THE PHONETICS AND PHONOLOGY OF THE STANDARD DIALECT OF IGBO

Thesis submitted for the degree of M.PHIL.

by

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ABSTRACT

This thesis is a phonetic and phonological study of the Standard dialect of Igbo. The type of speech form which we refer to as the Standard dialect is defined in the first chapter of the thesis. This represents the type of speech form which is considered more 'central' with respect to the existing local dialects in the language, and which is more widely understood in the different localities in Igbo land. This is the dialect that has emerged as the literary dialect of Igbo; the dialect that is used in the written literature in the language, and for radio and other media broadcasts in the Igbo language.

The thesis is organized into six chapters. The introductory first chapter states, among other things, the theoretical framework for the linguistic analysis presented in the thesis. The question of dialects in the Igbo language, which has figured very prominently in the previous studies on this language, is also discussed in the first chapter.

In chapter 2, the phonetic description of the speech sounds of the standard dialect is presented. Some instrumental data from mingograms, spectrograms and palatograms have been used, where necessary, in the description. The results obtained from the instrumental tests are presented in part II of the thesis. A brief analysis of the phonemic contrasts of the speech sounds is also given in chapter 2.

Chapter 3 deals with the distinctive feature analysis of the phonological segments of the standard dialect. In the analysis presented in this chapter, we have used the multivalue distinctive feature system, where this is considered more appropriate than the binary distinctive feature system. The model of multivalue distinctive features we used in our analysis represents a modified version of those proposed in Ladefoged (1971/1975) and in Williamson (1976).

Chapter 4 deals with the morpheme structure analysis of the standard dialect. Certain generalizations describing the constraints/ redundancies in the morpheme structure of the standard dialect are stated, using the system of Morpheme Structure Conditions as defined in Stanley (1967) and in Hyman (1975).

In chapter 5 we describe the phonological processes that operate in the Igbo language. The phonological processes include vowel assimilation, vowel contraction with the resultant process of diphthongization, vowel harmony etc. These phonological processes have been known to be consistent in the different dialects of Igbo. Consequently, what has been described generally for the Igbo language is, in this respect, equally relevant to the standard dialect.

Chapter 6 deals with the tonology of the Igbo language. Igbo being a tone language, the question of tones plays a significant role in the phonology of this language. Like the phonological processes, the features of tone are basically consistent in all the dialects of Igbo. Apart from describing the general tonological structure of Igbo, the thesis devotes special attention to the question of downstep in the language. The downstep has been at the centre of discussions in the previous studies on Igbo tonology. The downstep, no doubt, plays a strategic role in Igbo tonology, and any views which one may hold about the downstep will obviously affect the nature of the rules that could be devised to account for the tone features and the tone changes in the language. Other problems relating to Igbo tonology are reviewed in this chapter.

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Finally, in this brief acknowledgement, I would like to remember and to thank those who have taught me linguistics, notably Professor D. Lightfoot of McGill University. Professor Lightfoot has contributed immensely to my understanding of the linguistic science, and his immense help is hereby humbly acknowledged.

CONTENTS

CHAPTER 1

INTRODUCTION

Igbo is a tone language, spoken in the territories that occupy the Eastern part of Nigeria. It is estimated that over 8 million people speak this language.[1] The name Igbo is used to represent the language as well as the people who speak that language. The Igbo language belongs to the Kwa group of languages.

Igbo language is made up of several dialects which are mutually intelligible. Within the present Administrative set up in Nigeria, representing the different State governments created in that country, these dialects are spoken in the East Central State (the Anambra State), the Imo State, parts of the Rivers State and parts of the Bendel State of Nigeria. The geographical locations where the dialects are spoken are shown on page 14. The existence of these dialects, no doubt, makes the analysis of the phonology of this language a difficult task.

1.1. PREVIOUS STUDIES ON IGBO LANGUAGE

The first studies on Igbo language date back to the middle of 19th century and early 20th century.[2] However, the more important works on this language were published in the present century.

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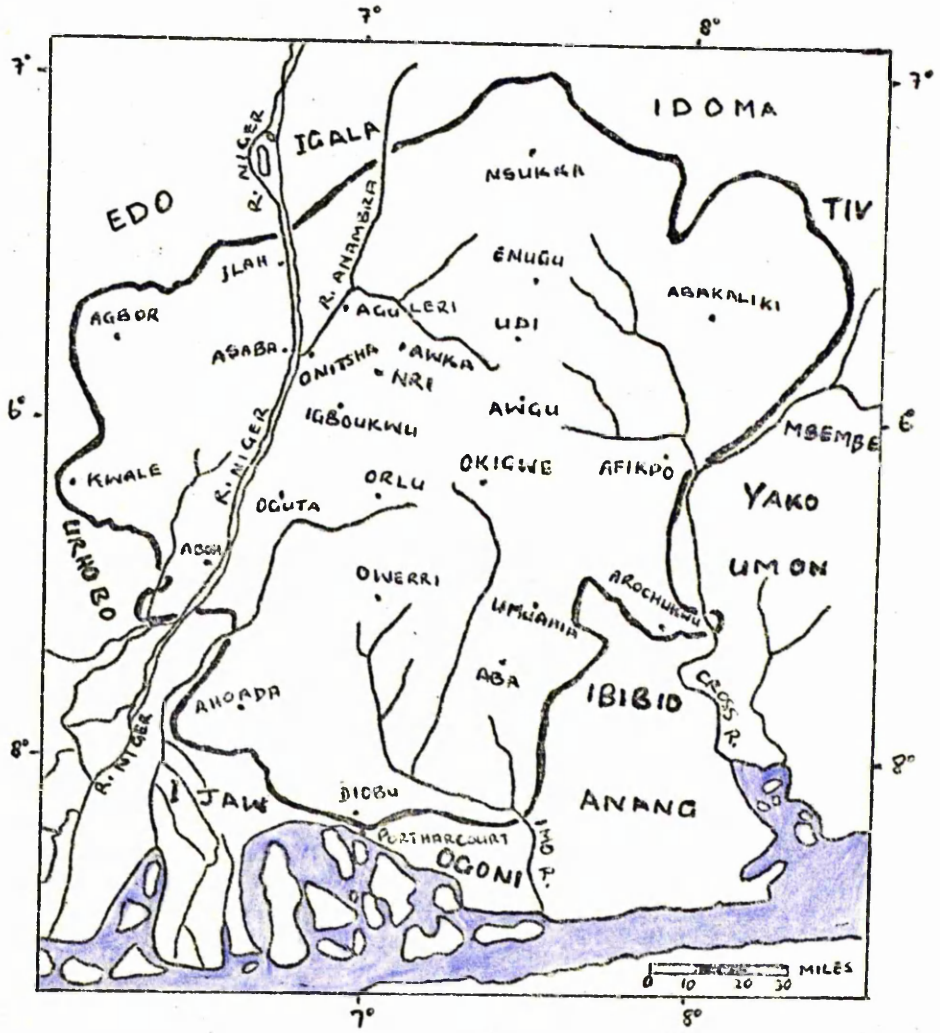
1. The exact figures of the people that speak this language can only be estimated. The last reliable figure of 7.5 million people was obtained from the 1963 Census. The 7.5 million people represent mainly the figure for the Igbos living in the former Eastern State of Nigeria, and it does not include those Igbos living in the former Mid Western State and the Rivers State. The Igbo speaking people in these latter States are well over one million.

2. The first grammar book on Igbo is 'OKU IGBO' (Ibo Grammar), written by J.F. Schön (1861). This represents the result of twenty years' study of this language by the author. Other grammar books on Igbo written after Schön's and before I.C. Ward's books include the following : Grammaire Ibo, by Le P.A. Ganot (1899), A First Grammar of the Ibo Language, by J. Spencer (1901/1927), An Elementary Grammar of the Ibo Language, by J. Spencer (1916), A Modern Ibo Grammar, by R.F.G. Adams (1934). Other books published on Igbo language during this early period include Isoama-Ibo Primer, by Rev. S. Crowther (1859), Vocabulary of the Ibo Language, by Rev. S. Crowther (1882), Vocabulary of the Ibo Language: Part II - English - Ibo, by Rev. S. Crowther (prepared by J.F. Schön) (1883), An Ibo Primer, by F.W. Smart (no date), Akwukwo-Oguguu Ibo: Primer and Reader. Ibo Language, ed. by Rev. F.W. Dodds (1920), English-Ibo Phrase Book, no author, no date.

THE IGBO CULTURE AREA



In the recent years, notably since 1960s, more and more research studies have been carried out on the Igbo language. The more serious works written on Igbo have concentrated on the description of the grammar of this language. These include a number of Ph.D. theses written on the grammar of Igbo.[3] Some studies have also been carried out on certain areas of Igbo phonology. These studies have appeared in the form of articles published in various journals.

The phonetics and the phonology of some of the local dialects have been described in the 'Long Essay' series at the Department of Linguistics and Nigerian Languages, University of Ibadan.

However, both the studies done in the Department of Linguistics and Nigerian Languages at Ibadan and the research studies carried out on particular aspects of Igbo phonology fall short of a general and comprehensive description of the phonology of this language, or of any of the dialects. No comprehensive study, on the level of those done on the grammar of Igbo, has yet been carried out on the phonology. The present thesis constitutes, to the best of my knowledge, the first attempt at a comprehensive description of the phonetics and phonology of Igbo.

In those works which are devoted to the grammar, some information about the phonology is also given. Evidently, most of what have been popularized about the phonology in the more recent studies were first mentioned in some of the grammar books, notably in 'The Introduction to the Ibo Language', written by I.C. Ward (1936), and in 'A Descriptive Grammar of Igbo', by Green and Igwe (1963). In our brief review mention will be made of the works where substantial contributions have been made in the description of Igbo phonology.

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3. The theses include A Transformational Grammar of Igbo, by P.L. Carrell, Ph.D. thesis, the University of Texas at Austin, 1966.

The Role of Affixation in the Grammar of Igbo, by G.E. Igwe, Ph.D. thesis, The University of London, 1974.

Noun Phrase Sentential Complementation in Igbo, by P.A. Nwachukwu, Ph.D. thesis, The University of London, 1975.

A Formal and Semantic Study of the Igbo Verbal Piece, by N. Oji, Ph.D. thesis, The University of London, 1978.

Some M.A. theses have also been written on Igbo Grammar; these are mentioned in footnote 7.

The first major contribution in the study of Igbo phonology was made in I.C. Ward's book, An Introduction to the Ibo Language, (1936). As Ward herself stated in the introduction to her book, "the purpose of this book - is to set out the results of research into the tones and tonal behaviour of Ibo, and to present those results in such a way as to introduce the learner to the difficulties of the language".[4] This briefly summarizes the purpose and the achievements of this book. "The study of tones has led the writer further into the paths of grammar".[5] The particular model of analysis adopted by Ward has been to describe the grammar of Igbo through the framework of the tonal structures in the language. Consequently, most of the information about the grammar in Ward's book has been approached from the point of view of the tonal structure. Since tones will constitute one aspect of our work, an appraisal of Ward's contribution to the study of Igbo tones is given in chapter 6.

The emphasis on tone and tonal structure in Ward's book supplements in a way the grammatical analysis given in that book. It is one of the places where it is convincingly shown that the tonal structure and the grammar in a tone language are closely related, with one supplementing the other.

Two areas of Igbo phonology were emphasized in Ward's book, namely, tones and vowel harmony. These two aspects of Igbo phonology have been taken up and analysed further by later writers. Today, tones and vowel harmony constitute the two most widely discussed areas of the phonology.

Another major work on Igbo grammar is 'The Descriptive Grammar of Igbo', by M.M. Green and G.E. Igwe (1963). Both the grammar and phonology in this book were based on the Ọhụhụ dialect of Igbo. The Ọhụhụ dialect is one of the Southern dialects of Igbo. Like Ward (1936) the authors had a lot to say about tones in the language. They adopted Ward's analysis of the segmental, lexical and phrase tones, concentrating on the tonal structure of what is later known as the 'completive phrase constructions' in Igbo (cf. Voorhoeve et alia 1969).

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4. Ward, I.C. 1936, An Introduction to the Ibo Language, p. IX.

5. Ward, I.C. 1936, ibid.

They described the different patterns of tonal behaviour in the completive phrases and showed how the tone patterns in these constructions differ from the genitival tone patterns. Green and Igwe inherited from Ward (1936) the mistake of treating the downstep tones as 'Mid' tones. Perhaps the greatest contribution by Green and Igwe with respect to Igbo phonology was in highlighting the importance of aspiration and nasalization in the Ọhụhụ dialect. In most of the works that appeared before Green and Igwe's book, these two phonological features have been overlooked, because these works, like Ward's Introduction to the Ibo language, have been based on the phonology of Onitsha dialects, where the features of aspiration and nasalization do not exist. These features, aspiration and nasalization, are however essential in the phonology of the Southern dialects.

Other later works on Igbo grammar include mainly Ph.D. theses.[6] These theses written in 1970's have been principally devoted to the analysis of some aspects of Igbo grammar. Also included here are some M.A. theses.[7] In some of these theses attempts have been made to formulate rules to account for some of the phonological processes in Igbo, particularly those processes already mentioned in the earlier works.

Carrell's book, A Transformational Grammar of Igbo, (1970), constitutes the first attempt to analyse the Igbo grammar using the framework of Transformational Grammar. Apart from formulating rules for tones, Carrell also gave brief distinctive feature specifications of the phonological segments of Igbo using the Jakobson, Fant and Halle distinctive feature system. The tone features used by Carrell were based on Welmer's three feature system of high, 'same', and low. The feature symbols [+h], [±e] and [-h] were used by Carrell to respectively represent the three feature system, the feature [±e], 'Echo', being used to stand for the feature of 'same' in Welmer's system.

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6. These Ph.D. theses have been listed in footnote 3 above.

7. The M.A. theses include 'The Igbo Verbal', by E.M. Emenanjo (1975); 'Comparative Analysis of Igbo and Russian Verbs', by S.U. Obi (1970).

With these features Carrell formulated rules to account for tone sequences and tone changes in the language.

The phonological rules formulated by Carrell have not been adequate for accounting for the different phenomena of tone in the language, and these rules as well as the distinctive feature system on which the rules were based have been superceded by the more recent developments in generative phonology. The efficacy of the analysis provided by Carrell is further undermined by the various incorrect interpretations of the surface tones of some words in that work.

Nwachukwu's thesis is based on the phonology of the Ezinihitte dialect in Mbaise. This is one of the central dialects of Igbo and it has a lot in common with the Ọhụhụ dialects of Green and Igwe(1963), but much more with the dialect described by Swift and Ahaghotu (1962).[8] On the level of phonology, this dialect also has a lot in common with the dialect which we intend to describe, i.e. the Standard dialect.

Nwachukwu (1975) touched on the various characteristics of the Ezinihitte dialect, though much of the discussion was centered around refuting some of the incorrect remarks and/or claims made in Green and Igwe (1963), and in bringing out the ways in which the Ezinihitte dialect differs from the other dialects such as the Onitsha dialect, in certain aspects like the vowel harmony.

One major weakness of the phonology contained in Nwachukwu's thesis is that the phonology does not constitute a consistent whole. The arguments and the discussions presented by Nwachukwu are generally seen as the author's reactions and/or refutations to what was stated by Green and Igwe. In other words, it was not a systematic attempt by the author to describe the phonology of the Ezinihitte dialect.

We disagree with some of the claims made by Nwachukwu (1975) regarding 'Phonemic (vowel) assimilation' (p. 57), 'Tonemic assimilation' (p. 66) etc. Arguments in support of the views we hold about these and other areas where we disagree with Nwachukwu will be embodied in the main work.

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8. Nwachukwu, P.A., 1975. 'Noun Phrase Sentential Complementation in Igbo', p. 19.

The area of phonology that is extensively treated in Nwachukwu's thesis is tone. Many tone rules were formulated and used to account for certain tonal phenomena in the language. The Downstep received special attention. Nwachukwu attempts (more than in any other place where Igbo tonology has so far been treated) to use the views advanced in recent studies, such as the floating tone theory, to account for the tonological phenomena in Igbo.

Since tones in the Igbo language constitute one of the main subjects to be treated in the present thesis, we shall postpone our arguments in favour of or against the views put forward in Nwachukwu (I975) till the section where tones are treated in the present work.

Suffice it for the moment to briefly point out some of the views which we disagree with in Nwachukwu's analysis.

(i) We hold the view that the Downstep and the Downdrift are two separate independent processes in Igbo tonology. Arguments in support of this claim will be given in chapter 6. Following the current views advanced about the Downstep and the Downdrift, Nwachukwu (p.I28) proposes that "despite their distinct origin ... the two phenomena can be uniformly treated". Apparently Nwachukwu's views about the Downstep, how this should be treated in Igbo, are not clearly defined. He states, for instance, on pages I34 - I35 that "the Downstep is only a surface or phonetic phenomenon for Igbo, even though it has its origin deep in Syntax". This would suggest that certain phonological rules are required for the derivation of the downstep.

However, after introducing series of tone rules, Nwachukwu states, (p.I37) that "there is no rule which could be described as the Downstep rule".

(ii) We disagree with the non segmental floating tone theory. The existence of a tone in Igbo presupposes that there is a segment on which the tone can be realised. In chapter 6 we will attempt to give arguments to back the views we hold about the Downstep, the downdrift and the floating tones with particular reference to Igbo.

The other areas where we disagree with the tone analysis presented in Nwachukwu's thesis will become evident from the discussions in chapter 6.

Following Green and Igwe (I963), Nwachukwu (I975) attributes the difference between (a) and (b) below,

(a) isi éghū

(b) isi Ēghu

where downstep occurs on the final syllable of the second noun in (a) and on all the syllables of the same noun in (b), to the fact that "they behave differently if they are personified or used as proper names" (p.I28), (i.e. referring to the second noun in the construction). Green and Igwe (I963) gave similar explanation.

However, what is important here is not whether or not the second noun in the construction is personified, rather it is the type of grammatical relationships that are involved in the phrase. Thus (a) indicates an associative (or Completive) phrase relationship, while (b) indicates a genitival relationship. As we will show later in chapter 6, it is purely the nature of the grammatical relationships in the two constructions that accounts for the differences in the tonal structure of the phrases.

Apart from these works in the form of books or theses written on the grammatical analysis of the language, other meaningful studies relating to the phonology have appeared in the form of articles in various journals. Most of these studies, like the ones contained in the works just mentioned, concentrate on the analysis of tone in Igbo. Discussions about these articles will be brief since most of the articles will be reviewed again in chapter 6, the section for tones in the present work.

Voorhoeve et alia (I969) in the article "New proposals for the description of tone sequences in the Igbo Completive Phrase" analysed the changes that occur in certain phrase constructions in the language, (cf Ward (I936) and Green and Igwe I963) using the downstep theory.

This analysis was restated in Williamson (I97I). Kay Williamson in her different publications has contributed immensely to the study of different aspects of Igbo phonology. Apart from those research studies carried out independently by Williamson, other studies devoted to the

description of the phonology of some dialects of Igbo done by some students in the Department of Linguistics and Nigerian Languages at Ibadan, were done through the supervision and direction of Williamson. Williamson's contributions to the study of Igbo phonology cannot be easily assessed because they are many and varied. Apart from specific topics devoted mainly to Igbo phonology, Williamson, like Hyman often uses data from Igbo to illustrate her point on certain views in phonology.

In the article 'Some alternative proposals for the Igbo completive phrase' Williamson (I97I) re-examines anew the question of tone changes in this type of construction in Igbo using the framework of generative phonology. Like Voorhoeve, Williamson used the downstep theory, the downdrift and the floating tone theory to account for some of the tone changes. In the article 'The Status of /e/ in Onitsha Igbo', Williamson (I966) examined this vowel segment, /e/, as it functions in the Onitsha Town dialect.

Ward (I936) and later Dunstan (I966) had earlier noted the occurrence of /ɛ/ apart from /e/ in Igbo-phonology. In Williamson (I966) it was established that /e/ and /ɛ/ in the Onitsha Town dialect are systematically patterned after the harmonic sets of Igbo vowels, whereby one of them co-occurs with the vowels from one harmonic set while the other co-occurs with the vowels of the other harmonic set.

William Welmers made an extensive study of Igbo tonology. In the article 'Igbo tonology', Welmers (I970) provides a detailed description of the terrace feature and consequently the feature of downstep in Igbo tonology. In their earlier publication 'Igbo: A Learner's Manual', by W.E. Welmers and B.F. Welmers (I986) the authors had set up certain features – high, 'same' and low to account for tones and tone changes in the language.

The feature 'same' (Echo cf Carrell I970), which is relevant only to the phonetic realisation of high tones that occur on the same pitch, would not be adequate in describing the different tonological processes characteristic of the downstep and downdrift in Igbo tones. Welmers, however, did not concern himself with setting up rules to account for tonological changes.

Carnochan is by far one of the greatest contributors in the study of Igbo phonology. This is evident not only from the many publications he has produced on this language, but also from the varied nature of these publications, touching on both the grammar and the phonology of Igbo. For instance, most of the studies mentioned earlier, relating to Igbo phonology, have been concentrated mainly on the description of Igbo tonology. Carnochan (1948) 'A study in the phonology of an Igbo Speaker' and (1960) 'Vowel harmony in Igbo' constitute exceptions in this respect.

In Carnochan (1960) a descriptive analysis of vowel harmony in this language was given and certain rules were formulated to account for this phonological phenomenon, using the Prosodic Analysis framework.

I.2. THE PRESENT WORK

Although various studies have been done on Igbo phonology it is evident (cf.I.1.) that most of the studies by their nature are very limited in content. Furthermore, most of the studies have been concentrated mainly on one aspect of the phonology - the analysis of Igbo tones. Even here, these studies have been restricted to the issue of downstep and the formulation of phonological rules that can account for downstep in the language. Despite the magnitude of these studies, a lot has been left untouched in the description of the phonology of this language. In these studies, for instance, little mention is made of the phonemic analysis and other aspects of phonological description which are conspicuously lacking in the studies.

Regarding those issues which have been treated in these studies, namely, issues relating to tonology, several problems raised in the course of the studies have not been convincingly and/or conclusively treated. Much was taken for granted in Williamson (1971) about the Downstep in Igbo. Some concepts, such as the floating tone, were introduced without probable justification from the grammar or phonology of the language.

Unless such concepts are justified by some language specific facts, those rules based on these concepts cannot be taken seriously.

In the present work, we shall disagree with Williamson and Voorhoeve on some of their proposals regarding the downstep in Igbo. The issue of downstep is, apparently, very crucial in Igbo tonology. Vowel harmony will be re-examined in the present work, in the light of the recent developments in generative phonology where this phonological phenomenon has received much attention. Some phonological rules will be formulated to account for vowel harmony in the language.

As a study devoted to a general phonological description, the phonemic, morphophonemic analyses of Igbo phonology, as well as the issues relating to tonology in the language, will receive due attention in the present work. The present work, therefore, apart from reviewing and modifying where necessary the views and proposals of the previous studies on Igbo phonology, will concern itself with describing those aspects of Igbo phonology which up till now have not been described.

The present work is a phonetic and phonological study of the Standard Dialect of Igbo. It has often been argued that for a language, such as Igbo, with a multiplicity of dialects, descriptions of the local dialects and/or idiolects, as has been generally done uptill now, would give a better composite picture of the general phonology of the language. We do not want to go into the pros and cons of this argument, however, for a dialect, such as the standard dialect, with some degree of consistency and uniformity of speech pattern, the same objective can be equally achieved through a general descriptive framework.

The standard dialect is taken, for this study, to represent the dialect used for radio and other media broadcasts in Igbo. This represents the type of Igbo dialect that is intelligible to a cross-section of Igbo speakers from different dialect areas. For the present work several news broadcasts in Igbo from the National Broadcasting Corporation (NBC) Lagos were tape-recorded. From these tapings a general phonological pattern of the standard dialect has been worked out for our analysis. We have chosen to collect our materials from the

NBC broadcasts rather than from Igbo broadcasts from the radio stations at Enugu, the Anambra State Broadcasting Service, or at Owerri, the Imo State Broadcasting Service, (these stations are situated in the Igbo speaking states), so as to eliminate any bias or prejudgements. Undoubtedly there is a uniformity in the dialect used for Igbo broadcasts from all radio stations in the country, however, since the NBC is more national in outlook than the respective state broadcasting stations, and since the news readers in the National Broadcasting Corporation come from different areas of the Igbo land, we can assume that the dialect used for the broadcasts would provide better and more objective material for our data. The NBC news, it should be understood, is relayed to the whole nation through the respective branches (broadcasting stations as they are called) in all the States of Nigeria. That is, the news has a greater areal coverage than that of any particular State.

Text books which are written in the Igbo language and which are recommended for use in all the schools throughout the Igbo Speaking States are written in the standard dialect. These text books include the following: Omenụko, by Pita Nwana (I933/I963 revised edition), Ije Odumodu Jere, translated by A. Amadi (I963), Ala Bingo by D.M. Achara, Elelịa Ma Ihe O Mere, by D.M. Achara (I964), Ụkwa Ruo Oge Ya O Daa, by T. Ubesie (I973), Isi Akwụ Dara N'ala, by T. Ubesie (I973) etc. These text books will supplement the taped broadcasts as our data - sources.

Since the standard dialect is closely related to the local dialects, (from which the standard dialect has been developed) occasional reference will be made to the previous works where some of the local dialects have been described.

Finally, with my personal experience as a teacher of this language, having taught the Igbo language for four years at the University of Ibadan, where the students happened to come from different dialect areas, I can strongly claim that I am well acquainted with the

Standard Dialect which I have chosen to describe in this work. In addition to my experience through teaching activities, I am a fluent speaker of this dialect, and I have had the opportunity of working as a member of a Committee entrusted with the task of describing the grammar and the phonology of the Standard Dialect, which is the literary dialect of Igbo.

In the present thesis, much attention is primarily devoted to a formal method that allows adequate descriptions of the phonetic and the phonological systems of the standard dialect of Igbo. In terms of the contribution which the present thesis makes to the study of the Igbo language, this is mainly of two kinds. In the first place, the present thesis constitutes the first attempt on the description of the full phonology of the standard speech form of the Igbo language. Although various studies have been previously carried out on the grammar and the phonology of the Igbo language, however, all those studies have been devoted to describing the grammar and/or the phonology of different local dialects of Igbo. Furthermore, none of the previous studies has set out to give a full phonological or phonetic description of any of the dialects. In other words, these studies have provided only partial descriptions of the phonetics and the phonology of the dialects, concentrating only on certain areas of the phonology, such as the vowel harmony and tones. The present thesis, in this respect, to the best of my knowledge, constitutes the first attempt on a comprehensive study of the phonetics and the phonology of any of the dialects of Igbo, and particularly of the standard dialect of this language.

In the thesis we have modified, where necessary, some of the views that have been propounded in the previous studies relating the respective topics in the phonology of the Igbo language, especially with particular reference to the standard dialect.

1.3. THE THEORETICAL FRAMEWORK

The model of phonological description adopted for the present study is essentially that of the Standard Theory within the framework of generative phonology. The Standard Theory in generative phonology has been modelled generally on the views expounded in The Sound Pattern of English (SPE) by Chomsky and Halle (1968).

Some modifications on the views put forward in that work will be necessary as a result of the recent developments in generative phonology, arising from the many useful contributions to this theory which have appeared since the publication of the SPE. Some phonologists working within the framework of the Standard Theory have elaborated on, expanded and sometimes devised certain alternatives to some of the views put forward in the SPE.

The present work has benefited as much as possible from these reviews of the SPE and the modifications on the views put forward in the SPE. We shall take as our primary source for theoretical orientation, the version of generative phonology as contained in Phonology: Theory and Analysis, by Larry Hyman (1975), Generative Phonology, by Schane (1973) and in Aspects of Phonological Theory by Postal (1968). We have also benefit-ed from the views put forward by many phonologists in various publications, such as 'Redundancy Rules in Phonology' by Stanley (1967), and other publications by the same author. Similarly, as will become evident from parts of our analysis, we have benefited from those views expounded in some of the publications by P. Kiparsky.

The significance which Hyman's views, as articulated in his various publications, have in the theoretical orientation of the present work arises from the fact that he, more than any other generative phonologist, has tried to relate the main concepts of generative phonology to the phonology of various African languages, including the phonology of Igbo language. Hyman, like Ladefoged, attempts to describe the phonology of some African languages and to explain the problems peculiar to these languages, using the framework of generative phonology, and conversely, using the phonology of these African languages, Hyman tries to illustrate his views with respect to certain problems in generative phonology.

1.4. THE PHONOLOGICAL COMPONENT

Phonology is concerned with the study of the Sound Systems of language, i.e. "the study of how speech sounds structure and function in languages" (Hyman, 1975: 2). A phonological study, in this way, deals with the structure and function of the phonetic segments in a language, in so far as these segments are used for the purpose of conveying meaning in the language. The goal of phonology is therefore a specific one - to study the properties of a sound system which the speakers of a language internalize and use for purpose of meaningful communication in that language. The sound system viewed in itself comprises two types of complex properties - physical properties (relating to how the sounds are formed and articulated in speech) and grammatical properties (i.e. the speech sounds viewed from the general perspective of how the sounds are used to make meaningful utterances). Both the phonetic and phonological sciences interact in the description of the physical properties of speech sounds, while phonology deals also with the description of the grammatical properties of speech sounds.

The phonological component of the grammar is a system of rules that relate surface structures to phonetic representations. The structural description assigned to a sentence by the grammar consists of its full syntactic description, as well as the associated semantic and phonetic representations. The phonological component assigns a

phonetic interpretation to the syntactic description, making reference only to properties of the surface structure (Chomsky and Halle 1968). The surface structure, in this respect, constitutes an output to the syntactic component and an input to the phonological component. The grammar must contain rules that convert the surface structures generated by the syntactic component into a form appropriate for use by the phonological component. Phonological rules convert phonological representations into phonetic representations. Certain syntactic information is generally required for the operation of phonological rules.

The phonological component is related in a special way to the lexicon through the morpheme structure conditions. 'The morpheme structure conditions (henceforth MSC) state the redundancies which hold at the systematic phonemic level. They match the partially specified dictionary matrix to the fully specified phonological matrix' (Amayo, 1976: 33). The views which the morpheme structure condition theory introduces into phonological analysis was first presented in Halle (1959) and later modified in Stanley (1967). Briefly, this view states that because of the constraints which develop as a result of the sequence of segments within morphemes, certain features of one segment can be predicted (i.e. become redundant) on the basis of certain features of another segment.

Following Stanley (1967) (also cf. Amayo, 1976: 33), we shall distinguish, for the purpose of our analysis in the thesis, two types of MSC, namely, segment structure conditions and sequence structure conditions. Segment structure conditions state feature redundancies on segments, that is, those features which can be predicted from other features in the same segment. For example, velars such as k, g, ŋ, in Igbo contrast with kw, gw and ŋw through labiality, whereas the other consonant segments in the language do not contrast phonemically through labiality. The sequence structure conditions state the feature redundancies that arise as a result of the sequence or co-occurrence of segments within a morpheme. They therefore specify those features which can be predicted through the features of the other segments that occur in the morpheme. Some examples that illustrate sequence structure conditions can be found in Igbo phonology.

Such phenomena as the homorganic nasals and the vowel harmony in the language are instances of sequence structure conditions.

In addition to the two structure types of MSC just discussed, Stanley (1967: 426-28) lists three types of 'Conditions' that can exist within any of the 'Structure types' of the MSC. These are, If - then conditions, Positive conditions and Negative conditions.

An If - Then condition states only the agreement of features. The 'agreement' here is supposed to imply predictability of features, and this type of MSC is said to capture a regularity in the underlying forms in the language (Hyman 1975 : 111). Amayo (1976:34) correctly points out that "an if-then condition operates like a transformational rule, in that it is made up of two parts - the 'If' part which usually satisfies the structural description of the matrix, an input to which the condition applies, and the 'Then' part which constitutes the output which is the structural change that is affected.

The syllabic nasals in Igbo phonology provides a good example of a sequential If-Then condition, and this we can state as follows:

1. If: ≠≠ C C V ≠≠

Then: ≠≠ N C V ≠≠

This MSC states that in any sequence of two successive consonants in a morpheme (and this can only occur in word initial positions in the language), the first consonant must be a syllabic nasal.

A 'Positive MSC is used to state the Canonical shapes of underlying forms' (Hyman : p. 111). It is supposed to capture certain regularities or constraints in the 'canonical shapes' of morphemes. The expression 'Canonical shapes' has been used by Hyman to differentiate the so-called 'content words', lexical morphemes, such as nouns, verbs (i.e. the root morphemes), adjectives etc., to which the condition

applies, from the "function words", grammatical morphemes, such as tense/aspect markers, inflectional markers, which are usually affixes and which often do not show the same phonological shapes as the lexical morphemes, and in which the observed regularity rarely obtains. To illustrate the positive MSC, Hyman (1975:II2) uses the following example from Igbo:

2. + C (Y) V +

This Positive condition states that each lexical morpheme in Igbo consists of an initial consonant, an optional /y/, and a vowel, for example, /bá/, /byá/ 'come' (Hyman p.II2). The Positive condition stated by Hyman from Igbo describes mainly the structural conditions for the verb roots in the language.

A Negative MSC states "that none of the matrices which meet its specification occurs in the language" (Amayo 1976, p. 34). The following Negative MSC may be stated for Igbo.

3. $\sim \begin{bmatrix} + \text{Syll} \\ + \text{back} \\ - \text{round} \end{bmatrix}$

(where $\sim$ = not).

4. $\sim \begin{bmatrix} + \text{Syll} \\ + \text{front} \\ + \text{round} \end{bmatrix}$ etc.

These Negative conditions state that (3) there are no unrounded back vowels, and (4) there are no rounded front vowels in the language.

Negative MSCs are fewer in any language than either the Positive or the If - Then conditions. Negative conditions are not only few in any language, and much more obvious and easily recognizable to the speakers of the language, but it is also equally

true that those conditions expressed by the Negative MSC are often statable through If-then MSCs; (3) and (4) above can be restated as (5) and (6) respectively.

5. If: $\begin{bmatrix} + \text{ Syll} \\ + \text{ back} \end{bmatrix}$

Then: $[+ \text{ round}]$

6. If: $\begin{bmatrix} + \text{ Syll} \\ + \text{front} \end{bmatrix}$

Then: $[- \text{ round}]$

However not every Negative MSC can be easily replaced by an If-then MSC. In particular, those negative MSCs that merely state the non-existence of a feature cannot be easily stated through the If-then MSC.

The MSCs, as indicated earlier, specify redundancies in the segmental and morpheme structures. They are designed to capture the redundancies at the underlying phonological level. The MSCs, it should be emphasized, are different from phonological rules (P rules), in that whereas the former do not convert one level of representation into another (the MSCs merely state the details of the phonological representation), only the latter (i.e. P rules) are capable of changing features, deleting and adding segments etc. The P rules convert phonological representations into phonetic representations.

Phonological rules relate the underlying phonological representations to the surface phonetic representations. We shall assume in our analysis that some rules of the phonological component are ordered relative to each other. This arises from the fact that certain rules depend for their operation on the prior application of other rules. Similarly, as has been most convincingly argued by some phonologists in the various articles and works published since the

appearance of SPE (cf. Irwin Howard I972, John Jensen I974), we shall equally assume that certain phonological rules apply iteratively. Phonological rules can reapply to their own outputs, or simultaneously if the structural description is met by more than one segment in a string. Some examples to be discussed in the main body of the present study will help to justify this modified view on rule ordering in generative phonology.

I.5. DISTINCTIVE FEATURE ANALYSIS

The MSCs and Phonological rules are usually stated using the distinctive feature system. To achieve economy and precision in presentation, the distinctive features are written with abbreviations. The notations used for distinctive features in the present work will be in line with the convention usually adopted in generative phonology. We shall, however, deviate from the standard convention by using the multivalue distinctive feature system as expounded in Kay Williamson (I976) and also in Amayo (I976).
However, we shall use the multivalue distinctive feature system only where we consider this more adequate than the standard conventional system. The system of distinctive features we shall consider necessary for the discription of the phonology of the Standard Dialect of Igbo will be presented in chapter 3.

I.6. SYSTEM OF TRANSCRIPTION

In the phonemic transcription used in the present work, both the vowel and the consonants will be written using the orthographic symbols as revised by The Onwu Orthography Commission I96I, usually referred to as the Onwu Orthography; this is the official orthography currently used in writing Igbo language.

The following symbols are used for the vowels: a, e, i, ị, o, ọ, u, ụ. The IPA equivalents for the symbols with diacritic mark (ị ọ and ụ) are ɪ, ɔ, and ʊ respectively.

IPA symbols will be used in phonetic transcriptions. Most of the symbols used in Igbo orthography for writing the consonants are the same as the IPA symbols, with the following exceptions:

	The IPA equivalents
ch	tʃ
j	dʒ
gh	ɣ
n̄	ŋ
ny	ɲ
nw	ŋʷ

Tones are marked over the syllabic segments, using the conventional system of marking the high, low and downstep tones, as shown below.

V́	high tone
V̀	low tone
V̄	downstep

In a sequence of identical tones only the first syllable is marked for tone. Details about the system of tone marking adopted in the present work are given in chapter 6.

Straight quotations from other works are enclosed with inverted commas, except where the original passage has been greatly modified.

The syllabic nasal is written as

m before labials (p, b, m, f, v, kp, gb) and before the approximants w and y;

n before other consonants.[9]

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9. Phonetically, the syllabic nasal is realised as ny before palatals and as ñ before back consonants, however, this has been ignored in the local orthography.

1.6.1. NOTATIONAL CONVENTIONS AND ABBREVIATIONS

The following notations are used in the work:

/ / the slashes enclose the systematic phonemic representations.

[ ] the square brackets enclose (a) bundles of distinctive features and (b) the systematic phonetic representations.

( ) the parentheses enclose optional elements. It is also used to indicate disjunctive ordering of the rules; the application of one of the rules precludes the application of the other. Thus (1) below, can be expanded into 1(i) and 1(ii). It also means that when 1(i) applies, 1(ii) cannot apply and vice versa.

1. X → Y / ZA(C) –

(i) X → Y / Z A –

(ii) X → Y / Z A C –

→ the arrow reads: 'rewrite as'.

/ a slash reads: 'in the environment of'.

{ } brace brackets are used to show sequences of partially similar rules. Rules enclosed with braces are conjunctively ordered, that is, the application of one does not preclude the application of the other.

< > the angle brackets are used in the present work to enclose those feature values (representing bundles of features) which can occur simultaneously.

α, β, these are variables whose coefficients vary over possible values of a feature.

1.6.1.1. JUNCTURE NOTATIONS

We will adopt the following convention for juncture notations.

≠ indicates morpheme boundary.

≠≠ indicates full word boundary.

$ represents syllable boundary.

1.6.1.2. ABBREVIATIONS

The abbreviations given below supplement the list of abbreviations which is provided at the end of this work. The linguistic abbreviations used in the work include the following.

C	consonant segment
V	vowel segment
H	high tone
L	low tone
D (or Dstp)	downstep
DD	downdrift
NP	noun phrase
VP	verb phrase

The names of well known periodicals will be written with abbreviations. A list of such abbreviations will be given at the end of the thesis.

1.7. DIALECTS

The Igbo language is made up of a number of dialects which are mutually intelligible. No detailed study or description of these dialects that exist in the language has yet been carried out. Although many references have been made in the various works on Igbo language to the dialects in this language and a few phonetic and phonological descriptions have been written on some of the dialects, yet a close look at these references and the phonetic

descriptions would reveal that the information we have so far about these dialects is very little and limited. In the first place, only a few of the dialects get mentioned. Secondly, what can be regarded as a full phonetic and/or phonological description has not been written on any of the dialects.

Some classifications of Igbo dialects have been given by Westermann and Bryan (1952), and by Forde and Jones (1950/1962). In these classifications Westermann (1952) and Forde (1950), on the basis of the differences in the speech patterns associated with given linguistic communities located in the Igbo territory, distinguished the major groups of dialects in the Igbo language. A brief discussion on these two previous classifications of Igbo dialects is given below.

The dialect situation in the Igbo language is a very complex one. It is evident, for instance, that within each of the major groups of dialects so far distinguished and classified for this language, there are other minor groups of dialects, and within each of the minor groups we can further distinguish some pockets of dialects which exhibit some form of differences in speech patterns. These smaller groups of dialects which exist within the respective major groups have not been easy to fully identify in the language. A detailed study and classification of these dialects in Igbo would require very long and intensive research. The discussions which we attempt in this thesis about the Igbo dialects are mainly introductory in nature and are limited only to the extent that this is relevant to our topic; it is more an exposition of the problems involved than an attempt to resolve them.

1.7.1. A BRIEF CLASSIFICATION OF IGBO DIALECTS

From what has been stated above, it becomes obvious that the classification of Igbo dialects presents certain problems. The main problem is centered around what to regard or treat as a dialect and in trying to find out how many dialects can be distinguished in the language.

In theory, this may appear simple, in the sense that the very act of determining whether a given speech pattern constitutes a dialect or not is one of the areas where a speaker does not necessarily

require the expert advice of the linguist for the speaker to make his judgement. This is one of the intuitive judgements which a speaker makes easily about the linguistic performance of his fellow speakers. When the speaker A observes that speaker B uses certain words or expressions not present in speaker A's language, but which do not hinder speaker A from understanding speaker B, the speaker A often concludes that speaker B is speaking a dialect different from his (i.e. A's). Viewed from this perspective, determining the dialects in Igbo would appear to present little problem.

In practice, however, the problem is not as simple as represented above. Practical observation shows that in the Igbo country almost every village or a group of villages has its own characteristic accents different from those of the neighbouring villages. The dialectologist in this case, is faced with the problem of how far he could go in the classification of the dialects or variations in the speech patterns mani-fested in this language. Should it be the case that every village or group of villages has to be assigned a different dialect, if so, what kind of realistic picture can we get from such a classification?

1.7.1.1. PREVIOUS CLASSIFICATIONS

The previous classifications (presently there are two of such) were based on the major dialect groups that are known to exist in Igbo. Westermann and Bryan (1952/1970)[10] distinguished five main groups of dialects in the language, namely, (a) the 'Northern' or 'Onitsha' dialects, spoken in the Onitsha Province and the northern part of Okigwi Division of Owerri Province; (b) the 'Southern' or 'Owerri' dialects, spoken in the Owerri Province; these are sub-divided into Isu-Ama, Orata-Ikwerre, Ohuhu - Ngwa and Isu - Item; (c) the Western dialects which are subdivided into northern Ika, southern Ika (Kwale) and the 'Riverian'; (d) the Eastern or Cross River dialects which are subdivided into Edda, Abam - Ohafia, Aro, Ogoja and Calabar Province; and (e) the North - Eastern dialects

10. Westermann, D. and M. A. Bryan, 1970 (new edition), Handbook of African Languages; Part II Languages of West Africa.

or 'Ogu - Uku' dialects.[11]

This brief classification by Westermann lists only the major dialect groups which are known to exist in the language. It does not mention or classify other clusters of dialects that exist within each of the major groups. In terms of the locations where the respective dialects are spoken, it is obvious that the author relied wholly on the political administrative divisions that existed in the then Eastern Nigeria, thus the classification was modelled on the different Provinces created in the Eastern Region. Although the administrative divisions of the Eastern Region into Provinces bear some correspondence to the dialect divisions, however, a complete reliance on the administrative divisions for dialect classifications can be misleading, in the sense that sometimes more than one dialect can be spoken in one Province. Similarly, Igbo is not spoken in some of the Provinces. For instance, Igbo is not spoken in the Calabar Province. In this Province, a different language, the Efik language, is spoken.

Forde and Jones (1950/1962)[12] using the five main groups of Igbo dialects given by Westermann provide a better and more detailed classification of the dialects. They specified in greater detail the locations where the respective dialects are spoken, and they gave the different subgroups that make up each of the main groups. Forde's classification of the dialects is briefly represented below.

Main Divisions	Location by Administrative Divisions[13]
I. Northern or Onitsha Ibo	
(a) Western or Nri-Awka	Onitsha, Awka (ON)
(b) Eastern or Elugu	Nsukka, Udi, Awgu,(ON), Okigwi (OW)
(c) Onitsha Town	Onitsha (ON)
II. Southern or Owerri Ibo	
(a) Isu-Ama	Okigwi, Orlu, Owerri (OW)

11. Westermann and Bryan, 1970, op. cit. pp. 89, 90.
12. Forde, Daryll and G.I. Jones, 1962 (reprint), The Ibo and Ibibio - Speaking Peoples of South-Eastern Nigeria.
13. opus cit. p. 10.

