi, Muthambi and Chuka who border the Meru to the south.

Guthrie noticed the distinction between Kitharaka and Kimeru and classified them under different code numbers. Under his Kikuyu-Kamba group he has the following classification:

E50   Kikuyu-Kamba Group

E51   Gekoyo (Kikuyu) (K.)

E52   Embu (K.)

E53   Mero (K.)

E54   Saraka (K.) [Kitharaka] [4]

E55   Kamba (K.)

E56   Daiso (Sengeju) (T.T.)

We feel that there is enough support for the view that Kitharaka is distinct from Kimeru. We shall hold this view in this study.

1.2   THE SCOPE OF THE STUDY

In this study we intend to deal with only one aspect of the grammar of Kitharaka, an aspect which may be appropriately called 'consonantal phonology'. We should point out, however, that no aspect of a grammar is wholly independent of other aspects of that grammar. In our case, for example, it is possible that the behaviour of a consonant in some phonological process can only be adequately explained by taking into account the influence

of the adjacent vowel, grammatical boundary, grammatical
category of the morpheme in which the consonant occurs,
or even the presence of tone on the preceding or the
following vowel. It is for this reason that, although
our concern is to study consonants, we may occasionally
mention other aspects of Kitharaka grammar.

1.3 THE OBJECTIVES OF THE STUDY

In this study we hope to establish the underlying
consonatal segments. In the two studies known to us
that have been done on Kitharaka, namely Lindblom (1914)
and Mberia (1979) a trial was made to determine the
segments of the language. We are, however, of the
opinion that the two studies failed to achieve the goal.
Lindblom's consonant system consists of surface segments
some of which do not exist in the language at all. For
instance, he claims that the language has the voiceless
dental fricative θ. As far as we are aware, the
language does not have this sound. Lindblom's work is
also inadequate in another respect. He analysed the
prenasalized voiced stops of the language as nasal-
obstruent clusters. It is one of our objectives to
rectify the foregoing shortcomings in the analysis of
the language.

I now do not agree with the underlying consonant
system that I advocated in Mberia (1979). I claimed,
for example, that the language has an underlying

affricate /ts/ which is phonetically realized as [dz]
after a nasal and as [ts] elsewhere. I am now of the
opinion that the language does not have any affricate
and that what was mistaken for a /ts/ is the voiceless
palatal stop /c/. I also analysed the prenasalized
voiced stops as nasal-obstruent clusters. In our
present study we hope to correct these errors.

Another objective of this study is to explore
the role of 'markedness' in the 'consonantal phonology'
of Kitharaka. We shall try to find out whether the
claims made by the generative proponents of the 'theory
of markedness' are supported or refuted by emperical
evidence from Kitharaka. It has been claimed, for
example, that a sound inventory (of a language) which
has marked segments should also have the less marked
segments; (see Chomsky and Halle 1968, Hyman 1975). We
shall investigate whether the claim is supported by
Kitharaka consonant inventory.

We shall try to find out the various phonological
processes involving the consonants of Kitharaka. We
shall do this by comparing segments in the underlying
representation with those of the phonetic representation.
The various rules that govern phonological processes
linking the two representations will be discussed.

Preliminary investigation tend to show that there
has been stem reanalysis in some verbs. Such verbs also

give an impression that stem reanalysis resulted in prefix replacement. We shall investigate these two issues in an effort to determine: whether stem reanalysis has actually taken place; and, the true nature of prefix replacement if indeed the phenomenon exists in the language.

1.4 METHODOLOGY

I will consult with other speakers of Kitharaka in compiling the data for the study. I will do this especially for the unclear and marginal cases of the data where my intuitions may differ from that of other speakers. Although I am a native speaker of Kitharaka this counter-checking of some of the data is necessary because one is never a very good informant to himself.

No devices such as tape-recorders, language laboratory equipment or computer will be used in the analysis of the data.

1.5 LITERATURE REVIEW

Nothing much has been done on Kitharaka. The only studies on the language that we are aware of are: Lindblom (1914): "Outline of A Tharaka Grammar" and Mberia (1979): "The Morphology of Kitharaka Nominal Word". Lindblom's article tries to cover Kitharaka as a whole (with the exception of supra-segmental phonology). It is not surprising, therefore, that the article is too sketchy. He handles Phonology in only four pages. Of

these four two and a half pages are devoted to the
description of the consonants. Some of his claims
are clearly incorrect. In section (1.3) above we cited
the case for the fricative θ which Lindblom posits for
the language but which is actually not a sound of
Kitharaka. Lindblom does not even say whether his set
of consonants represents the underlying or phonetic
segments. Owing to the large number of his consonants,
we feel he was dealing with the phonetic representation.
His consonant system does not, however, correspond to
the segments that are actually found in the phonetic
representation of Kitharaka.

In my work entitled 'The Morphology of Kitharaka
Nominal Word' I dealt with only a small area of the
language. I studied morphology within the narrow
scope of the nouns. I discussed, among other things,
phonological processes and the morphophonemic alternations
that result from those processes. I formulated rules
to formally represent the changes. The work is lacking
in details. I did not, for instance, discuss the
naturalness of the various rules that I formulated.
I excluded all factors other than phonetic conditioning
from rule environments. This ommision of non-phonetic
motivation in rules is a deficiency in the work in that
many phonological phenomena cannot be adequately
accounted for in purely phonetic terms.

Studies have been done on languages
(genetically) related to Kitharaka, specifically
Kikuyu and Kikamba. Among these studies the most
relevant for our purposes are: Mutahi (1977): The
Dialects of Southern Mt. Kenya; and Maundu (1980):
Reconstruction of Kikamba Sounds. Mutahi's and
Maundu's studies are unpublished doctoral thesis
and M.A. dissertation respectively. Maundu
discusses the role of analogy in relation to the
presence of /l/ in Kikamba phonology. He argues
that some of the present day l's in Kikamba have
been 'mistakenly' introduced in positions where
other segments had been deleted historically.
Since l is the segment that is most prone to deletion
in Kikamba (and indeed in other Bantu languages)
speakers of Kikamba felt that all positions where a
sound had been lost was previously occupied by /l/.
They introduced /l/ in all such positions. It is
true that some of those 'vacant' positions had
previously been occupied by /l/. Of importance here,
however, is the fact that not only was /l/ reintroduced
where it had been deleted historically but that it
was also extended by analogy to other 'vacant'
positions. Maundu's treatment of /l/ is of interest
to us from a theoretical point of view. As we will
show below, there is a phenomenon in Kitharaka that
seems to require analysis in terms of the notion of
analogy.

In Kitharaka there are alternations such as:

A	B	Gloss
Infinitive[5]	1st Person singular subjunctive	
koina	mbinɛ	'sing'
koɛnda	mbɛndɛ	'love/like'
koinga	mbiŋgɛ	'close'
koeta	mbetɛ	'call'
koɔna	mbɔnɛ	'see'

In column A all verb stems begin with a vowel. All
forms in column B have a voiced bilabial stop in
the stem-initial position. Some languages
(genetically) related to Kitharaka have infinitives
such as /ko ina/ and /ko inga/. Such forms are
found in Kichuka. Such forms suggest that probably
Kitharaka had voiced bilabial fricatives in at
least some of the forms of column A. The [b] of
the corresponding forms in column B can be accounted
for in terms of a continuant strengthening rule
that hardens /β/ to a [b] after a nasal consonant.
If Kitharaka had forms such as /ko ina/ and /ko inga/
correspondences of lexical items such as those shown
below existed in the language:

A_1	B_1	Gloss
Infinitive	1st pers. sg. subjunctive	
koβina	mbinɛ	'sing'
koβinga	mbingɛ	'close'

The β's of column A were then deleted probably
because they were in an intervocalic position
whereas the bilabials in column B were retained.
Supposing that this account of bilabial obstruents
is correct, does it explain the origin of [b] in
all forms given in column B? Was there any time in
the history of Kitharaka when there was a form
/ko eta/, for example? If not, how does one account
for the presence of [b] in mbetɛ ? To resolve
this issue we may have to resort to the notion of
analogical extension.

We find Mutahi's discussion of the status of
the Kikuyu glides of interest for the purposes of
our study. His arguments in this respect give us a
clue on the glides of central Kenya Bantu languages.
Put differently, his analysis gives us a good
starting point for the analysis of the glides in
Kitharaka[6]. This is especially true from a
theoretical point of view.

1.6   THEORETICAL FRAMEWORK

Our discussion on the 'consonants of Kitharaka'
will be within the framework of Natural Generative
Phonology (NGP). NGP is a model of Phonological
description that is more constrained than Transforma-
tional Generative Phonology. It takes as its area
of study the interaction between phonology and
morphology. In the words of one of its most

distinguished proponents, Joan Hooper, NGP is a
'theory of morphophonology'. For the purposes of
this study, the basic principles of NGP are given
below:

All the underlying forms must have some
surface manifestation. Lack of any surface instance
of a supposedly underlying form implies that the
form is unjustifiable and hence cannot be maintained;
in other words, it is not an underlying form at
all. The rules advocated by NGP are less abstract
than those allowed in Transformational Generative
Phonology. According to the True Generalization
Condition the rules of Phonology that native
speakers formulate relate surface forms to other
surface forms. Consequently, such rules cannot be
abstract.

The theory recognizes different rule categories.
They are: those rules that are phonetically
conditioned (P-rules); morphophonemic rules (Mp-rules);
morphological spell-out and word formation rules;
and via rules. P-rules are specifiable in purely
phonetic terms, that is, they make use of phonological
features that have intrinsic phonetic content.
They take into account phonological boundaries,
namely the syllable boundary and the pause.[7]
Syllabification rules, that is, rules that assign
syllable boundaries to a string of morphemes, are

a sub-set of P-rules.[8]

P-rules are natural and unsuppresable. Put differently, they apply whenever their structural description is met. Consequently, they have no exceptions. They describe processes governed by the physical properties of the vocal tract. It is worthwhile pointing out, however, that emerging P-rules may apply invariably whereby non-phonetic factors block their application in some cases.

The second category of the rules of phonology is that of morphophonemic rules (MP-rules). Unlike P-rules whose environments are described in phonetic terms, the environments of MP-rules are described in morphosyntactic or lexical terms. In other words, MP-rules make reference to morphological or syntactic information such as morpheme boundaries, morpheme classes and lexical groups. These rules take part in the sound-meaning correspondence of an individual language; they are, therefore, language specific. It is not surprising that MP-rules cannot be universal since there is nothing universal about morpheme boundaries or lexical classes. These rules have the characteristic of being quite arbitrary from a phonological point of view. Unlike P-rules they are likely to have exceptions.[9]

Another set of rules within the phonological

component of grammar consists of sandhi rules.
These rules resemble MP-rules in that they take
word-boundary into account. Word-boundaries are
not determined in phonetic terms. They are
determined quite arbitrarily by the syntax and
semantics of a language. On the other hand, sandhi
rules resemble P-rules in that a word-boundary has
the potential to coincide with either a syllable
boundary or a pause. When a word-boundary
coincides with a phonological boundary - that is
a syllable boundary or a pause - sandhi rules
behave like P-rules. Thus, like P-rules, sandhi
rules may be regular, productive and unsuppressable.

Via rules express phonological relationship
between two (or more) forms in a situation whereby
none of the the forms can be justifiably said to be
derived from the other syncronically. For instance,
although there is definitely a phonological relation-
ship between the English words 'drink' and 'drench'
it would be unjustifiable to claim that 'drench'
is derived from 'drink', or the vice versa, through
a synchronic phonological rule. Such a relationship
as exists between these two forms is expressed
through a via rule.

The last category of the rules of phonology
consists of morphological spell-out rules. These
rules give phonological shape or phonological

realization to abstract morphemes.[10]   Closely
related to these rules are the word-formation
rules that specify the order and the type of
morphological elements that can constitute a word.

In addition to the True Generalization
Condition NGP has the No-Ordering Condition.
According to this condition rules should not be
extrinsically ordered. Instead, they should
apply whenever their structural descriptions are
satisfied. This requirement - that rules should
only be intrinsically ordered - eliminates the
kind of abstractness that results from extrinsic
ordering of rules.

We would like to point out that the model
of our discussion is Natural Generative Phonology
as formulated by Hooper in her Ph.D. dissertation
(1973) and published in 1976 under the title
Introduction to Natural Generative Phonology. In
an article entitled "The Archi-Segment in Natural
Generative Phonology" Hooper proposed an extended
version of Natural Generative Phonology which
allows archi-segments in the underlying representation.
In the original formulation of Natural Generative
Phonology, which is the theoretical-framework of
our study, arch-segments are disallowed in the
underlying representation.

1.7 SIGNIFICANCE OF THE STUDY

We hope our study will be significant in two respects. First, the findings of the study will be a contribution to Bantu Phonology. The more languages we study within a given language family the more knowledge we gather concerning the language family. Such knowledge may then act as a starting point for the analysis of the unstudied or less studied languages within the particular language family.

The second significance of our study has to do with the practical application of the findings. Kitharaka has not been coded mainly because it has been regarded as one of the dialects of Kimeru. Presently the speakers of Kitharaka use books written in the 'standard dialect' of Kimeru. It was argued in section (1.1) that Kitharaka is distinct from Kimeru. For this reason there is a need for the standardization and coding of the language. Our study could be used as a basis for the orthography. Such an orthography and subsequent writing of reading materials will go a long way in making adult education a success in Tharaka as well as lessening the burden on lower primary school pupils who are taught not only how to read and write but actually a second language in the name of 'standard dialect' of Kimeru.

FOOTNOTES

1. 'Atharaka' is the name for the native speakers
   of Kitharaka. a- and ki- are the prefixes
   for the people (class 2) and the language
   (class 7) respectively.

2. The native speakers of Kimeru call themselves
   'Ameru' and not 'Meru' as one so often finds
   in books.

3. The article is found in <u>Journal of African
   History</u>; XIV, 1(1973) pp. 9-27.

4. The square brackets do not imply a phonetic
   transcription. We have used them to indicate
   that by 'Ṣaraka' Guthrie was referring to
   Kitharaka.

5. /ko/ is the infinitive marker. 1st pers. sing.
   is normally marked by /n/ which assimilates to
   the point of articulation of the following
   consonant.

6. Since Kitharaka and Kikuyu are (genetically)
   related one would expect them to have at least
   some similarities in their phonologies and
   indeed in other components of grammar.

7. A good example of a P-rule is the palatalization
   rule found in many languages including Luganda.
   It is generally of the nature:

$$\underset{[+ \text{back}]}{C} \longrightarrow [-\text{back}] \ / \ - \ \underset{[-\text{back}]}{V}$$

8. Syllabification rules assign syllable boundaries
   to a string of morphemes after a phonological
   process has interefered with the original
   syllable boundaries. For example,

   <u>Kiswahili</u>:

   /ku$a$ndi$ka/   'to write'

   glide formation:

   kwandika

   syllabification:

   kwandika.

An example of a MP-rule is the one that voices the English /s/ after a voiced consonant when it functions as the plural or the possessive marker. Put in a different language, English voices /s/ when the segment follows a voiced segment with a morpheme boundary separating the two segments. The rule may be formulated as follows:

$$
\underset{\begin{bmatrix} +\text{ant} \\ +\text{cor} \\ -\text{voice} \end{bmatrix}}{C} \longrightarrow [+\text{voice}] \ / \ \underset{[+\ \text{voice}]}{C} + \underline{\quad}
$$

10. Morphological spell-out rules are of the following form:

Kiswahili:

   (i)   INFINITIVE $\longrightarrow$ /KU/

  (ii)   SUBJUNCTIVE MOOD $\longrightarrow$ /ɛ/

 (iii) FUTURE TENSE $\longrightarrow$ /ka/.

2.0   THE UNDERLYING SEGMENTS.[1]

In this and subsequent chapters the term
'consonant' is to be understood to refer not only
to obstruents, nasals and liquids but also glides.
It is necessary to define the term for the purposes
of this study because whereas it is quite common
for linguists to sub-divide sounds into two major
classes - consonants and vowels - it is possible
for one to restrict the term 'consonant' to only
those sounds that are specified as [+consonantal].
Since one of the sound categories to be covered
in this study - namely glides - is specified as
[- consonantal] defination of 'consonants' is
necessary to avoid a possible confusion.

This chapter tries to determine the
underlying consonants of Kitharaka. It will form
a basis for the subsequent sections of the study
in that all the other sections will make reference
to the underlying consonants. For instance, in
Chapter Four in which we discuss phonological
processes, phonological rules will be said to
relate the underlying representation (that is,
underlying segments) to the surface representation.

2.1 THE VOICED FRICATIVES

Kitharaka has three sets of obstruents:
voiced fricatives, voiceless stops, and prenasalized
voiced stops. In this   section we discuss the

first of the three sets. The voiceless stops and
the prenasalized voiced stops will be discussed in
sections (2.2) and (2.3).

The set of voiced fricatives consists of
bilabial, dental, palatal and velar segments, that
is β, $\eth$, j and γ respectively. These four are the
only obstruent continuants in the language. With
exception of $\underset{\Lambda}{\eth}$ each of the four segments has two
realizations at the phonetic level. Since phonetic
realizations are discussed in details in Chapter
Four which deals with phonological processes we
need not cite examples here.

Positing the four fricatives as underlying is
justified in that they occur in morphemes in which
they cannot be said to be derived from other
segments. Put differently, the four fricatives are
underlying because they are found in underlying
morphemes[2] as the following examples illustrate:

1. /βaβu/ - [βaβu]   'father'

   /βo:ta/ - [βo:ta] 'thirst'

   /roɟεa/ - [roɟεa] 'jaw'

   /nɟεkε/ - [nɟεkε] 'that I laugh'

   /kajara/ - [kajara] 'small hand/arm'

   /jokya/ - [jokya] 'take!'

   /γoto/   - [γoto] 'ear'

   /moγa:/ - [moγa:] 'acacia tree'

2.2 THE VOICELESS STOPS

Kitharaka has bilabial, alveolar, palatal
and velar voiceless stops, that is, /p,t,c,k/.
None of these four has more than one realization at
the phonetic level. To use a traditional term,
each of the four stops has only one allophone,
specifically [p,t,c,k] respectively.The set under
discussion is unique in that all the other
consonants of the language are voiced.

Like in the case of voiced fricatives the
justification for positing the voiceless stops as
underlying segments is based on the fact that they
are found in the underlying representation of
morphemes. Their phonemic[3] status is illustrated
by the following examples:

2. /mpurya/ ⟶ [mpurya]   'rhino(s)'

   /ɣapurya/ ── [ɣapurya]   'small rhino'

   /ntamɛ/ ── [ntamɛ]   'small piece(s) of
                             cloth'

   /ɣatamɛ/ ── [ɣatamɛ]   'small piece of
                             cloth'

   /ncɔβi/ ⟶ [ncɔβi]   'wine'

   /ɣacɔβi/ ── [ɣacɔβi]   'small amount of
                             wine'

   /nkaŋga/ ⟶ [ŋkaŋga]   'guinea fowl'

   /ɣakaŋga/ ── [ɣakaŋga]   'name of a spotted
                             goat'

Among the four segments /p/ is peculiar in
terms of its distribution in the lexicon. Its

frequency of occurrence is very low compared to
that of the other voiceless stops and indeed all
the other consonants of the language.

2.3 THE PRENASALIZED VOICED STOPS

The language has four prenasalized voiced
stops, $/^{m}b, ^{n}d, ^{\eta}\dj, ^{\eta}g/$. The four segments are
realized at the phonetic level as $[^{m}b, ^{n}d, ^{\eta}\dj, ^{\eta}g]$
respectively.

One interesting characteristic of this set
of stops is that its members never occur word-
initially. On the basis of this observation alone
it seems plausible to consider the four segments
as phonetic variants of some other segments.
However, this aspect of their distribution is not
explainable in terms of phonetic variation. Each
of the four segments occurs in underlying morphemes
as the following examples show:

3. /keramba/   -   ⌊keramba⌋   ' baobab fruit'

   /iramba/   -   ⌊iramba⌋   'baobab fruits'

   /moindu/   -   ⌊mwindu⌋   'darkness'

   /kaindu/   -   ⌊kaindu⌋   'name of a black
                                         cow'

   /meɲ\dj i/   -   ⌊mwenɟi⌋   'one who digs'

   /eeɲ\dj a/   -   [e:ɲɟa]   'dig!'

   /koriŋga/   -   ⌊koringa⌋   'to beat'

   /toriŋgɛ/   -   ⌊toringɛ⌋   'let us beat'

There are only three possible ways of analyzing
mb, nd, ɲɟ and ŋg in the above examples. One of
these is to argue that mb, nd, ɲɟ and ŋg are
sequences of a nasal and a fricative whereby the
fricative becomes a stop through a continuant
strengthening rule. For this argument to be
maintained there must be at least some instances
in the language where the morphemes (specifically
stems) which have mb, nd, etc. appear with a
fricative at the phonetic level. For example, if
the [b] in the noun stem kɔmbɛ was indeed derived
from an underlying /β/ one would expect to find at
least some occurrences of the stem in which β
surfaces. To extend the argument to other
examples, one would expect the stems which have
d, ɟ and g to surface occasionally with ʒ, j, and ɣ
 respectively. None of the stems in examples (3),
however, has a phonetic realization which has a
phonetic realization which has a fricative. To
claim that these stems have underlying fricatives
is, therefore, positing underlying segments which
do not surface. This is contrary to the
requirements of Natural Generative Phonology. For
this reason, the argument that mb, nd, ɲɟ and ŋg
in the examples given in (3) are nasal-fricative
sequences is untenable.

The second possibility is to analyze mb, nd,
ɲɟ and ŋg as nasal-stop clusters. The implication

of such an analysis is that Kitharaka has both
underlying nasals and underlying voiced stops.
Whereas it is true that Kitharaka has underlying
m, n, ɲ, and ŋ, it is not true that the language
has underlying b,d,ɟ and g. Consequently, an
analysis which implies the presence of voiced
stops in the language is incorrect. This leads
us to the conclusion that mb, nd, ɲɟ and ŋg are
not nasal-stop clusters.

The third possibility is to analyze mb, nd,
ɲɟ and ŋg as prenasalized voiced stops. Since
mb, nd, ɲɟ and ŋg are neither nasal-fricative
clusters, nor nasal-stop clusters, we submit that
Kitharaka has underlying prenasalized voiced stops
in its consonant inventory. We consider mb, nd, ɲɟ
and ŋg to be basically obstruents which nevertheless
have a nasal on-set or what Armstrong (1967:31)
has called a nasal 'kick-off.'

2.4 THE NASALS

Kitharaka has four underlying nasals/m,n,ɲ ŋ/·
With the exception of /n/ each of the nasal segments
has only one phonetic realization; in other words,
/m,ɲ,ŋ/ are realized phonetically as ⌊m,ɲ,ŋ⌋
respectively. /n/ surfaces not only as ⌊n⌋ but
also as ⌊m,m̩,n̩,ɲ,ɳ,ŋ,ŋ⌋. This phonetic variation
results from homorganic nasal assimilation as well
as assimilation of voice. Both the homorganic

nasal assimilation and the devoicing of /n/ will
be discussed in more details in Chapter Four. .
Examples to illustrate the two processes will be
given in the same section.

Positing four underlying nasal consonants
for Kitharaka is justified on the grounds that
each of them may be followed by any vowel. Whereas
a vowel may influence a consonant, there is no
evidence that this happens in Kitharaka. In other
words, the language does not have any consonant
processes which are motivated by vowels. The
following examples show that there are four
underlying nasals in Kitharaka:

4. /makɔnɔ/   -   [makɔnɔ]   'snails

    /moɤumɔ/   -.   [moɤumɔ]   'fig tree'

    /moana/   -   [mwana]   'child, son'

    /kanini/   -   [kanini]   'small one,
                                           a woman's name'

    /koɲua/   -   [koɲua]   'to drink'

    /ɲaɤa/   -   [ɲaɤa]   'ostritch'

    /koaŋa:ra/   -   [kwaŋa:ra]   'to hang out'

    /koŋɛɲa/   -   [koŋɛɲa]   'to lick'

2.5 THE LIQUID

/r/ is the only liquid in Kitharaka. It is
realized on the surface as [d] (through a continuant
strengthening rule) when it is preceded by /n/.
Elsewhere it surfaces as [r]. The presence of the

segment in the underlying representation is
evidenced by the following examples:

5. /moremi/   -   [moremi] 'farmer'

   /korera/   -   [korera] 'to cry'

   /roriɤi/   -   [roriɤi] 'string/rope'

   /nrɛŋgɛ/   ⟶   [ndɛŋgɛ] 'that I cut (compare:
                                   kor ga 'to cut).

   /nriɤi/   ⟶   [ndiɤi] 'strings/ropes' (compare:
                                   kari i 'small string/
                                   rope).

2.6   THE GLIDES

It is probably useful to begin this
subsection by a justification for including glides
in the study because they differ from obstruents,
nasals and liquids in fundamental aspects especially
from a phonetic point of view. In general phonetics,
for instance, glides are considered as an intermediary
category between consonants (in the sense in which
the term includes only obstruents, nasals and
liquids) and vowels. A common label for them is
semi-vowels. Even the name 'frictionless continuants'
has the connotation of an intermediary category.

The major motivation or justification for
including this category of sounds in a study devoted
to 'the consonants of Kitharaka' is their position
and function in the syllable. In Kitharaka, unlike
vowels, glides never occur in the syllable-final
position. They do, however, like the obstruents,

nasals and the liquid, occur in the syllable-
initial position. In other words, unlike vowels,
they function as syllable on-set. (Vowels only
function as syllable-nucleus). Moreover, in
Kitharaka glides do not carry tone just like the
obstruents, nasals and the liquid. Whereas we
accept the phonetic fact that glides do not
properly fit either in the category of vowels or
that of consonants (in the narrow sense of the
term) we feel that in Kitharaka they are closer to
the latter than they are to the former in terms
of their function in the phonology.