(b) Oratta-Ikwerri	Owerri (OW), Ahoada (R)
(c) Ohuhu-Ngwa	Aba, Bende (OW)
(d) Isu-Item	Bende, Okigwi (OW)
III. Western Ibo	
(a) Northern Ika	Ogwashi Uku, Agbor (B)
(b) Southern Ika or Kwale	Kwale (W)
(c) Riverain	Owerri (OW), Ahoada (R), Ogwashi Uku (B), Onitsha (ON)
IV. Eastern or Cross River Ibo	
(a) Ada (Edda)	Afikpo (OG)
(b) Abam-Ohafia	Bende, Okigwi (OW)
(c) Aro	Aro (C)
V. North-Eastern Ibo	
(Ogu Uku)	Abakaliki, Afikpo (OG) [14]

Forde retains those major groups of dialects distinguished in Westermann's classification. However the classification of the Igbo dialects by Forde is much more accurate and better organised than Westermann's; more subgroups of dialects were distinguished, and the locations where the dialects are spoken are given by Forde. The classification is by all means a great improvement on the one given by Westermann.

Certain points, however, should be noted particularly with regard to the locations where the respective dialects are spoken, as indicated in Forde's classification. Once more we can notice a great mix-up in these locations due to reliance on the Administrative Divisions. The point about the Okigwi dialects which appear to be spoken in three out of the five main dialect groups, is of particular interest. This would appear to mean that Okigwi has the most complex dialect situation. From practical observation, however, this is not the case. On the contrary, the Okigwi dialects are known to maintain close similarity, i.e. more homogeneous, than can be observed in the other dialect clusters spoken in the areas that

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14. Provincial names are abbreviated as follows: Owerri (OW), Onitsha (ON), Benin (B), Ogoja (OG), Calabar (C), Warri (W), Rivers (R).

occupy the central part of the Igbo territory, such as the Onitsha or the Owerri dialects.

The 'Riverain' subgroups of dialects, for instance, cannot possibly extend so far to include Onitsha, Owerri, Ogwashi-Uku and Ahoada, as Forde's classification appears to show. These localities are not only very wide apart but also belong to different groups of dialects. The dialects spoken in these localities can never be said to be in any way close. The Oratta-Ikwerre subgroups are spoken in Oratta and Ikwerre respectively, but not in Owerri, even though these areas used to belong to the Owerri Province. Owerri has its own dialect different from the above. Forde's classification, in terms of the locations where the dialects are spoken, typifies what we remarked above about using the Administrative Divisions in the areas as the basis for dialect differentiation. The Administrative Divisions do not often correspond with dialect divisions.

1.7.1.2. THE PRESENT CLASSIFICATION

Igbo dialects have been named co-terminously with the political administrative divisions existing in the Igbo territories. The dialects are named after the Divisions or Provinces where they are spoken. However, as we have shown above, it would be wrong to infer absolute correspondence on this regard between the dialects and the Divisions after which the dialects are named. A Division may contain more than one dialect and the same dialect may be spoken in more than one Division, i.e. beyond the Division after which it is named.

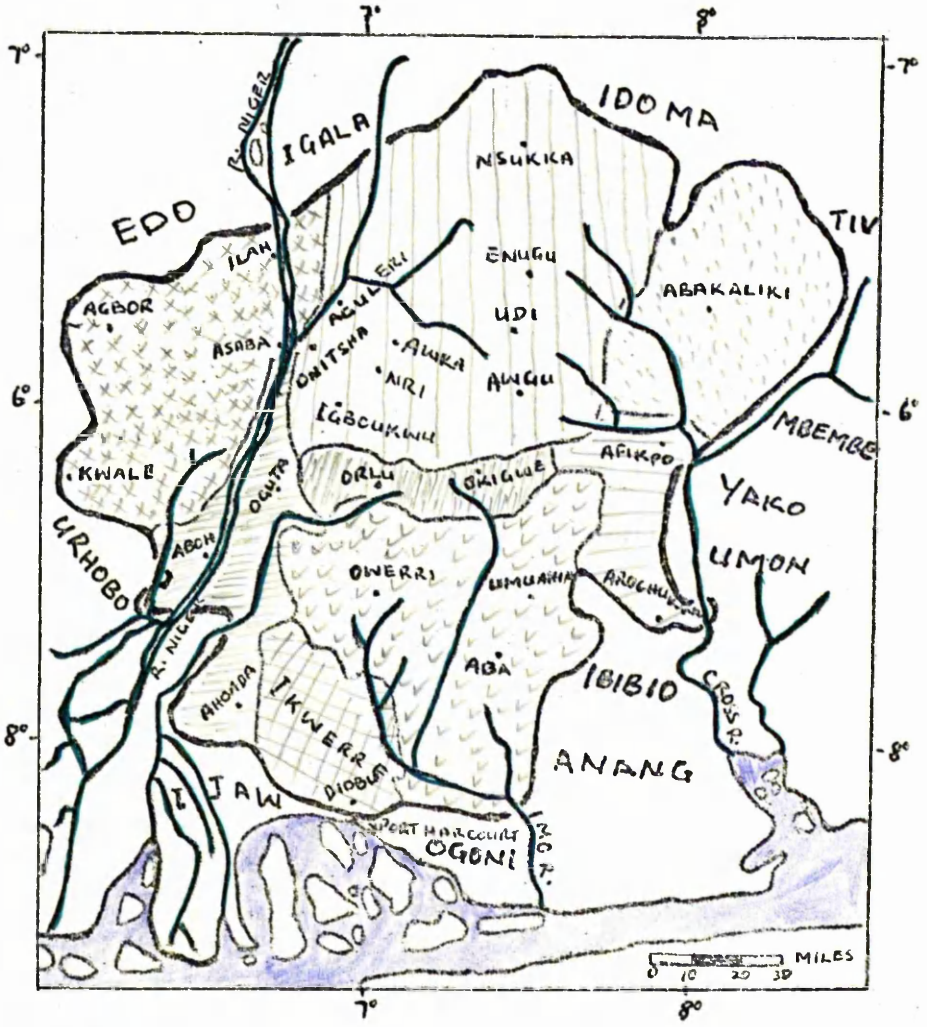
Unfortunately our present knowledge of the differences between the dialects, from the linguistic point of view, is very limited. No serious research has been done in this respect. Consequently we shall, for our present classification, equally rely on the previous approach of treating these dialects on the administrative divisional basis, i.e. by using the Divisional names to represent the dialects. However, we shall try as much as possible to avoid a complete reliance on the administrative divisions as Westermann and Forde

did. Some of the dialects will be named after the communities that speak these dialects. We shall distinguish the following groups of dialects in the language, representing the major and the minor dialect groups or clusters.

The Major Dialect Groups	The Main Dialect Clusters
I. The Northern Group	Onitsha
	Abaja
	Anam
II. North-Eastern Group	Izi
	Ezza
	Ikwo
III. Central Group	Okigwi
	Orlu (North)
IV. Western Group	Ika
	Aniocha (Enuani)
	Kwale
V. Southern Group	Owerri
	Orlu (South)
	Bende
	Ngwa
VI. South-Western Group	Oratta
	Etche
	Ikwerre
VII. Eastern Group	Abam-Ohafia
	Aro
	Afikpo
VIII. Riverian Group	
(i) West	Aboh
(ii) East	Osomari
	Oguta
	Egbema
	Ekpeye

The geographical locations, showing where the Major dialects are spoken, are given in the map on the next page.

THE MAJOR DIALECT GROUPS OF IGBO



The Northern Group

The North-Eastern Group

The Central Group

The Western Group

The Southern Group

The South-Western Group

The Eastern Group

The Riverian Group.

Within some of the clusters, other minor groups can be further distinguished, and within a minor group we may have some pockets of dialect$. This is characteristic of the cluster groups distinguished from the bigger major groups such as the Northern and the Southern groups. The main cluster groups distinguished from the other territorially small major groups such as the Central or the South-Western group may not be further distinguished in this manner because their speech patterns are more homogeneous. We shall take a cross section of the Onitsha cluster to illustrate how a cluster can be further divided.

Main Dialect Clusters		Minor groups within a cluster
I.	Onitsha	Onitsha Town
		Nri-Awka
		Idemili
		Agdaja (e.g. Nnewi, Ihiala etc)
	Abaja	Nsukka
		Udi
		Abaja east (e.g. Okunano, Ekulu-Emene etc)
	Anam	Isu-Ana (e.g. Achalla, Nteje etc)
		Anambra south (e.g. Aguleri and environs)

Each of the minor groups can be further divided into smaller dialect groups. For example,

II.	Nri-Awka	Njikoka
		Aguata-Orumba

Both the Njikoka and the Aguata-Orumba dialects can each be divided into smaller pockets of dialects. For example,

III.	Aguata-Orumba	Aguata-Orumba north (consisting of about ten or more villages)

Aguata-Orumba west (consisting of about nine villages)
Aguata-Orumba south (made up of over twenty villages).

Most of these smaller groups of dialects distinguished here differ only through some peculiarities in accent. These are what we usually refer to as local variations or local dialects. In the strict sense of the term dialect, as this is used in dialectological studies, only the main cluster groups distinguished above can actually qualify as dialects.

1.7.2. A BRIEF SUMMARY OF THE PHONOLOGICAL DIFFERENCES BETWEEN THE MAJOR DIALECT GROUPS OF IGBO

Studies in dialectology distinguish between dialects and patois. Patois is usually used to designate 'the totality of those linguistic features by which members of a dialect community identify members from a section of the community. This means that while members of a language community use dialects to identify members from a section of that community, members of a dialect community, on the other hand, use patois to identify members from a section of the dialect community. A language therefore is made up of dialects, and the dialect, in turn is made up of patois.[15]

It would appear from this that some of the dialect communities which we distinguished above are in fact patois, and as we remarked earlier, only the main cluster groups and/or the major groups would in the strict sense be treated as dialects.

However, the criteria for deciding whether a given speech pattern constitutes merely a patois or a dialect are more or less arbitrary, in the sense that there are no definitive linguistic criteria to base such judgements. Rather such judgements have generally relied on the levels or degrees of mutual intelligibility existing between given speech patterns. We shall however assume that dialects have wider degree of divergence which includes lexical and phonological differences, while patois have lesser degree of divergence which include differences that mainly arise from certain phonological and accentual

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15. Oluikpe, B.O., 1975. The Survey of Igbo Dialects: the Ngwa Experience. A paper presented at a seminar at the Dept. of Linguistics, Univ. of Ibadan.

variations in speech. However, one thing common to both dialects and patois is the fact that in each case there arise certain phonological and/or lexical variants.

We shall list briefly some of the phonological variants that are known to exist among some of the dialects we have distinguished in the Igbo language. The phonological variants we give here, it should be remembered, are based on observational judgements, bearing in mind the fact that no detailed description of the phonology of these dialects has been written. We shall select for our discussion only some of the major dialect groups in the language.

1.7.2.1. THE MAIN PHONOLOGICAL DIFFERENCES BETWEEN THE NORTHERN AND THE SOUTHERN GROUPS OF DIALECTS

The main phonological difference between the Northern and the Southern groups of dialects in Igbo lies in the presence or the absence of the two phonological features of Aspiration and Nasalization as significant elements of structure. The northern group of dialects does not have aspiration and nasalization as significant elements of structure in its phonology whereas these features play significant roles in the phonology of the southern group of dialects. Apart from this major difference certain phonemic variants[+] exist in the phonology of the two major groups. Some of the Ika dialects of the Western group also have nasalization in their phonology (cf. Elugbe 1969, and Williamson 1968); aspiration, however, has not been shown to play any significant role in the phonology of these dialects. The following examples will illustrate the phonemic role of the features of aspiration and nasalization in the phonology of the southern dialects in contrast to the northern dialects where these features are not used as phonemic elements of structure.

1.(a) Aspiration

Northern dialects	Southern dialects	
ɟdē	ɟde	to write
ɟdē	ɟdhè	to soak

+. By phonemic variants we mean to describe the situation whereby one phoneme in one dialect is replaced by another phoneme in another dialect. The variants may not be interchangeable in the contexts in any one dialect.

+. By phonemic variants we mean to describe the situation whereby one phoneme in one dialect is replaced by another phoneme in another dialect. The variants may not be interchangeable in the contexts in any one dialect.

ɟkʊ̄	ɟkʊ̄	to knock
ɟkʊ̄	ɟkhʊ̄	to sow
ɟkwā	ɟkwā	to sew
ɟkwā	ɟkhwā	to cry, to mourn etc.

(b) Nasalization

Northern dialects	Southern dialects	
ára	ára	madness
ára	ãrã	breast
ígwū	ígwū	to dig
ígwu	ígwũ	lice etc.

In the northern dialects these pairs of words are not contrasted either through aspiration as in (a) above or through nasalization as in (b), whereas in the southern dialects, pairs of words can contrast through these features as shown in the examples.

1.7.2.1.1. n/l phonemic differences between the dialects.

In certain words where /n/ is used in the northern dialects, in the southern dialects, this phoneme is replaced with /l/. For example,

2.

Northern dialects	Southern dialects	
àna	àla	ground, land
nàbá	làbá	go home
ékwūnà	ékwūlà	dont say, dont speak
énū	élū	top,
ínē	ílē	to look
ínì	ílì	to bury, grave etc.

This process of replacing /n/ in the northern dialects with /l/ in the southern dialects is not a regular process in the language. There are many words where /n/ is used in the northern dialects and where this phoneme is also retained in the southern dialects. In the following words, for instance, the /n/ phoneme is not replaced with

/l/ in both groups of dialects.

3.	ánụ	meat
	ịnụ̄	to hear
	nà	and
	ńnà	father
	ńne	mother
	ńnu	salt
	ńnụ̀nụ̀	bird
	ọ́nụ̄	mouth etc.

1.7.2.1.2. <u>f/h phonemic differences between the dialects.</u>

For some occurrences of /f/ in the northern dialects, the southern dialects use /h/. For example,

4.	northern dialects	southern dialects	
	áfụ̀	áhụ̀	that
	éfi	éhi	cow
	áfà	áhà	name
	áfụfụ	áhụhụ	suffering
	áfịa	áhịa	market
	áfịfịa	áhịhịa	grass, rubbish
	ófìfie	óhìhie	afternoon
	ịfụ̄	ịhụ̄	to see etc.

This process, like that of replacing /n/ with /l/, is not regular between the two dialect groups. There are some words where /f/ is used in the northern dialects and where this phoneme is also retained in the southern dialects.

Other phonological differences between the two dialects include the following.

1.7.2.1.3. Palatalization of sibilants

In the southern dialects /s/ and /z/ are palatalized, becoming /sh/ and /zh/ respectively, when the former are followed by a front vowel, either /i/ or /ị/. In the northern dialects these sibilants are not palatalized within any contexts. Compare, for instance, the way the following words are pronounced in the two dialects.

5.	Northern dialects	Southern dialects	
	ísi	íshi	head
	ísì	íshì	smell
	ósisi	óshishi	tree
	àsị́	àshị́	a lie
	ásị̀	áshị̀	hatred
	ézì	ézhì	pig
	ózi	ózhi	message etc.

Palatalization of sibilants before a close front vowel is a regular phonological process in the southern dialects.

1.7.2.1.4. The implosive /ɗ/ and glottal stops

Some of the southern dialects have the implosive /ɗ/. This sound does not occur in the northern, central and the other main dialect groups of Igbo. The implosive /ɗ/ is usually heard in the speech of speakers from Owerri, Mbaise, Mbierri and Orata areas; these people speak southern dialects. In the northern dialects, /t/ is used in those words where the implosive /ɗ/ occurs in the southern dialects. The following examples illustrate some of the words where the implosive /ɗ/ occurs in these southern dialects.

6.	Northern dialects	Owerri-Mbaise-Orata dialects	
	átụ	áɗụ	chewing stick
	ụ̀tú	ụ̀ɗú	a fine, a levy
	ụ̀tútù	ụ̀ɗúɗù	morning
	ńkịtā	ńkịɗā	dog etc.

These southern dialects use /t/ for certain words where the same sound is present in the northern and other dialects.

Most of the dialects that have implosive /ɗ/ also have glottal stops. The glottal stops can be heard in the speech of the speakers of these dialects, when the speakers pronounce certain words. The northern, central and the other dialects of Igbo do not have glottal stops. As in the occurrence of the implosive /ɗ/ in the speech of these speakers, the glottal stops are used in those words where /t/ is used in the northern and the other dialects where glottal stops and the implosive /ɗ/ do not occur. In all probability, the glottal stops in these cases in these dialects can be viewed as a further phonological development of the implosive /ɗ/ which could be expected to occur in these cases. The occurrence of glottal stops in these dialects (the words in which glottal stops are used in the dialects), is much more limited than that of the implosive /ɗ/. In the few examples we have of the words where glottal stops occur in these dialects, the glottal stop is generally used for the /t/ in the '-ta' suffix which occurs with the verb in Igbo. For example,

7.	northern dialects	Owerri-Mbaise dialects	
	bàtá	bà ʔ á	come in!, enter!
	wètá	wè ʔ á	bring!
	wébàtá	wébà ʔ á	bring in! etc.

1.7.2.1.5. The phonemic /ɛ/

Some dialects of Igbo, such as the Ika dialects, the Kwale dialects, both of which belong to the Western group of dialects, and the dialects spoken in Afikpo, in the Eastern group of dialects, have phonemic /ɛ/. In most of the other dialects of Igbo the phonetic [ɛ] is not phonemic but an allophone of /e/. In the Kwale, Ika and Afikpo dialects where the phonemic /ɛ/ occurs, it is used in the same harmonic group as a, i̱, o̱, u̱, and in these dialects this sound is usually used in places where a is used in the other dialects. This is evident from the following examples.

8.	The other dialects	Ika-Kwale-Afipko dialects	
	áka	ɛ́ka	hand
	ánya	ɛ́nya	eye
	áfà (áhà)	ɛ́hà	name

ákwà	ɛ́kwà	cloth
àkwá (àkwhá)	ɛ̀kwá	egg
áfọ	ɛ́fọ	stomach etc.

The phonemic /ɛ/ has been observed to occur in the Onitsha town dialect, which belongs to the northern group of dialects (cf. Williamson 1966). However, unlike in the Kwale, Ika and Afikpo dialects, in the Onitsha town dialect this sound never occurs in word initial position, and in this dialect the occurrence of /ɛ/ is much more well distributed with respect to the other vowels of the same group.

Apart from the phonological differences mentioned above, other differences do exist in the phonology of these dialects. Only a detailed research will be able to disclose and adequately describe the phonological differences that exist within and across the main dialect clusters in the Igbo language.

1.7.3. INTELLIGIBILITY WITHIN THE IGBO DIALECTS

The multeity of dialects in the Igbo language makes the question about intelligibility particularly interesting. On the basis of certain lexicostatistic data, Williamson (1973) argued that some of the clusters we have treated here as dialects of the same language - Igbo - should infact be considered as separate languages. Special mention was made of some of the dialects in the Western group, such as Ika and Ukwuani as well as the Ikwerre dialects in the Southern group. Similarly, Paul and Inge Meier and Bendor-Samuel (1975) have proposed that Izi is a separate language, not a dialect of Igbo. Meier and Bendor-Samuel remarked in the introduction of their book, A Grammar of Izi, an Igbo Language, that "these initial studies suggest that it is realistic to consider Izi, Ezza and Ikwo as constituting the North-eastern Igbo language, sufficiently different from Central Igbo to be regarded as a separate language within an Igbo language group. When Izi, Ezza and Ikwo are compared with one another, they give lexicostatistical scores of around 95%; but when the three are compared with the Central Igbo dialects, the scores drop sharply to the 80% area."[16]

16. Paul and Inge Meier and J. Bendor-Samuel, 1975. A Grammar of Izi: an Igbo Language. p. 15.

There are, on the other hand, those who argue that, pending more conclusive evidence, these linguistic communities should be treated along with the others as dialects of Igbo language. Obi (1975) and Onwuejiogwu (1975) argued, for instance, that lexicostatistic findings have not been adequately convincing and reliable in determining whether a given speech variety does or does not constitute a separate language within the different Igbo dialects. With particular reference to the complex linguistic situations characteristic of the different dialect communities of Igbo, we shall argue that considerations based purely on lexicostatistic findings have not been very reliable in the case of these dialects for deciding whether any or which of the dialects can be considered as constituting a separate language. The crucial point of our argument lies in the fact that despite the low percentage cognacy scores between the dialects of Igbo, as illustrated by the lexicostatistic investigations by Williamson and Bendor-Samuel, yet it is undeniably true that when speakers from these dialects with low percentage scores meet, they are able to communicate intelligibly. This is what lexicostatistic studies have not been able to explain.

Furthermore we argue that the Ika, Ukwuani and Izi together with the others are dialects of Igbo, and not separate languages, because a cursory glance through A Grammar of Izi by Paul and Inge Meier and Bendor-Samuel (1975), Ika and Ukwuani Phonology by Kay Williamson (1968), Ika Phonemic Statement, by B.E. Elugbe (1969), (these being the main known works published on the phonology and/or grammar of these dialects), will easily convince any one that there is no strong justification for treating these dialects as separate languages from the Igbo language. Both the grammar, the lexicon and the phonology of these dialects as presented by the authors, are not much different from the grammar, the lexicon and the phonology of the Central and the other dialects of Igbo.

Lexicostatistics is used to primarily establish the relationships between languages and to classify related languages. The evidence collected through lexicostatistic study helps the linguist to identify languages that are cognate as well as languages that are unrelated. It is assumed in lexicostatistics that in related languages some 'BASIC' vocabulary is commonly shared by the languages. A test-list of

meanings, items, etc. are sampled from the basic vocabulary, including those words that describe simple concepts such as parts of the body, some kinship relationships, simple verb forms, natural objects etc. Every day equivalents for this list are obtained from two or more languages, and the degree of their relationships and/or divergence is quantified. The key concept of this system centers around the 'BASIC' vocabulary. This concept can be variable, taking into account certain socio-cultural and psychological factors. As Hymes (1960) remarked, the theory of basic vocabulary is inchoate. Here the aid of social psychology should be sought.

The vocabulary items used in most of the present lexicostatistic studies have been generally modelled on the Swadesh word lists.[17] The test vocabulary used by Williamson (1973) for the lexicostatistic study of Igbo dialects was chosen from these lists. The Swadesh word lists rely heavily on structure-semantic relationships. Swadesh (1955: 124) warns that in the choice of which words to include in the lists of 'basic' vocabularies, culture terms have to be avoided in that their retention or loss is too closely correlated with fluctuations in the cultural situations.

The word lists given by Swadesh (1955) have been used extensively in lexicostatistic studies of European and American languages. Onwuejiogwu (1975) strongly argued that whereas in the non-tone European languages, the use of such word lists to obtain useful information about the linguistic affinity and/or divergence between languages could be envisaged; however, in a tone language, especially among the dialects/languages of West Africa, with other variables such as tone-semantic relationships and other socio-cultural factors which cannot be easily separated from the linguistic behaviour of the people themselves, the selection and use of the 'basic vocabularies' will inevitably become a much more complicated affair. The socio-cultural linguistic interactions between peoples speaking dialects of the same language or even different languages in the West African countries are quite different from those of the speakers of European and

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17. Swadesh, Morris 1955. 'Towards Greater Accuracy in Lexico-statistic Dating.' International Journal of American Linguistics (IJAL), 21, 121 - 138.

American languages. In the former the barrier between peoples and/or their languages is never artificially maintained as is usually the case with most peoples and languages of Europe and America; rather there has always been a state of cultural, social and linguistic fluidity in the West African context. "Thus as one moves from Owerri through Etche and Ikwerre into the Ijo country there is a gradual cultural gradient caused by the constant movement and interaction of peoples between the Igbo and Ijo culture areas."[18] Because of this long interaction between the peoples and languages there is usually the process of interlanguage influences and borrowings.

Generally in most African languages it would be practically impossible to separate words from their cultural contents. For instance, such words as feather, fire, fish, water, hunt, rain, river, stone, sun, wife, woman etc. which are included in Swadesh word-lists, and which in the European and American contexts would have no cultural contents, in these African languages can be easily associated with one or the other cultural meaning. If we are to take the warnings by Hymes, Swadesh and others seriously, which I think we should, about the evaluation of the type of words to be included in the 'basic vocabulary' it will be inevitable that serious objections would be raised about the choice of the words used in Williamson's and other lexicostatistic studies regarding the Igbo dialects. As mentioned above, the words used in these lexicostatistic surveys have been taken from the Swadesh word-lists.

The area where the inefficacy of the lexicostatistic methods as means of establishing linguistic distance and/or convergence among languages becomes most obvious with particular reference to Igbo and perhaps to some other languages in West Africa is the very concept of cognacy in the words used for the tests. The concept of cognacy, as we know, is central in lexicostatistic study. Cognacy among the different dialects of Igbo works in a different way from the way we know it in the European languages. Swadesh (1955) remarked, for instance, that in comparing French-Spanish cognates, langue and lengua are scored plus, whereas tête and cabeza are

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18. Onwuejiogwu, M. A. 1975. Lexicostatistics and the concept of mutual intelligibility. (MS) p. 7.

scored minus, i.e. the former are cognates, and the latter non-cognates.

A strict comparison of any two dialects of Igbo, using this idea of cognacy illustrated by Swadesh, would reveal a low percentage of cognacy between the dialects. For instance, Williamson's percentage scores of cognacy among some Igbo dialects, in comparison with those of some European languages are as follows:

English	- German	73%
Dutch	- English	76%
Alụụ	- Etche below	70%
Enuani	- Ukwuani below	70%.[19]

One obvious conclusion we can draw from the above cognacy percentage scores would be that Alụụ and Etche or Enuani and Ukwuani have greater linguistic distance and consequently greater distance in intelligibility than say English and German or Dutch and English. In actual fact, however, the reverse seems to be the case. We know, for instance, that a German or Dutch speaker who did not learn English cannot hold an intelligible discourse with an English speaker, nor can an English speaker who did not learn German or Dutch communicate intelligibly with the speakers of these languages.

The same cannot be said between an Enuani dialect speaker and an Ukwuani dialect speaker or between an Alụụ dialect speaker and an Etche dialect speaker. Practical observation shows that when speakers from these different dialects meet they communicate intelligibly. Onwuejiogwu thus recounts his conversation with an Ikwerre speaker; "Thus when I was communicating with an Ikwerre elder, I was speaking an Enuani dialect and the Ikwerre was speaking to me in an Ikwerre dialect. At the level of meaning and understanding I was able to generate words and patterns which I do not understand in the spoken sentences made by my Ikwerre friend. I was able to do this because both of us share a common cultural experience."[20] Onwuejiogwu, as indicated above, speaks a dialect of Enuani, and

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19. Williamson, K. 1973. "The Lower Niger Languages", Odụma, Vol. 1, No. 1, pp. 32 - 35.

20. Onwuejiogwu, M. A. 1975. op. cit. p. 17.

the Ikwerre dialect area is very distant from the Enuani dialect area and a lot of phonological and lexical differences exist between the two dialects. Both dialects are territorially and linguistically so far apart that it is much easier to conceive of an Enuani dialect speaker holding intelligible communication with a speaker of the Ukwuani dialect (both Ukwuani and Enuani dialects belong to the same major group of dialect, i.e. the western group) than of a speaker of the Enuani dialect with a speaker of Ikwerre dialect which is in the scuth-western main group. A lexicostatistic comparison of the two dialects would definitely show very low percentage score of cognacy; Ikwerre, it should be understood, is one of those dialects which Williamson (1973) treats as definitely constituting separate languages from Igbo.

I speak Aguata dialect in the Onitsha dialect group and I communicate intelligibly with speakers of Ukwuani, Ikwerre and other dialects. While speaking to those people from these dialect areas, I use the Onitsha dialect and these friends, most of whom cannot speak English, use their respective dialects, and we do not have problems in understanding ourselves. From lexicostatistic data mutual intelligibility among these dialects would not be feasible, in that the dialects would score low cognacy percentage.

One way of explaining why these dialects can score very low percentage in a word-to-word comparison of vocabulary items and yet be mutually intelligible is because of the existence of synonyms and other cognate forms in which the Igbo Language is extremely rich. Usually in Igbo an item may have in addition to the many cognate forms other words to designate it. Equipped with the cognate forms and the other names to designate an item, in the language, the speakers of these dialects can more easily achieve mutual intelligibility.

We shall give concrete examples to illustrate this. Ekpeye, for instance, is a dialect which, as Williamson argues, has one of the lowest percentage cognacy scores with the other dialects of Igbo, especially with the Onitsha dialects.

The following vocabulary items have been taken from the word-lists collected by Williamson from the Ekpeye dialect and their equivalents from the Onitsha dialect are given here for comparison.

10.	Vocabulary items	Ekpeye	Onitsha
	rope	ákwáńà	
		íkpō	ụ̀dọ̀
		èdhì	
	basket	ọ́bọ̄	ábọ́
		ọ̀gbànị̀	ǹkàtà
		ụ́kpọ̀	
	knife	ọ̀gè	ḿmà
	yam	ẹ̀gẹ̀	jí
		íyí	
	stone	ígwû	ọ̀kwúté̄
	branches/foliage	ọ̀bhọ́	ńkánā̄
			ábụ́bā̄

In a lexicostatistic analysis between the two dialects, items such as rope, knife, stone, yam (if we take the Ekpeye word ẹ̀gẹ̀), basket (if we take the Ekpeye words ọ̀gbànị̀ and ụ́kpọ̀), foliage etc. would be scored minus for cognacy. However, if I were to communicate with an Ekpeye speaker, I would be able to understand these words which would in the surface predict nonintelligibility. I am able to do so because in my local dialect I know that the word ákwárà means 'a type of rope' (both Ekpeye ákwáńà and the ákwárà of my dialect are cognates). Similarly in my local dialect 'mma ọgè' means a type of knife, usually a big knife (compare Ekpeye ọ̀gè for knife); also in my dialect jí àgà is used for one type of yam, (compare Ekpeye ẹ̀gẹ̀ for yam); ígú is used for a type of stone, usually the stone used for sharpening implements and/or for grinding, (compare Ekpeye ígwû for stone). In my local dialect the words ágbáyị̀ and ụ̀kpá are used to designate certain types of basket (compare Ekpeye ọ̀gbànị̀ and ụ́kpọ̀ for basket); also in my dialect the word

ụbọ means foliage (compare Ekpeye ọbhọ for foliage) etc.

These words from my dialect with which the items can be designated are widely understood both in the other dialects of the Onitsha cluster and in many other dialects in the southern group. However, despite their wide usage in the language, these words are rarely used in the literature written in Igbo and only the ones represented in the examples are widely used in literature. The relevant point to our argument is that in a lexicostatistic survey between the Onitsha dialect and any other dialects, it is usually the words we gave in the examples that will be chosen for the Onitsha dialect, and more important is the fact that nonnative speakers of Igbo such as Williamson, the Meiers and Bendor-Samuel do not know these words that have been provided from my local dialect, and they would normally base their judgement of cognacy purely and only on those words selected for the Onitsha dialect. This is the main reason why the cognacy percentage scores obtained through lexcostatistic studies among the different dialects of Igbo usually fail to correspond to intelligibility scores and that is why we argue here that the lexicostatistic evidence on which Williamson (1973) and Meier et alia (1975) based their conclusion about treating some of the dialects of Igbo as separate languages is inadequate and unreliable.

What we have observed above about our ability to achieve intelligibility with an Ekpeye dialect speaker is not unique to myself alone, rather this represents a general picture of what obtains among the speakers of different dialects. This is one of the ways through which mutual intelligibility is achieved among speakers of different dialects in the language. In other words, out of the names and cognate forms with which an item can be identified in a given local dialect, at least one of them would be intelligible to other people speaking a different dialect or help the speaker to understand words from other dialects. These facts may not be, and are usually not shown in a lexicostatistic survey, and as we pointed out earlier, a non-native speaker of the language would not be able to avail himself of the extra information and would inevitably give a low

percentage of cognacy score. Unfortunately, most linguists do not heed the serious note of warning by Hymes 'that lexicostatistics is not a short-cut; it does not replace other methods and information but must be incorporated with them into a consistent body of knowledge.'[21] Such a warning has not been heeded in the recent lexicostatistic studies carried out in the Igbo dialects. Lexicostatistic methods have to be seriously reviewed to be able to give significant information relevant for determining the linguistic relationships that exist among the dialects of Igbo.

Onwuejiogwu (1975) remarks that from his own observation 'it seems that people in the same language area possess two stocks of vocabulary and sound pattern: the latent and the manifest'.[22] This is parallel to Chomsky's distinction of competence and performance. The intelligibility patterns among the Igbo dialects, the way intelligibility is made possible among these dialects, are closely related to this concept of 'latent and manifest stocks of vocabulary and sound patterns' possessed by the speakers of the different dialects of this language. As we stated above, an item in Igbo may be designated by more than one word and by a series of cognate forms. We provide the following examples from my local dialect.

knife	ńmà - (a generic term)
	ńmà ékwū - kitchen knife
	ńma ɔgè - big knife used for cutting
	ɔgbúàdànì - " " "
	ɔbèjìlì - a local type of sword (usually used in combat), hunting knife.
	ńmà ánwẹ̀rẹ̀ - tobacco knife etc.
stone	ɔkwúté - (a generic term)
	ńkpúmè - big stone
	ákwẹ̀kwà - stone used as tripod
	ígú - stone used for grinding or sharpening implements
	ájíḷíjá - small pebbles etc.

21. Hymes, D. H. 1960. "Lexicostatistics so far" Current Anthropology Vol. 1.

22. Onwuejiogwu, M. A. 1975. op. cit. p. 17.

Some of the names used to designate an item describe the type, the size or the purpose for which the item is used. The generic name of the item is usually the more common name used for the item and it is often the one that is understood across different dialect groups. It is generally these generic names of the items that constitute those words that are used in the 'provincial' speech forms, i.e. the 'provincial dialects'. The other names for an item, especially those that describe the type, size, purpose etc. of the item are used mainly in the local speech forms; this however does not imply that the names cannot be understood in the other local or main dialects. It simply means that as a result of the socio-psychological attitude of the speakers, there is rather a natural tendency that when speakers from the same locality meet they usually use their local speech forms where the local terms or names for the items predominate, but when speakers from different localities or different dialect areas meet they use mainly what we may call a 'provincial speech form' or a provincial dialect, where those names or words which the individual speakers suspect are characteristic only of their localities, are supressed, and the more widely understood words, terms and names are used. When speakers from territorially distant areas, and consequently very different dialects, meet they use a 'regional' speech form where the local forms, words, names etc. are completely left out; in this case only the generic names are used. The 'provincial' forms of the dialects that are territorially close are usually the same or similar.

The general intelligibility pattern works in such a way that a speaker, apart from his own 'local' speech variations, should acquire the 'provincial' and the 'regional' forms to be able to understand and be understood by those who do not come from his locality or dialect area, i.e. those who speak other dialects than his own.

To the speakers of a dialect, therefore, the knowledge of some of the names of an item or items is 'latent' (competence), this helps him in identifying certain cognates and other words when these are used in other dialects, whereas in some cases, the knowledge is 'manifest', when the words are actually used in certain contexts or situations.

1.7.4. THE STANDARD DIALECT

The present work, as indicated in 1. 2. above, is concerned with the description of the phonology of the Standard Dialect of Igbo. We have explained in 1.2. above what we mean by the term 'Standard Dialect'. However, being the first time that such a dialect in the language has been selected for phonological analysis, we will give a detailed introduction of the Standard Dialect in this section.

Although no mention of the Standard dialect in Igbo has been made in the previous studies of this language, the development of this dialect has a long history which dates back to the middle of the nineteenth century when the first literature in Igbo was written. The issue of dialects in Igbo has been at the center of the many attempts, starting from early 1840s to the present time, to write literature in Igbo. The multiplicity of dialects in Igbo has constituted a great obstacle to the writing of this language. In the 1840s and thereafter the early missionaries tried to write literature for use in Igbo-land, but these attempts were frustrated by the existence of dialect differences in the language. Literature written in any particular dialect failed to attract wide readership and acceptance among the other dialect communities.

The history of the development of the Standard dialect can be taken to start from this period. The later attempts to find a dialect that is widely understood and accepted which could serve as the literary language for Igbo took the form of either (a) selecting a dialect that is actually spoken by a given community, or (b) constructing a literary dialect from the existing dialects, a dialect which would embody to some degree the features of most of the existing dialects.

The dialect used by the early missionaries to write literature in the Igbo language is known as the Isu-Ama dialect. This was the dialect spoken by the liberated Igbo slaves who lived in Freetown in Sierra Leone.[23] The missionaries lived and worked with these slaves before going to the Igbo country. The Bible and some Prayer books

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23. Hair, P. E. H. 1967. The Early Study of Nigerian Languages.

were translated into Igbo by these missionaries using the Isu-Aka dialect. The Isuama dialect as can be seen from our classification is one of the dialects in the southern group. It is one form of the Owerri dialects which is easily understood in the Onitsha group of dialects. However it is not really certain that the dialect we distinguish as Isuama in the classification is the same as the dialect that was spoken by the Igbo slaves in Freetown. Judging from the translations made in the Freetown Isuama, it evidently appears that it was a different dialect from the Isuama presently spoken in the southern group, or at least an extremely modified form of the latter.

Something has to be said about the rejection of the dialect in which the early literature in Igbo was written. The fact is that this dialect was never given a fair chance by the speakers of the other dialects before rejecting it. According to one episode recounted by Hair (1967), when the missionaries first entered the Igbo country, sailing up the Niger, and made the first stop at Aboh, Rev. J.F. Schön, a linguist who had learned the Isuama dialect in Freetown, started to preach the Gospel in this dialect before the chief of Aboh, the chief interrupted the sermon because he could not understand the dialect Schön was using. As a result of this experience Schön dropped his study of Igbo to which he had devoted so much time and labour. Similarly, in the Igbo land, the people were quick in reacting negatively when they found it difficult to understand the Isuama dialect, and despite all attempts by the early missionaries to ensure continued use of the Isuama dialect as the literary dialect of Igbo, the use of this dialect was eventually abandoned in the late 1870s.

Attempts were later made to construct a literary language for Igbo and the dialect so formed is known as Union Igbo. Union Igbo represents a type of artificially constructed dialect which tried to embody as much as possible certain features of the five dialects of Igbo, namely, the Onitsha, Owerri, Arochukwu, Bonny and Ngwana. The Union Igbo as the literary language of Igbo was short-lived, because as Ward (1941: 10) correctly remarked, 'it was not a consistent whole, but a composite picture more or less artificially constructed and consisting of vocabulary from the five areas represented, a mixed sound system and mixed grammatical constructions. Such a type of language which is not a natural growth

cannot easily be expected to develop.' Ward also warned that 'any type of language which finally may become the literary medium can well be enriched by gradual borrowings from other dialects, so long as the main framework is more or less consistent'.[24] We entirely agree with Ward both about the Union Igbo and especially about the type of language that can emerge as the literary medium for Igbo.

The Standard dialect has developed in the manner prescribed above by Ward. It can be rightly claimed that the present Standard dialect of Igbo has developed from the 'Isuama dialect'. This can be easily shown by a close look into the literature written in the Isuama dialect.[25] Such a close look will show obvious similarity between the Isuama dialect, which was spoken by the Igbos who at the time lived in Freetown, and the present Standard dialect. It would be important to note that the Isuama dialect was spoken and understood by Igbos, who at the time happened to come from different areas of Igbo-land. For such a dialect to serve as a medium for people from different dialect areas it could be assumed that it was devoid of accents characteristic of any one particular local dialect. The following account of the Isuama dialect, of the events leading to the rejection of this dialect in the Igbo-land, given by P. E. H. Hair (1967 : 94) will help us to understand the very nature and type of the Isuama dialect. Hair remarked that 'Isuama was supposed to be the dialect spoken by all the Ibos in Sierra Leone, whatever their individual origin, but Crowther began to realise that it was more of a mixed dialect, and that whereas a mixed dialect was inevitable in the small Ibo community in Freetown, and was possible because whole stretches of cultural vocabulary relating to traditional practices had been abandoned, it was not easily acceptable in Iboland.'[26]

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24. Ward, I. C. 1941. Ibo dialects and the development of a common language. p. 10.

25. A number of books were written in Isuama dialect, these include, Oku Ibo; Ibo Grammar, by Rev. J. F. Schön, 1861; Isoama Ibo Primer by Rev. S. Crowther, 1859; Vocabulary of the Ibo language by Rev. S. Crowther, Part I, 1882, Ibo - English, Part II, English - Ibo, 1883; Oku oma a nke Owu Matia: The Gospel according to St. Matthew, translated into the Ibo language by the Rev. John Christopher Taylor, 1860; Ibo Primer by Mr. F. W. Smart, native catechist, no date;

Isuama therefore developed as a dialect which was more or less 'central' and intelligible to a cross section of speakers with different dialects. Such a dialect as indicated earlier, though sharing certain features in common with the local dialects yet differs from these local dialects, it is devoid of respective local accents etc. Such a dialect has to be learnt by the speakers of the respective local dialects. It was the inability to fully understand this 'standard' speech form that made the Igbos, who at the time were used to only their respective local dialects, to reject the Isuama dialect. These Igbos at that time spoke and understood only their local dialects. What Ward (1941) referred to as the process of dialect levelling had not started at the time Isuama was introduced. The process of dialect levelling is usually achieved by people moving out of their local dialect areas to other dialect areas, so that they begin to be exposed to different dialect forms and consequently begin to understand these forms which may be different from those of their respective local dialects. In other words, the ill-fate of the Isuama dialect was that it was introduced prematurely into the Igboland. Obviously, if only the Isuama dialect were given the chance and trial at the time it was introduced, the argument about it lacking cultural terms could be resolved by time through gradual borrowings of these terms from the local dialects.

It is usually stated that the Isuama dialect which was used in writing the early literature in Igbo was rejected and abandoned; in actual fact that dialect was not abandoned. It continued to be spoken by those Igbos who returned from Sierra Leone and who along with the foreign missionaries formed the core of missionary activities in Igbo country. These Igbos were either missionaries themselves or worked as catechists and interpreters to the foreign missionaries. The first and subsequent groups of Igbos who later engaged in missionary work learnt and used this dialect. The result of this is that more

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Ibo common Prayer : Ibo translation (no author, no date); Grammaire Ibo by Le P. A. Ganot, 1899; A first grammar of the Ibo language by J. Spencer, first edition 1901, second edition 1927; An elementary grammar of the Ibo language by Rev. J. Spencer, third edition revised by T. J. Dennis 1916; Essai de dictionnaire Français - Ibo ou Français - Ika by the Rev. Pére C. Zappa, 1907 etc.

people became exposed to this dialect, and the dialect enriched itself through gradual borrowings from the local dialects. Basically this constitutes the development and growth of the present Standard dialect of Igbo.

Apart from the local dialects, therefore, there is a Standard dialect in Igbo. This is the dialect in which Igbo radio broadcasts are made, it represents the type of dialect that is widely understood, the type of dialect that is often used while addressing a mixed audience of Igbo speakers who come from different dialect areas. As we indicated earlier, the standard dialect has to be learnt apart from the local dialects, though it shares certain features with the local dialects, yet it is different from the local dialects. This means that many Igbo speakers have two or more dialects at their command - their local dialect plus the standard dialect and perhaps other local dialects. Some speakers may acquire the standard dialect at a more or less varying degrees of proficiency.

We have traced here in detail the history of the development of the Standard dialect, because, as we stated earlier, little mention has been made about this dialect in the previous studies on Igbo phonology.

1.7.4.1. CERTAIN PHONOLOGICAL DIFFERENCES BETWEEN THE STANDARD DIALECT AND THE ONITSHA AND OWERRI DIALECTS

The Standard dialect has a lot in common with both the Onitsha and the Owerri groups of dialects. We use the words 'Onitsha' and 'Owerri' to represent the northern and the southern groups respectively. However the Standard dialect differs considerably from both the Onitsha and the Owerri dialects. We shall briefly touch on some of the areas in which the Standard dialect differs from both groups of dialects. These two main dialects have been chosen for comparison with the Standard dialect because the Standard dialect is known to be closely related to the two dialects - Onitsha and Owerri. The relationship and/or the differences between the

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26. Hair, P. E. H. 1967. op. cit. p. 94.

Standard dialect and the two dialects can be briefly summarised thus:
(i) unlike in the Owerri dialects and like in the Onitsha dialects, in the Standard dialect aspiration and/or nasalisation do not play significant phonemic contrastive roles.
(ii) On the other hand, most of the grammatical formatives used in the Standard dialect correspond to those used in the Owerri dialects. These grammatical formatives are given below in the three dialects.

	Onitsha dialects	Owerri dialects	Standard dial.
Past tense morpheme	-lV	-rV	-rV (where the V element repeats the vowel of the root morpheme). For example:
	gàlà	gàrà	gàrà 'went'
	kwùlù	kwùrù	kwùrù 'spoke'
	sèlè	sèrè	sèrè 'drew'
	sòlò	sòrò	sòrò 'followed' etc.
Perfect tense morpheme	-gó	-Vlá	-Vlá
	àgágo	àgálala	àgálala 'has gone'
	èkwúgo	èkwúola	èkwúola 'has spoken'
	èsegó	èseéla	èseéla 'has drawn'
	èsogó	èsoóla	èsoóla 'has followed'
Negative morpheme	-rọ̀	-ghị̀	-ghị̀
	gárọ̀	gághị̀	gághị̀ 'did'nt go'
	kwúrọ̀	kwúghị̀	kwúghị̀ 'did'nt speak'
	sérọ̀	séghị̀	séghị̀ 'did'nt draw'
	sórọ̀	sóghị̀	sóghị̀ 'did'nt follow'

Imperative negative morpheme	-nà	-là	-là
	ágānà	ágālà	ágālà 'do not go'
	ékwūnà	ékwūlà	ékwūlà 'do not speak'
	ésènà	ésèlà	ésèla 'do not draw'
	ésònà	ésòla	ésòla 'do not follow'
Completive aspect morpheme	-chaa (sịa)	-chaa	-chaa
	gáchaa (gásịa)	gáchaa	gáchaa 'finish going'
	kwúchaa (kwúsịa)	kwúchaa	kwúchaa 'finish speaking'
	sècháa(sèsịa)	sècháa	sècháa 'finish drawing'
	sòcháa (sòsịa)	sòcháa	sòcháa 'finish following'
Inceptive aspect morpheme	-bé/bá	-wé/wá	-wé/wá
	gába	gáwa	gáwa 'start going'
	kwúbe	kwúwe	kwúwe 'start speaking'
	sèbé	sèwé	sèwé 'start drawing'
	sòbé	sòwé	sòwé 'start following' etc.