The language has two glides: /y/ and /w/.
These two glides are realized as [y] and [w]
respectively. The language has a glide-formation
rule which results in phonetic merger whereby /y/
merges with /e/ and /w/ merges with /o/. /e/ and
/o/ glide to [y] and [w] respectively. That the
language has a glide-formation rule is illustrated
by the following examples:

6i./moanki/ ⟶ [mwanki]   'fire'
  (ii) /roakwa/ ⟶ [rwakwa] 'mine (cl.11)'
  (iii) /meɛri/   ⟶ [myɛri] 'months'
  (iv) /eaɛto/   ⟶ [yɛto]   'ours (cl.9)'

The velar glide in the first syllable in (i) and
(ii) and the palatal glide in (iii) and (iv) are
derived from /o/ and /e/ respectively by a glide-

formation rule. The rule requires that the vowel following /o/ should not be /o/ or /u/, nor should /e/ be followed by /e/ or /i/. Stated formally the glide formation rule is as follows:

7.
$$\begin{bmatrix} +syll \\ -low \\ -high \\ +tense \\ \alpha back \end{bmatrix}_1 \longrightarrow \begin{bmatrix} -syll \\ \alpha back \end{bmatrix} \Big/ \; - \; [+syll]_2$$
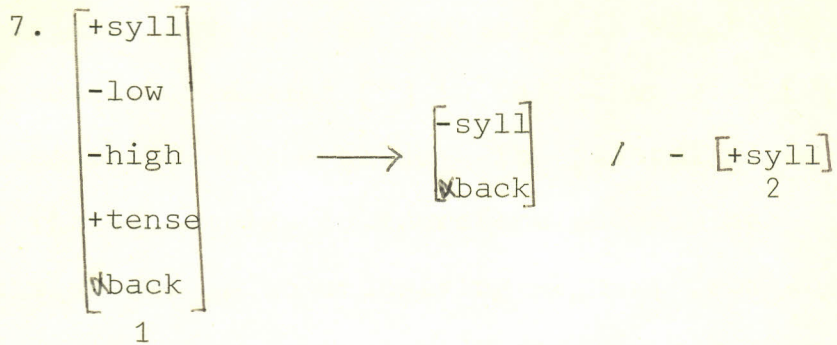
Conditions: (1) 1 and 2 should not be identical

(2) When 1 is /o/ 2 should not be /u/, when 1 is /e/ 2 should not be /i/

If there is evidence showing that all the glides in the language are derived from vowels by the above rule there would be no justification for claiming that Kitharaka has underlying glides. There are, however, examples that show that not all glides are traceable back to a vowel source. There is no way, for instance, in which we could link the palatal glide with an underlying /e/ in the following examples:

8. Kamɛryɛ   'let me swallow'

    mbɔkyɛ   'that I roast'

    kwenokya   'to take home'

To successfully maintain that the palatal glide in

the above examples (and other similar words) is
derived from /e/ by a rule, one would need to show
that the morphemes containing the palatal glide
have [e] in the place of [y] in some other occurrences.
There are, however, no instances in which the
morphemes containing [y] in (8) occur with [e] in
the position of the glide. The palatal glide in
the three examples is therefore underlying.
Positing /e/ as an underlying segment from which
[y] in the above examples is derived would be going
against one of the requirements of Natural Generative
Phonology. The theory requires that an underlying
form must surface, at least in some instances.

One very tempting 'evidence' for one wishing
to insist that the palatal glide in (8) is derived
from a vowel is that when the forms in (8) are
extended by verb suffixes, it may be argued, /i/
appears in the position occupied by [y] in (8).
One might then go on to argue that the palatal
glide in (8) is derived from /i/. The argument
might then be extended to the effect that rule (7)
should be written so that it includes not only /e/
and /o/ but also /i/ (and possibly /u/). After
verb suffixes are affixed to the forms in (8) we
get the new forms in (9).

9. (i) kamɛriʒyɛ   'let me make (it)to be
                              swallowed'

    (ii) mbokiʒyɛ   'that I cause (it) to be
                              roasted'

    (iii) kwenokiʒya   'to cause (something else)
                              to be taken home'

It is true that in (9) /i/ occupies the position
occupied by [y] in (8). It would seem as though the
/i/ ⟶ [y] proponent has proved his case. A close
look at (9), however, reveals that the glide in
(8) has simply shifted further to the right
(relative to the stem) in the forms of (9) and not
that it has 'reverted' back to /i/. The i in
(9) does not, therefore belong to the same underlying
segment with the palatal glide in (8). Furthermore,
the i in the forms of (9) belong to the
causative morpheme {iʒ} and there is no way in
which it could be affected by the extended glide-
formation rule since the segment is always
followed by /ʒ/. Consequently, the /i/ ⟶ [y]
account of the palatal glide in (8) is not tenable,
it is false. It is therefore not a counter-evidence
or counter-argument against our conclusion that
Kitharaka has an underlying palatal glide.

    In (6)(ii) above we gave the word [rwakwa]
as one of the examples. We argued that the velar
glide in the first syllable of the word is derived
from /o/ by the glide-formation rule. The glide in
the second syllable cannot be likewise traced back

to a vowel source. It is an underlying glide.
In the light of this evidence there is every
justification in concluding that Kitharaka has
both underlying palatal and velar glides.

There are several other examples in which
there is no indication that the glides are derived
from vowels. Some of these examples are cited
below in the hope that they will further support
our observation that there are underlying palatal
and velar glides in Kitharaka.[5]

10. (i) mbwɛ   'fox(es)'
   (ii) mbya   'money'
  (iii) mpyɔ   'cold'
   (iv) mpurya   'rhino(s)'
    (v) kumɛnwa   'to be hated'
   (vi) ntweɣa   'giraffe(s)'
  (vii) nɗwariɣa 'buck(s)'
 (viii) nɟya   'deer(s)'

With an exception of (10)(v) all the examples have
a glide in the noun stems. All of these stems
have only one phonetic realization (-the one in
which they appear in the examples). This is to
say that all these stems are given in their
underlying representation (which however happens to
be the form in which they surface). Since the
stems are in a form identical to their underlying
representation all the segments appearing in these

stems are necessarily underlying; for it is true
that underlying morphemes consist only of underlyingly
segments. The palatal and velar glides appearing in
the examples given in (10) are therefore underlying
segments.

The glide in komɛnwa is the passive morpheme
{w}. It is always realized as [w]. This is a
further empirical evidence that Kitharaka has an
underlying velar glide.

Having discussed in turn each of the four
categories of consonants - obstruents, nasals, the
liquid and glides - we are now in a position to
give a phonemic chart for the inventory of Kitharaka
consonants. The columns of the chart represent
places of articulation whereas the rows represent
the manner of articulation.

(11)   p   t   c   k

          mb   nd   ɲɟ   ŋg

          β   ɗ   j   ɣ

          m   n   ɲ   ŋ

                   r

                            y   w

One fact that emerges from the observation of the
above phonemic chart is that it is symmetrical.
Symmetry in a sound inventory, in our opinion, makes
the particular inventory simple for the speakers in
that symmetry is an implementation of proportional

relations among segment classes. That 'proportional
relations' is a desired notion in languages has
been illustrated by studies in analogy (see Antilla
1977, Vennemann 1972, and King 1969). It is on
these grounds that we consider the symmetrical
pattern of the above inventory to be a kind of an
external support for the underlying consonants that
we have posited for Kitharaka.

2.7 FURTHER JUSTIFICATION FOR THE CONSONANT INVENTORY

Closely related languages usually have many
structural similarities. It is to be expected, for
instance, that such languages have sound inventories
that are fairly similar, especially if they have
been separate languages for a relatively short
time. In this subsection we shall give sound
inventories for languages that are closely related
to Kitharaka. The inventories of all these other
languages, namely: Kikuyu, Kimeru, Kiembu, Kimbeere
and Kikamba are very much like the inventory for
Kitharaka given in (11)[6].

(12) KIMERU:

p	t	c	k
mp	nt	ɲc	ŋk
mb	nd	ɲɟ	ŋg
β	ʒ	j	ɣ
m	n	ɲ	ŋ
	r		

y   w

(13) <u>KIEMBU</u>:

		t			k
mb	nd		ɲɉ	ŋg	
v	ð/s		ʃ	ɣ	
m	n		ɲ	ŋ	
r					
			y	w	

(14) <u>KIMBEERE</u>:

		t			k
mb	nd		ɲɉ	ŋg	
v	ð/s		ʃ	ɣ	
m	n		ɲ	ŋ	
r					
			y	w	

(15) <u>KIKUYU</u>:

	t	c	k	(ʔ)
mb	nd	ɲɉ	ŋg	
v	ð		ɣ	h
m	n	ɲ	ŋ	
r				
	y	w		

(16) <u>KIKAMBA</u>

		tʃ	
	t		k
mb	nd	ndʒ	ŋg
	nð/nz		
v	ð/s		
m	n	ɲ	ŋ
	l		
		y	w

It is of particular interest to note that
all the five systems given above have prenasalized
voiced stops. An equally important aspect of the
five systems is that all have both the palatal and
the velar glides. We call attention to these two
classes because whereas we established all the other
consonants in a more or less straight-forward
manner, presence of prenasalized stops and glides
is not so obvious. It is therefore significant
to find that each of the five languages has palatal
and velar glides, as well as prenasalized voiced
stops.

2.8 THE CONSONANTS IN DISTINCTIVE FEATURES

Probably the clearest method of illustrating
the distinctiveness of each of the segments given
in (11) is to give a feature matrix for the inventory.
In addition to revealing the distinctiveness of each
segment relative to all the others, the feature
matrix will show which sounds can be grouped

together into natural classes. In any case, we shall need distinctive features for the discussion on phonological processes. The features will help us formalize rules. They will also help us to show the phonetic motivation or 'naturalness' of rules. Introducing features in the study is therefore not 'ad hoc' in any sense.

We shall use the <u>Sound Pattern of English</u> (SPE) system of features. Natural Generative Phonology and the SPE model of analysis do not differ in terms of distinctive features. Using the SPE system of features in this study is therefore not a deviation from our theoretical frame-work:

The consonant inventory in (11) has feature specifications as shown in the feature matrix (17)

(17) p t c k ᵐb ⁿd ⁿɟ ŋg β ð j ɣ m n ɲ ŋ r y w

	p	t	c	k	ᵐb	ⁿd	ⁿɟ	ŋg	β	ð	j	ɣ	m	n	ɲ	ŋ	r	y	w
CONS	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
VOC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
ANT	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	-	-
COR	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	+	-	-
CONT	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	+	+	+
VOICE	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
NAS	-	-	-	-	+	+	+	+	-	-	-	-	+	+	+	+	-	-	-
HIGH	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	+	+
BACK	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	+

Matrix (17) fails to reveal that all the ninteen consonants in (11) are distinct from each other. In other words, the phonemic status of some of the segments is not revealed. Specifically /^{m}b, ^{n}d, ^{ɲ}j, ^{ŋ}g/ are shown as having identical feature specifications with /m, n, ɲ, ŋ/ respectively. According to (17) the four prenasalized stops are partially specified as follows:

(18)   /^{m}b/   /^{n}d/   /ɲj/   /ŋg/

$\begin{bmatrix} +cons \\ +ant \\ -cor \\ +voice \\ +nas \\ -high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ +ant \\ +cor \\ +voice \\ +nas \\ -high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ -ant \\ -cor \\ +voice \\ +nas \\ +high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ -ant \\ -cor \\ +voice \\ +nas \\ +high \\ +back \end{bmatrix}$

The four nasals of the language have the partial specifications given in (19):

(19)   /m/   /n/   /ɲ/   /ŋ/

$\begin{bmatrix} +cons \\ +ant \\ -cor \\ +voice \\ +nas \\ -high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ +ant \\ +cor \\ +voice \\ +nas \\ -high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ +ant \\ +cor \\ +voice \\ +nas \\ +high \\ -back \end{bmatrix}$	$\begin{bmatrix} +cons \\ -ant \\ -cor \\ +voice \\ +nas \\ +high \\ +back \end{bmatrix}$

As is seen in (18) and (19) each of the prenasalized
stops in (18) has identical feature specification
with the corresponding nasal in (19). By implication,
the matrix makes the wrong claim that the phonology
of Kitharaka does not distinguish between nasals
and the prenasalized stops.

It seems that the inability for matrix (17)
to distinguish between the prenasalized stops and
the nasals stems from the inadequacy of the SPE
feature system. The feature system is not
capable of distinguishing prenasalized consonants
from both nasal consonants and oral stops. There
is a need to use more than one feature when dealing
with nasality. The SPE feature system uses only
one feature, [nasal]. Ladefoged (1971) has
recognized the need to use more than one feature
and has suggested that the feature [prenasal] be
used along with the feature [nasal]. The problem
of distinguishing prenasalized stops is adequately
solved by incorporating the feature [prenasal] in
the consonant matrix, as shown in (20) below:

(20)

	p	t	c	k	ᵐb	ⁿd	ᶮɟ	ᵑg	β	ʄ	j	ɣ	m	n	ɲ	ŋ	r	y	w
CONS	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−
VOC	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	−	−
ANT	+	+	−	−	+	+	−	−	+	+	−	−	+	+	−	−	+	−	−
COR	−	+	−	−	−	+	−	−	−	+	−	−	−	+	−	−	+	−	−
CONT	−	−	−	−	−	−	−	−	+	+	+	+	−	−	−	−	+	+	+
VOICE	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
NAS	−	−	−	−	−	−	−	−	−	−	−	−	+	+	+	+	−	−	−
PRE-NAS	−	−	−	−	+	+	+	+	−	−	−	−					−	−	−
HIGH	−	−	+	+	−	−	+	+	−	−	+	+	−	−	+	+	−	+	+
BACK	−	−	−	+	−	−	−	+	−	−	−	+	−	−	−	+	−	−	+

In matrix (20) the nasals are partly specified as
[+nasal] and left unspecified for the feature
[Prenasal] ; (see footnote 9). On the other hand
prenasalized stops are specified as [-nasal] and
[+prenasal] . This specification correctly
reveals the distinctiveness of each segment in the
two series.