Onitsha dialects use the morpheme -gá (often referred to as 'the floating -gá' in that it can be affixed to the noun or to the verb in the sentence) for marking the plural of the nouns. This morpheme does not occur in the Owerri dialects; in these dialects nouns are not marked for plural. The morpheme -gá is used in the Standard dialect in the same manner it is used in the Onitsha dialects. The following examples will illustrate the use of this morpheme in the Onitsha and the Standard dialects.

Singular/generic[27] form	Plural form
ósisi 'tree'	ósisiga 'many trees'
ḿmadù 'person, people'	ḿmadùga 'many people, crowd'
ụ́lọ̀ 'house'	ụ́lọ̀ga 'houses, many houses'
éwu 'goat'	éwuga 'goats' etc.

27. The system of plurals, how it is expressed in the language is very complex and has not been adequately described in any of the existing books on Igbo grammar. We cannot go deep into this in the present work,

(iii) Within the phonemic variants distinguished earlier among the Onitsha and the Owerri dialects, those variants that are found in the Owerri dialects also occur in the Standard dialect. For example,

(a) n/l phonemic variants.

Onitsha dialects /n/	Owerri dialects /l/	Standard dialect /l/
àna	àla	àla 'land, ground'
ụ́nọ̀	ụ́lọ̀	ụ́lọ̀ 'house'
énū	élū	élū 'high, top, height'
énigwē	éligwē	éligwē 'heaven, sky'
ị́nụ̄	ị́lụ̄	ị́lụ̄ to marry etc.

(b) f/h phonemic variants

áfịá	áhịá	áhịá market
éfi	éhi	éhi cow
áfà	áhà	áhà name
ífe	íhe	íhe thing
ífì	íhì	íhì reason, because
áfụfụ	áhụhụ	áhụhụ suffering
áfịfịa	áhịhịa	ahịhịa grass, rubbish
éfìfie	éhìhie	éhìhie afternoon
ị́fụ̄	ị́hụ̄	ị́hụ̄ to see etc.

(c) r/h phonemic variants

àrú	àhú	àhú body
órù	óhù	óhù slave
óru	óhu	óhu (ọ́gụ) twenty
órī	óhī	óhī theft
árụrụ	áhụhụ	áhụhụ ant etc

(d) l/r phonemic variants

élili	ériri	ériri string

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however, we would like to correct the erroneous remark made by Green and Igwe (1963) that Igbo nouns have no plural forms. This remark may be true about the dialect on which the authors wrote (which is one of the

ílī	írī	írī to eat
Òkólo	Òkóro	Òkóro personal name etc.

As in the Onitsha dialects and unlike the Owerri dialects, the sibilants /s/ and /z/ are not palatalized in the Standard dialect when they (sibilants) are followed by close front vowels. Similarly, the implosive /ɗ/ which we noted, is used in some Owerri dialects, does not occur in the Standard dialect. The Standard dialect has no glottal stops as we have in some Owerri dialects.

To summarise, it is apparent from what has been stated above that in terms of word structure the Standard dialect has borrowed more from the Owerri dialects than from the Onitsha dialects. However, from the phonological point of view the Standard dialects has been influenced more by the Onitsha dialects than by the Owerri dialects. Thus those phonological features which characterize the Owerri dialects such as aspiration and nasalization as well as the other features such as the implosive /ɗ/ and the development of glott-al stops etc. are completely lacking in the phonology of the Standard dialect.

Apart from these obvious differences stated above, the Standard dialect shares the other phonological features such as the vowel harmony, vowel assimilation and vowel contraction, tone features , and infact all the other phonological features to be described in the present work with the other dialects of Igbo, especially with the two main dialects of Onitsha and the Owerri dialects.

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southern dialects) but this cannot be generalized for the whole language. In the Onitsha dialect, as noted above, morphological indication of plurals is not an optional element in the grammar, rather nouns are systematically used in their singular and plural forms. There are however other extra linguistic and psychological factors which underly the ways in which the speakers of Igbo indicate plurality of nouns in their grammar. It can sometimes be the case that the nouns are used in the 'generic sense', i.e. referring to a class of the noun, in which case, a noun used in the singular can be associated with more than one member of the class. When, however, the peaker wishes to express plurality of nouns, he obviously indicates this morphologically through the use of the -ga morpheme.

CHAPTER 2

THE PHONETIC DESCRIPTION OF THE SPEECH SOUNDS OF THE STANDARD DIALECT

2.0. INTRODUCTION

A speech sound has at least three stages available for investigation, namely, the production stage, the transmission stage and the perception stage.[28] In phonetic description we are primarily concerned with the production stage of speech sounds.

From the point of view of practical phonetics two types of speech sounds are usually distinguished - the consonant type and the vowel type. The distinction is based on certain phonetic criteria such as the articulatory and the acoustic properties characteristic of each class of sounds.

Consonants are most conveniently defined in terms of the articulatory movements of the speech organs, because it is relatively easy to determine these articulatory movements involved in the production of consonants. The vowels, on the other hand, are much more difficult to define purely on the basis of articulatory movements due to lack of physical contacts by the articulators during the production of most vowels. That is, unlike in most consonants, during the production of vowels the articulatory events constitute mainly approximations rather than real or positive contacts by the articulators. On the basis of the presence vs the absence of stricture during articulation, therefore, consonants have been traditionally distinguished from the vowels.

From the acoustic point of view, some consonant sounds have an essential noise component which results from an obstruction or constriction in the mouth, whereas vowel sounds have voice, resulting from resonance modulations in the vocal chambers. Sometimes the two classes of sound are distinguished on the basis of formant display on spectrograms.

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28. Gimson, A. C. 1970 (second edition). An Introduction to the Pronunciation of English. p. 27.

Judgements based on stricture alone, namely, the presence vs the absence of stricture during articulation, do not provide a fully adequate and decisive means of distinguishing the consonants from the vowels, in that the production of certain consonants is characterized, just as in the vowels, by the approximation of the articulators which allows more or less free passage of air from the mouth. Most approximants are produced with this type of articulation.

Some consonant sounds such as sonorants and liquids have formant or resonance bars on the spectrograms. The presence of formant bars on spectrograms, therefore, is not an exclusive acoustic property of the vowel sounds alone.

A more realistic method of distinguishing and classifying these two classes of speech sounds should take the articulatory as well as the acoustic properties of the speech sounds into account.

In the phonetic description of the vowels and the consonants presented in this work, data obtained through experimental methods are used whenever possible to supplement the descriptions of the articulatory events of the vocal organs. Samples of utterances from my own speech are chosen, experimentally illustrated and presented in the descriptions. In the experiments done for the present study we have used word palatograms as well as mingograms and spectrograms of utterances from my speech to illustrate vowel and consonant contrasts in the Standard dialect of Igbo. The materials are presented in two sections, the first section dealing with the vowel contrasts, the second section dealing with the consonant contrasts.

All the instrumental tests presented in this thesis were done through the help of Mr. Stone, the phonetic laboratory technician at the School of Oriental and African Studies. He prepared a cast of my palate (an artificial palate) and with this we were able to obtain clear and accurate tongue wipes made during my articulation of the sample words. This method has been referred to as 'false palate method' (Keller 1971).

After each utterance of the sample words, a photograph was made of the artificial palate showing the tongue wipe relevant for the articulation of the sound under investigation. In this way we were able to obtain the palatographic records of those sounds with tongue articulation in the Standard dialect. The palatographic information provided in this study is relevant only for those sounds that have tongue articulation. No palatograms are made for those sounds whose articulations do not involve tongue contact.

Sometimes in the discussions we shall refer to the artificial palate used for the tests as the 'test palate', i.e. when we want to differentiate it from my 'natural' palate.

It is necessary to clearly state from the start that in the word-palatogram-analysis used in our work, the intention is not to illustrate the allophonic patterns of the speech sounds of this dialect. Rather we intend to primarily and accurately establish the areas in the vocal tract where the given sounds (including their allophones) are articulated. In other words, we assume that all the allophones of a given speech sound in the Standard dialect are often articulated in the same 'region' of the vocal tract. For instance, all the allophones of /k/ or /g/ in Igbo are articulated in the velar region; similarly all the allophones of /t/ or /d/ in the language are articulated in the alveolar region etc.

To establish more accurately where a given sound is articulated, we have chosen to pronounce the sound (especially the consonant sound) in the environment of open vowels, usually in the environment of /a/, because the vowel articulation, it is hoped, would have minimal influence on the consonant articulation, i.e. from the point of view of tongue contact necessary for the consonant articulation.

For the phonetic description of the speech sounds of the Standard dialect we have used mingograms of words uttered in isolation. However, for the study of suprasegmentals such as tones, we have used mingograms of isolated words as well as of connected utterances consisting of a phrase, a sentence etc.

Voicing in speech sounds, as well as the flow of vibrating air from the mouth and the nose, whenever this happens during the articulation of the speech sound, are indicated in mingograms through the presence of striations on the graph. In our discussions on the mingograms obtained for the present study, we shall refer to these graphic representations as the larynx tracings, the mouth tracings and the nasal tracings respectively. Since voicing, as a significant distinctive feature, is a redundant feature for the vowel segments, the data from mingograms will be used in the present study, mainly for the description of the consonant sounds.

Mingograms give us certain acoustic information about the production of speech sounds; the type of information that cannot be obtained from palatograms. Some of the acoustic information which are accessible through mingograms include the following:

(i) how the air from the lungs escapes through the vocal exits;

(ii) the presence and/or the absence of voicing;

(iii) the pitch and

(iv) the duration of an utterance.

Through the mouth tracings on the mingograms we can obtain information about how the air from the lungs escapes from the mouth. Ladefoged (1964/1968) noted that one of the ways to determine and analyse the complex variables that characterize the articulation of certain consonant sounds in some African languages is through the measurement of air pressures in the mouth and pharyngeal cavities. Ladefoged (1968: 5)[29], for instance, pointed out that in the production of some consonant sounds in these African languages, series of air-stream mechanisms such as the pulmonic, the velaric and the glottalic airstream mechanisms are used. Sometimes two or more of these air-stream mechanisms interact in the production of a given consonant sound. To accurately describe such sounds produced in this manner, it would be necessary to define the interaction of the airstream mechanisms and how this influences the air pressures in the oral cavity.

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29. Ladefoged, Peter 1968 (second ed.) A Phonetic Study of West African Languages. p. 5.

Ladefoged shows how the information obtained from the air pressures can be used to account for the implosive and plosive contrasts which exist within certain consonant sounds in some West African languages.

Igbo language has two of the type of complex consonant sounds described in Ladefoged (1968) which would require, for the production of each of these consonants, the use of two types of airstream mechanisms. These consonant sounds include the /kp/ and the /gb/ consonants in Igbo. Since the instruments we used for the present study do not include those for measuring the air pressure in the pharynx cavity, we have relied mainly on the recordings of the air pressure from the mouth for the description of these consonant sounds in the Standard dialect. This is shown through the mouth tracings on the mingograms. Through this we hope to assess how the air flow from the mouth is accomplished, whether egressively or ingressively. This will help us to determine which of the consonant sounds in the Standard dialect are implosives or produced with an ingressive air flow.

Through the nasal tracings on the mingograms, i.e. tracings that indicate the flow of air through the nose, we are able to identify nasal sounds in the language. These are the sounds during the production of which air escapes through the nose. Such flow of air through the nose would be recorded on the mingogram.

The microphone placed near the larynx picks voice vibrations, whenever this occurs during the production of speech sounds. In this way we are able to identify voiced consonant sounds from the voiceless ones.

Pitch and frequency in utterances can also be studied from mingograms. On the mingograms, pitch and frequency are shown through the nature of the vertical striations, such as the length of the striations and how the striations are spaced relative to one another. The striations, for instance, tend to be closer together in high frequency and wider apart in low frequency. Similarly, in tone languages, the striations are longer in high tones and shorter in the low tones.

The modern instrumental techniques used in phonetic studies, especially those intended for the acoustic research of speech sounds, have been structured in such a way as to provide information about the space-time distribution of acoustic energy sources in speech. On the basis of this space-time relationships we are able to determine the time it takes to produce any given sound or group of sounds in the experiment, by quantifying the measurements.

Spectrograms were made of utterances of isolated words from Igbo. Information obtained from the spectrograms concerning the speech sounds is intended to support and validate the information obtained from the mingograms. Like the mingograms, spectrograms give visual effects of the acoustic properties of speech sounds. Those acoustic properties of speech illustrated through mingograms are also visually shown on spectrograms. Since some of these acoustic properties have been discussed in the mingograms, their repetition in the spectrograms will be treated mainly as corraborative evidence.

However spectrograms give certain information about consonants and vowel sounds which are not available through the mingograms or through palatograms. For instance, information about the noise components in some consonant articulations which cannot be illustrsted through mingograms or palatograms, is visually shown on spectrograms. Similarly, the formant bars characteristic of vowel sounds as well as of certain consonant sounds such as sonorants and liquids and which cannot be portrayed on mingograms are visually illustrated on spectrograms.

Spectrography constitutes one of the most advanced techniques for investigatimg speech sounds. A technique which has so far come closest to visually portraying the effects of the modulations which the speech organs make on speech sounds. Through spectrograms we are able to visualize how the physical transitions of the articulatory organs from one articulatory posture to another is reflected in the components of sounds produced during this physical process.

In phonetic studies this is referred to as transitions from one sound to another. The study of such transitions that occur between contiguous sounds within a word has revealed a rich source of phonetic information. First, we are able to see how different sounds influence one another when the sounds are combined. Secondly, we are able to correlate the articulatory properties (which are physical) with the acoustic elements of speech sounds. The knowledge obtained through this has enhanced our understanding and the analysis of speech sounds.

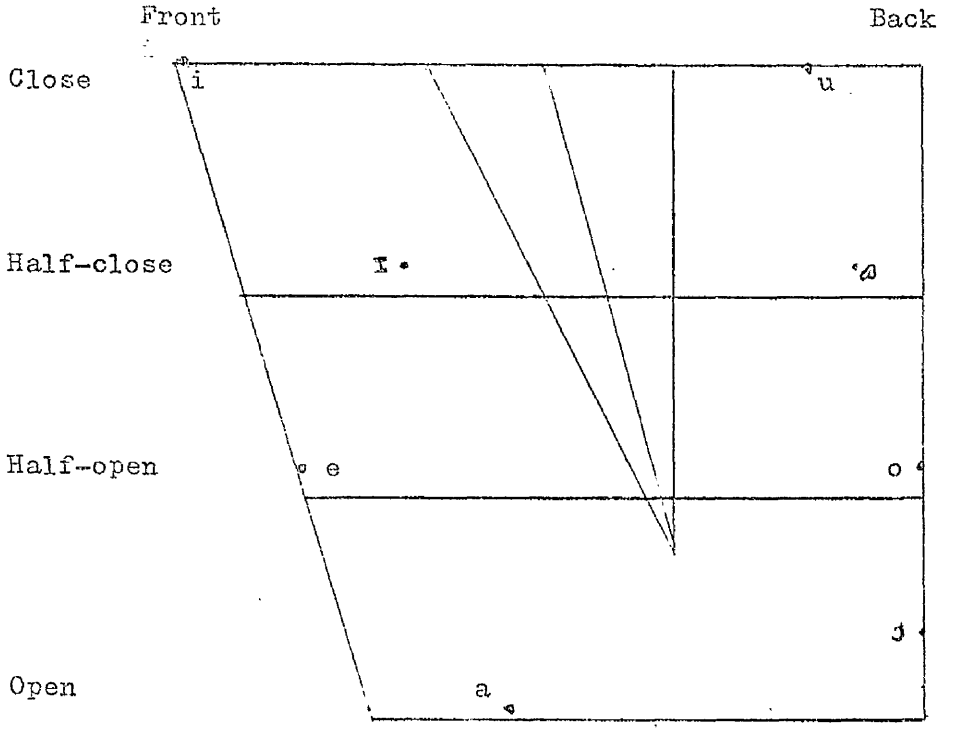
These extra information about speech sounds obtained through spectrographic tests of the speech sounds will be used in the description of the consonants and the vowel sounds of the Standard dialect.

The utterances used in the instrumental tests conducted for the present study are, to reiterate, those of my own speech. For the mingographic tests, however, we invited another speaker from the Mbaise dialect area, whose utterances were recorded on the mingograms and the results were compared with those of my utterances. The same samples of words from the language were used for both speakers. From the comparison of the recorded utterances of both speakers no notable differences were found between the two speakers. I have no speech defects and I am a native speaker of Igbo and a fluent speaker of the Standard dialect.

2.1. THE VOWELS

Igbo has eight phonemic vowels. The vowels are shown in the chart below. The chart represents an approximate plotting of the vowels on a cardinal vowel chart.

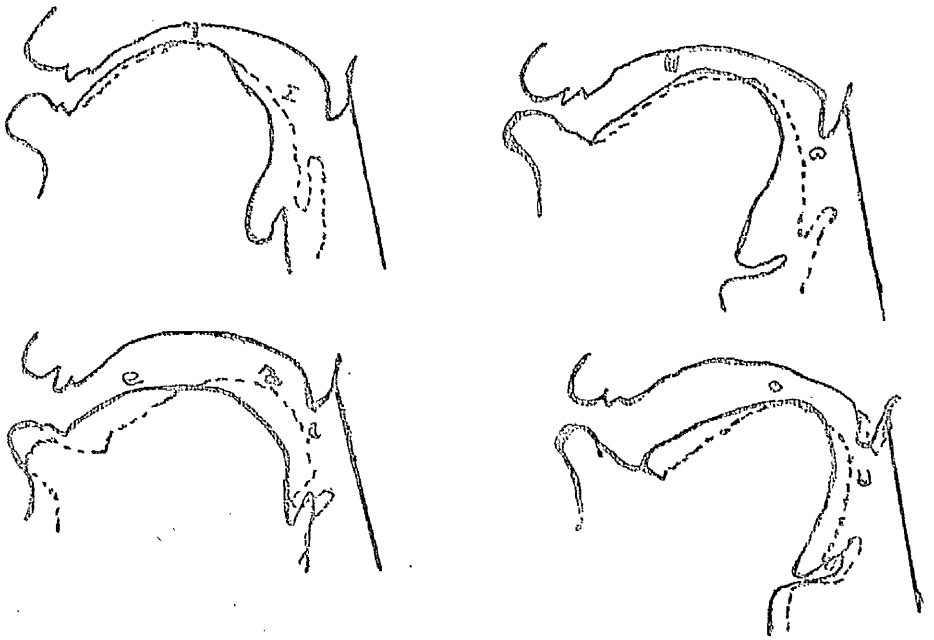
The Phonetic Vowel Chart



The eight phonemic vowels in the language are represented below using the official orthography.

	Front	Back
Close	i	u
Half-close	ị	ụ
Half-open	e	o
Open	a	ọ

The relative positions of the tongue for these vowels are shown in fig. 2.1. below. The diagrams have been modelled after Ladefoged (1968 : 38).[30]



30. Certain modifications on Ladefoged's diagrams are necessary These modifications concern the lip positions, especially the lip positions for [ɪ] articulation as well as for [ʊ] and [ɒ] and the open vowels. The lip position for [ɪ] is basically that of

The vowels illustrated in the vowel chart and in the diagrams are oral vowels. The oral vowels may have nasalized counterparts which are allophones in the Standard dialect and which maintain the same tongue positions as the oral vowels. Vowels may be nasalized in the Standard dialect when the vowels occur with nasal consonants, but as we pointed out earlier, nasalisation does not play significant phonemic role in the phonology of the Standard dialect.

2.1.1. THE DESCRIPTION OF THE VOWEL SEGMENTS [31]

[i] as in ísi, 'head', is a close front unrounded vowel. For the articulation of [i] the body of the tongue is raised towards the palate, with the root of the tongue in a 'forward position'[32] and the tip of the tongue touching the lower teeth ridge (i.e. of the lower jaw).

Palatogram 1 shows the position of the tongue for [i] articulation. The dark areas in the palatogram show the tongue wipe for [i]. The wipe occurs on both sides of the palate, starting from below the Lateral Incisor line and extends to the 4th molar line and beyond it. The wipe is widest at the 2nd molar line, i.e. at the central hard palate region, and thins down to about 11cm wide just below the 3rd molar line and around the 4th molar line.

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lip spreading, not necessarily accompanied by jaw opening. The lip positions for the open vowels are wider in our diagrams than in Ladefoged's. The lip positions for [u] and [ɑ] articulations in Igbo are the same. These modifications are based on my articulation of these vowel sounds.

31. Since I am a native speaker of this language, in the descriptions of the vowel and consonant segments presented here, I have relied on my own speech, i.e. the way I articulate these sounds.

32. The term 'forward position' is often used to describe the state or position of the root of the tongue in the articulation of some vowel sounds in the language. This is necessitated by the fact that the articulations of certain correlated but phonemically contrastive

All the vowels in this language are voiced sounds. This is clearly shown in the mingograms and spectrograms made of the vowel sounds. That is, all the mingograms and the spectrograms show voice tracings for all the vowel sounds investigated. The pitch recordings of the vowels as shown on the mingograms vary considerably since the pitch of a syllable in any given utterance is principally determined by the tone which that syllable carries in the utterance.

The individual vowel sounds are usually the product of the modulations of the voiced breath stream by the different sizes and shapes of the vocal cavities. Three main cavities are responsible for the modulations; these are the oral or mouth cavity, the pharyngeal or throat cavity and the nasal cavity. The nasal cavity is usually either completely or partially shut off from the pharyngeal cavity when we produce the vowel sounds. Since in the Standard dialect nasality in vowel sounds results from assimilation by the consonants that co-occur with the vowel, references will be made of this feature where necessary in the next section, where the consonant segments will be treated along with the vowels they combine with in the mingograms.

In the spectrograms we made of the vowel sounds, the vowels usually show from two to four resonance bars, with the front vowels showing more resonance bars which are clearly visible and well separated from one another and the back vowels showing less resonance bars, which, unlike those of the front vowels, are often not easy to separate from one another. In the latter, sometimes different resonance bars of a vowel are so close together that it is difficult to know where one ends and where the other begins.

The number and the position of the resonance bars for each vowel are related to the characteristic sizes and shapes of the vocal cavities used in producing the vowel.

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vowels in this language are characterized by the retraction of the tongue root (cf. Ladefoged 1968). Those vowels in the articulation of which this retraction of the tongue root does not occur are described as having forward tongue root position. The forward tongue root position for these vowels is in no way different from the position of the tongue root in the production of certain English

We made spectrograms of [i] both when this sound was pronounced in isolation and when it was combined with other sounds within a word. This method has been applied to all the vowel sounds investigated, and it has been helpful in determining the mean frequency values for the formants. The mean formant frequencies obtained from the spectrograms for [i] are given below in Hertz.

The frequency for F1 is 250 Hertz. The frequency for F2 is 2300 Hertz, and that for F3 is 3500 Hertz.

Spectrogram 1 made of [i] pronounced in isolation shows the formants of this vowel sound.

The space-time measurements for the vowel segments investigated, which represent the duration of these sounds and which were obtained from the mingograms and the spectrograms, will be given in the next section of this chapter, i.e. in 2.2. below, where the vowels will be treated mainly in conjunction with the consonants with which the vowels are combined in word utterances. In the section where word spectrograms are discussed, mention will also be made about the formant transitions. The principal objectives in the present section of our analysis are to establish the main formant frequencies for the vowel sounds investigated as well as to establish the main acoustic properties of these vowel sounds as illustrated from the tests.

[ɪ] as in ịsị̀, to say, ịfị̀, to wind, is a half-close unrounded front vowel. As in [i], [ɪ] is articulated by raising the body of the tongue towards the palate. However, the articulation of the latter, [ɪ], differs considerably from that of [i]. Similarly the articulation of [ɪ] in Igbo differs from that of [ɪ] in English, as in the words [sɪt], [dɪp]. For the articulation of [ɪ] in Igbo, as indicated above, the body of the tongue is raised towards the palate, and the tip of the tongue is touching the teeth ridge of the lower jaw. But instead of the tongue forming an even hump as in the articulation of [i], the front part of the tongue which is facing the mouth is 'energetically' pushed backwards from

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equivalents of these sounds such as in the production of [i:] as in deep, or see.

the front of the mouth. This affects the position of the tongue in two main ways. First, the tongue hump which almost touches the central region of the hard palate for [i] articulation is lowered in that position for [ɪ] . Secondly, as the front part of the tongue is pushed backwards from the front of the mouth, the root of the tongue is retracted towards the pharynx as shown in the diagram. The lips are spread for the [ɪ] articulation, i.e. the corners of the lips are drawn backwards.

From the above description it is clear how [ɪ] articulation differs from that of [i] , but not quite clear how the [ɪ] articulation in Igbo differs from that of the English [ɪ] as in [sɪt] . The main difference between the two lies primarily on the extent of retraction of the tongue root, and consequently on the degree of the tension on the tongue. Thus whereas both sounds have the same type of modifications on [i] articulation, for the English [ɪ] sound, the whole front part of the tongue, i.e. including the tip of the tongue, which is usually lifted from the floor of the mouth, tend to be drawn inwards; thereby exerting lesser tension on the tongue than for the Igbo [ɪ] sound. For the Igbo [ɪ] , the tip of the tongue stays flat on the teeth ridge of the lower jaw, almost the same position it assumes for the [i] sound. The result is that generally there is a greater tension on the tongue. On the whole, I should think that the main difference between the two sounds lies on the extent to which the root of the tongue is retracted towards the pharynx; this is greater for the Igbo [ɪ] than for the English equivalent of this sound.

Palatogram 2 made of the word fi[33] shows the tongue wipe relevant for [ɪ] articulation in Igbo. The tongue position described above for the [ɪ] articulation in Igbo is clearly illustrated by the tongue wipe in palatogram 2. Comparing the tongue wipe for [ɪ] in palatogram 2 with that of [i] in palatogram 1, we may note the following.

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33. For the palatograms of the vowel segments, we have chosen to combine the vowels with an [f] sound. Since no tongue contact is involved in the articulation of [f] , it makes it easy to identify the tongue wipe in the palatogram with the vowel that is combined the [f] .

(i) Unlike in palatogram 1, the tongue wipe on palatogram 2 starts well above the Lateral Incisor line, i.e. lower than the beginning of the tongue wipe for [i].

(ii) The widest wipe for [ɪ] occurs above the second molar line; that for [i] occurs along the second molar line.

(iii) It is important to note that the wipe for [ɪ] is very wide from the second molar line to the bottom of the palate. Between the 3rd and the 4th molar lines on the right side of the test palate, the wipe is 21cm wide, and 19cm in the same area on the left side of the palate. The width of the wipe in the same area for [i], as we noted, is 11cm. We also noted that the tongue wipe for [i] begins to thin down after the second molar line, whereas that for [ɪ] is broad from the second molar line to the bottom of the palate.

This most clearly illustrates the effects which the retraction of the tongue root has on the whole configuration of the position of the tongue in the mouth during the articulation of [ɪ].

Experimentally this supports the claim made by Ladefoged (1964/1968) that the main articulatory difference between those correlated vowels in Igbo, namely, between [i] and [ɪ], [u] and [ʊ], and between [o] and [ɔ] is not so much the tongue height, as had been previously maintained, but rather the fact that for [ɪ], [ʊ] and [ɔ] articulations the tongue root is retracted towards the pharynx, whereas for [i], [u] and [o] such active retraction of the tongue root is absent.

The articulatory difference between, for instance, [i] and [e] or between [u] and [o] in Igbo consists mainly in the differences between the tongue heights associated with one or the other of these vowels. This consists in the upward and downward movements of the lower jaw together with the body of the tongue. The articulatory difference between [i] and [ɪ] or between [u] and [ʊ], on the other hand, is much more than the upward/downward movements of the jaw and/or the body of the tongue. When, for instance,

one pronounces alternately [i] - [ɪ], [u] - [ʊ] in Igbo, one finds that the jaw position is basically the same for each pair, while the tongue is always drawn backwards for [ɪ] and [ʊ] as the back of the tongue is retracted backwards towards the pharynx. This movement of the tongue is never accompanied by any jaw opening, although as we indicated earlier, the retraction of the back of the tongue causes the hump formed by the tongue for [i] and [u] to be lowered for the latter vowel sounds, i.e. for [ɪ] and [ʊ].

Spectrogram 2 made of [ɪ], when this sound was pronounced in isolation, shows the formants of [ɪ]. From the spectrograms made of [ɪ] the following formant frequencies were obtained. The frequency of F1 is 500 Hertz; the frequency of F2 is 2225 Hertz, and the frequency of F3 is 3000 Hertz.

[e] [34] as in ífè, to worship, is a half-open unrounded front vowel. During the articulation of [e] the tongue is raised mid-way between the floor and the roof of the mouth and the jaw is half-open, more open than in [i] but less open than in [a]. The root of the tongue is not retracted in the production of [e].

Palatogram 3 shows the tongue wipe made during the articulation of [e]. The wipe occurs along the edges of the molars, on both the right and left sides of the palate. The wipes which occur laterally, starts from the Canine line of the palate and extends to the 4th molar line. The wipe is thin, not as broad as that for [i], and it is about 9cm wide at the 2nd and 3rd to the 4th molar lines. This shows that the tongue makes contact only with the edges of the molars.

Spectrogram 3 made of [e] pronounced in isolation, shows the formants of [e]. From the spectrograms made of this sound, we obtained the following formant frequencies. The frequency of F1 is 500 Hertz; that of F2 is 2000 Hertz, and the frequency of F3 is 3000 Hertz.

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34. Igbo has a phonetic [ɛ] sound as in ékè, python, ífe, thing. This sound also occurs in the Standard dialect. The phonetic [ɛ] in Igbo is an allophone of /e/ and it is phonemically written as /e/. In Igbo [ɛ] is a little more open than the [e] sound; the

[a] as in áka, hand, is an unrounded open front vowel. The jaw is open during the articulation of [a], much wider than for any other vowel in the language. The tongue lies on the floor of the mouth, almost the position it assumes during breathing. With some epeakers, the tip of the tongue may be raised from the jaw, though this does not introduce any difference in the [a] sound. Igbo has no back [a] sound.

During the articulation of [a] the root of the tongue is in a retracted position, though the tension resulting from the retraction is not as much felt as in [ɔ], [ɑ] or [ɪ]. This is due to the open position of the jaw which makes it easy for the back of the tongue to be pushed backwards to the pharynx without causing any muscular tension.

No palatograms were made for [a], [o], [ɔ], [u] and [ɑ], because during the articulation of these vowels the tongue does not make contact with the palate. If such contacts are possible with some speakers, they did not show in my articulations of these sounds.

Spectrogram 4 made of [a] pronounced in isolation shows the the formants of [a]. From this and the other spectrograms made of [a], the following formant frequencies were obtained. F1 has the frequency of 800 Hertz, F2 has 1500 Hertz and F3 has 2750 Hertz.

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lips are spread for the [ɛ] articulation in Igbo. Lip spreading is not present in [e] or in [a] articulations in the language. From the spectrogram made of the utterance ffe, thing, we obtained the following formant frequencies for the [ɛ] sound. The F1 for this sound has the frequency of 700 Hertz, F2 is around 2000 Hertz and the F3 of [ɛ] has the frequency of 2800 Hertz.

This description of [ɛ] given above helps to illustrate the phonetic properties of this sound in Igbo.

[o] as in ʃsð, to follow, is a half-open rounded back vowel. For the articulation of [o] , the tongue height is the same as in [e] . However for [o] unlike in [e] the back of the tongue is humped making the front part of the tongue to be drawn inwards. Irrespective of the humped state of the back of the tongue, the root of the tongue is not retracted towards the pharynx cavity during the articulation of [o] in Igbo. The lips are rounded during [o] articulation.

As stated above, no palatogram was made of [o] because no tongue contact is present during the articulation of this sound.

Spectrogram 5 was made of [o] when this sound was pronounced in isolation. It shows the formants of [o] . In the spectrograms we made of [o] when this vowel was pronounced in isolation, the first two formants are always so close together that it is difficult to know where one ends and where the other begins. We have therefore not relied on the measurements obtained from these isolated productions of [o] . The second formant of [o] is clearly shown in the spectrogram of the utterance - oyi - through the influence of the transition from the low hub of [o] to the y hub. The formant frequencies obtained from this spectrogram for the [o] sound (cf. spectrogram No.3b) and in relation to the other spectrograms made of this vowel are as follows. The frequency of F1 is about 500 Hertz, that of F2 is 1000 Hertz and the frequency of F3 is 2500 Hertz. The formant frequency of F3 for [o] , as can be seen, is nearly the same as that for the F2 of [i] .

The closing together of the first two formants of [o] is characteristic of back vowels.

[ɔ] as in ʃsɔ̄, to fear and avoid something, is an open rounded back vowel. During the articulation of [ɔ] the tongue is retracted towards the pharynx. The jaw opening for [ɔ] is wider than that for [o] . The lips are rounded for [ɔ] . Orthographically [ɔ] is represented as ọ.

Spectrogram 6 was made of [ɔ] when this vowel was uttered in isolation. The spectrogram shows the formants of [ɔ]. Similar to what have been stated about the formant display of [o] on the spectrograms, in those spectrograms we made of [ɔ] it is not easy to differentiate between the F1 and F2 because they always occur very close together, and the F3 in most cases is either very faint, hardly visible, or completely absent. For the estimated readings we could make of the formants of [ɔ] we had to rely a great deal on the formant transitions of [ɔ] when this vowel is combined with other sounds within a word. From such occurrence of [ɔ] the following formant frequencies were obtained: F1 600 - 700 Hertz, F2 100 - 1100 Hertz and F3 2200 - 2500 Hertz. The three formants were clearly distinguishable in the spectrogram of the word - ọ̀bị́bịá - from where we obtained the following frequency readings for the [ɔ]: F1 700 Hertz, F2 1200 Hertz and F3 2700 Hertz. Comparing this with the other readings we got from other spectrograms of the same vowel, we could see that the formants of [ɔ] in ọ̀bị́bịá have been greatly modified by the transitional influence of bị. The space between the F1 and F2 of the [ɔ] in this word-spectrogram was quite unlike all the other cases tested. On the whole we preferred the readings we got of the formants of [ɔ] in the spectrogram of the utterance ọ́nyà, where the formants of [ɔ] appear to be less influenced by the sounds that follow the [ɔ] sound. From the latter we obtained the following readings for the frequency values of the three formants of [ɔ] thus, F1 700 Hertz, F2 1000 Hertz and F3 2500 Hertz. We therefore prefer to use these latter readings for the formants of this vowel for the purpose of our description of this sound.

The closing together of the first two formants of this vowel, [ɔ], once more demonstrates that this vowel is a back vowel.

[ɷ] as in zụ, buy, is a half-close rounded vowel. For the articulation of [ɷ] the back of the tongue is humped as in [u] articulation. But unlike in the articulation of [u], the root of the tongue is retracted for [ɷ]. This causes the tongue hump to be lower in the [ɷ] than in the articulation of [u]. The lips are rounded in [ɷ] and the retraction of tongue root which is characteristic of this sound and which causes the tongue hump to be lowered, is not accompanied by jaw opening. That is, the same jaw positions are used for both the [u] and [ɷ] articulations. Orthographically [ɷ] is written as ụ in Igbo.

As already stated above, no palatogram was made of [ɷ] because in my articulation of this vowel no tongue contact was made.

Spectrogram 7 was made of [ɷ] when this vowel was pronounced in isolation. The spectrogram shows the formants of [ɷ]. The difficulties mentioned earlier with regard to the identification of the formants of [ɔ] are also present in the spectrograms made of [ɷ] and the same technique of trying to find out where the formants were more clearly indicated in the spectrograms have been followed. However it is much more difficult to distinguish between the F1 and F2 of [ɷ] from the spectrograms. The third formant of this vowel is usually not present in most of the spectrograms. The frequencies we obtained for the formants of this vowel are as follows: F1 is 300 Hertz, F2 is 800 Hertz and the frequency of F3 is 1700 Hertz.

The nature of the formant display of this vowel on spectrograms, namely, the closing together of the first two formants as well as the faintness or complete absence of the third formant, helps us to identify this vowel as a back vowel.

[u] as in zù, meet, is a close rounded back vowel. For the articulation of [u] the back of the tongue is raised towards the soft palate. The root of the tongue is not retracted. The lips are protruded and rounded.

In my articulation of [u] the tongue does not make any contact with the palate. Consequently no palatogram was made of this sound.

Spectrogram 8 was made of [u] when this vowel was pronounced in isolation. It shows the formants of this vowel sound. From the spectrograms made of [u] it is evident that like the other back vowels, the first two formants of [u] are close together. The first formant is on the baseline, just like that of [i]. The third formant is not visible in all the spectrograms made of [u], especially in those spectrograms where [u] is produced in isolation. However, from the spectrogram of the utterance uchu we estimated the location of the third formant of [u].

The formant frequencies obtained for [u] from the spectrograms are as follows: F1 is 300 Hertz, F2 is 900 Hertz and the frequency of F3 is 2300 Hertz.

The closeness of the F1 and F2 of [u] indicates that [u] is a back vowel, and the low frequency of the F1, which is located on the baseline, shows that [u] is a close vowel.

2.1.2. THE VOWEL FORMANTS

The ways that the formants of the individual vowels are patterned on spectrograms bear some correspondence to the ways in which the vocal cavities are modified through the displacements of or the positions assumed by the organs in and around the mouth during the vowel articulations. For instance, we find that close vowels have low frequency in the first formant. From our experiments we noted that the close vowels [i] and [u] have the lowest frequency values in F1, with 250 Hertz and 300 Hertz respectively. As the vowels progress in openness either within the front or the back series (i.e. from [i] to [a] through the front series and from [u] to [ɔ] through the back series) the frequency of the F1 for each vowel increases. The first formant, therefore, is inversely related to the vowel height.[35]

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35. cf. Ladefoged, P. 1975 p. 173.

In the same way the frequency of the second formant decreases as we procede from the front to the back vowels. For instance, the back vowels [u] and [ɔ] from our experiment have the lowest frequency for the second formant, with 900 Hertz and 800 Hertz respectively, while the front vowels [i] and [ɪ] have the highest frequency values for the second formant, with 2500 Hertz and 2300 Hertz respectively.

The formant frequncies for all the vowels we investigated are given below.

The Formant Frequencies of the Igbo Vowel Segments Expressed in Hertz

Vowel segments	F1	F2	F3
i	250	2300	3500
ɪ	500	2225	3000
e	500	2000	3000
ɛ	700	2000	2800
a	800	1500	2750
ɔ	700	1000	2500
o	500	1000	2500
ʊ	300	800	1700
u	500	900	2300

Igbo has no long or short vowels. Duration therefore does not play any distinctive role in the vowel or consonant contrasts in this language. For this reason we have not included the space-time measurements of these vowels in the analyses given above. Futhermore, since the spectrographic data we used in this section in describing the vowel segments were obtained sometimes from isolated productions of the vowels and sometimes from the production of the vowels in combination with other sounds, the space-time measurements of these vowels would not give us any consistent information with regard to the duration of these vowel segments.

The space-time measurements of the speech sounds of the Standard dialect which will be included in the discussions in the next section are meant only for the phonetic information relevant mainly to the time it takes to produce a given sound in relation to the other sounds in the combination. This will be necessary in that in the next section we will be dealing with mainly word-spectrograms, where the individual segments are produced and treated in conjunction with the other segments in the combination.

2.2 THE CONSONANTS

2.2.0. INTRODUCTION

In chapter 1 we discussed the various dialects that exist in Igbo, and gave some examples of phonemic alternations that occur among the dialects. The area in which the differences between the various dialects of Igbo are most clearly manifested is in the consonant systems of these dialects. Most of the differences that have been noted in the consonant systems of these dialects are not known to exist in the vowel systems. At least most of the dialects in the language operate on an eight-phonemic vowel system and the same type of phonemic alternations that are evident between the various consonant phonemes among the dialects are not known to exist within the vowel phonemes; the vowel harmony system is also the same in all the dialects.

Differences have been noted in the number of the consonant phonemes that are used in the different dialects of Igbo. Armstrong (1967)[36], for instance, noted from his comparative study of five dialects of Igbo that 'the Onitsha dialect has less than half as many consonants as any of the three Eastern dialects.'[37] The figures given by Armstrong for the four Eastern dialects investigated are Ọlụ 64 consonants; Owerri 60 consonants; Ọhụhụ 55 consonants and Onitsha 28 consonants. Each of the four dialects has 8 phonemic vowels, and the system of vowel harmony is the same for the four dialects.

While we admit to the differences in the number of the consonant phonemes that are used in these dialects, the figures given by Armstrong cannot be accepted as accurate. Some of the consonant phonemes he distinguished for some of the dialects do not have phonemic contrasts in the sound systems of those dialects. Of particular reference are the palatalized consonants as well as the labialized and nasalized stops which Armstrong distinguished in some of the dialects.

Igbo, that is, including all the dialects of Igbo, has two palatal consonants, namely, [ɲ] and [ʃ], and few labialized consonants, viz, [ʷ], [gʷ], [kʷ], [ɲʷ]. For these consonants palatalization and/or labialization constitute significant element in the way the consonants are articulated. That is, palatalization and/or labialization in these consonants are both phonetically and phonemically significant. Palatalization and/or labialization in other consonants than the ones indicated above are predictable phonetic features which result from the influence of the vowel that occurs after the consonant. For instance, when a close front vowel [i] or [ɪ] occurs after a consonant, the consonant tends to be palatalized, and when a back rounded vowel occurs after a consonant, there is a natural tendency for the consonant to be rounded.

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36. Armstrong, R. G. 1967. A Comparative Wordlist of Five Igbo Dialects. Ibadan University Press, Ibadan.

37. opus cit. p. 4.

Armstrong (1967) distinguished the following palatalized consonants, namely, by, bhy, py, phy, dy, ry, fy, etc. and some labialized consonants such as mw, hw, ɣw etc as phonemes in some of the dialects he investigated. The main reason for this comes from the fact that y or w glide is sometimes perceived in certain words where such consonants as b, p, d, r, etc are followed by two consecutive vowels, and the first vowel in the sequence is a close vowel, either i, ɪ , u, or ʌ as in the following words - bịá, pịá, rịá, fió, mụọ́, hụọ́, kuó etc. The palatalization and/or the labialization which result from these cases are contextually determined. Consequently the consonant segments that are palatalized or labialized under the influence of the vowels with which they are combined should be treated as allophones of their non palatalized or labialized counterparts, and not as separate phonemes.

Generally, the disparity in the number of consonant phonemes in the Igbo dialects can be explained by the fact that in the southern dialects, such as the Ọlụ, the Owerri, the Ọhụhụ dialects, aspiration and nasalization often play distinctive roles in the sound systems of these dialects, whereas in the Onitsha and other northern dialects, consonant phonemes are not contrasted through these features. Strictly speaking, the Onitsha dialects have 26 consonant phonemes, while the other southern dialects have, in addition to the 26 consonants used in the Onitsha dialects, the aspirated and/or nasalized counterparts of some of these consonants. Furthermore, it is also true that some of the southern dialects aspirate and nasalize more consonants than the other dialects. That is, within the southern dialects, one dialect may have more aspirated and/or nasalized consonants than the other dialect. For instance, in the Ọlụ dialects more consonants are aspirated and nasalized than in the other southern dialects, and the Owerri dialects have comparatively more aspirated and nasalized consonants than the Ụmụahịa or the Ọhụhụ dialects; and as one moves towards the Okigwe-Mbano dialects, located in the northern part of the southern dialect areas, aspiration and nasalization become greatly reduced and less number of consonants become aspirated and/or nasalized. Further north to the Onitsha dialect areas, aspiration and nasalization are completely lost.

2.2.1. THE CONSONANT SYSTEM OF THE STANDARD DIALECT

A phonetic and/or phonological analysis of the speech sounds of any of the southern dialects, where aspiration and nasalization play significant roles in the phonology, would include these features in the general descriptive framework. However, since as we mentioned earlier in chapter 1, in the Standard dialect, which we intend to describe, aspiration and nasalization do not play significant roles in the phonology, we will restrict our phonetic description only to those consonant sounds and features relevant in this dialect.

A phonetic chart of the consonant phonemes of the Standard dialect is given below. The consonants are classified according to their Place and Manner of articulation.

Phonetic Chart of the Consonants of the Standard Dialect

Manner \ Place	Bilabial	Labio-dental	Alveolar	Alveo-palatal	Palatal	Velar	Labial-velar	Velarized labial	Labialized velar	Glottal
STOPS									kw	
Plosives	p b		t d			k g	kp		gw	
Implosives								gb		
Affricates				tʃ dʒ						
NASALS	m̀		n		ɲ	ŋ			ŋʷ	
FRICATIVES		f v	s z	ʃ ʒ		ɣ				h
LATERAL			l							
ROLL			r							
APPROXIMANTS					y				w	

The description of consonant articulations in the Standard dialect will be treated here under the following headings:

(i) airstream mechanism

(ii) plosive consonants

(iii) implosive consonants

(iv) affricates

(v) nasals

(vi) fricatives

(vii) lateral

(viii) tap/roll

(ix) approximants.

Data from palatograms, mingograms and spectrograms are used, where necessary, to support the descriptions.

Palatograms provide us with information relevant for determining the place of articulation with respect to those consonants articulated with the tongue. On the basis of the information we obtain from palatograms we are able to note that certain consonants are articulated with the tip of the tongue (i.e. apical), some consonants are articulated with the blade of the tongue (i.e. laminal), and some consonants are articulated with the body of the tongue (i.e. dorsal). Alveolar consonants are generally apical, sibilants are laminal, and palato-alveolars, palatals and velar consonants are mostly dorsal. Most dorsal consonant articulations in the Standard dialect are characterized by 'tip-down' tongue position, i.e. the tip of the tongue is generally touching the teeth ridge of the lower jaw, while the body of the tongue is raised, making contact with the palato-alveolar, the hard palate or the velum as the case may be.

Using the different tongue articulations described above we can classify the consonants of the Standard dialect as follows.

Consonants without tongue artic.	Consonants with tongue articulation		
these are mainly labial consonants such as: p, b, f, v, m,	Apical	Laminal	Dorsal
	t, d, n, l, r	s, z, ʃ, ʒ	(i) Front and/or central body of the tongue: tʃ, dʒ, j (y), ɲ
			(ii) back of the tongue: k, g, ŋ, kp, kw, gw, ŋw, ɣ
	—		(iii) with back of the tongue raised but not touching the velum: gb

As already indicated above, in the phonetic description of the consonants presented here references will be made to the palatograms (where this is relevant), spectrograms and the mingograms made of the respective sound during our investigation. Information acquired through these experimental techniques will be useful for a more detailed description of the consonant sounds of the Standard dialect. This will help us to accurately define the articulatory and acoustic properties of these sounds in the manner indicated in 2.0. above.

2.2.2. AIRSTREAM MECHANISM

There are three principal methods of moving air to form speech sounds, namely, the pulmonic airstream mechanism, in which the air in the lungs is moved (usually outwards) by the action of the respiratory muscles; the glottalic airstream mechanism, in which the air in the pharynx is moved inwards or outwards by the movement

upwards and downwards of the closed glottis; the velaric airstream mechanism, in which the air in the mouth is moved (usually inwards) by the movement (usually backwards) of the point of contact between the raised back of the tongue and the roof of the mouth.[38]

From his phonetic study of some West African languages, Ladefoged (1964/68) has noted that in the production of certain complex speech sounds in these languages all the three airstream mechanisms are used. He observed, for instance, that "in some sounds two mechanisms are used simultaneously; and occasionally all the three mechanisms function in the production of a single sound. ..... The glottalic airstream mechanism is not used in the well known European languages (except as a stylistic variant); but in West African languages it is involved in the production of two kinds of sounds: ejectives, in which the closed glottis moves rapidly upwards and compresses the air behind an articulatory closure; and implosives, in which there is a downward movement of the vibrating glottis, which tends to cause a lowering of the pressure behind the oral closure.[39]

Most of the speech sounds in Igbo are produced with the pulmonic airstream mechanism. However there are certain sounds in Igbo, such as the implosives, in the production of which at least two of the airstream mechanisms mentioned above are used. Two such sounds in the language, namely, gb and kp, were particularly discussed in Ladefoged 1964/68. Both kp and gb are known to occur in other West African languages, but as Ladefoged showed, it does not necessarily imply that the articulations of these sounds in these languages are identical. In some languages these sounds are articulated with slight modifications in the kinds and nature of the airstream mechanisms used. In our description of the consonant sounds of the Standard dialect, especially in the description of kp and gb, we will attempt to correlate the articulatory movements involved in the production of these two sounds as well as the airstream mechanisms with the data obtained from the instrumental tests, notably from the mingograms made of these sounds.

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38. Ladefoged, P. 1968, 2nd edition, A phonetic study of West African languages. p. 5.

39. Ladefoged, P. opus cit. p. 5.

2.2.3. PLOSIVE CONSONANTS

Plosive consonants are produced with a complete closure formed at some point in the vocal tract, accompanied by a velic closure. Pressure is built up by the air from the lungs behind the point of closure and the pressure is released abruptly by a sudden separation of the articulators. At the time of release the air may explode egressively, i.e. outwards from the mouth, or ingressively, i.e. moves inwards into the mouth. Usually in phonetic description of speech sounds ingressive air plosion is associated with implosives or ingressive consonants, while egressive plosion of the airstream is associated with plosive or egressive consonants.

Most plosive consonants are oral consonants, in the sense that their articulations are often accompanied with velic closure. When a complete oral closure is not accompanied by a velic closure, i.e. the passage through the nose is left open and air is allowed to escape through the nose, the consonant so produced is a nasal consonant.

Plosive consonants may be voiced, i.e. the vocal cord is vibrating, or voiceless, i.e. the vocal cord is not vibrating during the articulation of the consonant. It often happens that a voiceless consonant has a voiced counterpart (though not vice versa), and both the voiced consonants and their voiceless counterparts form cognate pairs. Each pair has identical place of articulation but differs only through the fact that one member is voiced while the other is voiceless.

On mingograms voicing in consonants is shown on the larynx tracings by a wave form while voiceless consonants are characterized by the absence of such wave forms. On spectrograms voicing is shown by the dark bar immediately above the base line, and is referred to as the 'voice bar'. In the analysis, we shall refer to such consonants as having voice bars. Voicelessness in consonants, as well as in the articulation of other sounds, is indicated on the spectrograms by the absence of the'voice bar'.

Plosive consonant articulation is usually characterized on the spectrograms by the presence of a "stop gap", i.e. a blank space on the spectrographic pattern, as well as sometimes by the presence of a "spike fill". The stop gap occurs above the base line and it marks the period when the breath is blocked through the complete closure of the vocal tract occurring somewhere in the mouth, i.e. the period during which a complete closure is made by the articulators and the breath pressure is allowed to build up behind the articulators. The "stop gap" on the spectrograms therefore provides us with certain information about consonant articulation such as that

(i) the vocal tract is completely closed, and

(ii) a relative sequence of time is required, representing the period during which the closure was made. On the basis of this we are able to estimate through the space-time measurements of the gaps, the time it takes to produce a given consonant sound. The stop gaps are shorter in fast speech and longer in slow speech.

Apart from the plosive consonants, all stop consonants have "stop gaps" with or without spike fills. Spike fills represent the fricative modulation present in the articulation of certain consonants. The spike fill is much narrower and sharper for the voiced consonant than for the voiceless consonant.

[p̤] , as in p̤pā, to carry, is a voiceless bilabial plosive. For the articulation of this sound, a complete closure is formed by the lips accompanied by a velic closure. The air pressure in the mouth is released with plosion by an abrupt separation of the articulators. The vocal cords are not vibrating during the articulation of [p̤] . The lips are spread for [p̤] if this sound is followed by a close front vowel (eg. pi, p̤i).

No tongue articulation is involved in the production of [p̤] consequently no palatogram was made of this sound.

Mingogram 1 was made of the utterance p̤pa. The larynx line on the mingogram has no wave forms for the [p̤] articulation.

This indicates that [p] is a voiceless consonant. The mouth tracings for the [p] show that the release of [p] is characterized by a forceful puff of breath which escapes through the mouth. This is indicated by the sharp rise in the mouth tracings at the point of the release of [p]. The duration of [p] in the mingogram is 15 milliseconds.

Spectrogram 9 is of the utterance ṗāpā. It has a stop gap for the [p] and no voice bar for the duration of the stop. This indicates that the [p] is a voiceless stop. The duration of [p] in the spectrogram is 15 milliseconds, the same as that obtained from the mingogram. The duration of the vowels that occur with [p] of the word ṗapa is as follows: [ɪ] has the duration of 13 milliseconds, and [a] has the duration of 20 milliseconds.

The following formant transitions are shown in the spectrogram for ṗapa. Because the locus of [p] is near the base line the transitional influence on the first formant of [ɪ] is very minimal, especially in terms of transitional curvature ; the only transitional influence being that the formant bar of the F1 of [ɪ] is thicker towards the point of closure for [p] . Both the F2, F3 and F4 of [ɪ] are all curved downwards to the closure of [p] . The transitional influence of [p] is greater on [a] , the vowel that occurs after the [p] . Because of the locus of [p] , which is near the base line, the F1 of [a] curves upwards from the release of [p] , from the frequency range of 500 Hertz, to its steady state which is around the frequency of 800 Hertz. The transitional influence on the F2 of [a] is not as prominen-t as on the F1 or the F3 of [a] . The F2 of [a] curves upwards from the point of release of [p], from the frequency of 1350 Hertz to the steady state of 1500 Hertz. The most dramatic transitional influence occurs on the F3 of [a] which assumes a steady rise (a gradient) from the frequency range of 1800 Hertz at the point of release of [p] to around 3000 Hertz. The overall transitional influence on all the vowel formants both before and after the [p] is one of curving either downwards

to the locus of [p] (for the close front vowel that precedes the [p]) or upwards from the locus of [p] (for the open front vowel that occurs after the [p]).

[b] as in ẹbà, to enter, is a voiced bilabial plosive. [b] is the voiced cognate of [p], i.e. it is articulated like [p] except for the fact that [b] is voiced.

No palatogram was made for [b] because the production of [b] does not involve any tongue contact.

Mingogram 2 was made of the utterance ẹbà. The larynx line on the mingogram has tracings of wave forms, which indicates that the vocal cords are vibrating during the articulation of [b]. That is, the [b] in the utterance is voiced. In the mouth tracings for the [b] in the mingogram wave forms are present during the closure for [b] which further confirms that this sound is voiced, and the release of [b] is characterized by a sharp rise in the mouth tracing, thus indicating that the sound is released with a forceful puff of air as a result of the plosive-consonant closure characteristic of this sound. The duration of [b] in the mingogram is 13 msecs., which is shorter than that of [p] in mingogram 1, and comparatively both the [ɪ] and [a] of ẹbà have shorter duration than their counterparts in ẹpa in mingogram 1. The duration of the [ɪ] and [a] of ẹbà in mingogram 2 is 13 msecs. and 18 milli-seconds respectively, and that for the [ɪ] and [a] of ẹpā is 16 msecs. and 21 msecs. respectively.

Spectrogram 10, made of the utterance ẹbà, has a stop gap for the [b] closure and a voice bar for the duration of the closure. This shows that [b] is a voiced stop. The duration of [b] in the spectrogram is 13 msecs, the same duration as in the mingogram. The duration of the vowels that occur with [b] in ẹbà is 13 msecs for [ɪ] and 21 msecs for [a].

The vowel formant transitions in the spectrogram are as follows. As in [p] the locus of [b] is near the baseline. Consequently

similar formant transitions that occurred in ɟpā (cf. spectrogram 9) are present in spectrogram 10 of ɟbà. The first formant of [ɪ] does not curve upwards or downwards but the formant bar gets thicker towards the [b] closure. Also as in spectrogram 9, of ɟpā, the formant bars of F2, F3 and F4 of [ɪ] in ɟbà all curve downwards, and the F3 almost joins with the F2 at the point of transition to the [b] closure. The transitional influence on the [ɪ] of ɟbà is much more clearly shown on the spectrogram than that on the [ɪ] of ɟpa in spectrogram 9. The formant bars of the [a] of ɟbà fade away more quickly towards the end than those of [a] of ɟpā. This could be due to the fact that the [a] of ɟbà was produced on a low pitch while the [a] of ɟpā was produced on a high pitch. Note, for instance, that the [a] in ɟbà has a low tone whereas the [a] in ɟpā has a downstep. Consequently the formant transitions of the final vowel of ɟbà in spectrogram 10 are not clearly indicated, except for the fact that the F1 of the [a] prominently curves upwards from near the baseline, from the frequency range of 600 Hertz, to the steady state of 800 Hertz. The F2 of [a] shows little or no curvature from the release of [b] and it is for most of the time on a steady frequency of 1500 Hertz. The F3 which shows no curvature at the release of [b] curves upwards near the end towards the F4, thus forming an egg-shape form with the F4. This type of transitional effect is also illustrated in the spectrogram for ɟpā where the F3 of [a] curves upwards towards the F4 of the same vowel, and we can notice the same type of transition regarding the final vowel in spectrogram 13, made of the utterance ɟúkà. This rounding of the ends of formant bars 3 and 4 of the final a's is determined by the movements of the articulators, in this case the back of the tongue, which moves from its position for the consonant segments [p] and [b] upwards towards the velum.

[t] as in àtá, chewing, is a voiceless alveolar plosive. For the articulation of [t] the tip of the tongue forms a complete closure at the alveolar, accompanied by a velic closure. The air from the lungs is released with plosion by an abrupt separation of the articulators. [t] is apical, articulated with the tip of the tongue.

Palatogram 4 made of the word àtá shows the tongue position for [t], since the vowels that occurred with [t] in the word have no tongue contact. The tongue wipe for [t] occurs along both sides of the palate, closing up at the Lateral Incisor. The wipe is 13cm or half an inch wide. The curvature of the wipe, at the point where the tongue forms a complete closure with the palate, tends to tilt more towards the right side of the palate; it starts from the lateral incisor line at the right end of the palate and curves down to the Canine line at the left side of the palate. Consequently the wipe at the right end of the curvature is 1.5cm wider. Compare this with the wipe in palatogram 5 where the same thing can be observed for the [d]. This may be a personal trait in my articulation of these sounds.

From personal observations from my articulations of [t] or [d], these sounds are not dental, rather I articulate them often further back in the alveolar region than the wipes in palatograms 4 and 5 would indicate.

Mingogram 3 was made of the utterance ɟtā, to chew,. It would be necessary to note that the vowels used with the respective consonant sounds investigated for the present study may not be always the same for the mingograms, spectrograms and the palatograms. This is due to certain reasons; the main reason, of course, concerns the objectives of the test. Thus from the palatograms we intend to obtain information about the tongue articulation or tongue contact present in the articulation. We are therefore constrained in this regard to use open vowels with the respective consonant sounds, because the vowel articulation, in this case, would not affect the

the consonant articulation, in terms of tongue contact. For the mingograms and the spectrograms we are more free to use any word that contains the consonant we want to investigate. The objectives of these latter tests are to obtain information regarding the acoustic properties of these sounds and the choice of the vowels to occur with the consonant, in this case, should not be unnecessarily restricted.

In the mingogram made of the utterance, ítā, the larynx line has no wave forms during the closure for [t] . This shows that the vocal cords are not vibrating, and consequently this sound is voiceless. Similarly in the graph representing the mouth tracings no wave form is present during the closure for [t] . The release of [t] is marked by a very forceful egress of air from the mouth; this is indicated by a sharp rise in the mouth tracing at the point of [t] release. The duration of [t] in the mingogram is 18 msecs, and that of the co-occurring vowels in the word is 16 msecs for the [ɪ] and 28 msecs for the [a] .

Spectrogram 11 was made of the utterance ûte, mat,. The [t] in the spectrogram has a stop gap for the [t] closure and no voice bar during the closure. This indicates that [t] is a voiceless stop. The release phase of [t] in the spectrogram is marked by a relatively broad spike fill, of about 2cm wide, thereby confirming the information already obtained through the mingogram to the effect that the [t] is released with a forceful puff of air.

The duration of [t] in the spectrogram is 18 msecs the same as that obtained through the mingogram. The duration of the vowels that occur with [t] in the word is 17 msecs for the [u] and 24 msecs for the [e] .

The hub of [t] is located towards the centre of the pattern. Consequently the second formant of [u] curves upwards just before the closure for [t] ; no transitional influence is shown on the F1 of [u] which is on the baseline. The first formant of [e] , the vowel that occurs after the [t] , is thicker towards the release of [t] , otherwise no apparent transitional curvature is shown

in the first and second formants of [e]. The F3 of [e] curves slightly upwards from the release of [t], thereby indicating a transition from a lower frequency band to the steady state of the vowel.

[d] as in áda, fall (n), is a voiced alveolar plosive. It is the voiced cognate of [t], i.e. articulated like [t], except that [d] is voiced while [t] is voiceless. [d] is apical, articulated with the tip of the tongue.

Palatogram 5 was made of áda. It shows the position of the tongue for [d] articulation. As in palatogram 4, the tongue wipe for [d] occurs on both sides of the palate, closing up at the Lateral Incisor, below the Frontal Incisor. The width of the wipe at the molars is 11cm, and the wipe at the front part of the palate, where the tongue makes complete closure, is similar to that described for [t] above.

Mingogram 4 was made of the utterance ídē, to write,. The larynx line in the mingogram has wave forms during the closure for [d], which means that the vocal cords are vibrating during the production of [d]. The mouth tracings in the mingogram also show wave forms during the closure for [d], indicating that this sound is voiced. The sharp rise in the mouth tracing at the point of release for the [d] shows that the release of [d] is exploded. The rise in the oral tracing at the point of release is not as high as that observed for [t] in mingogram 3. The duration of [d] in the mingogram is 14 msecs, which is shorter than that of the surrounding vowels which are 15 msecs and 24 msecs for [i] and [e] respectively.

Spectrogram 12 was made of the utterance ùdé, pomade,. It has a stop gap, representing the closure for [d], together with a voice bar for the duration of the closure. This indicates that [d] is a voiced stop. The release of [d] in the spectrogram is marked by a narrow spike fill. The duration of [d] in the spectrogram is 14 msecs, the same as that obtained through

the mingogram. The duration of the vowels that occur with [d] in the word is 14 centiseconds for [u] and 24 centiseconds for [e].

The formant transitions in spectrogram 12, of ùdé, are more or less the same as in spectrogram 11, of úte. The hub of [d] is towards the centre of the pattern. The second formant bar of [u] which has very light shadings in the spectrogram curves upwards to the closure of [d]. The first formant of [u] does not curve, i.e. it is on a steady frequency band throughout the duration of [u]. As in spectrogram 11, the first formant of [e] has a slight curve upwards from the release of [d]. However, unlike in the spectrogram of úte, the second formant of [e] in spectrogram 12, of ùdé, curves upwards from the release of [d], from a lower frequency band of 1800 Hertz to the steady state of 2000 Hertz. The third formant of [e] also curves upwards from the release of [d]. The tonal influence on the formant bars of [e] is much more clearly indicated in spectrogram 12. Thus it can be clearly observed that both the F2 and F3 of [e] after curving upwards from the release of [d] and reaching the steady state of the vowel, curve upwards at the end due to the high tone on [e].

[k] as in ọ́kà, maize, is a voiceless velar plosive. For the articulation of [k] the back of the tongue makes a complete closure with the soft palate. This is accompanied by a velic closure. The stricture is released with a plosion by the abrupt separation of the articulators.

Palatogram 6 was made of the word ọ́kà. It shows the tongue wipe for [k]. The wipe starts from below the second molar line on both sides of the test palate and curves downwards, forming an arch-shaped wipe at the 4th molar line. This illustrates the closure formed by the back of the tongue against the soft palate. The width of the wipe at the bottom outline of the test palate is 6cm.

Mingogram 5 made of the word áka, hand, has no wave forms in the larynx line during the closure for [k], that is, the vocal cords are not vibrating during the production of [k]. Similarly there

are no wave forms in the mouth line during the closure for [k]. Mingogram 5, like the other mingograms made of this sound, shows that [k] is aspirated. This is indicated in the mingogram by the pattern at the release of [k]. Note, for instance, the peak in the intensity line at the point of the [k] release. This marks the presence and the duration of aspiration in this sound. Furthermore the aspirated release of [k] is clearly shown in the tracings on the larynx line. From this it can be clearly seen that there was some lapse of time, of about 2 msecs, from the release of [k] to the commencement of voicing in the vowel that follows [k]. The duration of [k] including the aspiration period, in the mingogram is 18 msecs. The vowels that occur with [k] have the duration of 18 msecs for the initial [a] and 20 msecs for the final [a].

Spectrogram 13 was made of the utterance ụ́kà, church,. In the spectrogram there is a stop gap during the [k] closure, and there is no voice bar for the duration of the closure, i.e. [k] is a voiceless stop. Towards the end of the stop gap for the [k] there is a comparatively broad spike fill which is 3cm wide, i.e. wider than that observed for [t] above and indeed the spike fill for [k] is wider than in any of the consonant sounds investigated. This once more confirms the observation made earlier from the mingogram regarding the release phase of [k]. The duration of the plosion that characterizes the [k] release, which is represented by the spike fill in the spectrogram, is 2.3 msecs.

Aspiration in these consonant sounds, to reiterate, is considered here only in so far that it is relevant in the phonetic description of the consonant sounds; in the Standard dialect of Igbo aspiration has no phonemic implication in the phonology.

The formant transitions of the vowels that occur with [k] in the spectrogram are clearly indicated in the pattern. Some of the resonance bars of the initial [a], notably the lower and the topmost resonance bars, representing the F1, F2, and the F4 of [a], continue well into the closure for [k]. A close look at the spectrograms

made of [ɑ] would appear to show that the lower formant bars of this vowel usually are longer than the 3rd and sometimes the 4th formant bars. Compare, for instance, spectrogram 7, made of [ɑ] produced in isolation, and the pattern of [ɑ] in spectrogram 14, of ụ́gụ̄. In assessing the formant transitions of the initial vowel of ụ́kà in spectrogram 13 we shall disregard the sharp rise in the shadings of the lower formant bars, this appears to be a mechanical error in the recording. The first two formants of [ɑ] are not affected by the formant transition, they are on steady frequency of the vowel. The third formant of [ɑ] curves downwards to the closure for [k], while the 4th and the 5th formants both curve upwards to the [k] closure. The F1 of [a], the vowel that occurs after [k], curves upwards from the release of [k]; the second formant of [a] has a slight curve downwards from the [k] release. The third formant of [a] curves downwards from the release of [k] and then curves upwards towards the F4, making an egg-shape form with the F4. This latter transitional pattern of [a], as Potter (1947) pointed out, is characteristic of the transitional influence of back consonants on the [a] sound when it follows the back consonant. Potter also observed that k and g are variable sounds in that their hub often shifts depending upon the sound (i.e. the vowel) with which they are combined. Thus the hub of k and g are located near the top of the pattern when these consonant sounds are combined with front vowels, notably [i] and [e], towards the baseline when they are combined with back vowels, and towards the middle of the pattern with mid-vowels.[40] In spectrogram 13, of ụ́kà, [k] is combined with an initial back vowel and a final open front vowel (which would be considered as a mid-vowel in Potter's sense). The above observations by Potter regarding the variability of the hubs of the back (velar) consonants will be useful in evaluating the transitional influence which the velar consonants have on the vowels that occur with the consonants. In spectrogram 13, of ụ́kà, we have seen how [k] influenced the formants of the co-occurring vowels. The hub of [k] in the spectrogram is towards the centre of the pattern, near the second formant of [a].

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40. Potter, K. et al., 1947. Visible Speech. p. 96.

[g] as in ágā, needle, is a voiced velar plosive. [g] is the voiced cognate of [k], articulated like [k] but differs from the latter by the fact that [g] is voiced while [k] is voiceless.

Palatogram 7 was made of the word ágā. It shows the tongue wipe for [g]. The tongue wipe for [g] is similar to that made for [k] (cf palat. 6). The wipe for [g] occurs on both sides of the palate starting from below the first molar line and curves in the characteristic arch-shaped manner at the bottom of the test palate. The wipe is 7cm wide along the curvature at the soft palate region, i.e. wider than that made for [k] at the same area. Comparing the wipes for [k] and [g] in palatograms 6 and 7 respectively, we note that the wipe for [g] is wider than that for [k] by one centimeter, and the former starts higher in the palate than the wipe for [k].

Mingogram 6 made of the word ágū, leopard, has wave forms in the larynx line during the closure for [g]. Wave forms are also shown in the mouth tracings during the closure for [g]. All this shows that [g] is a voiced consonant sound. An interesting point about the mingogram of [g] is the type of oral closure formed for [g]. It can be clearly seen from the mouth tracings in the mingogram that the closure for [g] is achieved in a gradual manner, and more importantly, the release of [g] is made as soon as the closure is completed. In other words, unlike most of the consonants we investigated, where the closure is sustained for some time before the release, the release of [g] starts as soon as the articulators make a complete closure. Consequently the oral tracing for [g], representing the closure for this sound, descends in a gradient manner and rises as soon as the lowest point in the closure is reached. From our tests, other voiced velar consonants, especially [gw], [g], and [gʷ] are typified by this kind of closure-release relationship. As a result of the unsustained nature of the closure for these consonant sounds, their release is usually not marked by forceful puff of air from the mouth. The mouth tracings in the mingograms representing the release periods of these consonants clearly justify this.

The duration of [g] in the mingogram is 14 milliseconds. The vowels that occur with [g] in the mingogram have the duration of 18 milliseconds for [a] and 24 milliseconds for [ɔ].

Spectrogram 14 was made of the word ụ́gụ̄ , spinach,. In the spectrogram there is a stop gap during the closure for [g] , and a voice bar during the duration of the closure. This indicates that [g] is a voiced stop. At the end of the stop gap there is a narrow spike fill. The duration of [g] in the spectrogram is 13 milliseconds and that for the vowels that occur with [g] is 15 milliseconds for the initial [ɔ] and 25 milliseconds for the final [ɔ] .

The formant transitions of the vowels in spectrogram 14, with respect to the initial vowel, are the same as those observed in spectrogram 13. However the formant bars in spectrogram 14, especially of the higher formants, have very light shadings and they tend to die off before or after the consonant, [g], . This happens more with the formants of the final vowel in the spectrogram. As a result of this the formant transitions are not clearly illustrated in the spectrogram. The third formant of the initial vowel of ụ́gụ̄ curves downwards to the closure of [g] while the 4th formant curves upwards to the closure of [g] . Similar transitional influence, though in the reverse directions, appear to take place in the formants of the final vowel. However, because the formant bars, i.e. apart from those of the first two formants, fade away towards the release of the consonant, it is relatively difficult to assess the transitional influence of the fromants. It can however be noticed that the third formant of the final [ɔ] tends to curve upwards from the release of [g] and the 4th formant curves downwards from the [g] release.

[kw] as in ákwà, cloth, is a voiceless labialized velar plosive. [kw] is a double articulated consonant, in the sense that the production of this sound requires two strictures being formed simultaneously and the strictures are also released simultaneously. For the

articulation of [kw] two simultaneous strictures are formed, namely, the stricture for [k] and lip rounding (i.e. a stricture of complete closure formed by the back of the tongue against the soft palate and an approximant stricture formed by the two lips) all of which are accompanied by velic closure. The breath pressure which builds up behind the velar closure is released with plosion by the abrupt separation of the articulators.

In the previous descriptions of this sound, notably Elugbe (1969), Williamson (1972) and in other places, [kw] has been treated as a complex sound which involves two successive strictures with successive release. Elugbe (1969:4,6,8) treats labialization in [kw] as an exponent of underlying [u] or [ɔ], so that an underlying $\begin{cases} CuV \\ C\text{ɔ}V \end{cases}$ is realised as CwV.

We disagree with the description of [kw] as presented in Elugbe (1969). On the basis of how [kw] is produced in the Standard dialect of Igbo, the description of [kw] presented by Elugbe cannot be accepted as accurate. In the first place, it is necessary to differentiate between the w glide which is usually heard at the point of vowel hiatus where the first vowel is [u] or [ɔ], and the w which is co-articulated with certain consonant sounds in some West African languages and with which these consonants are treated as constituting one unit of phoneme in these languages. As Ladefoged (1968:11) correctly observed, "twelve of the thirty-seven languages which have kp also have kw; and in at least eight of these languages consonantal sequences involving w only occur with velar consonants, so that in these languages the labialized velars are unit phonemes on a par with the labial velars."

In the Standard dialect, as well as in most of the dialects of Igbo, labialized velars are treated differently from a sequence of sounds involving a consonant followed by two vowels, the first of which is a back vowel.

Phonemically, as Ladefoged pointed out, labialized velars in Igbo, such as kw, gw, ŋw, are each treated as a unit of phoneme,

which contrasts with the other consonant phonemes in the language. For example,

15.

áka	hand
ákwa	cry (n.)
kụ́a	knock (narrative aspect)
á kụ́a	if it is knocked
gá	walk
gwá	tell
gụ́a	count, read
ágū̩	leopard
ágụ̄ụ̄	hunger
ágwù	bad spirit
á ŋ ū̩	bee
á ŋ wū̩	sun
ánụ	meat etc.

In Igbo a sequence that involves a consonant followed by two vowels, the first of which is a back vowel, is treated as consisting of three units of phoneme. In the following examples those words where this sequence of sounds occurs are contrasted with the words where labialized velars are used.

16.

(a)		(b)	
nwá	child	nụ́a	marry
nwé	own	núe	keep as a pet
nwò	change	núo	swallow
kwé	agree	kúe	scoop
kwá	sew	kụ́a	knock
gwọ́	cure	gụ́ọ	count, read etc.

In the above examples, the words in the (a) series consist each of two units of phoneme, while the words in the (b) series consist

each of three units of phoneme.

The labialized velar in Igbo, i.e. the consonant phoneme where labialization plays a significant role in the way the consonant is articulated, is a complex sound which involves simultaneous articulation in the manner described above for [kw] . The contextually labialized consonant, i.e. a consonant followed by two vowels the first of which is a back vowel, u or ɑ - C{u/ɑ} V - where the consonant is articulated with lip rounding arising from the influence of the co-occurring back vowel and where a [w] glide is sometimes heard at the point of the vowel hiatus, is usually produced as two successive sounds, namely, the respective consonant sound followed by a [w] , but never as one unit of sound or with simultaneous articulation. So that an item that has this sequence should be more accurately transcribed phonetically as C$^{\partial}$wV, not as CwV. Sometimes the [w] glide may not be perceived in the pronunciation, and the sequence is perceived simply as CVV.

Spectrograms 15 (a) - (c) were made of ákụ, ákụa and ákwa respectively and spectrograms 16 (a) - (c) are of ị́gū, ágụọ and ágwọ respectively, representing in each case the series of a simple velar consonant, a velar consonant followed by two vowels the first of which is a close back vowel and a labialized velar. Following the claim made by Elugbe (1969) about the labialized velars it would be expected that the patterns of kụ́a and kwá or gụ́ọ and gwọ́ in the spectrograms would be identical since each of the pairs would be realised in the same way.

Comparing the patterns of the velar consonant series in spectrograms 15 (a) - (c), representing [k] , [k] in the environment of CɑV and [kw] , we note that (i) all the consonant sounds in the spectrograms have stop gaps with no voice bars for the duration of the consonant closures. The k sounds in ákụ and ákụa have broad spike fills. This as we observed earlier characterizes the aspirated release of the k sounds in the utterances. [kw] in ákwa has no spike fill.

The duration of [k] in ákụ is 16 milliseconds and that of [k] in ákụa is 18 milliseconds. The duration of [kw] in ákwa is 12 milliseconds.

(ii) The duration of the initial vowels is identical for the three words; each has 22 milliseconds. The duration of the final vowels is identical for both ákụ and ákwa, each having 22 milliseconds, while the duration of the final vowels of ákụa is 30 milliseconds, i.e. 8 milliseconds longer than the former.

From the patterns of the k sounds and the kw sound in the spectrograms it is clearly evident that the two k sounds were articulated in identical manner, and that the articulation of kw differs from those of the k sounds in the series. Comparing the duration of the final vowels in the pattern for ákụa with that of the final vowel of ákwa in spectrogram 15 (c), it becomes evident that a CuV sequence is different from a CwV in the language. The CuV is produced and perceived as a sequence consisting of three units of phoneme, i.e. a consonant phoneme followed by two vowels (or at least by a long vowel), whereas a CwV is produced and perceived as a sequende consisting of two units of phoneme - a consonant phoneme followed by a vowel. In the pattern for ákụa, for instance, the spectrogram of ụ is clearly distinct from that of the vowel that follows it, i.e. [a], the duration of ụ in the combination being 10 milliseconds. In the pattern for ákwa however, no distinct or separate spectrogram of [ʌ] sound can be distinguished in the spectrogram of the final vowel.

Perhaps the most convincing evidence from the spectrograms come from the formant transitions in the patterns. We shall concentrate for the moment on the differences between the formant transitions in the patterns of ákụa and ákwa. Note, for instance, that the formant transitions of the initial vowels are different in the two patterns. In the pattern of ákụa only the second formant of the initial [a] curves downwards to the [k] closure, while the first formant of the same vowel is on a steady frequency throughout the duration of the vowel, i.e. does not curve (because the hub of the k is on the same frequency as the F1 of the initial [a] of ákụa).

In the pattern of ákwa both the first and the second formants of the initial [a] curve downwards towards the hub of kw which is located just above the baseline. The second formant almost joins to the first formant at the point of the kw closure.

The formants of the final vowels of ákụa are little influenced by the transitional influence of [k] due to the locus of the k hub in the pattern. The formants of the final vowel of ákwa, on the other hand, are very prominently influenced by the [kw]. Here the second formant of the final [a] is not only very close to the first formant of the same vowel but joins to the latter at the point of the kw release, both curving upwards from the release.

The differences noted above in the formant transitions of the vowels as illustrated in the patterns of ákụa and ákwa are very clearly shown in the patterns of ágụọ and ágwọ (cf spectrograms 16 (b) and (c)).

Evidence from spectrograms 16 (a) - (c) strongly confirms the observations made above regarding the velar consonant series in spectrograms 15 (a) - (c). Note that as in the patterns for the [k]s and [kw] in spectrograms 15 (a) - (c), the duration of the labialized velar, [gw], in spectrogram 16 (c) is comparatively shorter than that of the [g]s in spectrograms 16 (a) and (b). The duration of [g] in ị́gụ̄ is 12 milli-seconds, that of [g] in ágụọ is 14 milliseconds and the duration of gw in ágwọ is 10 milliseconds. It can also be observed that in both series of the velar consonants, the duration of the velar consonant that occurs in the environment of CuV is comparatively longer than that of the other consonants in the series,

Similar to what was observed in spectrograms 15 (a) - (c), the duration of the final vowels of ágụọ (cf spectrog. 16 (b)) is much longer than that of the final vowels of ị́gụ̄ and ágwọ. The duration of the final vowel of ị́gụ̄ is 25 milliseconds, that of the final vowels of ágụọ is 30 milliseconds and the duration of the final vowel of ágwọ is 23 milliseconds.

We shall conclude this discussion by noting that both from the evidence obtained from these experiments described above as well as from personal observations it is undoubtedly clear that a velar consonant which is followed by two vowels the first of which is a close back vowel, is both phonetically and phonemically different from a labialized velar consonant in Igbo. The latter, as we have shown above, is treated as a unit of phoneme like any other consonant phoneme in Igbo. The labialization which is present in the articulation of the labialized velar consonant constitutes a significant factor in the way the consonant is produced. The lip rounding which results from the influence of a close back vowel when this occurs after a consonant , or the w glide which results from the sequence of a close back vowel that is immediately followed by another vowel, is treated as secondary but not as the primary features in the production of such consonants. To treat labialization in the labialized velar consonants in this way would be highly inadequate and misleading.

Palatogram 8 made of the word ákwà shows the tongue wipe for [kw] . The wipe is characteristic of velar plosive consonant articulation, which usually involves complete closure being formed by the back of the tongue against the soft palate. As in the wipe for [k] , that for [kw] starts from below the second molar line, occurring on both sides of the palate, and ends with an arch-shaped wipe along the bottom of the test palate. The width of the wipe at the bottom outline of the test palate is 3cm, i.e. narrower than that for [k] or [g] in palatograms 7 and 6 respectively.

Mingogram 7 made of ákwà, cloth, has no wave forms in the larynx line during the closure for [kw] . This indicates that the vocal cords are not vibrating during the production of [kw]. There is no wave forms in the mouth tracing during the closure for [kw]. Similar to what was observed in mingogram 5 of [k] we can see from the patterns on the mingogram of [kw] at the point of the release of this sound that the [kw] was aspirated. Both the larynx tracings and the intensity representations in the mingogram clearly illustrate this.

The duration of [kw] in the mingogram is 14 milliseconds. The duration of the vowels that occur with [kw] is 18 milliseconds for the initial [a] and 26 milliseconds for the final [a].

Spectrograms 17 (a) - (c) were made of the words ákwa, cry, íkwē, to agree and ụ́kwụ, leg. In all the three spectrograms [kw] has stop gap and no voice bar during the closure for this consonant. The release of [kw] is marked by a relatively broad spike with little or no spike fill. The duration of [kw] in ákwà and íkwē is 14 milliseconds and of [kw] in ụ́kwụ is 13 milli-seconds. The duration of the vowels that occur in the utterances is as follows: the initial vowel of ákwa has the duration of 16 milli-seconds and the duration of the final [a] is 25 milli-seconds. [i] in íkwē has the duration of 12 milli-seconds and the [e] has the duration of 24 milliseconds. The initial vowel of ụ́kwụ has the duration of 13 milliseconds while the final vowel of this word has the duration of 20 milliseconds.

The formant transitions of the vowels vary in all the three spectrograms. In the spectrogram of ákwa we note that the F1 and F2 of the initial [a] are close and both curve downwards towards the baseline to the closure of [kw]. The F1 joins to the baseline at the closure. The F3 appears to be least affected by the transition, though it curves slightly downwards to the closure of [kw]. The F4 makes a prominent curve upwards to the closure of [kw]. The first two formants of the final [a] of ákwa curve upwards from near the baseline at the release of [kw], the second formant joining to the first formant towards the point of the consonant release. The egg-shape influence which [k] and [g] usually have on the 3rd and 4th formants of the final [a] vowel is not present in the pattern of ákwa. This appears to support the fact that though [kw] and [gw] are usually treated like k and g as velar consonants, the former are articulated in a more forward position in the palate than the latter. On the whole, the formant transitions in the spectrogram of ákwa are identical to those shown in spectrogram 15 (c) which has been discussed above.

Comparing the formant transitions in the spectrogram of ákwa with those shown in the spectrograms of ụ́kwụ and íkwē we shall note the following. In the spectrogram of ụ́kwụ very little transitional influence is shown on the formants of the vowels, except that the third formant of the first vowel tends to curve downwards to the closure of [kw] . In the spectrogram of íkwē we can see how the formants of [e] have been prominently influenced by the transition. The second formant of [e] for instance, curves from a very low frequency band of about 900 Hertz to the steady state at 2000 Hertz from the release of [kw]. Generally we can observe that formants on a low frequency band, such as the first formant of [i] or the first two formants of ụ, are not affected by the transition. This is because the hub of [kw] is near the baseline. It is important to note that spectrograms 17 (a) - (c) made of ákwa, íkwē and ụ́kwụ respectively clearly demonstrate that the hub of [kw] is always constant irrespective of the vowel that is combined with this consonant. In these spectrograms the hub of [kw] is identical in all the patterns despite the fact that [kw] was combined with both front and back vowels. Compare this with the [k] hubs in spectrograms 15 (a) and (b) where the hub of [k] shifts depending on the vowel that occurs after the k.

[gw] as in àgwa, beans, is a voiced labialized velar plosive. [gw] is the voiced cognate of [kw], articulated like [kw] but differs from it by the fact that [gw] is voiced while [kw] is voiceless. The arguments given above in respect of [kw] articulation and for the treatment of [kw] as one unit of phoneme are also relevant for [gw], and indeed for all labialized velar consonants in the Standard dialect.

Palatogram 9 made of the word àgwa shows the tongue wipe for [gw]. The tongue wipe for [gw] is similar to that for [kw] , with the same narrow arch-shaped wipe along the outline of the bottom end of the palate. The wipe for [gw] occurs on both sides of the palate, starting from below the second molar line and curves in an arch-shaped form at the bottom of the palate. The wipe is 9cm wide along the molars and 5cm wide along the curvature at the

soft palate region. The tongue wipe of [gw] shows, among other things, that [gw] is a velar consonant and that a complete closure was made during the production of [gw] by the back of the tongue against the soft palate.

Mingogram 8 made of the word àgwa has wave forms in the larynx line during the closure for [gw] , i.e. the vocal cords were vibrating during the production of [gw]. Wave forms are also present in the mouth tracings during the closure for [gw]. [gw] is not aspirated. The duration of [gw] in the mingogram is 17 milli-seconds. The duration of the vowels that occur with [gw] is 18 milli-seconds for the initial [a] and 24 milli-seconds for the final [a] .

Spectrograms 18 (a) - (c) were made of the words ágwa, ígwē, and ágwù. In all the patterns of [gw] in the spectrograms there is a stop gap and voice bar during the closure for this consonant. The release of [gw] in the spectrograms is very much like that of [kw] in spectrograms 17 (a) - (c), with spikes and very light spike fills at the bottom and towards the top of the patterns. The duration of [gw] in the spectrograms is 12 milliseconds in ágwa and ígwē and 15 milli-seconds in ágwù. The duration of the initial vowels in the spectrograms is identical - 15 milliseconds each, and that of the final vowels is 23 milliseconds for the final vowels of ágwa and ígwē and 17 milliseconds for the final vowel of ágwù.

The formant transitions of the vowels in the patterns of ágwa and ígwē are very similar to those shown in the patterns of ákwa and íkwē in spectrograms 17 (a) and (b). Comparing the formant transitions of the [a] that occurs initially in the patterns, i.e. before the labialized velar plosives (cf. spectrograms 17 (a), 18 (a) and (c)), we note that the [a]s have similar formant transitions, namely, both the F1 and the F2 curve downwards towards the baseline, to the closure for the consonant; the F1 almost touching the baseline. F3 does not show any curvature upwards or downwards, and F4 curves upwards to the closure of the consonant. The formant transitions of the final [a] of ágwa are the same as those described for ákwa above.

The formant transitions of [i] and [e] of ígwē in spectrogram 18 (b) are the same as those shown in spectrogram 17 (b) of íkwē. The F1 of [i] which is near the baseline is not affected by the transitional influence of [gw] . The F2 tends to curve upwards to the closure of [gw]. The transitional influence on the final vowel of ígwē is the same as that described above for the [e] of íkwē. The F1 of [e] which is on a low frequency band at the release of gw/kw, a little above the baseline, curves upwards from there (from a frequency of about 250 Hertz) to the normal frequency of the vowel which is about 700 Hertz. The F2 of [e] starts from a low frequency band of about 900 Hertz at the release of gw/kw and curves upwards to the normal state of the vowel which is about 2000 Hertz. Both the F3 and F4 of [e] curve downwards from a higher frequency band at the release of gw/kw.

Only the lower formants of [ɔ] of ágwụ̀ are shown in the spectrogram of this word (spectrogram 18 (c)) and these have no transitional curves. The hub of gw is located towards the baseline, hence most of the vowel formants curve towards this locus.

2.2.4. THE INGRESSIVE/ IMPLOSIVE CONSONANTS

Implosive consonants are produced with ingressive glottalic airstream. "In the production of implosives, the downward moving larynx is not usually completely closed. The air in the lungs is still being pushed out, and some of it passes between the vocal cords, keeping them in motion so that the sound is voiced."[41]

Igbo has two consonant sounds that are produced with ingressive airstream. These are reprented as kp and gb in the local orthography. In the previous descriptions of the consonant sounds of Igbo, both sounds, kp and gb, are usually classified as implosives. To some phoneticians, especially those who have attempted to describe the Igbo consonant sounds, ingression and implosion are treated as synonymous, one implying the other.

In his phonetic study of some West African languages Ladefoged (1964/68) gave a detailed description of kp and gb. These two

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41. Ladefoged, P. 1975. A Course in Phonetics. p. 116.

sounds which are produced with ingressive airstream are known to occur in most of the languges studied by Ladefoged. He notes, for instance, "the bilabial implosive ɓ which occurs in Igbo (and is spelt "gb" in the local orthography) was investigated in the pronunciation of speakers of three different dialects. ... All three dialects were found to be essentially the same from this point of view. Recordings of the pressure of the air in the mouth showed that when reading short sentences and word lists the pressure was seldom (8 per cent of the time)negative. ... The articulatory movements of all the three speakers were investigated with the aid of cine-radiology. The results indicated that ɓ was velarized as well as usually involving lowering of the glottis"[42]

Ladefoged's research confirms, therefore, that gb in Igbo is an implosive sound. The research has also shown (as further eloaborated in Ladefoged 1975) that implosives are usually voiced consonants, and more importantly, that a consonant sound can be ingressive without necessarily being an implosive sound. This latter view is particularly relevant to the kp in Igbo which is an ingressive but not an implosive consonant.