FOOTNOTES:

1. By 'underlying segments' we mean systematic
   phonemes and not the 'autonomous phonemes' of
   the structural school of linguistics.

2. An underlying morpheme is the one which has not
   undergone any phonological change.

3. See footnote 1.

4. An attempt to write the rule without 'conditions' results in a very cumberson and inelegant structure.

5. The initial nasal in the examples marks classes 9/10. In (v) /ko/ is the infinitive marker. We have used square brackets because the hormoganic nasal rule has already applied.

6. The sources of the consonant inventories are as follows:

   Kiembu and Kimbeere - Mutahi (1977).

   Kikuyu - Armstrong (1967).

   Kikamba - Ford (1975).

   Kimeru - Marete (personal communication).

7. The feature [Prenasal] is not applicable to nasals because it does not make sense to talk of a 'prenasalized nasal'. The nasals are therefore unspecified for the feature.

3.0 THE CONSONANT INVENTORY AND THE THEORY OF MARKEDNESS.

· Our objective in this section is to find out whether the claims made by the ‘theory of markedness’ are supported by Kitharaka consonant inventory.

According to the generative phonologists, for instance Chomsky and Halle (1968), and Hyman (1975), unmarked segments are generally acquired earlier by children during language acquisition. Unmarked segments are also generally to be found in a sound inventory if that inventory has marked segments. In unconditioned linguistic change marked segments change into unmarked ones.

In the consonant inventory for Kitharaka given in (11) it is shown that the language has four voiceless stops -/p,t,c,k/. These are the most unmarked obstruents in that obstruents are marked for both voicing and continuance. Since the language has /β,ʒ,j,ɣ/ the presence of /p,t,c,k/ in the consonant inventory is in line with the prediction made by the theory that unmarked sounds "are.....generally required in the inventory of sounds of a language before marked sounds can be added"; (see Hyman 1975:147). We should remember, however, that affricates are less marked than stops in the palatal region. Whereas Kitharaka has the palatal stop /c/ it does not have a palatal

affricate. In this particular instance, therefore, the inventory of the language does not bear out the prediction of the theory - the prediction that if a language has a palatal stop it will also have a palatal affricate. The issue here is to account for the presence of /c/ in a language that does not have a palatal affricate presumably /tʃ/[1].

Probably the issue could be explained by examining the role of symmetry in determining sound inventories. We will assume that a sound inventory will not have more underlying segments than are necessary for distinguishing meaning within the particular language. By implication, Kitharaka needs only nineteen consonants (as shown in the inventory given in (11)) to differenciate meaning in its vocaburary. With this assumption in mind it is evident that were the language to have /tʃ / in its sound inventory before before having /c/ (as predicted by the theory of markedness) the language would have nineteen consonants before incorporating /c/ into its sound system. If that was the case (20) would be the consonant inventory for the language.

(21)   tʃ

       p   t   k

    ᵐb   nd   ɲj   ŋg

    β   ɟ   j   ɣ

    m   n   ɲ   ŋ

                r

                         y   w

A glance at (21) reveals that the pattern of the
inventory is highly assymmetrical specifically with
regard to the affricate and the voiceless stops.
There is only a palatal affricate (although it is
phonetically possible to have labial, alveolar and
velar affricates). Secondly, there is a 'gap' in
the series of the voiceless stops in that whereas
there are labial, alveolar and velar voiceless
stops there is none in the palatal region. Moreover,
the only affricate in the inventory corresponds
(in terms of point of articulation) with the
'missing stop'. If the language incorporates /c/
into its sound inventory in preference to /tʃ/ the
consonant inventory would be symmetrical in that
the language will not only have a complete series
of voiceless stops but also it will eliminate the
only affricate. This would result in a high degree
of symmetry in that the series of the voiceless
stops will have proportional relation to the
prenasalized voiced stops, the voiced fricatives, and

the nasals. We propose that considerations of symmetry overruled those of 'markedness' in this particular aspect of Kitharaka phonology.

If our proposal is correct, it remains to be investigated as to whether the phonologies of other languages behave in a similar way in respect to the notions of symmetry and markedness. This is an area worthy investigating in that it may be the case that the role of 'markedness' in phonology is less than it has been thought to be.

FOOTNOTE:

1. /tʃ/ is less marked than /dʒ/. If a language has only one palatal affricate we would expect it to be /tʃ/ according to the theory of markedness.

4.0 PHONOLOGICAL PROCESSES

In this chapter we will discuss five
phonological processes namely: nasal assimilation,
continuant strengthening, /k/ dissimilation,
indentical consonant deletion, and /t/ deletion.
An attempt will be made not only to discuss the
nature of the rules expressing these processes,
but also the category an d scope of the rules.
Formal representation of the rules will be given
in distinctive features.

## 4.1 HOMORGANIC NASAL ASSIMILATION

Homorganic nasal assimilation is a process
that changes a nasal consonant so that it agrees
in point of articulation with the following
consonant. It is a regressive assimilation whereby
in anticipation of the articulation of the
consonant following the nasal the articulators
adjust early so that both the nasal and the
following consonant are articulated at the same
point.[1]

In all cases except word-initially the nasal
and the following consonant are already 'homorganic';
that is, they agree in point. The homorganic nasal
assimilation is therefore a word-initial phenomenon.
The process is illustrated by the following
examples:[2]

(22) /nβungɛ/ ⟶ [mbungɛ] 'that I lock'

 /npɛryɛ/ ⟶ [mpɛryɛ] 'that I refuse'

 /njɛroɛ/ ⟶ [ɲɟɛroɛ] 'that I become white'

 /ncanorɛ/ ⟶ [ɲcanorɛ] 'that I comb (hair)'

 /nɣarorɛ/ ⟶ [ŋgarorɛ] 'that I change
                                        (something)'

 /nkarangɛ/ ⟶ [ŋkarangɛ] 'that I fry'

The motivation for the homorganic nasal
assimilation in Kitharaka (and indeed in other
languages) is based on considerations of 'articulatory
simplification', (see Antilla 1972:74). The
process is the result of an attempt to 'by-pass'
some of the articulatory postures. For example, to
pronounce [ng] in /nɣarorɛ/ (assuming that the
continuant strengthening rule has already applied),
requires a complete closure at both the alveolar
ridge (for the articulation of [nɟ]) and hard palate
(for the articulation of [g]. The process of nasal
assimilation which results in [ŋgarorɛ] eliminates
a closure at the alveolar ridge so that there is
only one closure at the hard palate. The result
is some economy of effort in the utterance
because the number of movements of the articulators
is reduced by one. Assimilatory processes try
to minimize on the activity of the articulators.
This general statement applies equally well to
homorganic nasal assimilation. In the words of
Abercrombie (1967:135) "the result of the

assimilation is to reduce the number, or the
extent, of the movements and readjustments which
the speech-producing organs have to perform."
The articulatory complexity which would be
encountered if the language did not have the
nasal assimilation rule is illustrated by the
following anotated diagrams of the vocal tract:

(23)

alveolar ridge · nasal cavity · palate · velum · tongue · (5)
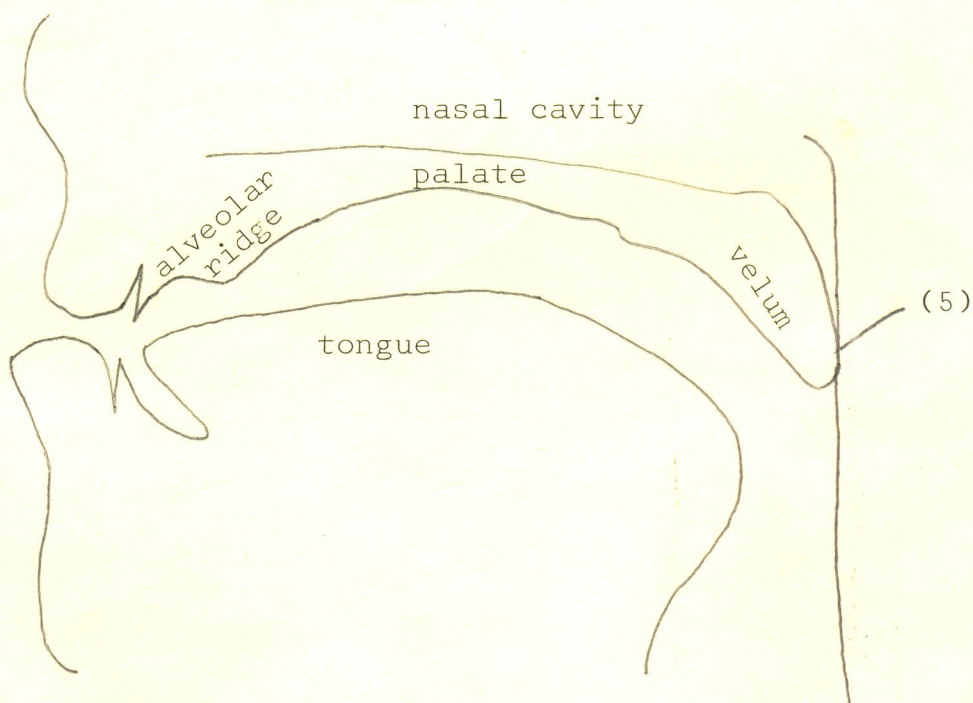
NEUTRAL POSITION OF THE TONGUE AND THE VELUM

From the neutral position[3] of the articulators
shown above it would be necessary to make the
following adjustments if the nasal did not
assimilate; that is, if the sequence [ng] were to
be produced:

stage 1:

    (i) raise the tip of the tongue to make

        contact with the alveolar ridge.

    (ii) simultaneously lowering the velum to

        make an opening at (5)

stage 2:

    (iii) raise the back of the tongue to make

        contact with the hard palate.

    (iv) simultaneously raising the velum to

        make a complete closure at (5).

(24)
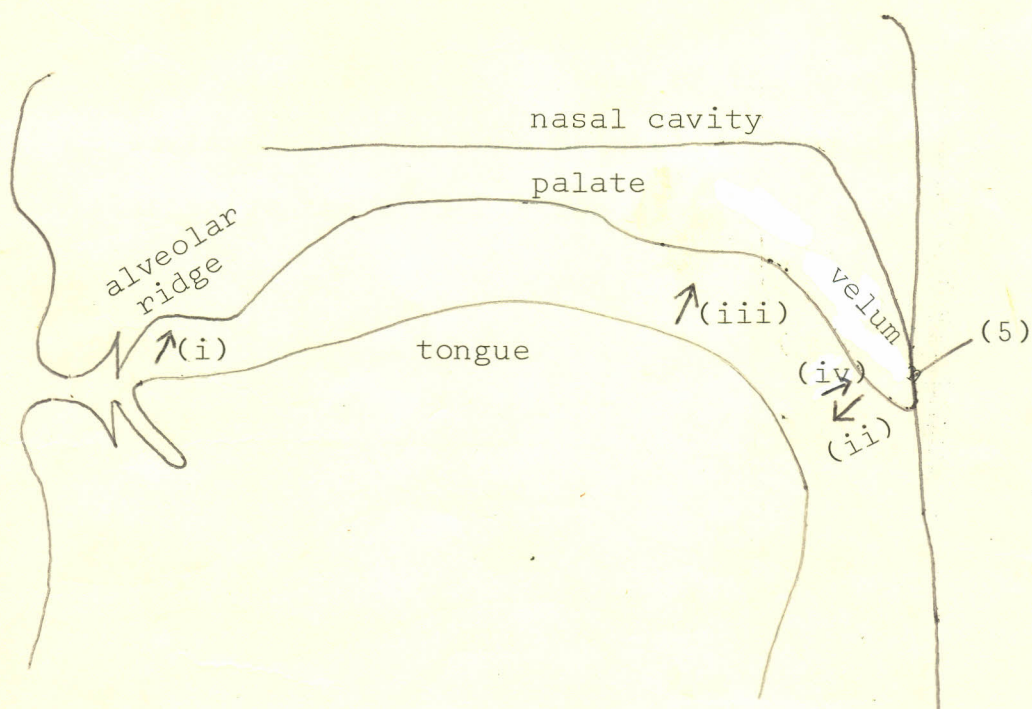
ARTICULATION OF [ng]

In all, to pronounce [ng] four articulatory
gestures are made by the tongue and the velum.

Assimilation of the nasal to the point of articulation of [g] reduces the articulatory movements from four to three. To produce [ŋg] the following gestures are required:

stage 1: (i) raising the back of the tongue to make contact with the hard palate

(ii) simultaneously lowering the velum to make an opening at (5) (for the production of [ŋ]).

stage 2: (iii) raising the velum to make a closure at (5) (for the production of [g]).

(During gesture (iii) the back of the tongue remains in contact with the hard palate). Diagram (24) illustrates the articulation of [ŋg]

(25)

ARTICULATION OF [ŋg]
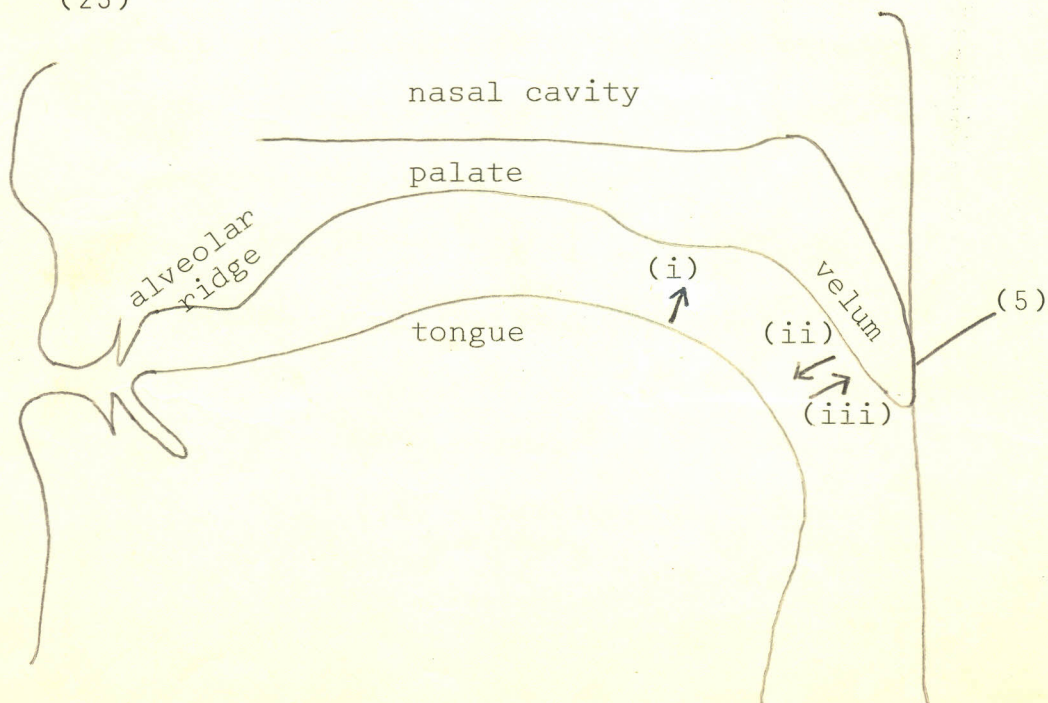
In this way the speaker succeeds in 'producing some economy of effort in the utterance'; (Abercrombie, 1967:135). This then, is the phonetic motivation for the nasal assimilation.

Since the process of homorganic nasal assimilation is phonetically motivated it is to be expressed by a p-rule. The rule may be formulated as[4]:

(26)

$$
\begin{array}{ccc}
& C & \qquad\qquad C \\
[\text{+nas}] \rightarrow &
\begin{bmatrix}
\alpha\text{ant} \\
\beta\text{cor} \\
\gamma\text{back}
\end{bmatrix}
& / \quad \underline{\quad}
\begin{bmatrix}
\alpha\text{ant} \\
\beta\text{cor} \\
\gamma\text{back}
\end{bmatrix}
\end{array}
$$

Articulatory simplification does not explain why the nasal assimilates to the following consonant and not vice versa. If the language had process such that: g → d/n—, instead of n → ŋ/-g the same degree of articulatory simplification would be achieved. The reverse assimilation, that is, g → d/n—, like the process n → ŋ/-g reduces the four gestures (necessary for producing [ng]) to three:

        stage 1: (i) raising the tip of the tongue to make contact with the alveolar ridge.

             (ii) simultaneously lowering the velum to make an opening at (5) (for the production of [d]).

stage 2: (iii) raising the velum to make a
complete closure at (5) for
the production of [d]).

(During gesture (iii) the tip of the tongue remains
in contact with the alveolar ridge).

The reasons for the preference of nasal
assimilation over the obstruent assimilation
remains to be investigated. There seems to be a
universal to the effect that in a situation where
a non-nasal consonant differs in point of articula-
tion with a preceding nasal, the later assimilates
to the point of the former. Existence of such a
linguistic universal would account for the fact that
homorganic nasal assimilation is attested in many
languages whereas assimilation of a non-nasal
consonant to the point of articulation of a nasal
is rare if attested at all.

Nasal assimilation in Kitharaka results in
phonetic merger. The phonetic variants of /n/
preceding voiced bilabial, palatal and velar
obstruents merge with /m n ɲ/ respectively. The
multiple merger is illustrated in figure (27)
below:

(27)   UR   /m   n   ɲ   ŋ/

PR   [m   m n ɲ ŋ   ɲ   ŋ]
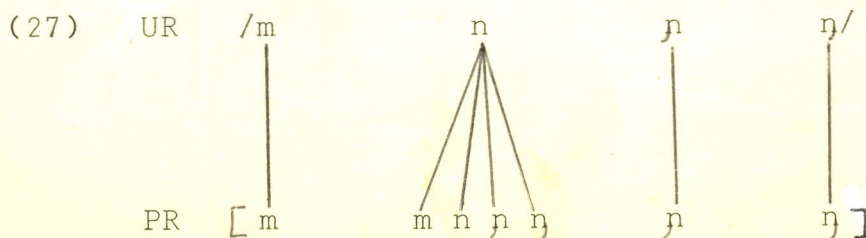
By a phonetic merger we mean a situation whereby
two underlying segments have identical phonetic
realization. This phenomenon is different from
phonemic merger whereby two underlying segments
become phonetic variants of the same underlying
segment; in other words, two underlying segments
cease to contrast meaning and the occurrence of
each becomes predictable.[6] The two types of merger
are further distinguished from each other by the
fact that whereas synchronic rules are responsible
for phonetic merger, phonemic merger results from
a historical process; (see Antilla 1972:70).

It seems that the homorganic nasals are
undergoing a historical process of weakening.
They are not articulated as strongly as the nasals
that are followed by either vowels or glides.
Whereas the latter are perceived as clearly as
other consonants of the language, homorganic
nasals are barely audible. They are devoiced
when followed by a voiceless consonant. The
nasal devoicing rule may be formulated as:

(28)   C

$$\begin{bmatrix} +nas \\ +cor \end{bmatrix} \longrightarrow [-voice] \; / \; - \; \overset{C}{[-voice]}$$

As shown in section (2·2) Kitharaka has four voiceless
consonants: /p, t, c, k/. The devoicing of /n/
when it precedes each of these segments results in
the following phonetic realizations: [m̥, n̥, ɲ̥, ŋ̥].
The two rules of homorganic nasal assimilation and
nasal devoicing result in eight different
realizations of /n/ at the phonetic level.
Diagrammatically /n/ and all its phonetic variants
may be represented as:

(29)   /n/

[m m̥ n n̥ ɲ ɲ̥ ŋ ŋ̥]
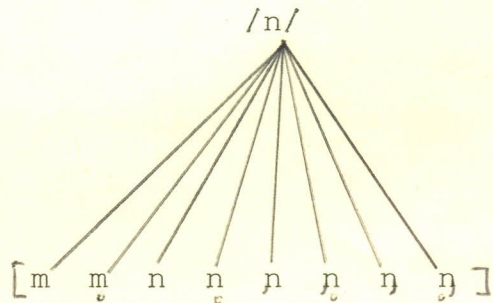
One way of accounting for the motivation for
nasal reduction is to consider the role of analogy.
It was noted in section (2.3) that Kitharaka has
prenasalized stops. Phonetically, these stops are
co-articulations of a reduced nasal and an
obstruent. Analogical extension might have
extended the phonetic realization of the
prenasalized stops to the
nasal-stop sequences. This hypothesis would
account for the unreduced articulation of /n/ in
the sequence [nd]. Reduction of the nasals takes
place only when the nasal is followed by a stop.
This implies that when a nasal is followed by a

continuant, the continuant strengthening rule, which changes continuants into stops, has to to apply before nasal reduction takes place. In the case of nǯ , /ǯ/ does not strengthen to a stop, and hence, nasal reduction does not take place.

4.2 CONTINUANT STRENGTHENING

We noted in section (2.1) that Kitharaka has five voiced continuants: /β, ǯ, r, j, ɣ/. With the exception of /ǯ/ all these continuants strengthen into stops when they are preceded by /n/. The process of continuant strengthening may be represented diagrammatically as:

(30)

$$
\begin{bmatrix} \beta \\ r \\ j \\ \gamma \end{bmatrix} \longrightarrow \begin{bmatrix} b \\ d \\ ǯ \\ g \end{bmatrix} \ / \ n \!-\!
$$
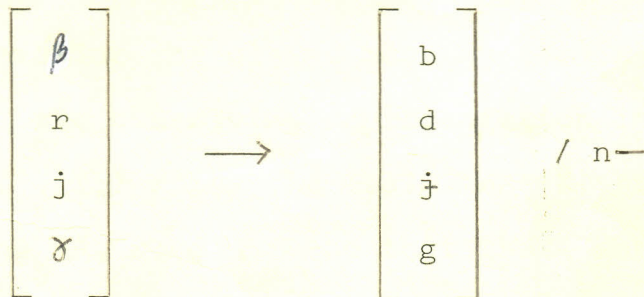
and it is expressed by rule (30'):

(30')   C

            [+cont] $\longrightarrow$ [-cont] / [+nas] -

Condition: The continuant should be [+son] if it
                is also [+cor].

The 'directionality'[7] of the above process is not necessarily obvious. It may be the case that the language has a stop weakening rule and not a

continuant strengthening rule.   In other words,
the reverse of (30), that is:

(31)

$$\begin{bmatrix} b \\ d \\ \dot{\jmath} \\ g \end{bmatrix} \longrightarrow \begin{bmatrix} \beta \\ r \\ j \\ \gamma \end{bmatrix} \Big/ \begin{Bmatrix} V \\ \# \end{Bmatrix} -$$

might be the correct representation of the native
speaker's competence.   Because (31) cannot be ruled
out on any 'a priori' grounds we need to provide
some justification for maintaining that the
language has rule (30') in its phonology.

For the purposes of such a justification we
need to examine the claims made by (30) and (31)
regarding the underlying representation in the
language.   (30) makes the claim that Kitharaka has
underlying /β, r, j, γ/ and that these segments
are realized as [b, d, $\dot{\jmath}$, g] respectively when
preceded by /n/.   On the other hand (31) makes the
claim that the language has underlying /b, d, $\dot{\jmath}$, g/
and that these segments are realized as [β, r, j, γ]
respectively when they are preceded either by a
pause or a vowel.   The claim made by (31) is
incorrect in that Kitharaka does not have underlying
voiced stops; (see Chapter Two).   On the other
hand, (30) makes a correct claim that the
language has voiced continuants.   Accordingly, we

(30) is part of Kitharaka phonology whereas (31) is not.

Continuant strengthening is a phonetically motivated process. Like nasal assimilation, strengthening of continuants is motivated by considerations of articulatory simplification. For example, the articulation of the sequence [nr] requires that the tip of the tongue makes contact with the alveolar ridge with a simultaneous lowering of the velum. Then, the velum is raised so as to block air from escaping through the nasal cavity, simultaneously making intamitent contact between the alveolar ridge and the tip of the tongue. Strengthening of /r/ into [d] is motivated by the desire to avoid this last articulatory gesture - that is, the tapping of the tip of the tongue on the alveolar ridge. To produce [nd] requires only one continuous contact between the tip of the tongue and the alveolar ridge. Hence, the change of /r/ to [d] after /n/ reduces the movements of the tip of the tongue and is therefore a simplication of articulation.

Strengthening of /β, j, ɣ/ into [b, ɟ, g] (respectively) when proceded by a nasal also results in articulatory simplification. To produce the sequence [ŋɣ] for example, the back of the tongue make contact with the hard palate for the

articulation of [ŋ] and then adjust to a fricative-position[7] for the articulation of [ɣ]. On the hand, to produce the sequence [ŋg] the adjustment of the back of the tongue to a fricative-position is avaoided. In a similar manner, hardening of /β/ to [b] and /j/ to [ɟ] after [m] and [n] respectively avoids making adjustment for the fricative.

It was noted in section (2.1) that /ð/ is the only continuant that does not strengthen in Kitharaka. Consequently, [nð] is the only nasal-fricative sequence in the language. The grammar would be simpler if the language had the process represented diagrammatically in (32).

(32)

$$
\begin{bmatrix} \beta \\ ð \\ ɼ \\ j \\ ɣ \end{bmatrix} \longrightarrow \begin{bmatrix} b \\ d \\ d \\ ɟ \\ g \end{bmatrix} \Big/ \ n \ \text{—}
$$
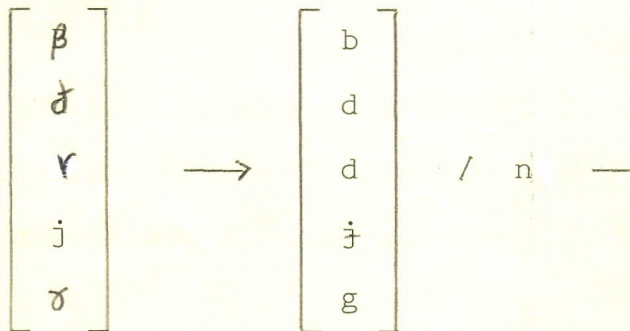
In features (32) may be rewritten as (32')

(32')   C

$$[+cont] \longrightarrow [-cont] \ / \ [+nas] \ \text{—}$$

As seen from the greater number of segments affected, (32) is more general than (30). The greater complexity of (30) stems not only from its less generality (in terms of

the number of segments affected) but also from the

fact that it does not apply to /ð/ although it

applies to /r/ both of which are [+ant] and [+cor].