[kp] as in àkpa, bag, is a voiceless labial velar plosive consonant. [kp] is a double articulated consonant, the articulation of which involves two simultaneous strictures of complete closure, viz, a velar stricture as in [k] which is accompanied by a bilabial stricture as in [p], both strictures being formed simultaneously. The strictures occur with velic closure.

The two strictures for [kp] maintain different degrees of air pressure. A strong air pressure is built up behind the velar stricture formed by the back of the tongue against the soft palate, while the air pressure behind the bilabial closure is comparatively low. The overall picture of the strictures with the accompanying air pressures is, the back of the tongue is firmly held against the soft palate because of the strong air pressure behind the velar closure, which is usually much stronger than that for the [k] or [g]

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42. Ladefoged, P. 1968 (second edition) pp. 6 - 7.

articulation, and the air in the mouth is drawn inwards, as it were, to help check the pressure behind the velar closure.

The release phase is characterized by complex articulatory movements. First there is a downward movement of the velum which causes the velar stricture to be released and the closure by the lips is released more or less simultaneously. When both closures are released the air flows into the mouth from two directions - the air in the mouth moves inwards (in a suction manner) while the air from the lungs which has been compressed behind the velar closure moves outwards.

During the release of [kp] the back of the tongue separates from the palate with an audible "click" sound which together with similar "pop-like" sound made during the separation of the inwardly and tightly drawn lips can be clearly perceived as a "pop" sound. The sound made by the tongue separating from the palate can be perceived at about 50msecs or less before the "pop" sound by the lips. This appears to suggest that (i) the velar closure is released first before the lip closure, though the time difference is infinitesimal, (the release of the lip closure is delayed for a split of a second to momentarily check the flow of the air in the mouth, which initially moves ingressively) and (ii) that the suction air-flow inwards occurs before the egressive pulmonic airstream (the air behind the velar closure). This shows that though [kp] is produced with an ingressive airstream, this is not an implosive sound, i.e. taking into account the fact that as a result of the complex mechanism of the release of the strictures and the movements of air in the mouth, the airstream moves both inwards and outwards from the mouth. This is well illustrated in the mingograms of [kp] which will be discussed later.

Palatogram 10 made of the word àkpa shows the tongue wipe for [kp]. [kp] has the characteristic tongue wipe of velar consonants. The wipe for [kp] is similar to that for [k] (cf. palatogram 6), but the [kp] wipe starts a little higher than that for [k]. The [kp] wipe starts from the first molar line on both sides of the palate, making the usual arch-shaped wipe at the bottom of the

palate. The wipe is 8cm wide at the bottom outline of the test palate.

Mingograms 9 (a) - (c) were made of the words àkpa, ákpụ, and íkpù respectively. In all the mingograms there is no wave forms in the larynx line or the mouth tracings during the closure for [kp], that is, the vocal cords are not vibrating during the production of this sound. The release of [kp] is marked in the mingograms by a downward dive or curve in the mouth tracing at the initial point of the release and this is followed by a rise in the mouth tracing. This indicates the initial ingressive flow of air which is immediately followed by a plosive egress of air from the lungs during the release of [kp]. Compare this pattern of mouth tracings at the release of [kp] with that at the release of [gb] (which is an implosive consonant) in mingogram 10. Note that at the release of [gb] the mouth tracing does not rise but rather stays below the baseline throughout the release.

The duration of [kp] in the mingograms is 18 milliseconds in àkpa as well as in ákpụ and in íkpù it has the duration of 14 milliseconds. The duration of the vowels that occur with [kp] is as follows: the initial [a] of àkpa has the duration of 20 milliseconds while the final [a] is 27 milliseconds. The [a] of ákpụ has the duration of 18 milliseconds and the ụ is 29 milliseconds. The duration of [i] of íkpù is 15 milliseconds and the duration of u is 18 milliseconds.

Spectrogram 19 made of the word àkpa has stop gap and no voice bar during the closure for [kp]. The release of [kp] in the spectrogram is marked by a spike and spike fill. This illustrates the aspirated release of this consonant. The duration of the [kp] in the spectrogram is 13 milliseconds. The vowels that occur with [kp] have the duration of 15 milliseconds for the initial vowel and 20 milliseconds for the final vowel.

The influence of [kp] on the surrounding vowels is shown through the formant transitions of the vowel in the spectrogram. The F1 of the initial vowel of àkpa curves downwards towards the baseline

to the [kp] closure. The second formant of this vowel is least influenced by the transition. The third formant curves downwards to the closure of [kp] from its normal frequency of 3000 Hertz to 2500 Hertz at the closure. Both the F1 and F2 of the final vowel curve upwards from a low frequency band at the release of [kp] to their normal frequencies. The F3 and F4 of the final [a] sound form an egg shaped pattern indicating that [kp] is a back consonant.

The overall transitional influence on the vowels that occur with [kp] is very illustrative of the complex nature of the [kp] articulation. Thus the bilabial p has its locus near the lower section of the pattern, i.e. near the baseline, whereas the transitional influence of the back consonant, k, on the final [a] sound results into the egg shaped form by the F3 and F4 of [a]. Note that this egg shape form by the F3 and F4 of the final [a] sound is not present in the pattern of àgba in spectrogram 20. This is so because, as we shall see later, there is no velar closure in the [gb] articulation in Igbo.

[gb] as in àgba, ụ̀ạ̀w, is a voiced velarized bilabial implosive. The production of [gb] in Igbo has been partly described in Ladefoged (1968:6) which is reiterated above.

For the articulation of [gb] in Igbo a bilabial closure is formed as in [b] , and the back of the tongue is raised towards the soft palate, but not making any contact with the palate. As in [kp] articulation, during the production of [gb] the oral air pressure is drawn inwards towards the pharynx cavity and the lips held tightly together and also drawn inwards as in [kp] articulation. The larynx is lowered and the pharyngeal cavity is enlarged. There is velic closure as well.

The overall effect of these articulatory 'postures' is that, as Ladefoged observed, the air pressure in the mouth is much lower than that in the pharyngeal cavity, and with the continuous vibration of the glottis throughout the articulation, "when the articulatory closure is released, there is neither an explosive nor, in a literal

sense, an implosive action. Instead, the peculiar quality of the sound arises from the complex changes in the shape of the vocal tract and in the vibratory pattern of the vocal cords"[43]

Palatogram 11 was made of the word àgba. There is no tongue wipe in the palatogram; this indicates that the back of the tongue does not make any closure with the soft palate. Compare this with palatogram 10 , with the tongue wipe for [kp]. This, in a way, illustrates the articulatory difference between [kp] and [gb] in Igbo. In some West African languages such as Yoruba where this sound occurs, [gb] is articulated in the same manner as [kp] , with identical double articulatory closures, except that [gb] is voiced while [kp] is voiceless. In languages such as these [gb] constitutes the voiced cognate of [kp].

Mingogram 10 was made of the word àgba. It has wave forms in the larynx line as well as in the mouth line during the closure of [gb] , this indicates that the vocal cords are vibrating during the production of [gb]. It is evident from the mouth tracings in the mingogram at the release of [gb] that the oral air pressure during the release of this consonant was low, hence the mouth tracings are low, below the baseline, throughout the release period, and continued to be low for the greater part of the vowel that follows [gb].

The duration of [gb] in the mingogram is 18 milliseconds. The duration of the vowels that occur with [gb] in the word is 18 milliseconds for the initial vowel and 20 milliseconds for the final vowel.

Spectrogram 20 made of the word àgba has stop gap and voice bar during the closure for [gb], indicating that this is a voiced stop. The duration of [gb] in the spectrogram is 12 milliseconds. The duration of the vowels that occur with gb is 14 milliseconds for the initial [a] and 17 milliseconds for the final [a].

The formant transitions of the vowels in the spectrogram show the influence of [gb] on the surrounding vowels. As in spectrogram 19, of àkpa, the F1 of the initial [a] curves downwards towards the

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43. Ladefoged, P. 1975. A Course in Phonetics, p. 116.

baseline to the closure of [gb]. However, unlike in the spectrogram of àkpa, the second formant of the initial [a] also curves downwards to the closure of [gb]. The third formant of this vowel curves downwards, though not as prominently as the same formant of the initial vowel of àkpa (cf. spectrogram 19), to the [gb] closure. The formant transitions of the final vowel of àgba are similar to those of the final vowels of àkpa, except that the F3 and the F4 do not form an egg shape pattern. The F4 of the final vowel of àgba is least affected by the transition, i.e. it does not curve from the release of [gb]. The hub of [gb] is located towards the baseline, i.e. similar to that of [b].

From the foregone discussions it is clear that we do not consider [kp] in Igbo as an implosive consonant. This consonant, as indicated above is produced with an ingressive airstream though the consonant is plosive in the end. Apart from the evidence from the mingograms we have arrived at our conclusion about this sound through the conventional basic practice of placing the palm at the front of the mouth when either [kp] or [gb] is pronounced. By placing the palm in front of the mouth while pronouncing these consonant sounds we feel the puff of breath escaping from the mouth during the pronunciation of [kp] whereas no puff of breath is felt during the pronunciation of [gb]. Basically this confirms our views about these consonant sounds in Igbo, namely, that [gb] in Igbo is implosive while [kp] is ingressive but plosive.

2.2.5. AFFRICATES

From phonetic point of view affricates are speech sounds that consist of complex articulatory events such as a stop articulation followed by a fricative articulation. Phonemically, however, an affricate constitutes one unit of phoneme.

Igbo has two affricates, namely, [tʃ] and [dʒ] ; orthographically they are represented as ch and j respectively.

[tʃ] as in ọchá, white, clean, is a voiceless post-alveolar affricate. For the articulation of [tʃ] the central body of the tongue is raised to the palate making a complete closure at the post-alveolar region of the palate. This is accompanied by velic closure.

During the release of [tʃ] the air is moved as for [t] articulation, but instead of a tip-of-the-tongue plosive release, a constricted delayed plosion with the tongue in the position for [ʃ] results. In this sense we can think of [tʃ] articulation as a [ʃ] articulation superimposed on [t] articulation, resulting into an empeded plosion.

Palatogram 12 made of the word ọchá shows the tongue wipe for [tʃ]. Affricates are by their nature palatalized sounds. Consequently the palatogram of [tʃ], as well as that of [dʒ], is characterized by a broad tongue wipe, indicating that the body of the tongue is spread during the production of [tʃ]. The wipe for [tʃ] in the palatogram starts from the Lateral Incisor line (specifically, from one millimeter below the lateral incisor line) and continues to beyond the 4th molar line. The wipe covers the whole body of the palate from the lateral incisor line to a little below the third molar line. The tongue wipes for [tʃ] and [dʒ] constitute the biggest wipes obtained for any of the consonants we investigated.

Mingogram 11 made of the word ịchà, to give way to, has no wave forms during the closure for [tʃ], thereby indicating that the vocal cords were not vibrating during the production of this consonant. [tʃ] is a voiceless consonant. The duration of [tʃ] in the mingogram is 20 milliseconds and that of the vowels that occur with [tʃ] in the word is 17 milliseconds for the initial vowel, ị, and 27 milliseconds for the final vowel, a.

Spectrogram 21 was made of úchu, industry. In the spectrogram [tʃ] has stop gap and no voice bar (although the voicing of the vowel that precedes the [tʃ] continued a little into the closure for [tʃ]) during the [tʃ] closure. As indicated earlier, the articulation of [tʃ] is characterized by a stop and fricative modulations. This is illustrated in the spectrogram of [tʃ] where the stop gap is followed by a relatively broad fricative fill. Both the stop gap

and the [ʃ] fill in the spectrogram are 25cm wide, about 9cm of which is taken up by the fricative fill. The spike for [t] cannot be easily separated from the [ʃ] fill. The [ʃ] fill is relatively dark throughout the pattern though darker still at the top of the pattern; this is characteristic of sibilant fills.

The duration of [tʃ] in the spectrogram is 20 milliseconds and the duration of the [ʃ] component of this sound is about 7 milliseconds. The duration of the vowels that are combined with [tʃ] in úchu is 17 milliseconds for the initial vowel and 23 milliseconds for the final vowel.

In the formant transitions of the vowels that precede and follow [tʃ] we note that the second formants of both vowels are prominently influenced by the transitions. The second formants prominently curve to and from the hub of [tʃ]. The F2 of the initial vowel curves upwards from the normal frequency band of 900 Hertz to about 1500 Hertz to the [tʃ] closure. The third formant of the same vowel curves downwards to the closure of [tʃ]. The transitional influence of [tʃ] on the final vowel is the same as in the initial vowel though in the reverse direction of formant curvature. Thus the F2 of the final vowel curves downwards from a higher frequency band of 1500 Hertz at the release of [tʃ] down to the steady state of about 1000 Hertz. The F3 of the same vowel curves upwards from 2000 Hertz at the release of [tʃ] to the steady state of 2500 Hertz. The locus or hub of [tʃ] closely approximates that of [t] which is towards the centre of the pattern.

[dʒ] as in ájā, sand, is a voiced post-alveolar affricate. It is the voiced cognate of [tʃ], articulated like [tʃ] but differs from the latter by the fact that [dʒ] is voiced while [tʃ] is voiceless. The articulation of [dʒ] is characterized by [ʒ] articulation superimposed on [d], resulting into an empeded plosive release.

Palatogram 13 was made of the word ájā; it shows the tongue wipe for [dʒ]. The wipe of [dʒ] is similar to that of [tʃ]. It shows

the same broad wipe as in palatogram 12, of [tʃ], which indicates that the entire central part of the tongue was spread, making contact with the hard palate during the [dʒ] articulation. The wipe for [dʒ] starts higher than that for [tʃ]. The [dʒ] wipe in the palatogram starts well below the lateral incisor line but below the frontal incisor line and extends to beyond the 4th molar line. Similar to the wipe for [tʃ], the [dʒ] wipe is spread, covering a greater part of the palate up to above the third molar line. That is, the wipe for [dʒ] though resembling that for [tʃ] in nature, differs from the latter in that it starts and ends higher than the [tʃ] wipe.

Mingogram 12 made of the word íjè, walk (n), journey, has wave forms in both the larynx and mouth lines during the closure for [dʒ]. This shows that the vocal cords vibrate during the production of this sound. The duration of [dʒ] in the mingogram is 18 milliseconds. The duration of the vowels that occur with [dʒ] in the mingogram is 23 milliseconds for the [i] and 29 milliseconds for the [e].

Spectrogram 22 was made of the word ùjú, plentiful,. In the spectrogram [dʒ] has a stop gap, voice bar and fricative or noise fill towards the end of the stop gap. This shows that this sound is a voiced affricate, consisting of a stop-followed-by-fricative modulations. The fricative fill of [ʒ] in the spectrogram is 10cm wide, i.e. wider than that of [ʃ] of [tʃ] in spectrogram 21, and unlike the [ʃ] fill, that of [ʒ] is lighter at the lower part of the pattern though dark at the top part. This shows the difference in the frequency of the air egress associated with these fricative components of the respective affricates. The duration of [dʒ] in the spectrogram is 20 milliseconds, about 8 milliseconds of which constitute the duration of the [ʒ] component of the affricate. The duration of the vowels that occur with [dʒ] in the spectrogram is 15 milliseconds for the initial [u] and 23 milliseconds for the final [u] vowel. The spike for the [d] can be distinguished from the [ʒ] fill in the spectrogram. The [ʒ] fill is darker at the top of the pattern, indicating that it is a sibilant sound.

The formant transitions of the vowels in spectrogram 22 are very similar to those in spectrogram 21, of úchu. The F2 of the initial [u] vowel curves upwards to the closure of [dʒ] , and the F3 curves downwards to the closure. The extent or degree of the curvature of the formant bar of the F2 is similar to that described for the initial vowel of úchu in spectrogram 21 above. Also as in Spectrogram 21, the F2 of the final vowel of ùjú curves downwards from a higher frequency band at the release of [dʒ], joining with the F3 which itself curves upwards from the consonant release. Both formant bars form an arch shaped pattern at the consonant release, resembling that formed by the second and third formants at the release of [tʃ] in spectrogram 21. Generally the two formant bars tend to meet at the closure and/or release of the consonants.

The hub of [dʒ] is towards the centre of the pattern, and approximates that of [d].

2.2.6. FRICATIVES

[f] as in éfi, cow, is a voiceless labio-dental fricative. During the articulation of [f] the lower lip makes contact with the upper teeth. The two articulators are held together allowing the breath to pass through the constricted space with audible friction noise. [f] is a continuant since there is no complete blockage of air during the production of this sound; [f] is produced with velic closure, the same as all the other consonant sounds described so far.

No tongue contact is involved during the production of [f], consequently no palatogram was made of this consonant.

Mingogram 13 made of the word éfi has no wave forms during the closure fór [f]. That is, [f] is a voiceless consonant and the vocal cords do not vibrate during the production of [f]. There is nasal tracing for the vowels that occur before and after the [f] in the mingogram, and more noticeably in the vowel that occurred after the [f]. The other mingograms we made of words containing [f] also confirm this, especially with regard to the vowel that precedes [f] in a word. This indicates that the vowels that

occur with [f] tend to be nasalized. Nasalization and/or aspiration, as we indicated earlier, do not play any phonemic role in the Standard dialect; our observation of these features in the analysis is merely intended as phonetic information about the consonant and/or its influence on the vowels that are combined with it.

The duration of [f] in the mingogram is 18 milliseconds. The duration of the vowels that are used with [f] in the mingogram is 23 milliseconds for [e] and 30 milliseconds for the [i].

Spectrogram 23 was made of the word ife, thing,. There is voice bar for the vowels but no voice bar during the closure for [f]. Since the breath is emitted continuously through the lip-teeth opening during the production of [f], the frictional modulation of the breath produces irregular vertical striations in the spectrogram of [f]; such irregular striations characterize the fill for fricative sounds. In the spectrogram the striations of the [f] fill are widely spaced, indicating low frequency in the air flow during the production of this sound. Observe also that the [f] fill in the spectrogram is light (not dark) and occurs throughout the [f] pattern.

The duration of [f] in the spectrogram is 13 milliseconds. The duration of the vowels that occur with [f] is 16 milliseconds and 20 milliseconds for the [i] and [e] respectively.

In the formant transitions of the vowels in ife, we observe that the first formant of [i] which is near the baseline is not influenced by the consonant transition. All the other formants of [i], however, are noticeably influenced by the consonant transition. Thus both the F2 and the F3, as well as the F4 and F5 of [i] all curve downwards to the closure of [f], with the F3 joining to the F2 at the point of the closure of the consonant. The higher formants, i.e. F4 and F5, of [i] are also marked by the same prominent curve downwards. All the formants of [e] curve upwards from lower frequency bands at the release of [f] to the normal state of the vowel. The F1 of [e] starts from near the baseline at the release of [f] and curves upwards to its normal frequency. This shows that the hub of [f] is towards the bottom of the pattern, which is very

usual with labial consonants. Note that the formant bars of [e] curve upwards from the normal state of the vowel towards the end. This appears to result from the influence of the high tone of the vowel.

f has two allophones, namely, [ɸ] and [β] which can be heard in colloquial speech in some dialects of Igbo. In colloquial speech in these dialects [f] is often pronounced as [ɸ] (a voiceless bilabial fricative), when f is followed by a back vowel. For example:

ọ̀fọ́ > [ɔ̀ ɸ ɔ́]

ífō > [íɸ ō]

ụ́fụ > [ʊ́ ɸ ʊ]

ị́fụ̄ > [ɪ́ ɸ ʊ̄]

ífù > [íɸù] etc.

When f is followed by a front vowel it is pronounced as [β] in these dialects. For example:

éfi > [éβ i]

ófe > [óβ e]

áfà > [áβ à]

éfè > [éβ è]

òfífi > [òβ íβ i] etc.

[v] as in ívù, hugeness, is a voiced labio-dental fricative. It is the voiced cognate of [f], articulated like [f] but differs from the latter by the fact that [v] is voiced while [f] is voiceless. [v] is a continuant.

No palatogram was made of [v] because there is no tongue contact during the articulation of this consonant.

Mingogram 14 was made of the word ívù. It has wave forms during the closure for [v], thereby indicating that the consonant is

voiced. Similar to what was observed in mingogram 13, of éfi, in the mingogram of fvù there is nasal tracing in the vowel that precedes the [v]. This confirms the remarks made earlier about the tendency of the vowels that are combined with the labio-dental fricatives to be nasalized. However a more detailed investigation would be needed in order to establish whether this phonological influence is merely a restricted occurrence peculiar to my own personal speech or whether it is a generalized phenomenon in the language.

The duration of [v] in the mingogram is 10 milliseconds. The duration of the vowels that occur with [v] in the word is 20 milliseconds and 30 milliseconds for [i] and [u] respectively.

Spectrogram 24 made of the word fvù has voice bar and fricative fill during the closure for [v]. The [v] fricative fill is lighter and with shorter vertical striations than the [f] fill in spectrogram 23. The [v] in the spectrogram has voice bars which result from the voice modulation of the breath that escapes 'continuously' from the lungs through the teeth-lip opening during the production of [v]. The spectrogram of most voiced fricative consonants have voice bars as a result of the voice modulation and the nature of air flow associated with the articulation of these consonant sounds.

As a result of the presence of voice bars for the [v] in the spectrogram both the direction of the [v] bars as well as the formant transitions in the spectrogram can be clearly determined. The first formant of the two vowels that precede and follow the [v] are least affected by the transition; they do not have any transitional curve. Towards the closure for [v] the second formant of [i] curves downwards making a steady gradient descent and joining to the resonance bar of the [v] which continues and joins to the second formant of [u], and the whole transitional effect presenting a form of an unfinished $\int$ pattern written horizontally. This most vividly illustrates the transitional movements of the speech organs moving from the position of [i] through that for [v] to their position for [u]. Both the F3 and the F4 of [i] curve downwards to the [v] closure; they are however not linked to the resonance

bar of [v] as we observed with the F2 of [i] . Like the F2, the F3 of [i] has been prominently influenced by the transition; the F3 curves from the frequency band of 3000 Hertz (which is the normal state of the vowel) down to the frequency of 2000 Hertz at the closure of [v] . Most of the vowel resonance bars tend to continue further into the consonant,i.e. [v] . The [v] hub in the pattern is near the second formant of [u], i.e. towards the bottom half of the pattern.

The duration of [v] in the spectrogram is 11 milliseconds; that of the vowels that occur with [v] is 23 milliseconds and 26 milliseconds for the [i] and [u] respectively.

[s] as in ọ̀sá, squirrel, is a voiceless alveolar fricative. During the articulation of [s] the blade of the tongue makes close contact with the sides of the palate, leaving a narrow groove at the alveolar ridge through which the breath is expelled. The breath escapes with high frequency noise, usually perceived as a hissing noise. [s] is a sibilant; it is produced with velic closure.

Palatogram 14 was made of the word ọ̀sá. It shows the tongue wipe for [s] . The wipe occurs on both sides of the palate, with each line of the wipe terminating at the lateral incisor and a space of about 12cm separating both wipes towards the end (i.e. at the lateral incisor). That is, the wipes are broken at the point where the groove was formed. The wipe is 8cm wide along the sides of the palate.

Mingogram 15 made of the word ṣ̀sā̀, to wash, has no wave forms during the closure for [s] . This means that the vocal cords do not vibrate during the production of this sound, hence it is a voiceless consonant. The duration of [s] in the mingogram is 15 milliseconds. The duration of the vowels that occur with [s] in the mingogram is 16 milliseconds for [ɪ] and 25 milliseconds for [ɑ] .

Spectrogram 25 was made of the word ósè, pepper,. There is fricative fill with no voice bar during the closure for [s] in the spectrogram. The [s] fill is heavy and dark at the top of

the pattern and light at the lower part of the pattern. Concentration of fricative fill at the top part of the pattern is typical of sibilant sounds and the degree of the darkness of the fill indicates the frequency or rate at which air is expelled from the mouth through the small space created by the tongue and the palate. Compare, for instance, the darkness of the fill towards the top part of the patterns for [s] and [z] (cf. spectrograms 25 and 26 respectively) it will be noticed that though both [s] and [z] have comparatively dark fills at the top of the respective patterns, the fill for [s] is darker than that for [z], indicating that during the production of [s] the breath is expelled with higher frequency than during the production of [z].

The duration of [s] in the spectrogram is 15 milliseconds. The duration of the vowels that occur with [s] is 16 milliseconds for [o] and 20 milliseconds for [e].

In the formant transitions of the vowels in ósè in spectrogram 25, we notice that the third formant of the initial vowel, o, which is a little below the centre of the pattern, curves upwards to the closure for [s]. The first formant of [o] has not been influenced by the transition. The formant transitions of the final vowel, e, are clearly evident; the second formant of [e], which is a little above the centre of the pattern, curves upwards from a lower frequency band (from the centre of the pattern) at the release of [s]. Both the F1 and the F3 of [e] have not been much influenced by the transition. Judging from the direction and extent of the formant curvature in the pattern, it becomes obvious that the hub of [s] is at or near the centre of the pattern.

[z] as in ʇzā, to answer, is a voiced alveolar fricative. [z] is the voiced cognate of [s], articulated in the same manner as [s] except that [z] is voiced while [s] is voiceless. [z] is a sibilant.

Palatogram 15 was made of the word àzá, answering,. It shows the tongue wipe for [z]. The tongue wipe for [z] is similar to that of [s] except that the break between the two lateral wipes

is wider in the [z] than in the [s] wipes. The [z] wipe starts a little higher in the palate than the [s] wipe. The wipe for [z] starts from below the frontal incisor line and it is broader at the beginning than the [s] wipe (cf. palatogram 14). Such differences in the palatographic wipes help to illustrate the articulatory difference between the two sounds. Thus, for instance, while the tip of the tongue is a bit curled inwards and the blade of the tongue as it were folded against the molars to form the groove necessary for the articulation of [s], during the articulation of [z] the tip of the tongue may not be curled with some speakers and the air escapes through the flat space created between the tongue-tip and the palate. Note that the articulatory postures assumed by the tongue during the production of these sounds correlate to the type of air pressure that escapes through the groove/space formed for the individual sound. This as we noted above has been clearly shown in the spectrograms of the two sibilant sounds.

Mingogram 16 made of the word fzà, to sweep, has wave forms during the closure for [z], which shows that the vocal cords were vibrating during the production of this consonant. The mouth tracing shows heavy vibration of the air that is expelled from the mouth. It can be seen from the light nasal tracings in the vowel that precedes the [z] in the mingogram (comparison with other mingograms made of words containing this sound confirm this) that the vowel that occurs before [z] in a word tends to be nasalized.

The duration of [z] in the mingogram is 15 milliseconds. The duration of the vowels that occur with [z] in the word is 15 milliseconds for [ɨ] and 22 milliseconds for [a].

Spectrogram 26 was made of the word ózi, message,. It has fricative fill and voice bar during the closure for [z]. As earlier observed, the fill for [z] occurs heavier towards the upper part of the pattern and lighter towards the lower part. This indicates that [z] is a sibilant sound. The [z] fill is generally lighter than that of [s] and the striations are more widely spaced than in the [s]. This shows that [z] unlike [s] is not a high

frequency sound. [z] in the spectrogram has resonance bars, the first of which occurs near the centre of the pattern. This is the locus of [z], and since both z and s have the same locus, it means that the locus of s is at the same area.

The duration of [z] in the spectrogram is 17 milliseconds. The duration of the vowels that occur with [z] in the spectrogram is 17 milliseconds for [o] and 22 milliseconds for [i].

The transitional influence of [z] on the preceding vowel, o, is not clearly indicated in the spectrogram because the higher formant bars of this vowel are very faint. Both the second and third formants of [i] make prominent curve upwards from lower frequencies at the release of [z] to the normal state of the vowel. The F2 of [i] curves from the frequency of 1800 hertz at the release of [z] to the frequency of 2300 Hertz and the F3 curves from the frequency of 2500 Hertz to that of 3000 Hertz.

[ʃ] and [ʒ]

[ʃ] and [ʒ] do not occur in the Standard dialect, although both sounds are used in some dialects of Igbo. In those cases where [ʃ] and [ʒ] are used in these dialects, in the Standard dialect they are replaced by [s] and [z] respectively. Even in the dialects where [ʃ] and [ʒ] are used, they often occur as the allophones of [s] and [z] respectively. For instance, in the Owerri dialect and the other southern dialects where [ʃ] and [ʒ] are extensively used, they are used as allophones of s and z respectively, in the environments where the latter are followed by a close front vowel, [i] or [ɪ]. For example, in Owerri dialect ísi is pronounced as [íʃ i], àsụ́ is pronounced as [àʃʊ́], òsimiri is pronounced as [òʃ imiri], ézi is pronounced as [éʒ i], ézì is pronounced as [éʒ ì], ózi is pronounced as [óʒ i] etc. In some other cases where sh or zh is used in some of the dialects, this only marks dialect variations. For instance, in some dialects óhi, theft, is pronounced as óshi, àhụ́, body, is pronounced as àshụ́. In the Standrad dialect these dialect variations are unacceptable. Also in the Standard dialect

the [ʃ] , [ʒ] allophones noted in the Owerri dialect are not acceptable, rather the [s] / [z] variants are the ones used in the Standard dialect.

What concerns certain words borrowed into the Standard dialect from other local dialects where sh or zh occur in the words, the situation is often such that there are usually other variants of the same words and it is often these variants where sh or zh does not occur that is more generally used and understood across different dialects and subsequently it is these variants that are adopted in the Standard dialect.

[ɣ] as in ágha, war, is a voiced velar fricative. In the official orthography of Igbo [ɣ] is represented as gh. During the articulation of [ɣ] the back of the tongue is raised towards the soft palate, leaving a constricted space between the back of the tongue and the soft palate through which the air from the lung is allowed to pass. The airstream forced through this space escapes with audible friction noise. [ɣ] is a continuant, produced with velic closure.

Palatogram 16 made of the word ágha shows the tongue wipe for [ɣ]. The wipe is typical of velar consonant wipes; it starts from the second molar line on both sides of the palate and curves into an arch-shaped form at the bottom of the test palate. The wipe is broken at the center of the bottom curve; this is the constricted space between the tongue and the soft palate through which the breath escapes.

Mingogram 17 made of the word ágha has wave forms during the closure for [ɣ]. That is, the vocal cords vibrate during the production of this sound. One remarkable fact in all the mingograms we made of words containing this consonant sound is the consistency and continiuty in the tracings obtained about the vibration of the vocal cords. Thus unlike in the other vowel-consonant-vowel recordings we made on the mingograms where there is always a break or drop in the tracings of vibrations of the vocal cords at the transition from consonant to vowel, in the recordings where [ɣ] precedes the vowel this break or drop in the tracings is never

present, rather there is always consistency in the tracings and it is not easy to tell from the tracings where the consonant articulation ends and where the vowel begins. This well illustrates the type of voice modulation associated with this consonant.

The duration of [ɣ] in the mingogram is 13 centiseconds. The duration of the vowels that occur with [ɣ] is 25 centiseconds for each of the vowels.

Spectrogram 27 made of the word ágha has voice bar and light fricative fill during the closure for [ɣ]. In the spectrogram [ɣ] has very clearly marked resonance bars, which are more clearly and prominently marked than the resonance bars of the co-occurring vowels. The nature of the fricative fill for [ɣ] with the subsequent prominent resonance bars corroborates the observation made by Potter et alia (1947) that as "the voicing (in fricatives) becomes stronger, the voice resonances become more apparent and the fricative fills less evident."[44] True to this observation, the resonance bars of [ɣ] in the spectrogram are very pronounced while the fricative fills are less apparent, due to the degree of voicing associated with [ɣ] articulation.

The transitional influence on the vowel formants in spectrogram 27 is apparent. The first resonance bar of [ɣ] is close to the baseline, consequently the F1 of the initial [a] curves downwards at the [ɣ] closure to join the [ɣ] resonance bar, while the F1 of the final [a] curves upwards at the release of [ɣ], also joining to the resonance bar of [ɣ]. Both the F2 of the two vowels and the second resonance bar of [ɣ] are on the same frequency, and therefore no transitional curve is apparent on the formants of the vowels which also join with the [ɣ] resonance bar, thereby forming a straight resonance bar which runs across the pattern. Both the third and the fourth resonance bars of [ɣ] occur higher than the corresponding vowel formant bars, consequently the F3 and the F4 of the initial vowel curve upwards at the closure for [ɣ] to join to the [ɣ] resonance bars, while the same formants of the final vowel curve

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44. Potter, R.K., et al. 1947, Visible Speech, p. 118.

downwards from the release of [ɣ], also joining with the resonance bars of [ɣ]. The overall pattern of the formant transitions together with the resonance bars of [ɣ] on the spectrogram present a vivid picture of the transitory articulatory movements of the speech organs relevant in the utterance of the word ágha.

The duration of [ɣ] in the spectrogram is 14 milliseconds. The duration of the vowels that occur with [ɣ] is 17 milli-seconds for the initial vowel and 20 milliseconds for the final vowel.

[h] as in àhụ́, body, is a voiceless glottal fricative. During the production of [h] the vocal cords are held apart and the airstream is forced through the open glottis, giving a picture similar to that of a forced breath. No oral stricture is present during the production of [h]. In producing [h], the articulators assume the position for the sound which precedes or follows the [h].

No palatogram was made of [h], because no tongue articulation is involved in the production of this sound.

Mingogram 18 made of the word àhụ́ has no wave forms during the closure for [h]. It is apparent from the mingogram that during the production of [h] the airstream is expelled both through the mouth and through the nose. The vowel that occurred after the [h] in the mingogram was heavily nasalized. The puff of air through the nose during the production of [h] and the subsequent heavy nasalization of the vowel that follows [h] in the word, which are apparent in the mingogram of àhụ́, do not occur when [h] is followed by a close front vowel, i or ị , as mingogram 18 (b) will illustrate. In the mingogram of éhi, however, [i] is lightly nasalized. The duration of [h] in mingogram 18 is 15 milliseconds. The duration of the vowels that occur with [h] is 25 milliseconds for the initial vowel and 30 milliseconds for the final vowel.

Spectrogram 28 made of the word àhụ́ has very light fricative fill and no voice bar during the closure for [h]. The fricative fill for [h] is dark on the baseline and makes it appear as if [h] has a voice bar. Above the baseline the fill becomes very light.

The duration of [h] in the spectrogram is 12 milliseconds. The duration of the vowels that occur with [h] is 15 milliseconds for the initial vowel and 20 milliseconds for the final vowel.

In the spectrogram of àhụ́ no formant transitions of the vowels are apparent. The h sound whether it is voiced as in American English or not voiced as in Igbo, has little or no influence on the formants of the vowels that are combined with the h.

2.2.7. NASALS

[m] as in ṃmā, to know, is a bilabial nasal consonant. All nasal consonants in Igbo are voiced. During the production of [m], a complete closure is formed by the lips not accompanied by velic closure. The breath escapes through the nose during the closure and consequently no pressure is built at the point of stricture, and the consonant is not released with plosion.

When [m] precedes another consonant (in which case it becomes a syllabic nasal in Igbo), the [m] is unreleased, such as in words like ḿbè, ḿbà, ḿkpu, m̀gbe etc. In Igbo only nasals can precede another consonant without an intervening vowel, and when a nasal consonant occurs in that environment it becomes syllabic, bearing an independent tone of its own.

Mingogram 19 made of the word ụ́mụ̀, offspring, has wave forms during the closure for [m]. There is nasality in [m] due to the air that is expelled through the nose during the oral closure for this sound. This is indicated in the mingogram by the wavy lines in the nose tracings. The vowels that occur with the [m] in the mingogram are nasalized because of the influence of the nasality in [m], i.e. the vowels assimilate the nasality of the consonant. The duration of [m] in the mingogram is 15 milliseconds. The duration of the vowels that occur with [m] is 14 milliseconds for the initial vowel and 16 milliseconds for the final vowel.

Spectrogram 29 was made of the word ụ́mụ̀. It has voice bar during the closure for [m]. In the spectrogram [m] has resonance bars,

which indicates that [m] is a sonorant as well as a nasal. Nasality is indicated in the spectrogram not only by the lightness of the shadings of the [m] formant bars but also by the light bar at the top of the [m] pattern. The duration of [m] in the spectrogram is 15 milliseconds and that of the vowels that occur with [m] in the word is 17 milliseconds for the initial vowel and 20 milliseconds for the final vowel.

The formant transitions in the spectrogram are apparent only in the lower formants of the [ɑ] vowels, since the higher formants of the vowels are not clearly visible in the pattern. The first resonance bar of [m] is on the baseline and the first formants of surrounding vowels curve towards the [m] resonance bar. The first formant of the initial vowel curves downwards towards the hub of [m], which is on the baseline, while the first formant of the final vowel curves upwards from the [m] hub at the release of [m].

[n] as in nà, and, is an alveolar nasal continuant. During the production of [n] the tip of the tongue forms a complete closure with the palate at the alveolar region. There is no velic closure and the breath escapes through the nose during the closure for [n].

Palatogram 17 made of the word nà shows the tongue wipe for [n]. The [n] wipe is similar to those of [t] and [d] (also alveolar consonants) in palatograms 1 and 2 respectively. The wipe for [n] occurs from the lateral incisor, extending on both sides of the palate to beyond the 4th molar line.

Mingogram 20 was made of the word ńnù, you (pl.),. It has wave forms during the closure for [n]. There are nasal tracings in the mingogram for the [n], which shows that air was escaping through the nose during the closure for this consonant. The vowels that occur with [n] in the mingogram are slightly nasalized. However in the mingogram we made of the word ńnùnu, bird, the vowels that occurred with [n] were prominently nasalized. The duration of [n] in the mingogram is 14 milliseconds and the duration of the vowels is 15 milliseconds and 18 milliseconds for the initial and final

vowels respectively.

Spectrogram 30 was made of the word ányụ, meat,. It has voice bar during the closure for [n]. In the spectrogram [n] has resonance bars, which shows that it is a sonorant; the resonance bar of [n] is near the centre of the pattern. This is the hub of [n]. Because the resonance bar of [n] occurs on the same frequency as the second formant of [a] , this formant is not influenced by the transition. The second formant of the final vowel curves down from the release of [n], from the end of the [n] resonance bar, which is located just above the second formant of the final vowel.

The duration of [n] in the spectrogram is 15 milliseconds. The duration of the vowels that occur with [n] is 16 milliseconds for the initial vowel and 20 milli-seconds for the final vowel.

Like m, n can occur in Igbo as a syllabic nasal, in which case it precedes another consonant without an intervening vowel and it carries an independent tone. For example, ńdị, ǹti, ńtị̀, ńsọ, ńnà, etc. As a syllabic, n can be combined with, i.e. can precede any consonant that is neither a labial nor a back consonant. Labial consonants co-oocur with m while back consonants occur with ŋ. As a syllabic nasal [n] is unreleased.

[ɲ] as in ányа, eye, is a palatal nasal consonant. During the articulation of [ɲ] the body of the tongue is raised to the palate, forming a complete oral closure with the hard palate. There is no velic closure and the breath is allowed to escape through the nose during the closure for [ɲ].

Like the other nasal consonants in Igbo, [ɲ] can occur as a syllabic nasal, in which case it co-occurs with a palatal consonant. Though it is customary in the local orthography to write the syllabic nasal that precedes a palatal consonant as n, for example, ńchà, soap, ǹché, watching, ńnyobà, looking into, etc, the syllabic nasal that occurs in such environment is infact pronounced as [ɲ]. For example, [ɲ́ tʃ à] , [ɲ̀ tʃ ó] , [ɲɲ óbà] etc.

Palatogram 18 was made of the word ányа. It shows the tongue wipe for [ɲ]. The wipe covers the whole width of the palate starting from the lateral incisor line to the third molar line, and extends laterally on both sides of the palate to beyond the fourth molar line. The [ɲ] wipe is similar to those of [tʃ] and [dʒ] in palatograms 12 and 13 respectively.

Mingogram 21 which was made of ányа has wave forms during the closure for [ɲ]. The mingogram shows heavy egress of air through the nose during the oral closure for [ɲ]. Due to the influence of the nasality in [ɲ], the vowel that occurs after this consonant was nasalized initially in the mingogram but the nasalization dies off gradually as the vocalization of the vowel continued. Note that there is no nasalization indicated in the vowel that precedes the [ɲ]. The duration of [ɲ] in the mingogram is 16 milliseconds. The duration of the vowels that occur with [ɲ] is 15 milliseconds for the initial vowel and 20 milliseconds for the final vowel.

Spectrogram 31 was made of the word ọ́nyà, trap,. It has a stop gap with voice bar during the closure for [ɲ]. As in the spectrogram of the other nasal consonants so far described, we may notice that the striations of the voice bar of [ɲ] are comparatively dark and longer than those of the accompanying vowels. There is a lightly shaded bar at the top of the pattern of [ɲ], which results from the nasality in this consonant articulation. Unlike [m] and [n], [ɲ] has no resonance bars in the spectrogram. The duration of [ɲ] in the spectrogram is 9 milliseconds. The duration of the vowels that occur with [ɲ] in the spectrogram is 16 milliseconds for the initial vowel and 22 milliseconds for the final vowel.

The transitional influence of [ɲ] on the surrounding vowels is clearly shown on the spectrogram through the formant transitions. The second formants of both vowels of ọ́nyà curve towards and from the centre of the pattern, which is the locus of [ɲ]. Thus the second formant of [ɔ] curves from the frequency band of 1000 Hertz (which is the steady state of the vowel) to 1900 Hertz, upwards, to the locus of [ɲ], while the second formant of [a]

curves from a higher frequency of 2000 Hertz at the release of [n] down to 1500 Hertz (which is the steady state of the vowel). The first formant of the same vowel curves downwards towards the baseline.

[ɲ] as in áñā, cane, is a velar nasal consonant. During the articulation of [ɲ] the back of the tongue makes a complete closure with the soft palate. There is no velic closure, so that the breath escapes through the nose during the closure for [ɲ] .

[ŋ] can occur as a syllabic nasal, in which case it can only precede a back consonant. For example, ŋ̀kè, ŋ́kwụ̀ (palm tree), ŋ̀gá (prison), ŋ̀gwú (implement for digging) etc.

Palatogram 19 was made of the word áñā. It shows the tongue wipe for [ɲ]. The wipe is characteristic of velar consonant tongue wipes. The [ɲ] tongue wipe occurs on both sides of the palate starting from the second molar line and forms the typical arch-shaped wipe along the bottom outline of the palate. The wipe at the bottom end of the test palate is thin.

Mingogram 22 made of the word áñā has wave forms during the [ɲ] closure, which indicates that the vocal cord vibrates during the production of this sound. The nasal tracings during the closure for [ɲ] shows a relatively heavy egress of air through the nose during the closure. The vowel that follows the [ɲ] in the mingogram is nasalized throughout, while nasalization in the vowel that precedes [ɲ] occurs only towards the juncture of the vowel and the [ɲ]. The duration of [ɲ] in the mingogram is 15 milliseconds. The duration of the vowels that occur with [ɲ] is 14 milliseconds for the initial vowel and 17 milliseconds for the final vowel.

Spectrogram 32 was made of the word áñụ̄, bee,. It has voice bar during the closure for [ɲ]. In the spectrogram [ɲ] has resonance bars. What has been observed above about the striations of the voice bars of the nasal consonants is true of the striations of the voice bar of [ɲ] in the spectrogram of áñụ̄.

The duration of [ɲ] in the spectrogram is 12 milliseconds.

The duration of the vowels that occur with [ŋ] in the spectrogram is 19 milli-seconds for the initial vowel and 22 milliseconds for the final vowel.

In the formant transitions in the spectrogram, illustrating the influence of [ŋ] on the surrounding vowels, we notice that the second formant of [a], the initial vowel, has not been much influenced by the transition. The resonance bar of [ŋ] is located very near this formant. The second formant of [ə] , the final vowel, curves downwards from a higher frequency band at the release of [ŋ] , from the locus of [ŋ] which is just above this formant. Both the third and fourth formants of [a] curve upwards to the [ŋ] closure.

[ŋw] as in ọ́nwa, moon, is a labialized velar nasal consonant. [ŋ w] is articulated with two simultaneous strictures – a [ŋ] stricture and a [w] stricture. The release of the two strictures is also simultaneous, in the manner described above for the other labialized velar consonants in the language. There is no velic closure during the production of [ŋ w] , and the air from the lungs is allowed to escape through the nose during the closure for [ŋw].

A syllabic nasal in Igbo is hardly pronounced as [ŋw] ; rather [ŋ] would be used in place of [ŋw] as a syllabic nasal.

Palatogram 20 made of the word ọ́nwa shows the tongue wipe for [ŋw] . The wipe is characteristic of velar consonants. The wipe for [ŋ w] starts from the third molar line on both sides of the palate and curves downwards forming an arch-shaped wipe along the bottom outline of the test palate. The wipe along the bottom end of the palate is very thin.

Mingogram 23 was made of the word ánwụ̄, sun,. It has wave forms during the closure for [ŋ w] . The tracings on the nose line in the mingogram indicate nasality in this consonant sound. As in the mingogram of ánā , we can notice that in the mingogram of ánwụ̄ the vowel that occurs after [ŋ w] is nasalized throughout under the influence of the nasality in the consonant, while the initial vowel has very light nasalization towards the juncture with [ŋ w] .