It is this latter aspect of (30) that necessitates

the use of a 'condition' in (30'). Whereas the

generality of rule (30') would be less than that of

rule (32') its complexity would nevertheless be

reduced if it failed to apply to both /ð/ and /r/.

If the rule did not apply to any of the two

segments it could be possible to write it without

the use of a condition; thus:

(30") C

$$\begin{bmatrix} +\text{cont} \\ -\text{cor} \end{bmatrix} \longrightarrow [-\text{cont}] \ / \ [+\text{nas}] -$$

The question that suggests itself at this point is:

why did the language prefer to have rule (30') which

is less general and more complex than both (32')

and (30")?

A look at (32) reveals that if the scope of

the continuant strengthening rule was extended so

as to include the strengthening of /ð/ into [d]

there would be a phonetic merger between /ð/ and

/r/ because both of them would be realized as [d] .

Such a merger would result in homophonons forms

as exemplified below:

(33)   /nrɛkɛ/ ⟶ [ndɛkɛ] 'aeroplane'

            /nðɛkɛ/ ⟶ [ndɛkɛ] 'that I laugh'

            /nrɛkɛ/ ⟶ [ndɛkɛ] 'that I allow'

All the above examples have identical surface realizations. Put differently, the surface form [ndɛkɛ] has a three-way ambiguity. Whereas it is possible to disambiguite the word for 'aeroplane' from the context since it is a noun and the other two words are verbs, there is no possibility of distinguishing each of the latter two from each other because they occur in the same context. It is probably to avoid this kind of homophony and ambiguity that the continuant strengthening rule is blocked from extending to /ð/.

Generally, homophony is undesirable in grammars because it is contrary to Humboldt's Universal or the principle of one form - one meaning correspondence; (see Vennemann 1972a, Antilla 1972). We consider this fact to be a theoretical support to our hypothesis on the failure of /ð/ to strengthen.

There is one major problem with the hypothesis that considerations of homophony and ambiguity limit the scope of the continuant strengthening rule from extending to /ð/. The hypothesis does not explain why it is /ð/ and not /r/ that does not strengthen. Homophony could equally well be avoided if the continuant strengthening rule

applied to /ð/ but was blocked from extending to
/r/. A second hypothesis which seems to adequately
explain why /ð/ does not strengthen is based on
phonetic facts. Unlike other continuants no stop
is produced at the same point of articulation with
/ð/. [β]and[b], [j]and [ɟ] and,[ɣ]and[g], are bilabial,
palatal and velar segments respectively. On the
other hand, although[r], [ð], and [d]are all specified
as [+ant] and [+cor] [ð] is an inter-dental sound
whereas[r]and[d]are alveolar sounds. Thus, in a
strictly phonetic sense the change of /ð/ to [d]
would not only be a change in the manner but also
in the point of articulation. The same cannot be
said of the other continuants in the language
because the change of /β, r, j, ɣ/ to [b, d, ɟ, g]
respectively is only a change in the manner and
not in the point of articulation. We propose
that it is this peculiarity of /ð/ that blocks the
scope of the continuant strengthening rule from
applying to the segment.

It is true that there are languages including
Kikuyu (see Mutahi 1977) where /ð/ becomes [d]
after a nasal. This observation does not, however,
necessarily invalidate our hypothesis because
different languages handle phonetic facts quite
differently in their phonologies. For example,
some languages including Kitharaka and Kikuyu do
not palatalize /k/ when it is followed by /i/.

The sequence /ki/ is therefore pronounced ⌊ki⌋.
It does not make sense, however, to argue that
because such languages exist some other languages
cannot be expected to palatalize /k/ before /i/
(as evidenced by Luganda). At any rate, the
phonology of a language is the language's
idiosyncratic arrangement and handling of sounds
for the purpose of efficient communication.

4.3 DISSIMILATION OF /K/

Kitharaka has a rule that changes /k/ into[ɣ]
when it is followed by a voiceless consonant.[8]
The rule combines two phonological processes,
namely voicing and sprintization. It may be
formulated as:

(34)

$$\begin{bmatrix} C \\ +back \end{bmatrix} \longrightarrow \begin{bmatrix} +cont \\ +voice \end{bmatrix} / \#-V \begin{bmatrix} C \\ -voice \end{bmatrix}.$$

The rule is illustrated by the following examples:

(35)   /kepuru/   ⟶ [ɣepuru]   'name of a tree'

/keakwa/   ⟶ [ɣyakwa]   'mine (obj. of cl.7)'

/katerya/   ⟶ [ɣaterya]   'woman's name'

/kakuro/   ⟶ [ɣakuro]   'puppy/small dog'

/kotɛɣa/   ⟶ [ɣotɛɣa]   'to set a trap'

/kocɛða/   ⟶ [ɣocɛða]   'to play'

The examples in (35) are chosen in such a way as to show that any voiceless obstruent in the language causes voicing and sprintization of /k/. Voiceless nasals (see 4.1) have a similar influence on the segment as illustrated below[9]:

(36) /keɔntɛro/ ⟶ [ɣyɔntɛro] 'dented (ob.of cl.7)'

/kankwɛ/ ⟶ [ɣaŋkwɛ] 'let me give you'

/koncoβa/ ⟶ [ɣoɲcoβa] 'to look at me'

/t/ is the only other voiceless consonant that occurs in an environment similar to the one in which /k/ is voiced and sprintized. The morpheme {to} may be prefixed to stems beginning with a voiceless consonant. Unlike /k/, however, /t/ does not undergo any change. In other words, although both /t/ and /k/ are both voiceless stops and occur in a similar environment, the scope of the rule that changes /k/ is blocked from extending to /t/. The implication of this observation is that either the motivation for the rule is non-phonetic and that /t/ does not meet the structural description of the rule, or that the rule belongs to the category of p-rules but that non-phonetic factors block it from extending to /t/. There is no evidence that the rule is motivated by non-phonetic factors. If we advocate the second alternative - that the rule belongs to

the category of p-rules, we could explain why it does not apply to /t/ by hypothezing that the rule is blocked by semantic considerations. If the morpheme {to} were to be realized as [ro] (whereby /t/ changes to [r]), the morpheme would merge with the class 11 marker {ro} which is realized as [ro]. One might question why /t/ does not change to [ð] since doing so does not go against any semantic considerations. It could be argued, however, that the change /k/ —[ɣ] involves only two processes namely sprintization and voicing. On the other hand, the change /t/ →[ð] involves not only these two processes but also 'fronting.'[10] Probably the language disallows three-way changes. Should such a suggestion turn out to be true we would have succeeded in explaining why /t/ does not change to [ð] .

The /k/ dissimilation rule is a form of what is commonly known as Dahl's Law; (see Meinhof and van Warmelo 1932, Bunnett 1967). The Law occurs in different forms in several Bantu languages. In Kikuyu and Kiembu, like in Kitharaka, the law occurs in the form of a /k/ dissimilation rule (see Mutahi 1977, Mberia 1979). In some languages Dahl's Law affects all voiceless stops.

The change of /k/ to [ɣ] results in phonetic
merger between /k/ and /ɣ/. The latter is realized
as [ɣ] except when it is preceded by a nasal in
which case it surfaces as [g]. Diagrammatically
the merger between the two segments may be
illustrated as shown below:

(37)   UR   /k/   /ɣ/

         PR   [k]   [ɣ]   [g]
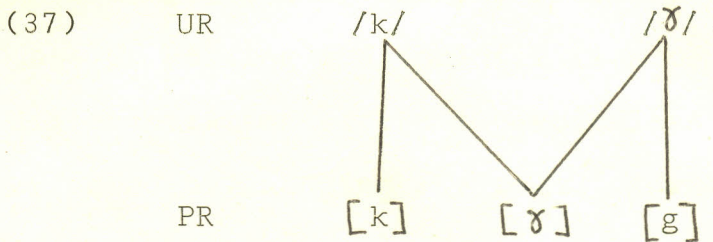
It was suggested in (4.2) that considerations
of ambiguity which results from homophony caused
by phonetic merger may be responsible for blocking
the continuant strengthening rule from extending
to /ð/. That reasoning is not applicable to the
merger between /k/ and /ɣ/. Whereas it is true
that the merger between the two segments causes
homophony the latter does not result in any
ambiguity. /k/ is realized as [ɣ] in the prefix-
position, an environment in which /ɣ/ does not
occur.[11] Because of this environmental context
the underlying source of [ɣ] is always obvious to
the native speakers of the language. In no way,
therefore, is the merger a hinderance to non-
ambiguous communication.

4.4   IDENTICAL CONSONANT DELETION

When two identical prefixes follow each
other in a word, the consonant of the second
prefix is deleted. This is a process of
dissimilation whereby the consonant of the first
prefix (also called pre-prefix, (see Nida 1946))
acts as the conditioning influence. Unlike the
case of voicing and sprintization of /k/ where
differentiation of the two voiceless consonants is
effected by changing /k/ to [ɤ], identical
consonant deletion is what may be termed total or
complete dissimilation.   In other words, deletion
of one of two identical segments is the maximum
differentiation between the segments.

The only prefixes affected by the identical
consonant deletion rule are /ke/ , /ro/ , and /to/ .
They are markers for classes 7, 11, and 14
respectively. Only these three morphemes may
occur in a reduplicated form. In the other cases
of double prefixes the function of the pre-prefix
is to reclassify the noun in which it occurs and
is therefore different from the prefix which marks
the original class of the noun. Reduplication of
/ke/ , /ro/ , and /to/ and the operation of the
identical consonant deletion rule are illustrated
by the following examples:

(38)   /kekenɛnɛ/ ⟶ [ke:nɛnɛ] 'big (cl.7)'

       /kekenɔru / ⟶ [ke:nɔru] 'fat (cl.7)'

       /rorokuβe/ ⟶ [ro:kuβe] 'short (cl.11)'

       /rorokoro/ ⟶ [ro:koro] 'old (cl.11)

       /totoɛɣa/ ⟶ [twɛɣa] 'good (cl.14)'

       /totoeðe/ ⟶ [tweðe] 'raw (cl.14)'

All the above examples are adjectives. This is not an accidental selection of the examples. Reduplication of prefixes occurs only in adjectives. The identical consonant deletion rule does not, therefore, apply in other grammatical categories. In addition to adjectives only nouns are capable of having double prefixes but in this case the two prefixes are not identical and the rule does not operate.

The motivation for the identical consonant deletion rule is not clear. It has been suggested by Antilla (1972:74) that dissimilation is desired because it results in neural ease. He claims (by implication) that human neural system does not favour repeating instruction (as is necessary for producing identical or similar sounds). According to his claim dissimilation eliminates such repeatation. Whereas Antilla might be right, we consider it unlikely that his hypothesis explains the motivation for the identical consonant deletion rule. There are

other forms in the language which do not undergo
any dissimilation although they satisfy the
'neural ease condition.' Words such as:

(39)   /koririkana/ —— [koririkana] 'to remember'

          /korerekana/ —— [korerekana] 'to curse'

          /korɔrɔmɛra/ —— [korɔrɔmɛra] 'to fall
                                          further
                                          deep'

          /rorara/   —— [rorara]   'palm leaf'

have reduplicated /ri, re, rɔ, ra/ respectively but
unlike the examples in (38) the consonant of the
second syllable of each of the four words (in 39)
is not deleted.

A more plausible explanation for the motivation
for identical consonant deletion rule is the one
based on semantic considerations. In each of the
examples given in (38) the double prefixes mark the
same class. One of them is therefore functionally
redundant from a semantic point of view. For
instance, /ro/ marks class 11. A form with a
reduplication, that is /roro/, is still marked for
class 11 and does not carry any form of 'extra'
information. Elimination of one /ro/ would therefore
not interfere with the meaning of the words containing
the reduplicated prefixes. We propose that it is
this semantic redundancy that motivates the deletion
of the consonant of the second prefix. Deletion
of the consonant is actually an elimination of the
second morpheme as a whole because the vowel left
behind after the deletion of the consonant is
reinterpreted as part of the preceding prefix which
is accordingly changed from CV to CV:[12]

The semantic redundancy hypothesis explains

why the identical consonant deletion rule does not
apply to the forms exemplified in (39). In all
the examples given in (39) it is syllables and not
morphemes that are reduplicated and the question of
semantic redundancy does not arise. Hence, the
structural description of the identical consonant
deletion rule is not met.

Since the identical consonant deletion rule
includes semantic information, it is a MP-rule.
It may be formulated as:

(40)   C ⟶ ∅/ ─────────────────────
                    [semantic redundancy]

Loss of redundant morphemes is one way in
which languages implement Humboldt's Universal (or
the principle of one-to-one relationship between
form and meaning). The significance of the
one-to-one relationship between form and meaning
has been discussed by Langacker (1977). He points
out that:

> Transparency is based on the notion that
> the ideal or optimal linguistic code,
> other things being equal, will be one
> in which every surface unit (typically
> a morpheme) will have associated with
> it a clear, salient and reasonably
> consistent meaning or function, and
> every semantic element in a sentence

will be associated with a distinct and
recognizable surface form...Languages
should show a tendency to eliminate
morphemes with no obvious meaning or
syntactic function by incorporating
them in other morphemes through
boundary loss, by assigning them new
meaning or by ommiting them entirely.[13]

4.5 /t/ DELETION

The /t/ of the negative marker {ti} is deleted
in negative plural imperatives. The following
examples illustrate the deletion[14]:

(41)   /βotikarɔmbɛ/ --→ [βwikarɔmbɛ] 'do not beg!'

/βotikajɛ/ —→ [βwikajɛ] 'do not come!'

/βotikarɛɤɛ/ —→ [βwikarɛɤɛ] 'do not refuse!'

/βotikainɛ/ —→ [βwikainɛ] 'do not sing!'

The words in (41) are also realized at the phonetic
level in forms identical to the underlying
representation. In other words, the examples in
(41) may surface as:

(41')   [βotikarɔmbɛ]

[βotikajɛ]

[βotikarɛɤɛ]

[βotikainɛ]

The presence of the forms exemplified in (41') is
an evidence that the /t/ deletion rule does not

necessarily apply every time its structural description
is met. Put in a different language, the /t/
deletion rule is not obligatory, it is optional.
It may be pointed out, however, that the forms in
which /t/ has been deleted seem to be more frequent
in the speech of Atharaka than the forms in which
the rule has not applied. It might be the case
that the rule is on the way to becoming obligatory.

As the examples in (41) show, /t/ is deleted
in an intervocalic position. This aspect of the
deletion might lead one into thinking that the rule
is phonetically motivated. Generally, intervocalic
consonant deletion is a process of weakening whereby
considerations of articulatory simplification come
into play. In other words, such deletions are
usually phonetically motivated. They are therefore
expressed in p-rules. To produce the sequence [oti],
for instance, the tongue moves from a vowel-position
to a consonant-position and back again to a vowel-
position[15]. Elimination of /t/ from the sequence
means that the tongue will not move to a consonant-
position and it is therefore simplification of
articulation. If /t/ deletion in Kitharaka is
governed by a rule of this nature the formulation of
the rule would be as follows:

(42)   C

$$\begin{bmatrix} +ant \\ +cor \\ -voice \end{bmatrix} \longrightarrow \emptyset\ /\ \ [+syll]\ \text{---}\ \ [+syll].$$

As was noted above, however, /t/ is deleted only in
specific morphological context. The process has
therefore to be expressed in a rule that incorporates
morphological information. A rule that includes
morphological information belongs to the category
of MP-rules. Thus /t/ deletion in Kitharaka is to
be expressed in an MP-rule. We need to revise rule
(42) such that its environment does not give the
wrong impression that the rule is phonetically
motivated. The correct formulation for the rule is
given below:

(42')   C

$$\begin{bmatrix} +ant \\ +cor \\ -voice \end{bmatrix} \longrightarrow \emptyset\ /\ \ \underline{\qquad\qquad\qquad} \\ \begin{bmatrix} neg.,\ Plural,\ Imp. \end{bmatrix}$$

FOOTNOTES

1. We shall occasionally refer to 'manner of
   articulation' and 'point of articulation' simply
   as 'manner' and 'point' respectively.

2. The nasal devoicing rule and the continuant strengthening rule also apply in these forms.

3. The defination of 'neutral position' adopted for the purposes of this study is the one proposed by Chomsky and Halle (1968:300). They write:
   ...in the neutral position, ... the velum is raised, and the air flow through the nose is cut off. The body of the tongue, which in quiet breathing lies in a relaxed state at the floor of the mouth, is raised in the neutral position to about the level that it occupies in the articulation of the English vowel e in the word 'bed'; but the blade of the tongue remains in about the same position as in quiet breathing.

4. We shall use 'C' and 'V' as abbreviations for '[+cons]' and '[+syll]' respectively.

5. 'UR' and 'PR' are abbreviations for 'underlying representation' and 'phonetic representation' respectively.

6. The occurence of each of the segments becomes restricted to certain clearly defined environment such that the distribution of the two segments can be expressed in the form of a rule.

7. The term has been suggested by Ferguson in his Paper entitled "Phonological Processes" found in Greenberg (1978).

8. /k/ is not immediately followed by the voiceless segment. There is always a vowel (or two vowels) between the two.

9. The /k/ dissimilation rule is intrinsically ordered after the nasal devoicing rule.

10. 'Fronting' refers to the phenomenon of a segment shifting towards the front part of the vocal tract. The change of a velar segment to a palatal segment, for example, is a case of 'fronting'

11. There is no prefix in Kitharaka which has /ɣ/.

12. The vowel of the pre-prefix   is lengthened.

13. Quoted by Leonne Hinton in Language Vol. 56, No. 2 (1980).

14. A glide formation rule changed /o/ into [w] after /t/ has been deleted. The two rules are intrinsically ordered.

15. The consonant-position of the tongue is the general
    configuration of the tongue during the articulation
    of consonants. Likewise, the vowel-position is
    the general configurate of the tongue during the
    articulation of vowels.

5.0 STEM REANALYSIS AND PREFIX REPLACEMENT

Some verbs and 'deverbative'[1] nouns seem to
have stem alternations. The objective of this
chapter is to examine whether there are stem
alternations at all in the language. It is
suggested that the verbs and the deverbative nouns
have only one stem form and that the impression of
stem alternation can be accounted for in terms of
prefix replacement.

There are a few verbs in Kitharaka that seem
to have two stem variants. On the one hand, the
stem appears with a stem-initial consonant and on
the other, without the consonant - that is, the stem
begins with a vowel. The following examples
illustrate the alternations.[2]

(43)	A	B	C
	Infinitive	1st person sg. Subjunctive	Gloss
	kwanda	mbandɛ	'plant'
	ku:ɣa	mbuɣɛ	'say'
	kwɛnda	mbɛndɛ	'love/like'
	kwinga	mbingɛ	'close'
	kwɔna	mbɔnɛ	'see'
	kwina	mbinɛ	'sing

One way in which we could try to account for
the stem alternation is to argue that the two
variants are a surface phenomenon brought about by a

consonant deletion rule that deletes the stem-
initial consonant in column A. In other words, the
stems have an initial consonant underlyingly and
that the stem forms in column A are derived by a
synchronic consonant deletion rule. As seen in
column B all the stems begin with a [b]. Since
Kitharaka does not have an underlying /b/ the [b]
in column B is derived from a /β/ by a continuant
strengthening rule. A claim is therefore being made
that /β/ has been deleted stem-initially in column
A by a /β/ deletion rule. There are however
counter-examples - and therefore counter-evidence -
against this claim. If there was such a rule it
would have deleted /β/ in (44).

(44)   /koβuŋga/ —— [koβuŋga]   'to shut'

        /koβo:ra/ —— [koβo:ra]   'to beat repeatedly'

        /koβo:ta/ —— [koβo:ta]   'to become thirsty'

        /koβeɗya/ —— [koβeɗya]   'to burn'

        /koβa:/   —— [koβa:]   'to become satisfied'

The presence of the above examples is an indication
that there is no synchronic /β/ deletion rule in the
language. The examples in (43) and (44) do not
differ in such a way as to argue that there is a
synchronic MP-rule which deletes /β/ in (43A) but
that its condition is not met in (44). In other
words, (43) does not differ from (44) either
morphologically or in semantic classification. We

are to conclude, therefore, that the stems in (43A)
are underlying; that is, they are not a product of
a synchronic rule.

We have suggested that since Kitharaka does
not have an underlying /b/ the stems in (43B) have a
/β/ in the initial position and that the segment
strengthens to a [b] through a continuant strengthening
rule. According to this suggestion the underlying
representation of (43B) is as follows:

(45)   1st Person Sg.
          Subjunctive   Gloss

          /nβandɛ/   'that I plant'

          /nβuɤɛ/   ' "   " say'

          /nβɛndɛ/   ' "   " love/like'

          /nβiŋgɛ/   ' "   " close'

          /nβɔnɛ/   ' "   " see'

          /nβinɛ/   ' "   " sing'

But how does one support the claim that the forms
in (45) are underlying? And if there is no
supporting evidence, how are they to be maintained
as underlying? We try to answer these questions
below.

The forms in (45) can not be supported by any
argument based on the facts or data in the language.
They can, however, be argued against from two points
of view - theoretical requirements and empirical
evidence. It is a requirement of Natural Generative

Phonology that a segment can not be maintained as
underlying unless it surfaces at least in some
environment. In other words, a segment that has
no phonetic realization identical to it can not be
justified as underlying. This requirement on
segments applies equally well on morphemes. The
underlying representation of morphemes must surface
at least in some words. The stems in (45), that is:

(45')   /βand/

         /βuɣ/

         /βɛnd/

         /βiŋg/

         /βɔn/

         /βin/

do not surface anywhere. Put differently, the stems
in all the examples given in (43) do not surface
with a /β/. The stem forms suggested in (45) (and
which have a /β/ initially) are, therefore, ruled
out a priori on theoretical grounds. Thus (45)
is not an underlying representation in Kitharaka.

     The second argument against positing the
stems in (45) as underlying is an emperical one.
We suggested they are underlying so as to account
for the presence of [b] in (43B), in that it was
suggested that [b] is derived from /β/ by a
continuant strengthening rule. There is, however,
evidence to show that [b] in the 1st person singular

subjunctive (exemplified in (43B) is actually not
derived from /β/. The following subjunctives
derived from borrowed words support our assertion:

(46) Borrowed   1st person sg.
     Words[3]   Gloss   subjunctive   Gloss

  (i) ingia   'enter' mbiŋgeryɛ   'that I score'
                                         (Sw.)

 (ii) amka   'wake'   mbamokɛ   'that I become
                                      enlightened'
                                         (Sw.)

(iii) andika   'write' mbandikɛ   'that I write'
                                         (Sw.)

 (iv) arrange ———   mbareɲɟera   'that I arrange'
                                         (Eng.)

  (v) invite   ———   mbainiβaiti 'that I invite
                                      them'
                                         (Eng.)

The examples in (i) and (iii) have become almost
wholly nativized and are widely used.[4] Examples
(ii) is heard only in restricted context.[5]
Examples (iv) and (v) are to be found only in the
speech of Atharaka who know English and who in a
conversation between themselves may occasionally
use an English word but change its syllabic and
sound structure so as to resemble native words.
That these examples are to be found in Kitharaka,
is to us, an evidence that [b] in the verbs that
seem to have stem alternations is neither part of
the underlying representation of the stems nor is
it derived from /β/. We are of the opinion that

it is part of the prefix. The development of this
situation is explained below:

Comparative evidence from the central Kenya
Bantu languages indicate that there is a historical
rule that has deleted bilabial voiced fricatives in
the stem initial position (see Mutahi 1977). In
its synchronic stage (all historical rules were
initially sychronic) the rule deleted /β/ in some stems
when these stems were not prefixed with a nasal
consonant.[6] When the prefix was a nasal, /β/
hardened to [b] through a continuant strengthening
rule (which is still operative in the language) and
was therefore not deleted. The /β/ deletion rule
caused stem alternations but the alternations were
merely phonetic and there was only one underlying
representation for the stems. Underlyingly the stems
had an initial /β/. At some point in the history
of Kitharaka the /β/ deletion rule ceased to be
synchronic (as shown by examples given in (44)
and the stems in which /β/ had been deleted were
realized as underlying. The deletion of /β/ in
the stem initial position became a historical
phenomenon. The rule governing the deletion also
became a historical one. There were now two
underlying representations for stems. Thus:

(47)

Stems after a Nasal Prefix	Stems in Other Environment	Gloss
/βand/	/and/	'plant'
/βuɤ/	/uɤ/	'say'
/βɛnd/	/ɛnd/	'love/ like'
/βiŋg/	/iŋg/	'close'
/βɔn/	/ɔn/	'see'
/βin/	/in/	'sing'

Of the two stem alternations the /β/- initial
alternates were restricted to the first person
singular subjunctives and classes 9/10 deverbative
nouns. It is only in these lexical categories that
a nasal is prefixed to stems. Because of their
widespread distribution in the lexicon the vowel-
initial alternates were generalized as the only
underlying stem representation. The stem-initial
/β/ which was realized as [b] in the sequence
/nβ(⟶[mb]) was reinterpreted as part of the prefix.
A new redundancy rule was added to the grammar of
Kitharaka. This rule is of the nature: markers for
the 1st person sg. and classes 9/10 is [mb] in
verbs and deverbative nouns whose stems begin with
a vowel. It is through this rule, in our opinion,
that [mb] came to be prefixed to the borrowed
words. In other words, [mb] was extended to the
borrowed words by analogy. That [mb] appears in
these words is, to us, a proof that the above

redundancy rule is part of the native speaker's competence.

We conclude that there are no stem alternations in Kitharaka and that in all the examples given in (43) the stems begin with a vowel in both (43A) and (43B). The [b] appearing in (43B) is part of the prefix and not the stem. We further propose that since [b] could no longer be linked to a /β/ by a synchronic rule the prefix sequence /nβ/ was replaced by the prenasalized voiced stop /^{m}b/. If this proposal is correct, the redundancy rule that assigns the markers to the 1st person singular subjunctives and classes 9/10 deverbative nouns is: /^{m}b/ is prefixed to verbs and deverbative nouns whose stems begin with a vowel; /n/ is prefixed elsewhere.

FOOTNOTES

1. 'Deverbative' means 'derived from a verb'. The term has been proposed by Polome (1967:77).