The duration of [ŋw] in the mingogram is 12 milliseconds. The duration of the vowels that occur with [ŋw] is 15 milliseconds for the initial vowel and 16 milliseconds for the final vowel.

Spectrogram 33 made of the word ọ́nwa has voice bar during the closure for [ŋw] . In the spectrogram [ŋw] has resonance bars, the first of which is located a little below the centre of the pattern.

In the formant transitions in the spectrogram, both the second and the third formants of [ɔ] curve downwards to the closure of [ŋw] ; the second formant curving down towards the baseline. Similarly, both the first and second formants of [a] , the final vowel, curve from a lower frequency band, from near the baseline, upwards at the release of [ŋw] . The second formant of [a] joins to the first formant at the release. The second resonance bar of [ŋw] is located towards the upper part of the pattern. The arrangement of the resonance bars of the nasal consonant together with the patterns of the formant transitions in the spectrogram present a vivid picture of the articulatory movements of the speech organs during the utterance of the word ọ́nwa.

The duration of [ŋw] in the spectrogram is 15 milliseconds. The duration of the vowels that occur with [ŋw] is 18 milliseconds for the initial vowel and 22 milliseconds for the final vowel.

2.2.8. LATERAL

[l] as in àla, ground, land, is an alveolar lateral sonorant. It is produced with an incomplete oral closure. The tip of the tongue is raised to the alveolar, leaving openings between the sides of the tongue and the upper molars on each side of the mouth. This is accompanied by velic closure. The opening at the sides of the mouth allows a continuous stream of voiced breath to be emitted during the closure for [l] as well as while the articulators are moving towards the positions for the adjacent sound in the combination.

Palatogram 21 made of the word àla shows the tongue wipe for [l]. The wipe occurs from between the frontal incisor line and the canine line and extends laterally on both sides of the palate to above the second molar line. Unlike the wipes for [d] , [n] , [t] or [r] , the wipe for [l] does not continue to and beyond the fourth molar line, thereby suggesting that this area of the palate (i.e. from the second molar line further back in the palate) was open and the air is allowed to escape freely from the opening.

Mingogram 24 made of the word àla has wave forms during the closure for [l] , indicating that the vocal cords vibrate during the production of [l]. There is heavy vibration in the air in the mouth during the closure; this is indicated in the mingogram by the relatively long striations in the mouth recordings during the closure for [l] . There is no nasal tracing during or after the closure. It is apparent from the mouth tracings on the mingogram that the oral cavity was only partially closed during the articulation of [l] . Thus we can notice that there was very little drop in the mouth line during the [l] closure. The duration of [l] in the mingogram is 18 milli-seconds. The duration of the vowels that occur with [l] in the word is 15 milliseconds for the initial vowel and 27 milliseconds for the final vowel.

Spectrogram 34 was made of the word ụlọ̀, house,. It has voice bar and resonance bars during the closure for [l]. The second formant of [ụ] curves upwards to the closure of [l] and the third formant of the same vowel curves downwards at the closure. The first formant of the initial vowel, [ụ] , continues through the [l] closure. The first formant of [ɔ] curves upwards from the end of the formant bar that has continu-ed from [ụ] , i.e. at the release of [l] . The second formant of [ɔ] curves downwards from the resonance bar of [l] which is located just above the former. [l] is a sonorant.. The duration of [l] in the spectrogram is 13 milliseconds. The duration of the vowels that occur with [l] in the word is 16 milliseconds for the initial vowel and 21 milliseconds for the final vowel.

2.2.9. ROLLED

[r] as in ára, madness, is a rolled alveolar sonorant. For the articulation of [r] the tip of the tongue is held loosely close to the alveolar, so that when the air from the lung is forced between the articulators it makes the tip of the tongue to strike in vibrating movements against the alveolar. During the production of [r] in Igbo about three to four successive strikes are made by the tip of the tongue against the alveolar. The vibrating strikes made during the production of [r] is not sustained long enough as in the English equivalent of this sound, hence the [r] in Igbo cannot be said to be a trill. There is velic closure during the production of [r] .

Palatogram 22 was made of the word ára. It shows the tongue wipe for the [r] in the utterance. The wipe for the [r] shows a complete oral closure formed by the tongue against the palate. The wipe occurs from the lateral incisor along both sides of the palate to and beyond the fourth molar line. The nature of the wipe at the alveolar well illustrates the vibrating strikes which the tip of the tongue made against the alveolar.

Mingogram 25 made of the word ára has wave forms during the closure for [r]. This means that the vocal cords vibrate during the production of this consonant. In the mingogram there are three main vibratory peaks in the mouth tracings for the [r] , which represents the number of times the tip of the tongue made positive strikes against the palate at the alveolar region during the production of the [r] sound. The vowels that occur with [r] in the mingogram were slightly nasalized. The duration of [r] in the mingogram is 10 milliseconds. The duration of the vowels that occur with [r] is 24 milliseconds for the initial vowel and 27 milliseconds for the final vowel.

Spectrogram 35 made of the word ára has voice bar for the [r]. [r] has resonance bars which are broken at the stop closures (there are two such closures in the pattern). These closures represent the periods of the intermitent closures made during the vibratory strikes by the tip of the tongue. The resonance bars of [r] occur

on almost the same frequencies as those of the surrounding vowels. However the first resonance bar of [r] is nearer to the baseline than the first formants of the two [a] sounds, consequently the first formants of the initial and final [a] sounds curve towards and/or from the baseline. The F1 of the initial vowel curves downwards towards the baseline while that of the second vowel curves upwards from near the baseline to the normal state of the vowel. The F2 of both vowels have no apparent transitional curves because both formants occur on the same frequency as the resonance bar of [r] (i.e. the second resonance bar of this consonant). The third resonance bar of [r] is a little higher than the third formants of the two [a] sounds, and as a result the third formants of both vowels curve a little upwards (for the initial vowel) towards or downwards (for the final vowel) from the [r] resonance bar.

The duration of [r] in the spectrogram is 6 milliseconds. The duration of the vowels that occur with [r] is 21 milliseconds for the initial vowel and 22 milliseconds for the final vowel.

2.2.10. APPROXIMANTS

[y] as in ọ́yà, illness, is a palatal approximant. During the production of [y] the body of the tongue is raised to the palate forming an approximant stricture with it, almost in the same position as in [i] articulation, except that the elevated position of the tongue is higher for [y] and not so forward in the mouth as in [i] articulation. The passage to the nasal cavity is closed and there is a continuous emission of voiced breath while the articulators are moving towards their positions for the sound that follows [y].

The articulation of approximants differs from those of the other sounds (including vowels) mainly by the fact that whereas the articulatory 'postures' are sustained steadily during the production of the other sounds, during the production of approximants (notably y and w) the articulators are progressively moving from their initial postures to the positions for the sound which follows (i.e. if the approximant is combined with another sound) or to the neutral

position of the articulators (if no sound follows the approximant). For instance, though the initial articulatory postures for [i] and [y] , or for [u] and [w] are more or less the same for each pair, the production of each of the pairs differs mainly in the manner described above.

Palatogram 23 made of the word ọ́yà shows the tongue wipe for [y]. The [y] wipe is in many respects similar to that of [i] (see palatogram 1). As in the wipe for [i], the [y] wipe occurs on both sides of the palate becoming broadest at the second molar line where the wipe occurs almost across the entire width of the palate. The wipes along both sides of the palate are broad showing the extent of the contact made by the tongue and the palate. The wipe for [y] starts from the lateral incisor line and extends backwards to beyond the fourth molar line.

Mingogram 26 was made of the word ịyà, to be sick,. There are wave forms during the closure for [y]. As in the mingogram of [l] , the mouth tracings for [y] in mingogram 26 show consistent and uninterrupted flow of the voiced breath from the mouth during the articulation of [y] and the surrounding vowels. Air was escaping through the nose during my articulation of this approximant; this is shown in the mingogram by the wavy tracings on the nose line. The same can be observed in mingogram 27, of [w] . This, I should think, can be explained by the laxed nature of the articulatory strictures associated with these approximants, rather than a deliberate lowering of the velum during the articulation of the approximants.

The duration of [y] in the mingogram is 16 milliseconds. The duration of the vowels that occur with [y] in the word is 16 milliseconds for the initial vowel and 29 milliseconds for the final vowel.

Spectrogram 36 was made of the word ọ́yī, cold,. It has voice bar and resonance bars for the [y] articulation. Both the voice bar and the resonance bars of [y] form continuous pattern with those of [i] , the vowel that occurs after the [y]. That is, the voice bar and the resonance bars of [y] are not separated from those of [i]

in the spectrogram. This also means that [y] in the spectrogram has no transitional influence on the formants of [i] , since the formant bars of the two sounds occur on the same frequency bands. On the other hand, [y] has pronounced transitional influence on the second formant of [o] , the initial vowel. The second formant of [o] prominently curves upwards from the frequency band of 1000 Hertz, the steady state of the vowel, to about 2000 Hertz, touching the second formant of [y] , which is also about the third formant of this vowel. This shows that the locus of [y] , like that of [i], is towards the upper part of the pattern.

The duration of the initial vowel in the pattern is 16 milliseconds. As already pointed out above, it is not easy to distinguish the [y] from [i], the vowel that follows the [y] , in the pattern. It is not easy, for instance, judging from the pattern, to see where the [y] ends and where the [i] begins. The duration of the two sounds in the spectrogram is 38 milliseconds.

[w] as in ẇe, anger, is a labialized velar approximant. For the articulation of [w] the back of the tongue is raised towards the soft palate but not making any positive contact with the palate. This is accompanied by lip rounding and velic closure. There is continuous emission of voiced breath while the articulators are moving either towards their neutral positions or to their positions for the sound that follows [w].

No palatogram was made of [w] because there is no tongue contact during the articulation of [w] .

Mingogram 27 made of the word ẇe has wave forms for the [w], which shows that the vocal cords were vibrating during the production of this sound. As in the mingogram of [y] , the wave forms in the mouth tracings for [w] are heavy and consistent throughout, thereby indicating that there was a continuous uninterrupted flow of voiced breath from the mouth during the articulation of [w] . Air also appeared to escape through the nose during the production of [w] in the mingogram. This has been explained above. The vowel that

precedes the [w] in the mingogram is nasalized. The duration of [w] in the mingogram is 15 milliseconds. The duration of the vowels that occur with [w] is 20 milliseconds for the initial vowel and 30 milliseconds for the final vowel.

Spectrogram 37 made of the utterance fwe has voice bar during the closure for [w]. In the spectrogram [w] has resonance bar which is located near the baseline. Similar to the relationship between [i] and [y], the locus of [w] approximates that of [u], i.e. near the baseline. The transitional influence of [w] on the surrounding front vowels is very pronounced in the spectrogram. This is illustrated by the arch-shaped curve formed by the second formants linking with the resonance bar of [w]. Thus the second formant of [e] curves upwards at the release of [w] from near the baseline, from the frequency band of 800 Hertz to that of 1800 Hertz which is the steady state of the vowel. The vowel formant joins to the resonance bar of [w]. Similarly, although the second formant bar of [i], the initial vowel, continues well into the closure for [w], the apparent curve by this formant to link with the resonance bar of [w] towards the baseline is shown on the spectrogram. The duration of [w] in the spectrogram is 13 milliseconds. The duration of the vowels that occur with [w] in the word is 12 milliseconds for the initial vowel and 25 milliseconds for the final vowel.

2.3. SUMMARY PHONEMIC CONTRASTS OF THE SPEECH SOUNDS OF THE STANDARD DIALECT OF IGBO

In the Standard dialect of Igbo all the speech sounds described in 2.1. and 2.2. above are phonemic, i.e. they contrast phonemically with one other. Few of the allophones that exist in Igbo have been noted in the phonetic descriptions given in the preceding sections (i.e. 2.1. and 2.2.). These allophones, to reiterate, occur among the labio-dental fricatives, where it has been noted that [ɸ] and [ɱ] are allophones of /f/ in some dialects of Igbo, and also within the palato-alveolar fricatives, where it was noted that both [ʃ] and [ʒ] are allophones of /s/ and /z/ respectively in the Standard dialect.

In the present part of this chapter, we shall provide a brief summary of the phonemic contrasts that exist among the speech sounds described in 2.1. and 2.2. above.

2.3.1. PHONEMIC CONTRASTS WITHIN THE VOWEL SEGMENTS

All the 8 vowels described in 2.1. above are phonemic not only in the Standard dialect but also in all the dialects of Igbo. The phonemic contrasts that exist between vowels of different phonetic qualities are more or less obvious in the language. In the discussions that will follow, we are primarily concerned with the contrasts that exist between vowels that are phonetically similar but which differ mainly through the tongue root positions.

2.3.1.1. a , e

/e/ has an allophone in Igbo, phonetically represented as [ɛ]. This occurs in words such as

/éke/	[ɛ kɛ]	-python
/ífe/	[ifɛ]	- thing
/ébe/	[ɛbɛ]	- place, where
/ìsé/	[isɛ]	- five etc.

/a/ contrasts with /e/

áka - hand
éke - python

ɻsà - to reply to
ísè - to draw

ákwa - cry (n.)
ékwe - wooden tom-tom etc.

/a/ contrasts with /ọ/, [ɔ]

áka - hand
ọ́kọ - rash

ɻsā - to wash
ɻsọ̄ - to fear, to avoid

ɻbà - to enter
ɻbọ̀ - to carve meat etc.

/e/ contrasts with /o/

ídō - to place
ídē - to write

ísò - to follow
ísè - to draw

óbì - heart, chest
ébì - porcupine etc.

/e/ contrasts with /i/

ézè - king, ruler
ézì - pig

íbē - to slice
íbī - to dwell

ísì - smell, odour
ísè - to draw

ídì - to bear, endure
ídè - be soak etc.

Both a and e are in complementary distribution when they are used as affixes by themselves or when they occur as the vowels of the affix morpheme, in which case the affix vowel would be required to agree with the harmonic quality of the vowel of the root morpheme. That is, /a/ is used when the vowel of the root morpheme is of the retracted or non-advanced tongue root type and /e/ is used when the vowel of the root morpheme is of the advanced tongue root type. For example,

(i) performative vowel prefix a/e

This is used with the performative aspect of the verb, and consists of a vowel prefix, either /a/ or /e/, and the root morpheme. For example,

vowel prefix	verb root	performative verb form	
a	gá	àgá	- going
e	gè	égè	- listening
a	sɨ́	àsɨ́	- saying
e	sí	èsí	- cooking
a	sǫ́	àsǫ́	- avoiding
e	sò	ésò	- following
a	bʉ́	àbʉ́	- being
e	bú	èbú	- carrying etc.

(ii) negative imperative verb form

This consists of a vowel prefix, /a/ or /e/, verb root and a negative suffix, -là. For example,

vowel prefix	verb root	negative verbal form	
a	gá	ágālà	- dont go
e	gè	égèla	- dont listen to
a	sɨ́	ásɨ̄là	- dont say
e	sí	ésīlà	- dont cook
a	sǫ́	ásǭla	- dont avoid
e	sò	ésòla	- dont follow
a	bʉ́	ábʉ̄là	- dont be
e	bú	ébūlà	- dont carry etc.

(iii) completive aspect verb form

This consists of a vowel prefix, /a/ or /e/, the verb root, a vowel suffix and the -la suffix. The vowel suffix can be either a/e or o/ọ. For example,

vowel prefix	verb root	vowel suffix	completive form
a	gá	a	àgáala -has gone
e	gè	e	ègèéla -has listened to
a	sị́	a	àsị́ala -has told (eg. a lie)
e	sí	e	èsíela -has cooked
a	sọ́	ọ	àsọ́ọla -has avoided
e	sò	o	ésòóla -has followed
a	kwụ́	ọ	àkwụ́ọla -has paid
e	kwú	o	èkwúola -has spoken

(iv) inceptive aspect verb form

This consists of a vowel prefix /a/ or /e/, the verb root and -wa/-we suffix. For example,

vowel prefix	verb root	inceptive aspect form
a	gá	àgáwa - starts to go
e	gè	égèwé - starts to listen
a	sị́	àsị́wa - starts to say
e	sí	èsíwe - starts to cook
a	sọ́	àsọ́wa - starts to avoid
e	sò	èsowé - starts to follow
a	kwụ́	àkwụ́wa - starts to pay
e	kwú	èkwúwe - starts to speak

(v) imperative vowel suffix

The vowel suffix that occurs in the Imperative form of the verb in Igbo can be either a/e or o/ọ. a/e are used when the vowel of the root morpheme is a front vowel while o/ọ are used when the vowel of the root morpheme is a back vowel. For example,

verb root	vowel suffix	imperative form of the verb
gá	a	gàá - go
gè	e	gèé - listen to
rí	e	rìé - eat
rị́	a	rị̀á - climb
kò	o	kòó - pluck, pull with a hooked object.
kọ́	ọ	kọ̀ọ́ - narrate, tell
kwú	o	kwùó - speak
kwụ́	ọ	kwụ̀ọ́ - pay etc.

2.3.1.2. i , ị [I]

/i/ contrasts with /ị/ . For example,

ísī - to cook
ịsị̄ - to say

ímì - to deepen, to be deep
ịmị̀ - to bear fruit

írī - to eat
ịrị̄ - to climb etc.

/i/ contrasts with /u/. For example,

ísī - to cook
ísū - to crack by pounding

íbī - to dwell
íbū - to carry etc.

/ị/ contrasts with /ụ/. For example,

ịdī - to be in a state of
ịdụ̄ - to poke (with a long object)

ịchī - to gather, to herd, to rule
ịchụ̄ - to chase, to pursue etc.

Both i and ị occur in complementary distribution when they are used as affixes or as the vowel of affix morphemes. In this case the vowel affix or the vowel of the affix morpheme agrees harmonically with the vowel of the root morpheme. For example,

(i) infinitive prefix

An infinitive prefix in Igbo is a close front vowel which is phonetically realised as [i] or [ɪ], depending on the harmonic quality of the vowel of the root morpheme of the verb it occurs with. For example,

verb root	infinitive prefix	verb form
gá	ị	ịgā - to go
gè	i	ígè - to listen
sí	i	ísī - to cook
sị́	ị	ịsī - to say
rí	i	írī - to eat
rị́	ị	ịrī - to climb
sọ́	ị	ịsọ̄ - to avoid
sò	i	ísò - to follow
kwú	i	íkwū to speak
kwụ́	ị	ịkwụ̄ to pay etc.

(ii) verb form indicating insistence on an action.

This is achieved in the language by suffixing the morpheme -ríri or -rị́rị to the verb root. When this morpheme is used with the future tense of the verb, it has the meaning of command(i.e. on the part of the speaker) but when used with the present tense of the verb, it has the meaning of the performer insisting on continuing and if possible completing an action. For example,

verb root			
kwú	gà-ekwúriri	(future)	- must speak
kwụ́	gà-akwụ́rịrị	"	- must pay
	nà-ekwúriri	(present)	- continues to speak
	nà-akwụ́rịrị	"	- continues to pay
gá	gà-agárịrị	(future)	- must go
	nà-agárịrị	(present)	- continues to go
gè	nà-égèrírị	"	- continues to listen
sí	gà-esíriri	(future)	- must cook
sị́	gà-asị́rịrị	"	- must say etc.

2.3.1.3. o , ọ [ɔ]

/o/ contrasts with /ọ/. For example,

ógō - height
ọ́gọ̀ - inlaw

ísò - to follow
ísọ̄ - to fear, to avoid

ítō - to grow
ítọ̄ - to unwrap etc.

The phonemic contrasts between /o/ and /e/ and/or between /ọ/ and /a/ have been illustrated in the examples given earlier above.

Both o and ọ occur in complementary distribution when they are used as affixes or as the vowel of the affix morpheme. Some examples illustrating this have been given above, such as in the Imperative suffix and the completive aspect formsof the verb in Igbo.

2.3.1.4. u , ụ [ʊ]

/u/ contrasts with /ụ/. For example,

íkwū - to speak
íkwụ̄ - to pay
ílū - to reach
ílụ̄ - to work etc.

/u/ contrasts with /o/. For example,

ókwu - speech
úkwu - plenty, big
ífò - folk tale
ífù - to miss, be lost
ídō - to place, to put
ídū - to lead, to escort etc.

/ụ/ contrasts with /ọ/. For example,

ígụ̄ - to read
ígọ̄ - to deny

íchọ̄ - to seek, to want
íchụ̄ - to chase, to pursue

íkọ̄ - to tell, to narrate
íkụ̄ - to knock etc.

The phonemic contrast between /u/ and /i/ and that between /ụ/ and /ị/ have been illustrated in the examples given in the preceding sections.

/u/ and /ụ/ are rarely used as affixes or as the vowel of the affix morpheme in Igbo. But if they ever occur as affixes or as the vowel of the affix morpheme, they would necessarily be in complementary distribution just as the other cases discussed above.

2.3.2. PHONEMIC CONTRASTS WITHIN THE CONSONANT SEGMENTS

2.3.2.1. p, b, f, v,

/p/ contrasts with /b/. For example,

ípū - to be open, to germinate
íbū - to carry

/p/ contrasts with /f/.

ípē - to slice with axe
ífē - to fly

/p/ contrasts with /m/, /kp/, /d/ etc.

ípē - to slice with axe
ímē - to do

íkpē - to judge
ídē - to write
ítē - to scrub, to smear etc.

/b/ contrasts with /f/.

íbè - to cut
ífè - to worship

/b/ contrasts with /m/, /gb/, /k/ etc.

ị́bā - to enlarge, to grow rich
ị́mā - to know
ị́gbā - to run, to sting
ị́kā - to surpass etc.

/v/ contrasts with /b/, /p/, /f/ etc.

ị́vṵ - to scramble
ị́bṵ - to be
ị́fṵ - to hurt, to be painful
ị́vṳ́ - to hatch
ị́pṳ́ - to go out etc.

In some dialects of Igbo /b/ has two allophones, namely, [β] and [v] , which occur mainly in colloquial speech forms. For example,

/ ọ́ bṳ́/ 'it is', is pronounced as [ɔ́ βɔ̀] ,

/dìbé/ 'endure', is pronounced as [dí βè] etc.

These allophones are not acceptable in the Standard dialect.

In many cases where /v/ occurs in most of the other dialects of Igbo, in the Standard dialect it is replaced by /b/. For example,

other dialects	Standard dialect	
íví	íbū	to carry
íví	íbú	bigness
ávụ́	ábụ́	pus etc.

There are, however, some cases where /v/ in these dialects are not replaced by /b/ in the Standard dialect, such as in the following words :

òvu - dove
èvu - wasp
ị́vṳ́ - to hatch etc.

Similarly, in some cases where /f/ occurs in some of the local dialects, it is replaced by /p/ in the Standard dialect. Some illustrative examples of this have been given in 1.4. above.

In some cases where /f/ is used in the Onitsha and other northern dialects, in the Standard dialect it is replaced by /h/. This has been discussed along with other instances of alternations in chapter one above.

/f/ has two allophones, [ɸ] and [ᵝ] which occur in colloquial speech forms in some of the local dialects. In the Standard dialect these allophones are not acceptable.

/f/ contrasts with /v/, /h/, /gh/ [ɣ] etc.

ị́fụ̀ - to snatch, to blow
ị́vụ̀ - to hatch
ị́hụ̀ (ọ́nụ̄) - to prize

ífù - to miss, be lost
íhu - face
áfụ̀ - half penny
áhụ̀ - that
ị́fụ̄ - to hurt, be painful
ị́ghụ̄ - to roast

ífè - to worship
íghè - be well cooked etc.

2.3.2.2. d, t, ch, j

/d/ contrasts with /t/. For example,

ídē - to write
ítē - to smear, to rub
ídō - to place
ítō - to grow
ị́dụ̄ - to poke with long object
ị́tụ̄ - to throw etc.

/t/ contrasts with /ch/, /j/, /d/. For example,

ɪtē - to rub, to smear
ɪdē - to write
ɪjē - to go, to travel
ɪchē - to wait etc.

/ch/ contrasts with /j/.

ɪjè - walk,, journey
ɪchè - different etc.

Both /d/ and /t/, etc, contrast with /k/, /g/ etc. For example,

ɪḍụ̄ - to poke with long object
ɪtụ̄ - to throw
ɪjụ̄ - to refuse
ɪchụ̄ - to chase, to pursue
ɪkụ̄ - to knock
ɪgụ̄ - to read
ɪkwụ̄ - to pay
ɪgwụ̄ - to be finished etc.

2.3.2.3. k , g , gb , kp

/k/ contrasts with /g/. For example,

ọkụ̀ - property
ọgụ̀ - hoe etc.

/k/ contrasts with /kp/, /gb/, /kw/, /gw/ etc.

ọkụ́kụ - knocking
ọkpụ́kpụ - moulding
ọgwụ́gwụ - being finished
ọkwụ́kwụ - paying
ọkụ̀ - property
ọgwụ̀ - medicine
ọkà - maize
ọgbà - handicap etc.

2.3.2.4. kw , gw , nw [ŋʷ]

/kw/ contrasts with /k/, /g/. For example,

ɟkẉṳ̄ - to pay
ɟkṳ̄ - to knock
ɟgṳ̄ - to read etc.

/kw/ contrasts with /gw/, /nw/.

ɟkwē - to agree, to sing
ɟgwē - to grind, sky
ɟnwē - to own etc.

/gw/ contrasts with /g/, /gb/.

àgwa - beans, colour
àgba - jaw
ɟgwā - to tell
ɟgā - to go
ɟgbā - to run, to sting etc.

/nw/ contrasts with /n/, /g/, /gw/.

ɟnwṳ̄ - to die
ɟnṳ̄ - to hear
ɟgṳ̄ - to read
ɟgwṳ̄ - to be finished etc.

2.3.2.5. m , n , ny , ñ [ɲ]

/m/ contrasts with /n/. For example,

mà - but
nà - and
ḿmà - knife
ńnà - father
ṃ̀mṳ̀ - offspring, children
ṃ̀nṳ̀ - you (pl.) etc.

/n/ contrasts with /ñ/.

ánṳ - meat
áñṳ̄ - bee
ɟnṳ̄ - to hear
ɟñṳ̄ - to drink
ɟmṳ̄ - to give birth to

ọ́nṵ̄ - mouth
ọ́n̄ṵ̄ - joy etc.

/m/ contrasts with /n̄/

ímē - to do
íñē - to step over (across)
ímṵ̄ - to give birth
íñṵ̄ - to drink etc.

Both /m/ , /n/ and /n̄/ contrast with /ny/ , /nw/.

ímṵ̄ - to give birth
ínṵ̄ - to hear
íñṵ̄ - to drink
ínyṵ̄ - to pass through the rectum
ínwṵ̄ - to die

ọ́ma - good
ọ́nwa - moon
áñṵ̄ - bee
ánwṵ̄ - sun, mosquito
ányṵ̄ - pumpkin
ánṵ - meat
ímē - to do
ínyē - to give
ínwē - to own
íñē - to step across (over) etc

In some words where /n/ is used in the Onitsha and other northern dialects, this is replaced by /l/ in the Standard dialect. Some examples of words that illustrate this have been given in 1.4 above, and these will be repeated here.

Onitsha dialect	Standard dialect	
àna	àla	- land, ground
ụ́nọ̀	ụ́lọ̀	- house
énū	élū	- high, top
ínē	ílē	- to look
ínā	ílā	- to go home
ímṵ̄	ílṵ̄	- to marry etc.

It may be observed that in this as in the other cases of phonemic alternations that exist between the two dialects, there are no systematic phonological conditions under which these alternations take place. In other words, these alternations between the local dialects and the Standard dialect are not phonologically conditioned as such, but rather develop merely as differences between the phonology of the Standard dialect and these local dialects.

2.3.2.6. r , l

/r/ contrasts with /l/ in the Standard dialect. For example,

àla	-	ground, land
ára	-	madness
írē	-	to look
íre̱	-	to rot, to sell etc.

/l/ contrasts with /n/.

álụ̄	-	abomination
ánụ	-	meat
ínū	-	to push
ílū	-	to reach
ịnụ̄	-	to hear
ịlụ̄	-	to marry etc.

Some /l/ in the Onitsha dialect alternate with /r/ in the Standard dialect. For example,

Onitsha dialect	Standard dialect		
ílē	íre̱	-	to rot
ńlọ	ńrọ	-	dream
ílī	írī	-	to eat
òkólobịa	òkórobịa		young man, youth
Òkólo	Òkóro	-	personal name
ákàla	ákàra	-	line etc.

/l/ contrasts with /m/. For example,

àla	-	ground, land
àma	-	divulging secrecy
ɨlū	-	to marry
ɨmū	-	to give birth to
ílē	-	to look
ímē	-	to do etc.

2.3.2.7. s , z

The situation about [ʃ] and [ʒ] that occur in the local dialects and their relation to the Standard dialect have been discussed above. It has been stated that both [ʃ] and [ʒ] where they occur in these local dialects are allophones of /s/ and /z/ in the Standard dialect. In the Standard dialect,

/s/ contrasts with /z/, as in the following words,

ɨsā	-	to wash
ɨzā	-	to answer, to swell
ísè	-	to draw
ízè	-	to dodge
ísì	-	to smell
ízì	-	to send on a message
ísū	-	to pound
ízū	-	to steal etc.

/s/ contrasts with /ch/.

ísè	-	to draw
íchè	-	different
ọ́sá	-	squirrel
ọ́chá	-	white
ísi	-	head
íchi	-	ritual or title mark
ɨsǭ	-	to avoid
ɨchǭ	-	to seek for, to want
ísū	-	to pound
íchū	-	to fetch (water) etc.

/z/ contrasts with /j/. For example,

ízè - to dodge
íjè - walk, journey
ízū - to steal
íjū - to be full
ịzụ̄ - to buy
ịjụ̄ - to refuse etc.

2.3.2.8. h , gh [ɣ]

/h/ contrasts with /gh/ in the Standard dialect. For example,

ágha - war
áhà - name
íhe - thing
íghè - to be well cooked
ághụ̄ - alligator
áhụ̄ - a type of menu
áhụ̀ - that etc.

Both /h/ and /gh/ contrast with /g/ , /k/.

áhà - name
ágha - war
áka - hand
ághụ̄ - alligator
ágụ̄ - leopard
áhụ̄ - a type of menu
íghè - to be well cooked
íkè - to create etc.

In Igbo both /gh/ and /n̄/ have limited occurrence; they occur in very few words in the language. The phonemic contrasts between /gh/ and /n̄/ and the other consonant phonemes are drawn mainly through approximation, i.e. the tones of the words where these phonemes (/gh/ and /n̄/) are used may not be identical with those of the phonemes with which they are contrasted.

The /h/ phoneme in the Standard dialect sometimes alternates with /r/ in the Onitsha dialect. That is, in some words where /r/ is used in the Onitsha dialect, in the Standard dialect this is replaced by /h/. For example,

Onitsha dialect	Standard dialect	
ọrī	ọhī	- theft
ọrù	ọhù	- slave
ịru	ịhu	- face
ɨrāpụ̀	ɨhāpụ̀	- to leave off, to abandon
ọ̀ra	ọ̀ha	- crowd
ńrā	ńhā	- a fine, levy, penalty etc.

2.3.2.9. w , y

/y/ contrasts with /w/ in the Standard dialect. For example,

yá - 3rd pers. sing. pronoun (he/she/it)
wá - break
ɨyọ̀ - to seave
ɨwọ̀ - to deny somebody of something

/y/ contrasts with /ny/.

éyī - rabbit.
ényi - elephant
ɨyà (also ɨrɨà) - to suffer from
ɨnyà - to drive
ọ́yà - sickness
ọ́nyà - trap etc.

/y/ contrasts with /j/.

ǹyọ̀ - siever
ǹjọ́ - sin, evil
ịyī - oath, stream
ịjī - to take, to hold etc.

CHAPTER 3.

DISTINCTIVE FEATURES

3.1. THE DISTINCTIVE FEATURE THEORY

The distinctive feature theory which was first developed by the Prague School is well established in the present day phonological studies. Jakobson's model of the distinctive features, as well as the modifications of this in the Sound Pattern of English (henceforth SPE), (Chomsky and Halle 1968), which form the main basis of the distinctive feature theory in generative phonology, have been well documented in the various literature on phonology. The distinctive feature theory as contained in these two works has been so much popularized in modern phonological studies and literature that it would not be necessary to recount the same here.

The main principles that underly the distinctive feature theory, from Jakobson to the present time, are basically the same. The speech sound is viewed as comprising of discrete phonetic properties which account for the phonemic properties of the respective speech sound and for the phonemic contrasts that exist between the speech sound and other speech sounds in the language. In other words, the speech sound is seen and analysed in terms of those phonetic properties which are essential for its production and which make it possible for the speech souhd to be differentiated from the other sounds within the phonemic structure of the language.

One of the advantages of the distinctive feature theory in phonology is that it makes it easier and simpler to identify those speech sounds which constitute natural classes of sound. Sounds which share certain features in common form a natural class. For instance, /p t k/ constitute a natural class of sounds, whereas /p y a g/ do not, because the former share a feature while the latter do not share any feature in common.

Sounds which fall under the same natural class usually tend to undergo the same phonological rule. For instance, in Igbo, apart

from the vowels which are normally syllabic, nasal consonants can be syllabic, whereas all the other consonants are nonsyllabic in the language. These nasal consonants, /m n ny $\bar{n}$ nw/, can be seen to constitute a natural class of sounds. In Igbo only /k g ṅ ([ŋ])/ can be phonemically labialized. These three consonants form a natural class in that they are all [+ velar]. In American English, as pointed out by Hyman (1975), palatalization rule is typical to /s z t d/, and this rule changes these segments to /š ž č ǰ/ respectively. The segments /s z t d/ from a natural class in that they are all alveolar consonants. Similarly, in Russian language, palatalization rule often applies to /t d s z k g/ changing them to /č ž š ž ć ž/ respectively. The segments /t d s z k g/ are all articulated with the tongue. In Igbo, the rule that changes the nonclose, nonback vowels, /a e/, to back vowels, /ụ u/, respectively, in the environment of C V C (where the two consonant segments are identical) applies only when the consonant segments are either /b, p, m, f, v, gw, kw, nw ([ŋʷ]) or w/. These consonants share one feature in common, i.e. they are all [+ labial] . These examples, together with others like them in various languages, help to illustrate the point that speech sounds which shafe certain phonetic properties in common often tend to undergo the same phonological rule.

The distinctive feature system therefore provides a simpler and more accurate technique of identifying those speech sounds that share in common certain phonetic features and consequently belong to the same natural class of sounds. This subsequently is essential for the classification of the speech sounds. For instance, if we were to rely on criteria short of the distinctive feature system, it would be hardly possible to correlate /kw gw nw w/ in Igbo with /p b m f v/ and treat both sets of sounds as belonging to the same natural class, in that the former are readily seen and treated as velar consonants and the latter as labial consonants. However by the fact that these segments undergo the same rule and through our understanding of the feature that motivates that rule we are able to correlate these segments and group them under one class.

Similarly, /k g/ would hardly be classed with /t d s z/ especially judging from the point of view of place and manner of production. But . . . the fact that the former undergo the same phonological rule as the latter (cf. the example from Russian) is because these consonant segments share a phonetic feature in common, i.e. the feature of tongue articulation. In this way we are able to more easily and accurately identify those sounds that share the same feature and belong to the same class.

Using the distinctive feature system, phonologists have found it easier and more convenient in constructing phonological rules. The distinctive features make it easier to achieve simplicity and greater generalization in the phonological rules. For instance, rule (i) below expresses in a more simplified and generalized way than rule (ii), the nasalization of vowels after nasal consonants in Igbo.

(i) $\begin{bmatrix} + \text{Syll.} \\ - \text{cons} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{nasal} \end{bmatrix} \; / \; \begin{bmatrix} + \text{cons} \\ + \text{nasal} \end{bmatrix} —$

(ii) a → ã; e → ẽ; i → ĩ; ị → ị̃; o → õ; ọ → ọ̃; u → ũ; ụ → ụ̃ / { m, n, n̄, ny, nw } —

The distinctive features proposed in Jakobson, Fant and Halle (1952) and later in Jakobson and Halle (1956), as well as those proposed in Chomsky and Halle (1968) were intended to capture the phonological oppositions found in languages. The features in the various parameters chosen to express the phonological oppositions were set in binary oppositions designed to state either the presence or absence of a feature. Jakobson et alia relied more on the acoustic correlates of speech sounds in selecting the sets of distinctive features. These acoustic correlates, they found, more effectively and generally express the phonological oppositions between 'major' classes of speech sounds. Thus features like vocalic vs non-vocalic, or consonantal vs non-consonantal most effectively express the binary phonological opposition between consonants and vowels, the two major classes of speech sounds. Similarly features like compact/diffuse; grave/acute; tense/lax; flat/plain etc. were seen to very effectively express the phonological oppositions between classes of speech sounds. These features, it can be seen, have been chosen on the basis of the degree or amount, presence vs the absence of the spectral energy involved in the production of given speech sounds. The articulatory properties of the speech sounds are taken more or less as secondary considerations.

The distinctive features proposed in the SPE, although generally based on those proposed earlier by Jakobson et alia, take into account the articulatory and acoustic properties of speech sounds. Like Jakobson's features, they were designed to capture the phonological oppositions found in languages, and in addition to this, they were also designed to describe the phonetic content of the segments. The SPE provides substantial modifications on the system of distinctive features proposed in Jakobson et alia (1952/56). With respect to the distinctive features proposed in the SPE the features High, Low, Back, Syllabic, Anterior and Coronal evidently constitute the most dramatic modifications on Jakobson's distinctive features.

The features High, Low, Back, which describe the different displacements of the body of the tongue during articulations, are designed to define the different vowel sounds as well as the secondary phonetic features of certain consonant sounds such as palatalization and velarization. Thus palatalization of consonants can be specified as [+ high] , and velarization of consonants can be specified as [+ back] .

The feature Anterior is designed to define those consonant sounds that are produced with an obstruction that is located in front of the palato-alveolar region of the mouth; non-anterior sounds are produced without such an obstruction. For example,

[+ ant] p b t d f s v z m n l

[- ant] k g ñ ([ɲ]), gh ([ɣ]) etc.

The feature Coronal is designed to define those consonant sounds produced with the blade of the tongue raised from the neutral position; non-coronal sounds are produced with the blade of the tongue in the neutral position. Some examples of consonant segments defined by this feature are:

[+ cor] t d n s z l r etc.

[- cor] p b g k f v etc.

The feature Syllabic is designed to capture certain phonological similarity between the vowels and certain consonants in some languages like Igbo. In most languages the vowel segments are usually syllabic while the consonant segments are nonsyllabic. In some languages such as Igbo, certain consonant sounds are, like the vowels, syllabic. In Igbo, as we mentioned earlier above, some nasal consonants can be syllabic. This feature, Syllabic, was not proposed by Jakobson, and it is clearly evident that what can or cannot constitute a syllabic peak is phonologically significant in a language.

Other features such as Lateral, Distributed, etc. were introduced in the SPE. These features which are designed to define the different properties in the articulation of certain consonant segments have modified, supplemented or replaced some of those features used by Jakobson.

Despite its achievements, the SPE has not provided all the answers necessary for the distinctive feature analysis in many languages. As the phonology of other languages are described using the SPE distinctive feature framework, the more the shortcomings of the SPE system become apparent. Take for instance, the case mentioned earlier where we noted that /t d s z k g/ undergo similar phonological rule of palatalization in Russian phonology; within the SPE distinctive feature system, there is yet no feature which can be used to specify this feature property which these consonant segments have in common, i.e. the fact that all these consonants are articulated with the body of the tongue. The features of coronal and anterior would, for instance, identify these consonants differently, thus:

[+ cor] t d s z

[- cor] k g

[+ ant] t d s z

[- ant] k g

Using the distinctive features proposed in the SPE certain double articulated consonants in Igbo such as kp, gw, ŋw etc. would be specified with plus and minus values of the same feature. Kp, for instance, would be specified as [+ anterior] and [- ant].

One aspect of the distinctive feature theory presented in the SPE which has come under constant attack from some phonologists is the binary opposition hypothesis. The distinctive feature theory proposed by Jakobson as well as that proposed in the SPE, as we mentioned earlier, is based on the binary opposition hypothesis.

According to this hypothesis, a feature is specified with either a minus or plus value but never both. In other words the binary opposition hypothesis presupposes either the presence or the absence of a feature.

Some objections have been raised by some phonologists against the binary opposition hypothesis and some proposals have been made to revise the binary opposition system in phonology. Ladefoged (1971, 1975), Contreras (1969), Lindau (1975) and Williamson (1976), to mention a few, have each proposed that some other alternative of feature opposition other than the binary opposition be adopted for the distinctive feature analysis in phonology. On the basis of some evidence from his study of the phonology of some African languages, Ladefoged has proposed that a multivalue type of feature opposition would be required to accurately account for certain types of feature oppositions in phonology. In Ladefoged (1975), the author tried to outline how the multivalue feature opposition system could be used in the analysis of English phonology. The multivalue system will be discussed in the next section.

The distinctive features set up in the SPE cannot fully and adequately define certain speech sounds in Igbo. As Hyman (1975 :53) points out, the set of distinctive features proposed by Chomsky and Halle (1968) fail to relate labial and labialized (rounded) segments. Labial consonants such as [p b m] are [+ ant , - cor] and [- round], while labialized consonants such as [kw] , [gw] , [ŋʷ] are [+ round] . That is, whereas the SPE feature system would successfully correlate the labialized consonants in Igbo to rounded vowels, through the feature [+ round] , it fails to relate the labialized consonants and the rounded vowels to the labial consonants. We have given some proof earlier from Igbo to show that the labialized consonants [kw, gw, ŋʷ and w] are related to the labial consonants in this language.

Igbo has four vowel heights, namely, Close, Half-close, Half-open and Open, These vowel heights are both phonetically and

phonemically significant in the language. Within the SPE framework only three vowel heights are possible and the features [High] and [Low] which have been used to specify the three vowel heights, will not be adequate enough to account for the four vowel heights in this language.

For reasons such as the ones given above, we will not consider the distinctive feature analysis as proposed in the SPE fully adequate for our analysis.

3.2. MULTIVALUE DISTINCTIVE FEATURES.

The multivalue distinctive features proposed in Ladefoged (1971/75) and expounded in Williamson (1976), using the generative phonology framework will be more favourable and adequate for our present analysis of the Standard dialect of Igbo.

The multivalue distinctive feature theory is a comparatively recent development in generative phonology. The principles that underly this theory is however as old as those of the binary distinctive features. However, the multivalue distinctive feature theory has not been popularized in phonological studies in the way that the binary feature theory has. Consequently, we shall first devote some time in explaining what the multivalue distinctive feature theory is all about, and in providing some arguments in favour of the multivalue distinctive features, showing how and in what aspects they can account for phonological facts more efficiently than the binary distinctive features.

In modern generative phonology, distinctive feature opposition is treated as exclusively binary, because, as Halle argued, the binary system of opposition is easier to incorporate into phonological descriptions than the mixed system, i.e. tertiary system. However, as Ladefoged (1971) correctly points out, it is universally accepted that many features are multivalued at the systematic phonetic level, consequently it is an arbitrary restriction to require them all to be binary at the systematic phonemic level.

Ladefoged (1975 : 256) therefore proposes that besides the binary distinctive feature opposition, we should also use the multivalue distinctive feature opposition in phonology. He states, for instance, that "when classifying the phonemes of a language there are often two possible values of a feature." Phonemes can be classified as having features with a plus or a minus value, i.e. if the feature has a strict two-way opposition. 'But even when we simply classify phonemes, some features are multivalued'. If in a given language the phonemes can be classified by stating only two contrasting values of a feature, then the terms [+] and [-] are used. If more than two possible values contrast, then the values are given names (labels) such as, for the feature of Height, [High] , [Mid] and [Low] . English phonemes, Ladefoged explained, can be classified in terms of five values of the feature of Place : [Labial] , [Dental] , [Alveolar] , [Palatal] , and [Velar] . These terms form a set of mutually exclusive items.[44]

The multivalue distinctive feature theory therefore claims that apart from those features with strict binary opposition, there are certain features with multivalued distinctive opposition. Features such as Height, Stricture etc., which for their contrastive values are defined in terms of phonetic scales or gradations, are multivalued, whereas those features which do not constitute phonetic scales are usually binary.

Williamson (1974, 1976)[45] strongly argued that certain feature oppositions in some languages suggest 'gradual' rather than 'privative' opposition. Gradual opposition characterizes the type of opposition in which the members differ through degrees or gradations of the same feature. A feature opposition that occurs in this way does not fall neatly into the dichotomous 'either - or' type of opposition, which is characteristic of the privative opposition.

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44. Ladefoged, P. 1975. A Course in Phonetics, p. 256.

45. Williamson, Kay 1974. "Some proposals for multivalued features". Paper presented at the Linguistic Seminar, University of Ibadan.

—— (1976). "Multivalued features for consonants". MS.