2. The infinitive marker is /ko/.

3. In this column words appear in their orthographic transcription.

4. The word [kwiŋgerya] refers to making a score in a soccer game. Owing to the popularity of the game in Tharaka schools the word has become wide-spread. The word [kwandika] has become widespread mainly because of the spread of letter writing in Tharaka. It came into the language with the introduction of formal education.

5. The word [kwamoka] refers to the realization,
   awareness, or enlightenment that one gets
   after a nasty experience. It is for instance
   used in the context: [ndekoriŋga wamokɛ]' I
   am going to beat you so badly that you will
   become wiser'.

6. The stem-initial /β/ deletion rule had applied
   only to some of the morphemes which met its
   structural description before it ceased to
   operate. The fact that the rule applied to
   these morphemes and not others can be explained
   in terms of what has been called the 'lexical
   diffusion hypothesis'. Wang (1969) has
   summed the hypothesis as follows:

       "Phonological change may be implemented
        in a manner that is phonetically abrupt
        but lexically gradual. As a change
        diffuses across the lexicon, it may not
        reach all the morphemes to which it is
        applicable. If there is another change
        competing for part of the lexicon,
        residue may result". (See also
        Hsin-I Hsieh (1974) and, Cheng and Wang
        (1975)).

6.0 CONCLUSION

In this chapter we will give a summary of
the study. Remarks will be made on specific areas
that require further investigation. The chapter
will end with a brief discussion of the practical
significance of the study.

6.1 SUMMARY OF THE FINDINGS

It has been shown that Kitharaka has nineteen
underlying consonants (including two glides) and
that only four of these consonants are voiceless.
It was argued that it is probable that considerations
of pattern symmetry overruled those of 'markedness'
in determining the consonant inventory. This
proposal accounts for the presence of /c/ in the
language and the absence of the less marked /tʃ/.

An investigation of the consonant processes
has revealed that Kitharaka has at least five
phonological processes involving consonants. These
processes are: homorganic nasal assimilation,
continuant strengthening, /k/ dissimilation (a form
of Dahl's Law), identical consonant deletion, and,
/t/ deletion. We have shown that in some cases
phonological processes result in phonetic merger
between different underlying segments.

It has been suggested that stem reanalysis
or restructuring has taken place in some verbs and
derivational nouns formed from such verbs. It has

further been argued that stem reanalysis resulted in prefix replacement and that the new prefix has been extended to the borrowed words by analogy.

The results of Chapter Two and Chapter Four may be represented diagrammatically as shown in (47) (see the next page). The diagram is to be interpreted as follows:

UR - Underlying Representation

PR - Phonetic Representation

TD - /t/ Deletion Rule

CD - Identical Consonant Deletion Rule

KD - /k/ Dissimilation Rule (Dahl's Law)

CS - Continuant Strengthening Rule

NA - Homorganic Nasal Assimilation Rule

ND - Nasal Devoicing Rule

A visual representation of phonology like the one presented in figure (47) is justifiable on at least three grounds. First, diagrammatic representation of information is clear and probably easier to comprehend than information given in prose form. This is the principle that underlies the use of maps and graphs in geography, diagrams in biology, and architectural designs in construction science, to mention a few examples. Secondly, visual representation of information affords the reader less

(47) DIAGRAMMATIC REPRESENTATION OF THE UNDERLYING CONSONANTS, THEIR PHONETIC

REALIZATION, AND THE PROCESSES LINKING THE TWO LEVELS.

time to be spent on going through the information.
Thirdly, visual representation of phonology can
serve as a useful tool for comparative study in
phonology in that systematic representation of
underlying and surface segments and the rules that
interrelate the two in different languages would
make comparison easier.

6.2 SOME REMARKS

The analysis given in Chapter Five under the
heading 'Stem Reanalysis and Prefix Replacement' is
meant to be a tentative one. The phenomenon
discussed is a complex one not only because of its
diachronic nature but also because it is more of
an areal aspect among central Kenya Bantu languages
than an isolated case in Kitharaka. A more thorough
study than time permits us to carry out in this
study is necessary for a better understanding of
the subject. For more fruitful results such a study
will have to look at the history of each of the
central Kenya Bantu languages - that is, internal
reconstruction - as well as a comparative analysis
among these languages. It is only after such a
study that a comprehensive picture of the phenomenon
will emerge. We believe that the subject is more
general than can be revealed in the use of only
Kitharaka data. We hope that such a study will
shed more light on the languages of central Kenya

in particular and Bantu phonology in general.

Owing to the short time within which the study had to be carried out, not much field research has been done with an exception of a few consultations with other speakers of Kitharaka. It is likely that an intensive field research would have revealed more information especially on the nature of phonological processes. A cross-sectional investigation among the speakers of Kitharaka might reveal, for example, a correlation between phonological processes and the age or social status of the speaker. Such information would in turn help us to spell out which rules are disappearing from the language and which ones are emerging. We hope that a field research of this nature will be conducted for a better understanding of phonological processes in Kitharaka.

6.3 PRACTICAL SIGNIFICANCE OF THE STUDY

In the introductory section it was shown that Kitharaka is not a dialect of Kimeru and that the two are distinct from each other. The implication of this view is that there is no linguistic justification for using Kimeru books in Tharaka primary schools. There is therefore a need to devise an orthography for Kitharaka to be used as a basis for writing the language. This

study could serve as an important starting point
in the process of devising such an orthography.
It is in this respect that we hope that the study
will be of some practical significance and a more
direct application to the needs of society. Such
an orthography and the subsequent writing of reading
materials will not only be useful for children in
the lower classes of primary education but will
also go a long way into making adult education a
success in Tharaka.

BIBLIOGRAPHY

Abercrombie, D. (1967): Elements of General
                         Phonetics. Edinburgh:
                         Edinburgh University Press.

Antilla, R. (1972): An Introduction to Historical
                     and Comparative Linguistics.
                     New York: The Macmillan Company.

Armstrong, L.E. (1967): The Phonetic and Tonal
                         Structure of Kikuyu.
                         London: Dowsons of Hall Mall.

Bennett, P.R. (1977): "Dahl's Law and the Thagicu."
                       In African Languages Studies,
                       Vol. VIII, pp.127-159.

Brown, G. (1972): Phonological Rules and Dialect
                   Variation. Cambridge: Cambridge
                   University Press.

Cairns, C.E. (1969): Markedness, Neutralization and
                      Redundancy Rules." In Language,
                      Vol. 45, pp. 863-885.

Chen, M.Y. and Wang W.S-Y (1975): "Sound Change:
                      Actuation and Implementation".
                      In Language, Vol. 51 pp. 255-281.

Chomsky N. and Halle, M. (1968): Sound Pattern of
                      English. New York: Harper
                      and Row.

Coates, W.A. (1969): "Near - Homonymy as a Factor in
                      In Language, Vol. 44, pp. 467-479.

Elson, M.J. (1975): Symmetry in Phonology." In
                     Language, Vol. 51 pp. 293-302.

Elson, M.J. (1980): "On the Nature of Morphophonemic
                     Alternations." In Lingua,
                     Vol. 51, pp.297-309.

Fadiman, J.A. (1973): "Early History of the Meru of
                       Mt. Kenya." In Journal of
                       African History, Vol. 14,
                       pp. 9-27.

Ferguson, C. (1961): "Assumptions About Nasals:
                      A Sample Study in Phonological
                      Universals." In Greenberg J.H. (ed
                      Universals of Language.
                      Cambridge: The MIT Press.
                      pp. 53-60.

Ferguson, C.A. (1978): "Phonological Processes."
                        In Greenberg J.H.(ed): Universals
                        of Human Language, Vol.2.
                        Stanford: Stanford University
                        Press. pp. 403-442.

Foley, J. (1977): Foundations of Theoretical Phonology.
                   Cambridge: Cambridge University
                   Press.

Ford, K.C. (1975): Tone and Intonation in Kikamba.
                    Unpublished Research Project
                    Report; University of Nairobi.

Gamkrelidze, T.V. (1978): "On the Correction of
                           Stops and Fricatives in a
                           Phonological System." In
                           Greenberg, J.H. (ed): Universals
                           of Human Language, Vol. 2.
                           Stanford: Stanford University
                           Press. Pp. 9-46.

Guthrie, M. (1970): Comparative Bantu, Vol. 3.
                     Farnborough: Gregg International
                     Publishers Ltd.

Halle, M. (1961): "On the Role of Simplicity in
                   Linguistic Descriptions". In
                   Proceedings of Symposia in Applied
                   Mathematics, Vol. XII, pp.89-94.

Herbert, R.K. (1977): "Prefix Restructuring,
                       Lexical Representation, and the
                       Bantu Noun." In Studies in
                       African Linguistics, Supplement
                       7 pp. 105-111.

Hinnebusch, T. (1972): Prefixes, Sound Change, and
                        sub-grouping in Coastal Kenyan
                        Bantu Languages. Unpublished
                        Ph.D. Dissertation, University
                        of California, Los Angeles.

Hinton, L. (1980): "When Sounds Go Wild: Phonological
                    Change and Syntactic Reanalysis
                    in Havasupai." In Language,
                    Vol. 56, pp. 320-344.

Hooper, J. (1976): An Introduction to Natural
                    Generative Phonology. New York:
                    Academic Press.

Hooper, J. (1975): "The Archi-Segment in Natural
                    Generative Phonology". In

Language, Vol. 51, pp. 536-560.

Hsieh, H.I. (1974): "Time as a Cause of Phonology
Irregularities". In Lingua,
Vol. 33, pp. 253-263.

Hyman, L.M. (1975): Phonology: Theory and Analysis.
New York: Holt, Rinehart and
Winston.

Jaeger, J.J. (1980): "Testing the Psychological
Reality of Phonemes." In
Language and Speech, Vol. 23
pp. 233-253.

Katamba, F. (1979): "How Hierarchical and Universal
is Consonant Strength". In
Theoretical Linguistics, Vol.6
pp. 23-40.

Kim, C.W. (1966): The Linguistic Specification of
Speech. Ann Arbor: University
Microfilms, Inc.

Kiparsky P. (1968): "Linguistic Universals and
Linguistic Change." In Bach, E.
and Harms R.T. (eds.):
Universals in Linguistic Theory.
Bloomington: Indiana University
Press. Pg. 171-202.

Kurylowicz, J. (1968): "The Notion of Morpho(pho)neme".
In Lehmann, W.P. and Malkiel Y.
(eds) (1968): Directions for
Historical Linguistics. Austin:
University of Texas Press.
pp. 65-81

Ladefoged, P. (1971): Preliminaries to Linguistic
Phonetics. Chicago: The Chicago
University Press.

Leguil, A. (1979): "Neutralization, Alternance, et
Complémentarité". In La
Linguistique, Vol. 15, pp.23-39.

Leonard, C.S. (1968): "Initial Alternation in Proto-
Romance". In Language, Vol. 44
pp. 267-273.

Lindblom, G. (1914): Outline of a Tharaka Grammar.
Uppsala: J.A. Lundell.

Lockwood, D.G. (1969): "Markedness in Stratificational Phonology". In Language, Vol. 45 pp. 300-308.

Macken, M.A. (1980): "The Child's Lexical Representation: The Puzzle - Puddle - Pickle Evidence. In Journal of Linguistics, Vol. 16, pp.1-17.

Maundu, P.M. (1980): Sound Change and the Reconstruction of Kikamba Consonantal Sounds. Unpublished M.A. Dissertation, University of Nairobi.

Mberia, K. wa (1979): The Morphology of Kitharaka Nominal Word. Unpublished B.A. Dissertation, University of Nairobi.

Meinhof, C. (1932): Introduction to the Phonology of the Bantu Languages. Berlin Dietrich Reimer/Ernst.Vohsen.

Mutahi, E.K. (1977): Sound Change and Classification of the Dialects of Southern Mt. Kenya. Unpublished Ph.D Thesis, University of Nairobi.

Newman, P. (1968) "The Reality of Morphophonemes". In Language, Vol. 44, pp. 507-515.

Ohala, J.J. (1974): "Phonetic Explanation in Phonology." In Bruck, A., Fox R.A., and Lagaly, M.W., (Eds): Papers from the Parasession on Natural Phonology. Chicago: Chicago Linguistic Society. Pp. 251-274.

Rhodes, R.A. (1974): "Non-Phonetic Environments in Natural Phonology." In Bruck, A., Fox, R.A., and Lagaly, M.W., (Eds): Papers from the Parasession on Natural Phonology. Chicago: Chicago Linguistic Society. pp. 285-296.

Schane, S.A. (1968): "On the Non-Uniqueness of Phonological Representations". In Language, Vol. 44, pp. 709-716.

Trubetzkoy, N.S. (1969): Principles of Phonology.
                          Berkeley and Los Angeles:
                          University of California
                          Press.

Vennemann, T. (1972d) "On the Theory of Syllabic
                       Phonology." In Linguistische
                       Berichte, 18, pp. 1-18.

Vennemann, T. (197a) "Phonetic Analogy and Conceptual
                      Analogy. In Linguistische
                      Forschungen, 26 pp. 181-204.

Vennemann (1974) "Restructuring". In Lingua, Vol. 33
                  pp. 137-156.

Wang, W. S-Y. (1969): "Competing Changes as a Cause
                       of Residue." In Language
                       Vol. 45, pp. 9-25.