Williamson noted that certain forms of sound change such as Assimilation and Consonant Weakening which occur in many languages, clearly indicate gradual feature opposition. With some examples illustrating diachronic sound change from the dialects of Ịjọ language, Williamson (1976) provided some evidence in support of her claim. The examples from the Ịjọ dialects together with some matching examples from the Igbo language are given below.

In these dialects of Ịjọ the following forms of diachronic sound change were noted (cf. Williamson 1976):

1. Stops became affricates before close vowels in some dialects. For example,

(a) d > dʒ before i, ị, in Nkọrọọ dialect.

(b) d > dʒ before i, ị, u, ụ, in Kalabarị, Ọkịrịka etc.

(c) t > tʃ before i, ị, u, ụ, in Kalabarị, Ọkịrịka etc.

(d) k > tʃ before i, ị, in Biseni.

2. Affricate [tʃ] (from [t]) became fricative [s] in Kalabarị and Ibanị.

3. The stop [g] became fricative or approximant [ɣ] in all the dialects of Izon and Biseni - Ọkịrịka, when it occurs between two stem vowels. In many dialects it was later lost.

4. The implosive stop [ɓ] became approximant [w] in Ibanị when it occurs between back vowels in C_2 position.

5. The fricatives [f] , [s] became approximant [h] in Akasa.

These changes can be related as steps or degrees/gradations on a feature scale as shown below.

	Stop		Affricate		Fricative	Approx.	Zero
1 (a),(b)	d	>	dʒ				
1 (c), 2	t	>	tʃ	>	s		

	Stop		Affricate		Fricative		Approx.	Zero
1 (d)	k	>	tʃ					
3.	ɛ			>	ɣ	>	ɣ̇	> ~~θ~~
4.	ɓ					>	w	
5.					f	>	h	
5.					s	>	h	

Similar consonant weakening also occurs in Igbo. However, the Igbo cases represent a synchronic phonological process. The following are some of the examples from Igbo illustrating consonant weakening:

1 (a) [b] becomes an approximant [w] before ụ in some dialects of Onitsha and Owerri. For example,

i. ọ́ bụ̀ [ɔ́ wà] - it is/it was

ii. ị́bụ̄ [ɪ́ wā] - to be

iii. ỌỌ-bụ́bụ [ɔ̀ wá wa] - being

iv. ọ́ bụ̀bu [ɔ́ wàbu] - it used to be

v. ỌỌ bụ́ghị̄ [ɔ̀ wá ɣɪ̄] - it is not etc.

The change observed here appears to be restricted only to the verb ị́bụ̄,'to be'.

(b) [b] becomes [v] before u, ụ, in other cases.

For example,

i. ó bù [ó vù] - he carries, he is carrying

ii. ọ̀bụ́bụ̀ụ̄ [ɔ̀ vá vaa] - a typr of larva

iii. ábụ [ávɑ] - pus etc.

2. [p] becomes [f] before u, ụ (cf. the preceding chapters). These examples will illustrate.

i. ɟpụ̀ > [ɟ́ fə̀] - to go out

ii. ò̩pụpụ́ > [ò̩ fɷ fə́] - going out

iii. ífū > [ífŭ] - to germinate etc.

As in the (i) (a) examples, the [p] → [f] change exemplified above is restricted to verbs and forms derived from verbs.

3. (a) [f] becomes [ɸ], a voiceless bilabial fricative, before back vowels. For example,

i. Nwáàfọ > [ŋ - wáàɸɔ] - personal name

ii. òfufú > [òɸ uɸ ú] - missing, being lost

iii. ífù > [íɸ ù] - to miss

iv. ífò > [íɸ ò] - folk-tale

v. ífō > [íɸ ō] - to mention

vi. áfọ > [áɸɔ] - stomach

vii. áfò > [á ɸò] - year

viii. ɟfù > [ɟ́ ɸə̀] - to blow etc.

(b) [f] becomes [β] before non-back vowels, a, e, i, ị. For example,

i. éfi > [éβ i] - cow

ii. ɟfɪ̄ > [ɟ́ βɪ̄] - to twist

iii. áfà > [á β à] - name

iv. ífè > [í β è] - to worship etc.

It is important to note that in the dialects where the latter synchronic sound changes mentioned in (3) (a), (b) above operate, an [f] which is realised from a [p] as a result of the consonant weakening mentioned in (2) above, as in ịpụ̀ > [ị́fʊ̀], ịpū > [ị́fū], ọ̀pụpụ́ > [ɔ̀fʊfʊ́] etc., does not become [Φ] or [β]. In other words, only those [f]s which are not realised from another consonant as a result of the phonological process of consonant weakening can change to [Φ] or [β].

In the preceding chapters (chapters 1 and 2) mention was made of certain alternations between the phonemes of some local dialects and the Standard dialect. With regard to the members of the sounds that undergo these alternations, there is sometimes an element of phonetic scale in the feature of Stricture between the alternated consonant segments. The following examples will illustrate.

4. [f] in the Onitsha dialect sometimes alternates with [h] in the Owerri and the Standard dialects. For example,

áfà	>	áhà	–	name
éfi	>	éhi	–	cow
áfụfụ	>	áhụhụ	–	suffering
áfịfịa	>	áhịhịa	–	grass
áfịa	>	áhịa	–	market
éfìfie	>	éhìhie	–	afternoon etc.

5. [n] in the Onitsha dialect alternates in some cases with [l] in the Owerri and the Standard dialects. For example,

ànа	>	àla	–	ground, land
ịnā	>	ịlā	–	to go home
ínē	>	ílē	–	to look
ịnụ̄	>	ịlụ̄	–	to marry etc.

These examples discussed from Igbo, like those given by Williamson from Ịjọ, show changes occurring along a scale of phonetic feature, namely, the feature of Stricture. The changes along this scale with respect to the Igbo examples are summarized below.

Consonant Weakening in Igbo dialects.

	Stop		Fricative[1]		Fricative[2]	Lateral		Approximant
1 (a)	b						>	w
(b)	b	>	v					
2.	p	>	f					
3 (a)			f	>	Φ			
(b)			f	>	β			
4.			f	>	h			
5.	n					>	l	

The examples of consonant weakening from the Ịjọ dialects, Williamson argued, are clear indications of 'gradual' feature opposition which occurs along a phonetic scale of the same feature. She further argued that 'in addition to purely phonetic evidence, the reality of such a scale can be shown by the degree to which it is useful in explaining synchronic phonological rules'.

This observation by Williamson summarizes, in part, the advantages which the multivalue feature system has over the binary distinctive feature system. The former, the multivalue feature system, helps us to achieve economy and greater generalization in phonology. For instance, in the examples of consonant weakening discussed from Ịjọ and Igbo, modern generative approach would set up separate phonological rules to account for each of the phonological changes discussed above. Some of the rules would look something like the following:

i. [Stop] → [Affricate] / — [V, + high]

ii. [Affricate] → [Fricative] / X — Y

iii. [Stop] → [Approximant] / — [V, + back]

iv. [Stop] → [Fricative] / — [V, + back] etc.

Though we have not taken time to give the actual formalization of these rules, however, the essential point here is that modern generative approach would require several phonological rules to account for these phonological changes involved in the consonant weakening of the segments; each rule designed to account for each case of the changes.

Using the multivalue feature system, we would be able to account for the whole range of the consonant weakening described above in a much more simple and economical way. All the phonological changes described above would be treated as changes occurring within the different steps along the scale of the same feature, namely, that of [STRICTURE] . They involve changes from one Stricture type to another, viz, from the Stop Stricture to Affricate Stricture, from Stop Stricture to Approximant or Fricative Stricture, from Affricate Stricture to Fricative Stricture etc. This represents a phonetic scale of one feature - [Stricture] .

Some of the examples we described from Igbo where a fricative further weakens to another fricative are particularly interesting. Here we have examples of what we may term as fricatives of 'stronger' stricture weakening to fricatives of 'weaker' stricture. For instance, though both [f] and [ɸ] or [β] are fricatives, the strictures involved in both types of articulation are different, one being a closer and 'stronger' fricative stricture, as in [f] , while the other is a more open and 'weaker' fricative stricture as in [ɸ] or [β] . A similar case of consonant weakening within one stricture type would be the weakening of [s] to [ʃ] in some dialects of Igbo.

As we noted earlier in the analysis, most dialects of Owerri, i.e. the southern dialects, tend to use [ʃ] where [s] occurs in the Onitsha and the Standard dialects, especially where the latter is followed by a close front vowel. Examples illustrating this have been given above, for instance, such words as ísi, àsị́, ísī etc. in the Standard and the Onitsha dialects are pronounced as íshi, àshị́, íshī, respectively in these southern dialects. In this case we have a more 'tense' fricative stricture weakening to a more 'lax' fricative stricture.

Phonological changes such as these that apparently depict changes within the phonetic scale of a given feature abound in many languages, and evidence from such phonological changes provide strong support to the multivalue feature hypothesis.

The multivalue feature analysis expressed one important claim widely made in generative phonology, viz, the principle of naturalness. This principle claims that there are natural and unnatural phonological rules. Natural phonological rules describe natural phonological processes and they are more plausible than the unnatural rules, because they state natural phonetic facts. For instance, (a) - (f) below represent natural phonological processes that operate in many languages.

(a) k → tʃ

(b) t → tʃ

(c) d → dʒ

(d) p → f

(e) w → u

(f) y → i etc.

(g) - (j) below are unnatural phonological processes and they rarely operate in any language.

(g) k → p

(h) p → s

(j) y → a etc.

Natural phonological processes operate between segments that share in commom certain phonetic properties, and the phonological change usually involves a gradual transition along a phonetic scale. In most of the natural phonological processes given above, the phonological change is usually that of shifts (along a scale) in the feature of Stricture. In languages with final consonant devoicing, such as in Russian and German, this phonological change is that of shifts in the feature of glottal state or voicing. The same is true of other forms of neutralization described in several languages, all of which usually involve shifts along a scale within a given phonetic property.

Apart from the arguments presented above regarding those features that are expressed in phonetic scale, other arguments in support of the multivalue distinctive feature system come from those sounds whose distinctive features cannot be expressed through the binary distinctive feature system given in the SPE. We observed earlier, for instance, that to specify the distinctive features of certain complex sounds in Igbo such as kp, gb, ŋw etc., using the SPE system of distinctive features, would result into the use of incompatible features or incompatible values of the same feature for the same segment. For example, both kp and gb would be specified as [+ ant] and [+ back] or as [+ ant] and [- ant] .

Complex sounds such as those illustrated from Igbo exist in other languages, especially in some African languages. Pongweni (1977), for instance, described certain complex sounds, such as [px] , [bɣ] etc., which occur in the Karanga dialect of Shona. Like the kp in Igbo, these sounds, [px, bɣ] , are both [+ ant] and [+ back] , and this is the way those segments were defined by Pongweni. However, the feature specifications, [+ ant] and

[+ back] are both logically incompatible within the same segment.

Similar problems are encountered in the definition and analysis of other complex sounds such as the prenasal and post-nasal consonants which occur in the Karanga dialect as well as in other languages. The Karanga dialect has prenasal complex sounds such as [mb, nd, ŋg, ɳz, ɳʒ, ɳlz, ɳdz] (Pongweni, 1977 : 350). Problems connected with the phonological structure of prenasal, postnasal and full nasal consonants have been well defined by Anderson, S. (1976). As Anderson pointed out, the significant problem about prenasal and postnasal consonants is not only that nasality does not spread into the neighbouring segment in the complex, despite the fact that these segments are often voiced consonants, but also how the vowels that occur with these complex sounds are assimilated to the nasality of the complex sounds. Anderson illustrates this using the following paradigm.

The paradigm of phonetic nasality in the full range of possible circumstances is as follows; where V indicates oral vowel and Ṽ a nasal vowel (Anderson, S. 1976 : 337):

A	B
[V b V]	[V b d V]
[Ṽ m͡b V]	[Ṽ m d V]
[V b͡m Ṽ]	[V b n Ṽ]
[Ṽ m Ṽ]	[Ṽ m n Ṽ]

The forms in the first column represent possibilities for single intervocalic consonants, including pre and post nasal complexes, while the second column represents the shape of intervocalic clusters. One obvious conclusion we can draw from this is that in terms of the concord in nasality by the surrounding vowels, the

pre and post nasal complexes behave like the clusters. This shows that the non-nasal members of the pre and post nasal complex sounds do in fact block the nasality from spreading to the vowel that follows them, just as this would happen if the member occurred in an inter-vocalic cluster between a nasal consonant and a vowel.

How do we specify the features of these complex sounds in terms of nasality, using the current binary feature system in generative phonology? To answer this question, we shall borrow the following scheme from Anderson, S. (1976).

[:... o $\widehat{bm}$ n ....]

Syll	+	-	-
cons	-	+	+
nasal	-	- +	+
high	-	-	-

From the above, [bm] or [mb] will be treated as having the features of [+ nasal] and [-nasal]. This theoretically true but logically awkward analysis which involves using incompatible values of plus and minus of the same feature for a single phoneme can be easily avoided if we use the multivalue features to define these segments. For instance, using the multivalue distinctive features which we shall propose later, we can specify the features for [bm] and [mb] thus:

$$\begin{bmatrix} 6 & 6 & \text{Stricture} \\ 9 & 9 & \text{Place} \\ +\text{nas.} & -\text{nas.} & \end{bmatrix}$$ for [$\widehat{mb}$].

$$\begin{bmatrix} 6 & 6 & \text{Stricture} \\ 9 & 9 & \text{Place} \\ -\text{nas.} & +\text{nas} & \end{bmatrix}$$ for [$\widehat{bm}$].

Through the multivalue distinctive features we can show, as in the above examples, which of the members of the complex sounds are nasal and which one is not. This provides not only an adequate means of defining these complex sounds but also for accounting for any change which any member of the complex sound may undergo.

One of the areas in which the binary feature system has come under constant attacks has been in the considerations about vowel height. We mentioned earlier that within the SPE framework only three vowel heights are recognized, viz, high, mid and low. The features [+high, - low] are used to specify the high vowels, while the features [- high, - low] specify the mid vowels, and [- high, + low] specify the low vowels. It has been pointed out that languages such as Danish (Matinet 1937), Swedish (Fant 1967) etc. have each four vowel heights. The Standard dialect of Igbo has four vowel heights which are as follows;

	Front	Back
close	i	u
half-close	ị	ụ
half-open	e	o
open	a	ọ

Some dialects of Igbo have five phonetic vowel heights. In these dialects /ɛ/ is phonemically differentiated from /e/.

The vowel heights in these languages, as Hyman (1975) correctly remarked, represent a system where the members are characterized by different degrees or gradations of the same property. We would therefore require a multivalue feature system to be able to accurately define such vowels in terms of tongue height.

The use of binary features runs into difficulties in tonology. Some register tone languages operate on one of the following tone systems.

i. High
Low

ii. High
Mid
Low

iii. Extra High
High
Mid
Low
Extra Low etc.

Similar to what was stated about vowel heights, the different contrastive tone levels represented above constitute different degrees or gradations of the same phonetic feature. We would need a multivalue feature system to be able to accurately handle the phonological features of tone in such languages.

From the above discussions it becomes undoubtedly evident that we require multivalue features in phonology. We have shown through these discussions the shortcomings of the binary distinctive feature system in some areas of phonological analysis, and we implicitly make the claim that the problems posed in these and other areas would be much more conveniently resolved through the multivalue feature approach.

From the cases discussed above, especially the consonant weakening in Igbo and Ịjọ, we have shown that the multivalue feature system helps to achieve simplicity and greater generalization in phonology than the binary feature system.

We cannot ignore the advantages which the multivalue distinctive feature system has in phonological description, nor can we seriously pretend that the problems pointed out above regarding the binary feature system do not exist.

3.2.1. A BRIEF SUMMARY OF THE MULTIVALUE DISTINCTIVE FEATURES PROPOSED BY LADEFOGED (1975) AND WILLIAMSON (1976).

The multivalue distinctive features were first proposed in Ladefoged (1971) and revised in Ladefoged (1975). We shall concentrate here on the revised version presented in (1975). In both works the author sometimes gives three to five or more subcategories within a given feature type. For instance, within the feature of Voice, other subcategories such as Glottal stop, Laryngealized, Voiced, Murmur and Voiceless were distingiushed on the basis of the different types of glottal stricture used in the production of certain speech sounds.

Those features which show significant phonetic differences within a features class (where the differences in the degrees of the phonetic properties of a feature class play significant function in the phonemic structure of the speech sound) were subcategorized in relation to the levels in the phonetic properties. Those features in which the differences in the degrees of the phonetic property do not carry phonemic contrasts in the sounds so produced, were treated as having a two-way contrast, represented with a plus or a minus value for that feature.

In the distinctive features proposed in Ladefoged (1975), as well as in Ladefoged (1971), two systems of feature specification were used, namely, a binary system, where the features were specified with plus or minus values, and a multivalue system, where the features were specified either with labels, without numerical values, or with scale, where the features are specified in numerical values. The features specified with plus or minus values include the following: [+ nasal] [- nasal] ; [+ labial] [- labial] ; [+ lateral] [- lateral] etc. Some features were specified with labels only (i.e. without numerical values), for example, for the feature of STOP, [Stop] , [Fricative] , [Approximant] ; for the feature of PLACE, [bilabial], [labiodental], [dental], [alveolar] , [palatal] , [velar] etc. Some features were specified with

numerical values, representing the phonetic scale, for instance, for the feature of VOICE, [1 glottal stop] , [2 laryngealized] , [3 voiced] , [4 murmur] , [5 voiceless] ; for the feature of HEIGHT, [4 height] , [3 height] , [2 height] and [1 height] etc. (cf. Ladefoged 1975 : 258-259).

The main objective underlying the multivalue distinctive feature analysis presented in Ladefoged (1971, 1975) is principally to explain the multivalue feature theory and to show how this can be used as a possible alternative to the binary distinctive feature system in certain areas of phonology. Ladefoged does not go into detail in the works mentioned, to show how the multivalue features could be formalized in phonological analysis (i.e. in terms of formulating and/or justifying phonological rules).

Christine Allen (1974) and Williamson (1976) have criticised Ladefoged with reference to the feature of Place. Allen criticised Ladefoged's treatment as inconsistent; 'if [Articulatory Place] is a scalar feature, measuring, say, distance from the glottis, then labial-velar and labial-alveolar cannot fit in', for as Allen points out, Ladefoged's system does not allow the specification of two different values of the same feature simultaneously. Williamson criticises Ladefoged for the same reason, that the features Ladefoged proposed for PLACE do not permit the description of complex sounds which involve simultaneous articulations in different locations in the vocal tract.

Using the features proposed by Ladefoged for Place, we would define kp in Igbo as [bilabial] and [velar] . This does not allow us to state, for instance, that the articulatory contacts in both places are simultaneous. Similarly, in certain articulations involving two places of articulatory stricture, the strictures can be sequential, not simultaneous as in kp in Igbo. This, for instance, is the type of stricture involved in the production of Affricates, where one stricture (or the articulatory contact) is released before the other is formed. Using the system proposed by Ladefoged for

the feature of PLACE, we cannot show this sequence in the articulation.

This problem can be resolved by, among other things, ordering the features that come under PLACE with numerical values. In this way, as will be shown later in the present work, we can represent easily the sequences in the articulations of complex sounds.

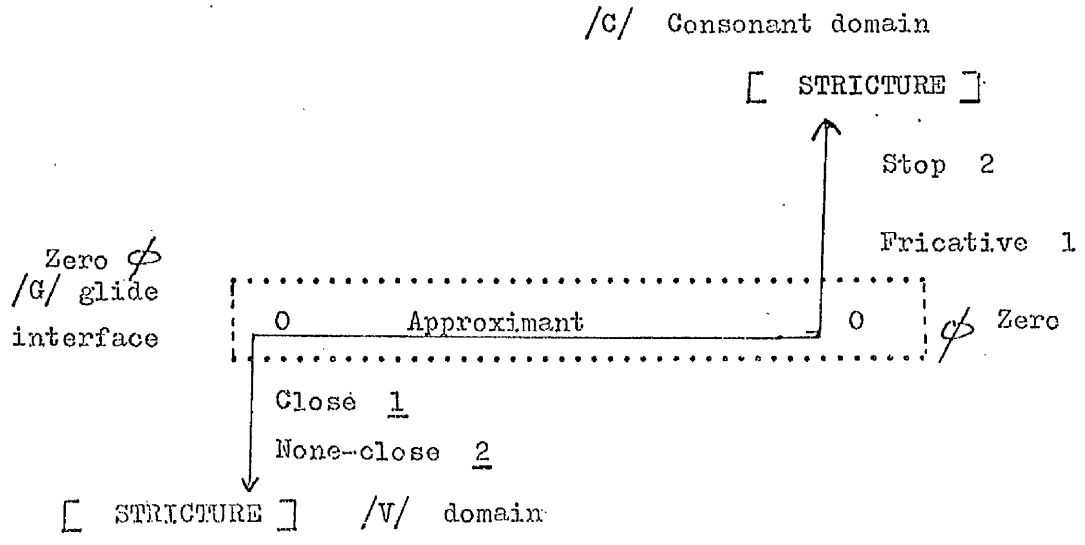
Ladefoged's use of labels for some feature specifications and of numerical values for some feature specifications in the system might have been motivated by what we may call 'logical reality', that is, the fact that some features such as Height represent a logical scale, whereas some features such as Stop or Place do not neatly fall into the scalar consideration. However, for theoretical convenience, at least, any feature that involves three or more subcategories requires certain ordering along a scale of numerical values. Features such as PLACE can be viewed as constituting a phonetic scale ranging from the foremost position, which in this case is [bilabial] , to the backmost position, i.e. [glottal] . In this way all features which are multivalued would be numerically ordered in a scalar manner, i.e. represented with numerical values.

Williamson (1976) attempts to formalize the multivalue distinctive feature system using the framework of generative phonology. Williamson's analysis constitutes a great improvement on Ladefoged's system. Some of the features given in Ladefoged's system were revised or modified, and some new features were introduced in Williamson (1976). Williamson attempted to show how the multivalue feature system can be incorporated into the modern generative phonological analysis, especially , how the multivalue features can be used in formulating phonological rules. Williamson's analysis of the multivalue distinctive feature system using the modern generative phonology has provided the general theoretical framework in which Amayo (1976) described the phonology of Edo (Bini). In the present thesis, we have modelled our description of the distinctive features of the segments of the Standard dialect of Igbo generally on the framework of Williamson's analysis. In the analysis adopted for the present work, certain modifications on the features proposed in Williamson (1976) will be necessary in some cases.

Apart from the modifications and certain new features introduced in Williamson (1976), some basic differences do exist between her approach and that of Ladefoged (1971, 1975). One area where Williamson's approach differs from Ladefoged's is in the fact that whereas in Ladefoged's view the multivalue distinctive feature system should be allowed to run (be used) together with the binary distinctive feature system in phonology, which as we observed above, would involve the use of plus and minus values as well as the label and the numerical values for the features (the latter being characteristic of multivalue feature specifications), Williamson carefully avoids this commitment and uses the same system of feature specification in the analysis. All the features are specified with scalar system of representation, i.e. numerically ordered, even though some of the features have basically two-way contrasts. For example, the features of nasality, labiality, laterality etc., which are specified by Ladefoged as [+ nasal] [- nasal]; [+ labial] [- labial] and [+ lateral] [- lateral] respectively, are specified by Williamson as [1 nasal] [0 nasal]; [1 labial] [0 labial] and [1 lateral] [0 lateral].

An important concept introduced in Williamson (1976) is what the author called "the point of interface" in the phonetic scale of certain features. The following example from Williamson (1976) will be used to illustrate this concept.

In Williamson (1976 : 20) the feature of [STRICTURE] is represented thus, showing the 'point of interface'.



The consonant domain involves 2 - 0 of STRICTURE below /C/. The vowel domain, /V/, involves 1 and 2 (i.e. -1 and -2) of STRICTURE. ..... The glide interface, opposite /G/, is marked out with dots (Williamson 1976, p. 20, MS).

This concept, 'interface', is not a very popular one in phonology or in linguistics generally. From the little we understand of this concept, it describes a stage or state along the line in a transformational or transitional process from one state to another. Interface is used to characterize a phase in a transition where the object that is being transformed exists in as it were, a 'neutral' stage (state), whereby the stages or phases before and after the transition are described in positive and negative values, respectively, with reference to the change that results from the transition. This, of course, is how this complex concept can be expressed in a nontechnical language.

We disagree with Williamson in positing the point of interface with regard to the feature of Stricture, and for that matter, any feature that involves a phonetic scale which is thus treated as multivalued. The complex movements of the speech organs during speech production can hardly be seen in the light of interface. The question is, what point in the movements of the speech organs can be identified as an interface stage or the zero stage in the articulatory process? The speech organs are always in continuous and fluid movement during speech, especially during the transition from one articulatory posture to another. Which sounds or segments of a sound can be really described as being produced during the 'interface' stage?

According to Williamson, the Approximants are characterized by or produced during the interface stage of Stricture and they are therefore represented with zero value of Stricture; the Consonant segments are assigned positive values and the Vowel segments are given negative values of Stricture. However, it is evident from our phonetic description of the segments, in chapter 2, that

on the basis of stricture alone [i] and [y] or [u] and [w] have little or nothing to differentiate between each pair of sounds. Each pair is characterized by the same type of stricture, namely, a stricture of close approximation of the articulators which allows free and unimpeded emission of the air from the lungs. Under similar considerations, the stricture types characteristic of [ɸ] , [β] , [h] etc. constitute strictures of open approximation of the articulators, more open indeed than those for [i] , [u] , [y] or [w] , except that the former have frication modulation; yet the former, i.e. the fricatives are given 1 value of Stricture and the vowels and the approximants are given -1 and 0 values of Stricture, respectively, in Williamson's analysis. In other words, the concept of interface is not supported either phonetically or phonemically in phonology. In our present analysis, the feature of Stricture just as that of tongue Height will be treated as one of progressive phonetic scale, starting from the most open state of the articulators as in [a] to the most close as in the production of stop consonants.

Not unconnected with the above arguments, Williamson (1976) uses positive and negative values in her scalar system of the multivalue features. It is however, difficult to understand how this polarization of values (into negative and positive values) logically differs from the plus and minus values used in the binary distinctive feature oppositions. For instance, both [1 stricture] and [-1 stricture] or [2 stricture] and [-2 stricture] are logically equivalent to [+ stricture] and [- stricture] , i.e. if we disregard for the moment, the numerical values. As we stated earlier, a multivalue system should describe a progressive scale within a feature, where the differences are that of degrees, not necessarily in terms of positive and negative polarization of values.

In the analysis presented in Williamson (1976) the Zero, (0), has no consistent value. In some cases zero indicates the presence of a feature, such as [0 glottal state] , which is Voice ;

[0 larynx movement] , which is Pulmonic; [0 pharynx size] , which stands for Normal etc.; in some cases zero indicates the absence of a feature, for instance, [0 nasal] for non-nasal; [0 gravity] for non-grave; [0 sibilance] , which is non-sibilant etc. In other words, the Zero has no consistent value. This problem about what value to assign to the Zero, arises, on the one hand, from mixing purely binary features with those features which are by nature multivalued, and on the other hand, from treating the multivalued features with positive vs negative values arranged within the scalar numerical order of the feature values.

Finally, despite these and the other areas where we might disagree with Williamson, it should be sincerely admitted that the analysis of the multivalue distinctive features presented by the author has its great merits. Immense contribution has been made by the author towards a systematic analysis and formalization of the multivalue distinctive feature theory, a theory which as we noted earlier has been little used in modern phonological studies.

A summary of the distinctive features proposed in Ladefoged (1975), Williamson (1976) and those proposed in the present thesis will be given later, at the end of this chapter.

3.3. THE CONVENTION FOR SPECIFYING THE DISTINCTIVE FEATURES FOR THE SEGMENTS OF THE STANDARD DIALECT OF IGBO.

In defining the set of distinctive features which we consider necessary for the phonological description of the Standard dialect of Igbo, we have benefited much from the previous studies mentioned earlier, both from the conventions established in the SPE as well as from the multivalue distinctive features proposed by Ladefoged (1975) and particularly from the refined and formalized version of the multivalue distinctive features presented by Williamson (1976) and from this revised system of distinctive features as used by Amayo (1976) in the description of the Edo (Bini) phonology.

The type of distinctive feature system we consider ideal for our purpose is roughly similar to that proposed by Ladefoged (1975). Like Ladefoged we feel that feature specification in phonology should be such that we can allow the use of plus and minus values for those features that are strictly binary in nature, and the use of scalar system of representation where numerical values are more convenient for specifying the different phonetic scales of a feature. In other words, we wish to propose that numerical values be designed to represent the phonetic scales of a feature, where this is necessary, and where phonetic scale does not play significant role in the phonemic property of a feature (i.e. where the phonemic characterization of a feature merely requires the presence or the absence of the feature) the distinctive properties of such a feature are expressed through plus or minus values.

The use of numerical values, namely, 1 and 0 values, for features which are strictly binary, will not be adopted in our description. Numerical values such as 1 and 0 values implicitly express some scale and binary opposition is not expressed in scales. Under similar considerations, Zero values by implication indicates absence of a feature. However, in the strict sense of multivalue features, the feature is supposed to be present but only within some phonetic measures or degrees. Consequently, the use of zero value for specifying the features that are multivalued is not fully adequate.

For the set of distinctive features required for the present work, multivalued features are used only for those features that show phonetic scale. Such features as Stricture, Place, Vowel Height, Release etc. are specified as multivalued, with numerical values, whereas features such as nasality, laterality, rounding, syllabicity etc. are specified as binary, with plus and minus values.

In the present study, we shall recognise three types of complex articulations (i.e. apart from the simple articulation), namely, double articulation, sequential articulation and secondary articulation.

Double articulation usually involves two strictures being formed simultaneously at two places along the vocal tract. The strictures are also released simultaneously. This type of articulation is characteristic of complex consonant segments such as [kp, gb, kw, gw, ŋw] in Igbo.

Sequential articulation involves two strictures which may or may not be formed simultaneously. The release of the strictures is not simultaneous but rather sequential, with the stronger stricture being released before the weaker stricture. The difference in time either between the strictures or between the release of the two strictures is relatively short, often about few centi-seconds. This type of articulation characterizes the affricate articulation such as in [tʃ] and [dʒ] in Igbo.

Secondary articulation involves two strictures, one primary, the other, secondary. The primary stricture can consist of either a simple articulation, a double articulation or a sequential articulation. The secondary stricture usually modifies the primary stricture. Ladefoged (1975 : 207) observes that 'it is appropriate to consider secondary articulations in conjunction with vowels, because they can usually be described as added vowel-like articulations'. The main characteristic of secondary articulation from our point of view, is that the consonant type of the complex is articulated before the vowel-like articulation and, as it were, is independent of the latter.

In some languages, sounds with secondary articulations are considered as consisting of two unit of sounds each, whereas sounds with the other two types of articulation constitute each one unit of phoneme. Four types of secondary articulations are usually distinguished (cf. Ladefoged 1975 : 207; Williamson 1976 : 48), and these are palatalization, labialization, velarization and pharyngealization.

It may be important to note that our concept of double articulation does not exactly match those of Williamson and Ladefoged. Thus while both Williamson and Ladefoged would consider [kw, gw, ŋw]

in Igbo as instances of secondary articulations, we would consider them as double articulations. This is so because the articulatory characteristics of these complex sounds match our criteria for double articulation, namely, they are produced with two simultaneous strictures with simultaneous release. Hence, even these sounds, [kw, gw, ŋw] , can themselves be labialized or palatalized just as any other consonant sounds in the language. In other words, [kw, gw, ŋw] like the other consonants with double articulations or simple articulations in Igbo can be further modified with secondary articulation features described above. The phonetic descriptions we gave of [kw, gw, ŋw] in the Standard dialect in chapter 2 clearly support our views about these consonants.

Another departure we shall make from Williamson's approach is with regard to how to treat the different types of articulation described above. In terms of Stricture and Place, Williamson (1976) distinguishes the following types of articulation.

Possible types of articulation (Williamson 1976 : 52)

	Simple	Double	Additional	Sequential	Secondary
Stricture	A	A	(AB)	AB	AB
Place	X	(XY)	X	X	XY

where A,B represent any value of Stricture and X, Y represent any value of Place.

Sounds with double articulation are expressed with two values for [PLACE] , enclosed within parentheses to show that they are simultaneous, while they require only a single value for [STRICTURE] . For example:

[kp]	[w]
2 Stricture	0 Stricture
(1 6) Place	(1 6) Place

Sounds with additional articulation are expressed with two values for [STRICTURE] with a single value for [PLACE] . Nasals and laterals can be analysed in this way. The primary stricture is usually greater in value than the additional stricture (the additional stricture is usually an approximant, 0 value, or a fricative, 1 value) and the two strictures are simultaneous. For example:

[n]	[l]	[ĩ]
(20) stricture	(20) stricture	(2 0 0) stricture
4 place	4 place	4 place.

Sounds with sequential articulation are expressed with a sequence of two values of [STRICTURE] with a single value of [PLACE] . Affricates and tone glides are defined in this way. For example:

[pf]	[ts]	[tʃ]	[kx]
2 1 stricture	2 1 stricture	2 1 stricture	2 1 stricture
6 place	3 place	2 place	4 place.

Sounds with secondary articulation are expressed with two successive values for both [STRICTURE] and [PLACE] . The features of palatalization, labialization, velarization and pharyngealization are treated in this manner. For example,

[b^w]	[b^j]	[$b^{ɣ}$]	[$b^ʔ$]
2 0 stricture	2 0 stricture	2 0 stricture	2 0 stricture
6 6 palce	6 1 place	6 1 place (cf. Williamson 1976).	6 3 place

We disagree with the above analysis given by Williamson. For the reasons given below we find the analysis unacceptable.

(i) Any complex sound which has either two types or two values of Stricture or Place, should be assigned two values for each of both features. The reason for this is obvious. Although the

examples used by Williamson to illustrate the possible types of articulation, the consonant segments representing the Affricates which were used for this illustration, happened to have identical place of articulation for each segment, however it does not generally follow that all affricates have identical places of articulation for the component members of each of the complex sounds. As we pointed out earlier, in the Karanga dialect of Shona the following affricates occur - [px, bɣ] . It cannot be seriously argued that the constituent members of each of these affricates have identical places of articulation. Affricates therefore should be specified with two values of Place, even though the consituent members of the complex happen to have identical places of articulation.

Similarly, it is not always the case that all double articulated consonants necessarily have the same type or value of Stricture, as Williamson suggests. Even though we may disagree with Williamson as to how to treat [kw, gw, ŋw] in Igbo, whether to treat them as instances of double articulation, as we do in the present work, or to treat them as cases of secondary articulation as Williamson would prefer, however evidence can be provided from other languages to show that consonants with double articulation may have two different values of Stricture. The Karanga dialect provides us with such evidence. As we mentioned earlier, in this dialect we have complexes such as [nd, mb, nz, nl] etc. These complex consonant segments are double articulated, and sounds such as [nz, nʒ] obviously have each two different values of [STRICTURE] as well as two different values of [PLACE] . In Igbo we shall consider [kw, gw, ŋw] as consonants with double articulation. The phonetic justification for this has been given in the phonetic descriptions of these sounds in chapter 2. Consequently, we will describe these sounds with two separate values of [STRICTURE] as well as two separate values of [PLACE] for each segment. Thus just as we observed above regarding the specification of the values for the feature of [PLACE] for complex segments, in the specification of the values for the

feature of [STRICTURE] for the double articulated consonant segments, each segment should be specified with two separate values of this feature, even though such values happen to be identical for the constituent members of the segment.

Finally, we do not see any phonetic or phonemic justification for treating [n], [l] or [ĩ] as sounds with additional approximant strictures. These consonants have each only one value of Stricture and one value of the feature of Place, in that they have always been treated as consonants with simple articulations. So far it has not been shown in any phonetic studies that strictures can be formed in the nasal cavity or that even if this is possible, that such strictures play significant phonemic roles in the consonants so produced. Until such evidence can be produced, we shall treat these sounds as having simple articulation with single values for the features of Stricture and Place.

With regard to the types of articulation necessary for the description of the segments of the Standard dialect of Igbo, we shall distinguish the following:

Types of articulation

	Simple	Double	Sequential	Secondary
STRICTURE	X	<X Y>	X Y	X Y
PLACE	Z	Z Y	Z Y	Z Y

(where X, Y, Z are variables representing any values, and the angle brackets enclose those features that are simultaneous). Only Strictures can be distinguished for simultaneity; Place of articulation may or may not be the same, and simultaneity for this feature is redundant, i.e. is predictable from the other features such as Stricture. Simultaneity therefore need not be indicated for this feature (the feature of Place). We prefer to use angle brackets to enclose the features/values that occur simultaneously. Both Williamson (1976) and

Amayo (1976) use parentheses, thus, [2 (2 0) stricture] , to express simultaneity of features/values. We however feel that this is likely to lead into confusion, in that [2 (2 0) stricture] is liable to be interpreted as indicating an either-or alternative such as (i) - (iii), - (i) [2 stricture] ,

(ii) [2 0 stricture] or

(iii) [2 2 0 stricture] .

The angle bracket has not been as conventionalized and popularized as the braces and the parentheses in phonological analyses.

3.3.1. FEATURES FOR CONSONANTS.

For the purpose of defining the consonant segments of the Standard dialect of Igbo, we require multivalue distinctive features to describe those features that show phonetic scale such as the features of Stricture, Place, Release etc. For those features that show two-way or binary distinctive opposition, we will use the plus and the minus values.

3.3.1.1. THE FEATURE OF STRICTURE.

The views we adopt in the present study about the feature of Stricture differ from those expounded in Ladefoged (1975) and in Williamson (1976). Ladefoged distinguishes three main types of stricture, namely; [Stop] , [Fricative] and [Approximant] . Williamson distinguishes five values of stricture, viz, [2 stricture] , for stop consonants; [1 stricture] , for fricatives; [0 stricture] , for approximants; [-1 stricture] , for close vowels and [-2 stricture] for open vowels. Williamson's system constitutes a development over Ladefoged's. Through her system, for instance, we are able to describe the vowel and consonant segments through the same feature - STRICTURE.

Like Williamson, we shall treat [STRICTURE] as a phonetic feature shared in common by both the vowels and the consonants. Stricture will be considered as one connected phonetic process starting from the open to the close states of the articulators.

On the basis of how the strictures are formed we have summarized the types of strictures relevant for the articulation of the consonant and vowel segments of the Standard dialect. In the summary of the types of stricture given below, we have equally relied on the phonetic descriptions of the segments of this dialect presented in chapter 2.

Three major types of stricture are distinguished for our analysis. Some of the major types are further subdivided giving an overall of six different values for the feature of Stricture. The strictures are categorized as follows:

(i) stricture of complete oral closure. This characterizes Stop consonants and nasals.

(ii) stricture of incomplete oral closure, and

(iii) stricture of intermittent closure.

Stricture of intermittent closure characterizes Trill, Tap or Flap consonant articulation.

Stricture of incomplete oral closure is subdivided into Lateral stricture (usually without fricational modulation), Fricative stricture and Approximant stricture. Approximant stricture is further subdivided into close and open approximations.

The phonetic criteria for the above categorizations and sub-categorizations have been illustrated in the phonetic descriptions of the speech sounds given in chapter 2. These will not be repeated here, however, we may in addition , give some brief arguments in form of justification.

The main point of departure in our proposals from those given by Ladefoged and Williamson is with respect to the strictures for the lateral and trill or tap consonants. These consonant types, we should note, have been generally differentiated in phonetic studies from the other consonants, <u>principally</u> on the basis of the types of stricture with which these consonants (laterals and trills) are associated. Purely on the types of stricture they

are associated with these consonants have been called LATERAL, TRILL or TAP. In other words, these stricture terms have been used to describe and identify these consonant segments.

The lateral consonant stricture differs from both the fricative and the approximant strictures mainly by the fact that for the lateral consonants we have a central closure with lateral opening, whereas for the fricatives and the approximants, we have lateral closure with narrow opening in the center of the closure formed by the articulators.

The stricture of intermittent closure is clearly differentiated from the other types of stricture used in consonant articulation purely by the nature of the stricture involved, which is the intermittency of the stricture. In the mingogram made of the word _ára_, from my speech, the [r] sound has about three to five peaks in the mingographic tracings, representing the intermittent closures made by the tip of the tongue during the production of this sound, even though my utterance of this sound is by far weaker and shorter in duration than its English equivalent as in 'right'. In the mingogram of the word _ọ́rịà_, where the [r] is a very weak sound, about three peaks were recorded on the mingogram. This shows that despite the fact that a tapped or a flapped [r] appears to consist of one ballistic movement by the tongue against the palate, in practice every [r] articulation consists of a series of intermittent strikes made by the tongue against the palate.

In view of these arguments we cannot treat r or l with the same value of stricture as the Stop consonants, as this was done in Williamson (1976). We shall assign separate values of stricture to [r] and [l], different from the stricture values of the other consonants.

One advantage that is achieved through our treatment of [r] and [l] is that of economy in the way these two consonants have been treated in both Ladefoged (1975) and Williamson (1976) and also

in Amayo (1976). If the lateral and the trill or the tap consonants are defined in the distinctive feature matrix through stricture, then we would not require the extra features of [± lateral] and [± trill or tap] , which have been usually used in addition to their stricture values (cf. Amayo 1976 and Williamson 1976). Only these two consonants often require these particular additional features, the specification of the additional features therefore is more or less redundant (i.e. under the proposals we make here, unless it can be shown that some sounds in the language other than [l] and [r] or their allophones can be [± lateral] and [± trill/tap] respectively) and these consonant segments can be defined mainly through their Stricture values without the additional features mentioned above.

Finally, another area where our views differ from those of Amayo (1976) and Williamson (1976) is with regard to the feature values for the vowels and the approximants. Both Amayo and Williamson assign zero value of Stricture to approximants and negative values of -1 and -2 Strictures to the close and open vowels respectively. As we indicated above, in our view, both the approximants and the vowels operate (and should be considered) on similar scales of Stricture. According to our view therefore, the same value of Stricture can be assigned to vowels and approximants. We have clearly pointed out above that from the point of view of stricture alone, there is little to differentiate a close vowel such as [i] , [ɪ] or [u] and [ɔ] from close approximants such as [y] or [w] respectively. Similarly in those languages where we have more open approximants such as [ɦ] in Ịjọ, as indicated in Williamson (1976), such approximants, from the point of view of stricture, would usually be associated with the same value of Stricture as the open or half-open vowels.

The values for the feature of [STRICTURE] we propose in the present work for the consonant segments (the vowel segments included) of the Standard dialect of Igbo are as follows :

The Stricture Values for Consonant Segments.

6	Stop
5	Tap, Trill, Roll
4	Lateral
3	Fricative
2	Close Approximants (Close Vowels)
1	Open Approximants (Open/half-open Vowels).

The stricture configuration for affricates is expressed as 6 and 3 values of STRICTURE which are sequentially represented thus, [6 3 stricture] .[45] Close approximant stricture, [2 stricture] , characterizes close vowels as well as [y] and [w] ; open approximant stricture characterizes open and half-open vowels as well as other approximants articulated with open approximation of the articulators.

Using the values proposed above for STRICTURE, we can define the consonant segments of the Standard dialect thus:

[6 stricture]	- p, b, d, t, k, g, m, n, ny, $\bar{n}$.
[6 6 stricture]	- kp
[6 2 stricture]	- kw, gw, gb, nw.
[6 3 stricture]	- ch, j
[5 stricture]	- r
[4 stricture]	- l

45. With reference to what we stated above concerning complex sounds in Igbo, we shall note the following regarding the specification of stricture feature values for these complex consonant segments in the language.

[3 stricture] - s, z, f, v, (sh, zh),gh, h.

[2 stricture] - y, w, i, ị, u, ụ.

[1 stricture] - e, a, o, ọ, some "h" sound in Igbo.

The scalar arrangement of the values for the feature of Stricture given above will be adequate in accounting for the types of consonant weakening described earlier from the Ijo and Igbo languages. As we pointed out in the discussions above, in these languages a Stop stricture weakens to affricate, fricative or lateral strictures as the case may be. Of particular interest is the case where a Stop weakens from the highest value of stricture, i.e. Stop stricture, through fricative to zero strictures, as in the example from Ịjọ where [g] first weakens to a fricative, [ɣ] , and later to an approximant, also represented as [ɣ̞] , or in Igbo where [b] weakens to an approximant [w] . These examples clearly illustrate the fact that STRICTURE constitutes one continuous phonetic scale, in the manner described above.

3.3.1.2. THE FEATURE OF PLACE.

It has been argued by Christine Allen (1974) that the feature of Place of articulation does not constitute a phonetic scale. The feature of place of articulation obviously does not present the same picture of phonetic scale in the manner that the feature of Height does. The feature of Place represents localisations along the oral tract. However, there is nothing strange or odd in treating this feature in terms of ordered scale along this tract. One evidence in support of this is the fact that the points of articulation along this tract are not randomly arranged. Rather, the points range from the locations in the foremost area in the mouth (i.e. the lips) to the backmost, i.e. the pharynx and the glottis.

The stricture values are enclosed with angle brackets as in kp above, when the strictures are simultaneous; the stricture values are specified sequentially, i.e. without brackets, as in the affricates above, when the strictures occur sequentially and

More important is the fact that in terms of the phonetic changes that occur within these consonants, with respect to the feature of Place, these changes maintain some systematic shifts along this scale. Thus alveolar consonants usually change to palato-alveolars, eg. t ⇒ tʃ , d ⇒ dʒ , s ⇒ ʃ , z ⇒ ʒ etc., which represents the next stage or step along this scale. Similarly, labials change to consonants articulated in the labial region, for example, p ⇒ f, f ⇒ ɸ or β , b ⇒ w or β etc., once more representing shifts along the scale. Velar consonant [k] usually changes to [tʃ] in many languages, which represents a shift from the back to the front locations along the scale, while [g] often changes to [ɣ] or [h] which represents a gradual shift along the scale. With arguments such as these it would appear justifiable to represent the feature of Place using the scalar system.

In arranging the values for the feature of Place, Williamson (1976) sets up what she called 'the neutral position', i.e. the central vowel position. This corresponds to the criteria used by Chomsky in the SPE for setting up the features of [± anterior] and [± coronal] . From this 'neutral position' Williamson arranges the values for this feature, Place, positively towards the bilabial region, and negatively towards the glottis. For example,

6	upper lip (bilabial)
5	upper teeth (labio-dental)
4	behind upper teeth (dental)
3	alveolar ridge (alveolar)
2	behind alveolar ridge
1	hard palate (palatal)
0	central vowel position (central)

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the successive values are separated with a comma for strictures involving secondary/additional articulation, thus, [6, 2 stricture] as in segments such as b^w, p^w etc., where the strictures occur separately in the sequence.

-1	velum (velar)
-2	uvular area (post alveolar-uvular)
-3	back wall of pharynx (pharyngeal)
-4	glottis (glottal)

(Williamson 1976:30).

There is no justification for this type of arrangement of feature values for Place in so far as we treat the various points of articulation as constituting one continuous phonetic scale which ranges from the foremost area in the mouth to the rearmost point in the oral tract. Furthermore, using Williamson's feature value system for Place, sounds like [kp] in Igbo would have to be specified with both the positive and the negative values of the same feature. There is no way we can justify this, particularly from the articulatory point of view.

In the present study we shall recognise the following values for the feature of [PLACE] :

9	bilabial
8	labiodental
7	dental
6	alveolar
5	post-alveolar (palato-alveolar)
4	palatal
3	velar
2	pharyngeal
1	glottal

With these values for the feature of [PLACE] , it will be possible to specify two or more values of this feature. Consonants with double articulation as well as the other complex consonant sounds which are articulated at two places in the oral tract will all be specified each with two values of PLACE. The simultaneity and/or the sequentiality are as we pointed out earlier, predictable from the strictures. For example, the labial velar, [kp] , and the phonemically labialized velar, [kw] , in Igbo will be specified as [3 9 place] respectively. On the other hand, the difference between the labial velar [kp] , and especially the phonemically labialized velar, [kw] , and the contextually labialized [k] , represented as [k^w] , can be shown thus:

$$[\ kp\ ] \qquad \begin{bmatrix} \langle 6\ 6\rangle & \text{stricture} \\ 3\ 9 & \text{place} \end{bmatrix}$$

which indicates that strictures of complete closure are formed simultaneously at two places;

$$[\ kw\ ] \qquad \begin{bmatrix} \langle 6\ 2\rangle & \text{stricture} \\ 3\ 9 & \text{place} \end{bmatrix}$$

also indicating that two strictures, a Stop stricture and an approximant stricture, are formed simultaneously at two places, and

$$[\ k^w\ ] \qquad \begin{bmatrix} 6,2 & \text{stricture} \\ 3\ 9 & \text{place} \end{bmatrix}$$

which indicates that two strictures, one primary - a Stop stricture, and the other secondary - an approximant stricture are formed non-simultaneously at two places (at the velar and at the lips respectively). Note that the feature specification for the contextually labialized [k] (when this sound is followed by a rounded back vowel) clearly shows that [k^w] unlike [kw] consists of two units of sound, both of which are separated by a comma, and that the labialization is a secondary feature.

Another advantage which our proposed system has over that proposed by Williamson is with respect to the feature definition/specification of those complex sounds mentioned earlier from the Karanga dialect. Take for instance, the prenasal complex [mb] or [nd] found in this dialect, using Williamson's system these sounds would be specified in the following way:[46]

[mb]

6 (2 0)	stricture
9	place
1	nasal

[nd]

6 (2 0)	stricture
6	place
1	nasal

where both the nasal stricture and the feature value for nasality are redundantly specified, and more importantly, the feature value for nasality suggests that all the members of the complex are nasal or nasalized.

Using the system we proposed, these sounds can be more accurately defined as follows:

[mb]

6	6	stricture
9	9	place
+nas	-nas	

[nd]

6	6	stricture
6	6	place
+nas	-nas	

In this way one can very easily know, for instance, that the sounds in question involve each, double articulation, with two values of Stricture and Place respectively, and that nasality

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46. We have not restricted ourselves entirely to Williamson's system in the examples. The feature values have been taken from our own system, however, this does not affect the main ideas presented in the argument.

applies only to one member of each of the complex sounds. This gives a simpler and more accurate account of the phonemic definition of these sounds.

3.3.1.3. THE FEATURE OF RELEASE.

The feature of Release was not discussed in Ladefoged (1975/1971) nor in Williamson (1976) or in Amayo (1976). In other words, in the multivalue features so far known to us the feature of Release is conspicuously left out.

However, it is generally accepted in phonology that the three phonetic features - stricture, place of articulation and manner of release - play significant roles in the phonetic descriptions of consonant sounds. Jakobson (1952), for instance, used the features 'checked/unchecked' and 'strident/nonstrident' to define the phonetic properties of the feature of release for consonant segments. He used the features 'strident/nonstrident' to distinguish affricates and fricatives from stops, for example, [pf] from [p]; [ts] from [t] etc.

In the SPE (p. 329), the feature of stridency was retained. The SPE defines it thus, 'strident sounds are marked acoustically by greater noisiness than their nonstrident counterparts'. In the SPE, the feature of 'delayed release' was introduced in place of Jakobson's feature of 'checked/unchecked', also to define this phonetic property in the consonant segments.

Evidence has been provided from different languages to show that certain consonant sounds differ mainly through the feature of Release. In the SPE (p. 329), for instance, it was mentioned that strident liquids which are nonvocalic are found in Czech, where strident and nonstrident [r] contrast. Ladefoged (1964) also stated that in Bura and Margi strident and nonstrident [l] contrast.

The feature of Release is therefore important in the definition

of consonant segments. This feature, like those we have discussed so far, maintains a phonetic scale correlating to the different types of strictures. Release of strictures, for instance, can be abrupt, fortis, lenis, gradual or delayed. It can be accompanied by noisiness or not accompanied by noisiness. The acoustic element of noise or friction is sometimes superimposed on the abrupt, gradual etc. manners of release.

On the basis of this we distinguish the following values for the feature of Release.

6	abrupt with plosion (plosives and implosives)
5	abrupt without plosion
4	gradual
3	delayed
2	with noise component (friction)
1	without friction.

1 and 2 can interact with 3, 4, 5 and 6, that is, can co-occur with any of them during the release phase of a consonant segment, such as in the affricates and the fricatives. To account for those consonants that have hitherto been treated under fortis/lenis contrasts, we have set up two different values for abrupt release. In the languages where fortis/lenis contrasts exist, some consonants described as lenis are known to be produced without plosion, though the release is abrupt.

With the values for the feature of release given above, it will be possible to specify two or more values of this feature which may occur either simultaneously or sequentially within a segment. For example, the complex phase of the release of affricates, which is both sequential and simultaneous (the stop release occurs before the fricative release, i.e. an abrupt release followed by a delayed release, and the delayed release has prominent noise component),

can be captured by representing affricates thus, [6 <3 2> release] for strident affricates such as [ts] , [dz] etc. Where the affricates are nonstrident they would be specified as [6 <3 1> release] . The release feature value for plosives and implosives is usually [6 release] and for fricatives it is either [<3 2> release] or [<3 1> release] for strident and nonstrident fricatives respectively. Nasals and laterals usually have the value of [4 release] . Laterals that contrast through stridency are specified as [< 4 2 > release] and [4 release] for the strident and nonstrident laterals respectively. Other sounds that are known to contrast through the presence and/or absence of stridency can be accounted for in the same way.

3.3.1.4. THE FEATURE OF LINGUAL.

This feature is used to define tongue articulation in certain consonant segments. The different tongue articulations involved in the production of certain consonant segments have been described in chapter 2.

Like the feature of Place we shall use multivalues to define this feature. The values for the feature of Lingual are given as follows:

4	apical
3	laminal
2	central-dorsal
1	back-dorsal

Using these values for the feature of tongue articulation, we can define [t] , [d] , [n] and [l] as [4 lingual] ; [s] , [z] and their allophones as [3 lingual] ; [tʃ] , [dʒ] , [ʃ] and [y] as [2 lingual] and the velar consonants as [1 lingual] .

3.3.1.5. THE FEATURE OF AIRSTREAM.

For the feature of airstream we propose the following multi-feature values.

3	pulmonic-egressive
2	pulmonic-ingressive
1	implosive

The definition of the consonant segments of the Standard dialect would require at least two of the airstream feature values suggested above. For example,

[3 airstream]	p, b, d, t, k, g, etc.
[2 airstream]	kp
[1 airstream]	gb.

3.3.1.6. THE FEATURE OF LENGTH.

In some languages consonants as well as vowels contrast through the feature of length. Generally in Igbo, consonants and/or vowels do not contrast through length, however, in certain phonological environments a vowel segment can change from normal to short, i.e. in relation to length. On the basis of such possible phonological changes by the vowel segments in Igbo, and also as a provisional measure (in case such feature could be found to operate in the language), we shall propose the following values for the feature of length.

2	long
1	normal
~ 1	short

(where the symbol ~ stands for 'less than').

3.3.1.7. THE FEATURE OF GLOTTAL STATE.

The feature of Glottal state, as indicated by Ladefoged (1975), can be multivalued. Evidence from some languages such as Karanga dialect (Pongweni 1977), can be provided to support this claim. In some dialects of Igbo this feature is multivalued; in these dialects where aspiration is phonemically significant, apart from the features of voice/voiceless, certain consonant sounds can be contrasted through the feature of 'breathy voice'. In the Standard dialect, however, we have only a two-way opposition within this feature. The values which we propose for this feature of glottal state are intended for use in the Standard dialect as well as in those dialects where this feature is multivalued. What this implies is that in the case of the Standard dialect, only two of the possible values suggested here would be used, while in some of the local dialects the whole range of the values would be used.

The following values are proposed for the feature of glottal state.

3	voiced
2	breathy voiced
1	voiceless

In the Standard dialect all voiced sounds will be specified as [3 glottal state] and the voiceless sounds as [1 glottal state] .

3.3.1.8. NASAL.

The feature of nasality in speech sounds is basically binary. That is, it represents a two-way opposition with an either-or alternative. We shall represent this feature with plus and minus values. Nasals and nasalized sounds are [+ nasal] , while non-nasal sounds are specified as [- nasal] .

[+ nasal]	m, n, ny, nw, ɲ.
[- nasal]	p, b, k, g, t, d etc.

3.3.1.9. ROUND.

The feature of Rounding, which usually represents lip-rounding, is a secondary articulatory feature. It is a basically binary feature characterized by either the presence or the absence of the feature. We shall therefore specify those segments with the feature of rounding with plus value and those segments that do not have it with minus value. For example,

[+ round] w, gw, kw, nw, o, ọ, u, ụ etc.

[- round] b, p, k, g, t, d, i, ị, e, a etc.

3.3.1.10. LABIAL.

This feature is binary. Labial segments are specified with plus value and nonlabial segments are specified with minus value of this feature. For example,

[+ labial] m, p, b, gb, kp, f, v etc.

[- labial] g, k, t, d, s, z, y etc.

The feature of labiality is redundantly specified for these segments and should be incorporated into the feature of Place. Thus only those segments with the value of [9 place] can be defined with the feature of labiality.

3.3.1.11. SIBILANT.

This feature is binary. Sibilant sounds are therefore specified with plus value, nonsibilant segments are specified with minus value of this feature. For example,

[+ sibilant] s, z, and their allophones.

[- sibilant] p, b, t, d, k, g, f, v, etc.

3.3.1.12. SONORANT.

This feature is binary. Consonant segments that are sonorant have formant bars in the spectrogram while nonsonorant consonants have no formant bars in the spectrogram. Sonorant segments are specified with plus value while nonsonorant segments are marked with minus value for this feature. For example,

[+ sonorant] m, n, l, r etc.

[- sonorant] b, g, z, d etc.

3.3.1.13. SYLLABIC.

This feature is binary. Syllabic segments are specified with plus value for this feature while nonsyllabic segments are specified with minus value.

In Igbo all the vowel segments are syllabic, and the syllabic nasals are also syllabic. All syllabic segments in Igbo are tone bearing.

[+ syllabic] m, n, ñ, a, e, i, ị, u, o etc.

[- syllabic] y, w, b, p, k, g, t, d, etc.

3.3.2. THE FEATURES FOR VOWELS.

We shall require the features Height, Back and Tongue root to define the vowel segments in the Standard dialect. Some of the features proposed for the consonants, such as Round and Syllabic, will also be required for the vowels. In defining the vowel segments of this dialect, the feature of Tense will not be used. This feature which is significant in the description of English

vowels is not significant for the description of Igbo vowels; rather the feature of Tense is replaced by the feature of Tongue root position in Igbo phonology.

3.3.2.1. THE FEATURE OF HEIGHT.

In the preceding section, where arguments were given to justify the multivalue distinctive feature system in phonology, it was argued that the vowels of the Igbo language maintain four-way opposition with regard to the feature of Tongue Height. It was shown in the argument that Igbo vowels are defined in terms of this feature using the following references of tongue height: close, half-close, half-open and open. The vowel segments associated with these different types of tongue height have been given above.

The feature of Height in this dialect is therefore multivalued. We shall propose the following values for this feature.

1 close, eg. i, u.

2 half-close, eg. ị, ụ.

3 half-open, eg. e, o.

4 open, eg. a, ọ.

Certain advantages are achieved through the scalar arrangement of the values of the feature of Height for the vowels as presented above. For instance, some correlation can be achieved between the vowel height and the feature of stricture. Vowel height and certain types of consona-nt stricture are correlated; they interact at two stages thus, [1 Height] = [2 Stricture] and [1 stricture] = [4 Height] . This illustrates the correlation between the approximants and the vowels, on the one hand, with

respect to these two features, and, on the other hand, this helps to account for the changes that occur in some languages between vowels and approximants.

The correlation between vowel height and stricture is further illustrated below. It has often been pointed out in some studies in phonology, Williamson (1976), Hyman (1975), to mention a few, that in some languages vowels assimilate to the collocated consonants in terms of 'Height' and/or 'graveness/acuteness'. Hyman (1975 : 31) notes , for instance, that in Fe?fe? -Bamileke, "before [p] and [k] we find [ɑ] (a back vowel), and before [t] we find [a] (a front vowel)". Hyman explains this as assimilation of the vowels to the consonants in terms of 'graveness/ acuteness'.

In Igbo, as mentioned in the beginning of this chapter, non-high, non-back vowels, namely, [a] and [e] , change to close back vowels, [ɑ̀] and [u] respectively, in certain constructions, when [a] and [e] are followed by m, b, f, v, kw, gw, nw, i.e. before consonants that are [+ labial] . This phonological phenomenon will be discussed in greater detail later in the thesis. However we provide the following examples to illustrate the type of changes mentioned. The examples illustrate the grammatical process of reduplication through which verbal nouns are formed in Igbo from the simple verb roots. Later in the thesis we shall show that the changes illustrated here occur whenever the environments are met.

	Verb root		Reduplicated form (i.e. Verbal noun)		
(a)	dé	- write	/ɔ̀déde/ >	ɔ̀dídе	- writing
	dà	- fall	/ɔ̀dada/ >	ɔ̀dịda	- falling
	kè	- create	/ɔ̀keke/ >	ɔ̀kike	- creating
	ká	- surpass	/ɔ̀káka/ >	ɔ̀kịka	- surpassing etc.

(b) mé - do /ɔ̀méme/ > ɔ̀mú́me - doing

bé - slice /ɔ̀bébe/ > ɔ̀bú́be - slicing

má - know /ɔ̀máma/ > ɔ̀mụ́ma - knowing

bà - enter /ɔ̀baba/ > ɔ̀bụba - entering

gwá - tell /ɔ̀gwágwa/ > ɔ̀gwụ́gwa - telling

gwé - grind /ɔ̀gwégwe/ > ɔ̀gwú́gwe - grinding

kwé - sing /ɔ̀kwékwe/ > ɔ̀kwú́kwe - singing

kwà - push /ɔ̀kwakwa/ > ɔ̀kwụkwa - pushing

fé - fly /ɔ̀féfe/ > ɔ̀fú́fe - flying etc.

Note that no change takes place when the vowel of the verb root is a close vowel. For example,

(c) sí - cook /ɔ̀sísi/ > ɔ̀sísi - cooking

bí - dwell /ɔ̀bíbi/ > ɔ̀bíbi - dwelling

mì - be deep /ɔ̀mimi/ > ɔ̀mimi - being deep

mụ̀ - learn /ɔ̀mụmụ/ > ɔ̀mụmụ - learning

fù - be missing /ɔ̀fufu/ > ɔ̀fufu - being missing

gbú - kill /ɔ̀gbúgbu/ > ɔ̀gbúgbu - killing

kwú - speak /ɔ̀kwúkwu/ > ɔ̀kwúkwu - speaking

kwụ́ - pay /ɔ̀kwụ́kwụ/ > ɔ̀kwụ́kwụ - paying

rị́ - climb /ɔ̀rị́rị/ > ɔ̀rị́rị - climbing etc.

Note that /o/ and /ọ/ also change to high or close vowels, /u/ and /ụ/ respectively, when they occur as the vowel of the verb root. For example,

(d)	kɔ̀	-	pluck	/ɔ̀koko/	>	ɔ̀kuko	- plucking (with hooked object)
	kọ́	-	narrate	/ɔ̀kọ́kọ/	>	ɔ̀kụ́kọ	- narrating
	ɛwọ́	-	cure	/ɔ̀gwọ́gwọ/	>	ɔ̀gwụ́gwọ	- curing, being cured
	dɔ́	-	place	/ɔ̀dɔ́do/	>	ɔ̀dú́do	- placing etc.

One general observation we can make with regard to the changes that occur in the vowels of the verb root in the above examples is that nonhigh vowels become high in the environment C-C (the environment under which this phonological change takes place will be described in more detail later in the subsequent chapter). Another way of expressing this phonological change noted above is that the vowels assimilate in Stricture to the consonants. The consonants, as we know, have higher values of Stricture than the vowels. When the vowels have higher value of Stricture, i.e. when they are close vowels, the phonological changes do not take place, apparently because of their relatively high value of the feature of Stricture. What concerns the change of the vowels from Front to Back, i.e. /a/ and /e/ changing to /ụ/ and /u/ respectively, we may note that these changes occur only when the co-occurring consonants have the feature value of [+ 9 place]. These are the consonants and/or complexes articulated at the peripheries of the oral cavity and especially that involve lip articulation.

3.3.2.2. THE FEATURE OF BACK.

Acoustically this feature is defined (Ladefoged 1975: 265) "in terms of the inverse of the difference between the frequency of the second formant and that of the first formant". The evidence

from the formant displays on the spectrograms, made of the vowels, especially the difference between the frequencies of the first and the second formants, provides a more reliable basis for distinguishing the front vowels from the back vowels. Articulatory evidence can sometimes not be very reliable or definitive in this respect. This is so particularly in the differentiation of the back from the front [a] in some languages. Whereas the difference between [i] and [u] or between [e] and [o] can be clearly defined in terms of the feature of backness/frontness through articulatory evidence, the front and back [a] sounds depend for their differentiation more on perceptual or auditory judgements. But through the formant displays on the spectrograms, in terms of what has been described above, we can easily tell whether a particular [a] sound is a front or a back vowel. For instance, whereas the first and the second formants of the [a] sounds in the English words *are*, *far*, *mark* etc. are close together (i.e. the difference in frequency is small), in the Igbo [a] sounds, the two formants are well spaced out one from the other. In the spectrogram we made of the [a] sound in Igbo, the first formant has the frequency of 800 Hertz and the second formant has the frequency of 1700 Hertz. In this way we are able to know that the [a] sound in this language is a front vowel.

The feature of Back will be treated as a binary feature. Front vowels are specified with minus value for this feature, and the back vowels are specified with plus value. For example,

[+ back] o, ọ, u, ụ.

[- back] a, e, i, ị.

3.3.2.3. THE FEATURE OF ADVANCED TONGUE ROOT.

Arguments to justify the use of this feature in defining the vowel segments of the Standard dialect and of Igbo language in general, have been given in chapter 2. On the basis of this

feature the 8 vowel segments in the language are divided into two equal sets, one set produced with advanced tongue root (i.e. when the tongue root is in forward or nonretracted position), and the other set produced with nonadvanced or retracted tongue root. The latter defines those vowel segments produced with retracted tongue root. This feature determines the harmonic behaviour and the harmonic sets of Igbo vowels.

This feature therefore is treated as binary. Those vowel segments that are produced with advanced or nonretracted tongue root are specified with plus value for this feature, while those vowel segments that are produced with retracted tongue root are specified with minus value for this feature. For example,

[+ ATR] e, i, o, u.

[- ATR] a, i̱, ọ, u̱.

3.3.3. SUMMARY OF THE PROPOSED FEATURES.

In sections 3.3.1. and 3.3.2. above, we have set up the distinctive features necessary for defining the sound system of the Standard dialect of Igbo. Those features which are not relevant for this purpose have been left out in the discussion. In setting up the distinctive features needed for our analysis, we have used both the binary distinctive feature system and the multivalue distinctive feature system where these are considered more adequate.

The multivalue distinctive feature analysis, as we mentioned earlier, is yet a very recent development in generative phonology. The present thesis constitutes, to the best of my knowledge, the second work where the multivalue distinctive features have actually been systematically used in describing the full phonology of a language, the first being in the Generative Phonology of Edo (Bini) by Amayo (1976), a Ph.D. thesis submitted in the Department of Linguistics and Nigerian Languages, University of Ibadan. Both Amayo and myself have fully benefited from the previous accounts of multivalue

distinctive features especially from that given by Kay Williamson (1976). The present work has equally benefited from Amayo (1976).

The multivalue distinctive features, the way they are presented in this thesis has some originality. Apart from providing some midifications to Williamson's analysis, the pattern used in the present work differs in practice from the latter as well as from that used in Amayo (1976). In Amayo (1976) just as in Williamson (1976) every feature was treated as multivalued, with scalar numerical values. In the present work we have treated some features as multivalued and some features as binary, on the basis of the criteria given at the beginning of this chapter.

A summary of the distinctive features proposed for the description of the phonology of the Standard dialect is given below, and the relevant sections where the features are discussed are indicated in parentheses after each feature.

1. STRICTURE. (3.3.1.1.)

6	Stop
5	Tap, Trill, Roll
4	Lateral
3	Fricative
2	Close Approximation
1	Open Approximation

2. PLACE. (3.3.1.2.)

9	bilabial
8	labiodental
7	dental
6	alveolar
5	post-alveolar (palato-alveolar)
4	palatal
3	velar
2	pharyngeal
1	glottal

3. RELEASE. (3.3.1.3.)

6	abrupt with plosion
5	abrupt without plosion
4	gradual
3	delayed
2	with noise component (friction)
1	without noise component (frictionless)

4. LINGUAL. (3.3.1.4.)

4	apical
3	laminal
2	central-dorsal
1	back-dorsal

5. AIRSTREAM. (3.3.1.5.)

3	pulmonic-egressive
2	pulmonic-ingressive
1	implosive

6. LENGTH. (3.3.1.6.)

2	long
1	normal
~1	short

7. GLOTTAL STATE. (3.3.1.7.)

3	voiced
2	breathy voiced
1	voiceless

8. NASAL. (3.3.1.8.)

[+ nasal]

[- nasal]

9. ROUND. (3.3.1.9.)

[+ round]

[- round]

10. LABIAL. (3.3.1.10.)

[+ labial]

[- labial]

11. SIBILANT. (3.3.1.11.)

[+ sibilant]

[- sibilant]

12. SONORANT. (3.3.1.12.)

[+ sonorant]

[- sonorant]

13. SYLLABIC. (3.3.1.13.)

[+ syllabic]

[- syllabic]

14. HEIGHT. (3.3.2.1.)

1 close

2 half-close

3 half-open

4 open

15. BACK. (3.3.2.2.)

[+ back]

[- back]

16. ADVANCED TONGUE ROOT. (3.3.2.3.)

[+ ATR]

[- ATR]

3.3.4. BRIEF COMPARATIVE SUMMARIES OF THE DISTINCTIVE FEATURES FOR CONSONANT SEGMENTS PROPOSED BY LADEFOGED (1971/1975), WILLIAMSON (1976) AND THOSE PROPOSED IN THE PRESENT WORK.

Ladefoged 1971/75		Williamson 1976		Proposed/Adopted in the present work.	
Features	Values	Features	Values	Features	Values
Glottalic		Larynx Movement		Airstream	
1.	ejective		1 ejective		(not applicable)
	pulmonic		0 pulmonic		3 pulmonic-egressive
					2 pulmonic-ingressive
	implosive		-1 implosive		1 implosive
Velaric		Velaric Suction		Not applicable.	
2.	+ click		1 click		
	- click				
Voice		Glottal State		Glottal State	
3.	1 glottal stop		2 glottal stop		
	2 laryngealized		1 laryngealized		
	3 voice		0 voice		3 voice
	4 murmur		-1 murmur		2 breathy voice
	5 voiceless		-2 voiceless		1 voiceless
Aspiration		To be dealt with by		Aspiration[47]	
4.	aspirated	allowing sequence			+ aspiration
	unaspirated	in Glottal state			- aspiration
Place		Place		Place	
5.	bilabial		6 bilabial		9 bilabial
	labiodental		5 labiodental		8 labiodental
	dental		4 dental		7 dental

47. This feature, Aspiration, is not required in the Standard dialect, but will however be needed for describing the phonology of those dialects (the local dialects) where aspiration occurs.

alveolar	3 palato-alveolar	6 alveolar
retroflex palato-alv.	2 post/palato-alveo.	5 palato-alveolar
palatal	1 palatal	4 palatal
velar	0 central	3 velar
uvular	-1 velar	2 pharyngeal
pharyngeal	-2 uvular	1 glottal
glottal	-3 pharyngeal	
	-4 glottal	

	Labial	Labiality	Labial
6.	+ labial	1 labial	+ labial
	- labial	0 labial	- labial

	Apicality (1971)	Apicality	Lingual
7.	tip of tongue	1 laminal	4 apical
	blade of tongue	0 apical	3 laminal
		-1 retroflex	2 central-dorsal
			1 back-dorsal

	Stop	Stricture	Stricture
8.	stop	2 stop	6 stop
	fricative	1 fricative	5 tap/trill/roll
	approximant	0 approximant	4 lateral
		-1 close vowel	3 fricative
		-2 open vowel	2 close approx./close vowels
			1 open approx./open, half-open vowels

			Release
9.	_____	_____	6 abrupt with plosion
			5 abrupt without plosion
			4 gradual
			3 delayed
			2 with friction
			1 without friction

Nasal		Nasality	Nasal
10.	+ nasal	1 nasal	+ nasal
	- nasal	0 nasal (oral)	- nasal
Lateral		Laterality	Defined through the
11.	+ lateral	1 lateral	feature of Stricture
	- lateral	0 lateral	
Trill		Posture	Defined through the
12.	+ trill	1 flapped	feature of Stricture
	- trill	0 steady	
		-1 trilled	
Tap		----------	Defined through the
13.	+ ta-p		feature of Stricture
	- tap		
Rate (1971)		Length	Length
14.	rapid	2 extra long	2 long
	normal	1 long	1 normal
	long	0 normal	~1 short (where ~
	extra long	-1 short	means 'less than')
Sonorant		Any segment with a	Sonorant
15.	+ sonorant	STRICTURE of 0 or	+ sonorant
	- sonorant	less is a sonorant	- sonorant
Sibilant		Sibilance	Sibilant
16.	+ sibilant	1 sibilant	+ sibilant
	- sibilant	0 non-sibilant	- sibilant
Grave		Gravity	Grave
17.	+ grave	1 grave	+ grave
	- grave	0 non grave	- grave

Round		Rounding	Round
18.	+ round	1 rounded	+ round
	- round	0 non rounded	- round
Wide		Pharynx Size	
19.	+ wide	1 expanded	
	- wide	0 normal	
		-1 narrow	
Syllabic		Not specified as a feature	Syllabic
20.	+ syllabic		+ syllabic
	- syllabic		- syllabic

3.3.5. MAXIMALLY SPECIFIED PHONOLOGICAL SEGMENTS OF THE STANDARD DIALECT OF IGBO.

With the distinctive features discussed in 3.3.1. and 3.3.2. above and summarized in 3.3.3., we can provide a fully specified distinctive feature matrix of the phonological segments of the Standard dialect. Table III (i) below shows the distinctive feature matrix for the consonant segments in which every segment is specified as a single column matrix of distinctive features. In Table III (ii) we present the distinctive feature matrix for the vowel segments. Separate distinctive feature matrices are required for consonants and vowels. Each of these categories of sound requires a different set of distinctive features.

Table III (i) CONSONANTS

MAXIMALLY SPECIFIED PHONOLOGICAL SEGMENTS OF THE STANDARD DIALECT.

	p	b	t	d	k	g	kp	gb	kw	gw	tʃ	dʒ
STRICTURE	6	6	6	6	6	6	<6 6>	<2 6>	<6 2>	<6 2>	6 3	6 3
PLACE	9	9	6	6	3	3	3 9	3 9	3 9	3 9	6 5	6 5
RELEASE	6	6	6	6	6	6	6	6	6	6	6<32>	6<32>
LINGUAL			4	4	1	1	1	1	1	1	2	2
AIRSTR.	3	3	3	3	3	3	2	1	3	3	3	3
GLOTTAL STATE	1	3	1	3	1	3	1	3	1	3	1	3
LENGTH	1	1	1	1	1	1	1	1	1	1	1	1
NASAL	–	–	–	–	–	–	–	–	–	–	–	–
LABIAL	+	+	–	–	–	–	+	+	+	+	–	–
ROUND	–	–	–	–	–	–	–	–	+	+	–	–
SIBILANT	–	–	–	–	–	–	–	–	–	–	–	–
SONORANT	–	–	–	–	–	–	–	–	–	–	–	–
SYLLABIC	–	–	–	–	–	–	–	–	–	–	–	–

	m	n	ŋ	M	N	ɲ	ŋw	ɾ	ʃ	l	r
STRICTURE	6	6	6	6	6	6	<62>	6	6	4	5
PLACE	9	6	3	9	6	3	39	4	4	6	6
RELEASE	4	4	4	4	4	4	4	4	4	4	6
LINGUAL		4	1		4	1	1	2	2	4	4
AIRSTR.	3	3	3	3	3	3	3	3	3	3	3
GLOTTAL STATE	3	3	3	3	3	3	3	3	3	3	3
LENGTH	1	1	1	1	1	1	1	1	1	1	1
NASAL	+	+	+	+	+	+	+	+	+	−	−
LABIAL	+	−	−	+	−	−	+	−	−	−	−
ROUND	−	−	−	−	−	−	+	−	−	−	−
SIBILANT	−	−	−	−	−	−	−	−	−	−	−
SONORANT	+	+	+	+	+	+	+			+	+
SYLLABIC	−	−	−	+	+	+	−	−	+	−	−

	f	v	ɸ*	β*	s	z	ʃ*	ʒ*	ɣ	h	y	w
STRICTURE	3	3	3	3	3	3	3	3	3	3	2	2
PLACE	8	8	9	9	6	6	5	5	3	1	4	9
RELEASE	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	⟨32⟩	4	4
LINGUAL				-	3	3	3	3	1		2	
AIRSTR.	3	3	3	3	3	3	3	3	3	3	3	3
GLOTTAL STATE	1	3	1	1	1	3	1	3	3	1	3	3
LENGTH	1	1	1	1	1	1	1	1	1	1	1	1
NASAL	–	–	–	–	–	–	–	–	–	–	–	–
LABIAL	+	+	+	+	–	–	–	–	–	–	–	+
ROUND	–	–	+	–	–	–	–	–	–	–	–	+
SIBILANT	–	–	–	–	+	+	+	+	–	–	–	–
SONORANT	–	–	–	–	–	–	–	–	–	–	+	+
SYLLABIC	–	–	–	–	–	–	–	–	–	–	–	–

* These segments, it should be understood, are allophones and have been purposely specified here along with the other segments in the dialect.

Table III (ii) VOWELS.

	a	e	i	ɨ	o	ǫ	u	ʊ
STRICTURE	1	1	2	2	1	1	2	2
HEIGHT	4	3	1	2	3	4	1	2
GLOTTAL STATE	3	3	3	3	3	3	3	3
LENGTH	1	1	1	1	1	1	1	1
SYLLABIC	+	+	+	+	+	+	+	+
BACK	−	−	−	−	+	+	+	+
ROUND	−	−	−	−	+	+	+	+
TONGUE ROOT (A T R)	−	+	+	−	+	−	+	−

CHAPTER 4.

THE MORPHEME STRUCTURE OF THE STANDARD DIALECT.

4.0. INTRODUCTION.

The morpheme is a grammatical unit; it is defined as the minimal unit of meaning in the grammar. A lexical unit may consist of one or more morphemes. A polymorphemic word in Igbo may consist of two or more morphemes all of which are used together to form one word, or it may consist of one or more lexical morphemes plus an affix or some affixes.

For the purpose of our analysis, a morpheme, therefore, may represent a lexical morpheme or an affix (i.e. an affix morpheme). Structurally a morpheme can consist of a single segment or of several segments. The verb ịgā, for instance, is made up of two morphemes - i, which is an affix morpheme (it is used as an infinitive marker in Igbo) and ga, which is the verb root; gàrà consists of two morphemes - ga, the verb root and rà, an affix morpheme which is used to mark past tense in the language; ńzùkọ́, 'meeting', 'assembly', consists of three morphemes - n, the nominal prefix, zù, 'meet' a verb root, and kọ which has the meaning of 'together'; the last two morphemes can be used to form a compound verb, such as zùkọ́, 'meet together'. The words ákwụkwọ̄, 'leaf, book'; ósisi, 'tree'; ágbàrà, 'one possessed of bad spirit' etc. constitute each a morpheme, because none of these nouns can be further divided into component meaningful units as in ńzùkọ́ above.

In chapter 2 we gave the phonetic and phonemic descriptions of the vowel and consonant segments of the Standard dialect of Igbo. In the present chapter we shall describe how these segments are distributed in the morpheme structure of this dialect. The morpheme structure will be discussed under the following headings:

1. vowel/consonant distribution and vowel sequence
2. syllable structure

3. morpheme structure

and 4. morpheme structure conditions.

Under (1) we will discuss the distribution of the vowels in the morphemes, pointing out the phonological constraints that operate in the sequence of vowels within a morpheme in the dialect. Less attention is given to the distribution of consonants in the morpheme, because as it is correctly pointed out in Hyman (1975), the consonant segments in Igbo language are distributed freely within a morpheme, in the sense that there are no restrictions on the vowel-consonant or consonant-vowel sequences within a morpheme in the language and no identifiable phonological changes are known to occur as a result of the sequence of consonants and vowels in the morpheme. If such changes ever occur, they can be seen as part of the phonological phenomena generally present in other languages and this would not necessarily imply any specific constraints on how the consonants are distributed in the morpheme structure of this dialect.

One area, for instance, where it could be suspected or rather expected that some constraints would arise in the consonant-vowel sequence in the language was with regard to the nasal consonants - n, ny,([ɲ]) and n̄ ([ŋ]). It could be expected, for instance, that some restrictions would be present in the type of vowels that can occur with these nasal consonants, say, that n would occur with mainly front vowels, ny would occur with i or ị and ŋ would occur with mainly back vowels. This suspicion or hypothetical case is not supported in this language, in that any of the nasal consonants can co-occur with a front or a back vowel as the following examples will show.

ánụ	-	meat
ányụ̄	-	pumpkin
ánn̄ū	-	bee
ịnā	-	to take from, to receive
ịnyā	-	to warm oneself, eg. in the sun shine.
íñā	-	to roast very mildly.

ńne	-	mother
ínē	-	to look (On. dial.; Stnd. dial. - ílē)
ínyē	-	to give
ín̄ē	-	to step over something etc.

Under (3) we will discuss the morpheme structure of Igbo words. It should be noted in this respect that in this language the verb forms, including the derivatives from these forms, have the most complex morpheme structures. The nouns mainly consist of single lexical morphemes, except in certain cases where two lexical morphemes are joined together to form compound nouns. Examples that illustrate these points will be given later in the discussions.

Under (4), the morpheme structure conditions, we will discuss those phonological conditions that operate in the morpheme structures of the Standard dialect and in the Igbo language in general.

4.1. VOWEL DISTRIBUTION AND VOWEL SEQUENCE.

The distribution of the eight phonemic vowels which have been distinguished in the Standard dialect (cf. 2.1. above) is simple and straightforward, in the sense that there are no restrictions as to which vowel co-occurs with which consonant. The vowels occur freely with any consonant in the Standard dialect. With regard to the distribution of these vowels in the morpheme, the eight phonemic vowels therefore have more or less free distribution within the lexical morpheme.[48] Any of the eight vowels can occur in the initial, medial and final positions within a lexical morpheme. This is illustrated by the following examples.

/a/	áka	-	hand
	ágadī	-	an old person
	ụ̀ganị	-	famine
	àdákā	-	chimpanzee
	Ọ̀kị́jà	-	name of a town etc.

48. We need to distinguish for our purpose two types of morphemes, namely, the canonical and the noncanonical morphemes (cf. Hyman 1975:111).

/e/	éke	–	python
	ékike	–	being well dressed
	èkpére	–	prayer
	Òwérrì	–	name of a town/province
	éhi	–	cow
	íhe	–	thing etc.
/i/	íjè	–	walk, journey
	ósisi	–	tree
	éhìhie	–	afternoon
	ètítì	–	middle
	ényi	–	elephant
	ísi	–	head etc.
/ị/	ịgà	–	hand-cuff
	àsị	–	a lie
	ńtị	–	ear
	ànyịnya	–	horse
	áhịhịa	–	grass
	àkịdị	–	type of cocoyam etc.
/o/	óbì	–	chest, heart
	òbodo	–	town
	ógō	–	money
	Efobi	–	personal name
	ógbènye	–	poverty
	óberē	–	small etc.
/ọ/	ọjị	–	iroko tree
	ńjọ	–	bad
	ụlọ	–	house
	ọfọlọ	–	bamboo
	ọgụ	–	hoe etc.

The canonical morpheme which we shall use here to represent the lexical morpheme has a consistent structure in the grammar, while the noncanonical morpheme has a structure which may vary, and we shall represent this as the affix morpheme. The way these two types of morpheme are structured in the Igbo grammar clearly justifies the differentiation we make here.

/u/	ùdé	–	pomade
	ùbé	–	pear
	ùjú	–	fullness
	úchu	–	industriousness
	égwu	–	dance
	ígwu	–	lice
	òkpúrù	–	underneath
	Enugu	–	name of a town etc.
/ụ/	jụ́	–	refuse
	ụ́gụ̄	–	spinach
	ágụ̄ụ̄	–	hunger
	ọ́nwụ	–	death
	ụ́gụ̀rụ	–	harmatan
	ụ̀dị́	–	type, kind, manner etc.

In monosyllabic words, which usually consist of CV structure, any of the eight vowels can occur as the V element in the structure. For example,

bé	–	place, home
jí	–	yam
mụ́	–	first person pronoun – I
gị́	–	you (sing.)
yá	–	he/she/it
dí	–	husband

Monosyllabic nouns such as these are few in the language; however, since most verb roots are monosyllabic, with CV structure in Igbo, we can use the verb roots as further illustrations of the examples.

bà	–	enter
bé	–	slice
bí	–	live, dwell
sí	–	cook
sị́	–	tell, say
bú	–	carry
bụ	–	be

sò	-	follow
sọ	-	fear, avoid
gá	-	go
gè	-	listen to
gó	-	buy
gọ́	-	deny
gụ́	-	read
ká	-	surpass
kè	-	create
kò	-	pluck with hooked object
kọ́	-	narrate
kú	-	scoop
kụ́	-	knock etc.

4.1.1. VOWEL SEQUENCE.

Certain phonological constraints operate in the sequence of vowels within a morpheme in Igbo. One of these constraints is the vowel harmony constraints which require that the vowels that occur within a morpheme be from the same harmonic group. The vowel harmony in this language will be discussed in the section devoted to this phonological phenomenon in the next chapter. Similarly, some of the phonological processes that result from the sequence of two successive vowels within a morpheme or across the morpheme boundary, such as vowel assimilation, will be discussed in the next chapter. In the discussions that will follow in the present chapter we shall concentrate on those constraints that govern the sequence of successive vowels within a morpheme in the Standard dialect as well as in the language in general.

Two successive vowels never occur at the beginning of a morpheme in Igbo. In other words, no morpheme begins with a VVC- structure in this language. Also in this language there is no morpheme with only a VV structure. A morpheme however can end with two successive vowels, as can be seen in some of the examples given above.

When two consecutive vowels occur with a lexical morpheme (i.e. within a morpheme boundary) in Igbo, the first of such vowels in the sequence is usually a high or close vowel (either i, ị, u, or ụ). For example,

bị́a	[bɪ̭ a]	–	come
rịa	[rɪ̭ a]	–	be sick, suffer from
áhía	[ahɪ̭ a]	–	market
áhịara	[ahɪ̭ ara]	–	weaver bird
èhíhiè	[ehihi̭e]	–	afternoon
fió	[fi̭o]	–	tie
fịo	[fi̭o]	–	miss a target
ụ́lụ̄ọ	[ʊlʊ̭ɔ]	–	clay
ḿmụ̄ọ̄	[mmʊɔ]	–	spirit
ágụ́ụ̄	[agʊʊ]	–	hunger
ójíī	[ojii]	–	black (adj.) etc.

With respect to the sequence of the consecutive vowels in the examples, which as we noted earlier, always involves a close vowel followed by another vowel, it should be remarked that in some cases a "y" or a "w" off-glide is heard at the juncture of the two vowels, depending on whether a front vowel or a back vowel precedes in the sequence. When both vowels in the sequence have identical tones, the high or close vowel tends to lose its syllabicity and form a diphthong with the vowel that follows it. In consequence of this the underlyingly two syllable morpheme is realised as one syllable and the high vowel, as it were, does not carry an independent tone of its own, rather the tone of the syllable derived through this process is realised on the vowel that follows the high vowel. In the transcriptions of those words in the examples where this phonological process operates, the reduced or contracted high vowel is indicated with a diacritic mark (^) below it.

When the two vowels in the sequence have unidentical tones, the high vowel does not lose its syllabicity, i.e. it has its independent tone in the sequence and it does not form a diphthong with the co-occurring vowel in that sequence. In other words, the sequence is perceived as that of two vowels, and the morpheme is likewise perceived as a two-syllable morpheme. The phonological process of diphthongization mentioned above will be discussed below.

The constraints and the subsequent phonological changes described above, relative to the sequence of two successive vowels, are particularly relevant only to those cases where this sequence occurs within a lexical morpheme. When two vowels follow each other across a morpheme boundary, the first of such vowels in the sequence is not necessarily constrained to be a close vowel. The first vowel in the sequence can be any of the eight phonemic vowels in this language. Consequently some of the phonological changes described above may not be entirely relevant in the latter cases. However there are other conditions that may be observed in the latter case (when the sequence occurs across morpheme boundary) regarding the second vowel in the sequence. These constraints are discussed below.

4.1.2. VOWEL SEQUENCE ACROSS MORPHEME BOUNDARY.

When a sequence of consecutive vowels occurs across morpheme boundary (i.e. within the same lexical unit) the second vowel in the sequence is invariably an affix morpheme. Such a lexical unit in Igbo usually consists of a verb root and a vowel suffix. The vowel suffix is often used in Igbo to form the imperative and the narrative constructions. This is illustrated in the following examples.

4.1.2.1. THE IMPERATIVE VERB FORM

The imperative is formed in Igbo by suffixing a vowel to the verb root. For example,

Verb root	Imperative form
gá	gàá
gè	gèé
sí	sìé
sị́	sị̀á
kò	kòó
kọ́	kọ̀ọ́.
kú	kùó
kụ́	kụ̀ọ́ etc

4.1.2.2. THE NARRATIVE VERB FORM.

The narrative construction is achieved in Igbo by among other things, the following form of the verb which consists in suffixing a vowel morpheme to the verb root. For example,

Verb root	Narrative construction.		
gá	Ò wèé gáa	-	and he went
gè	Há wèé gèé	-	and they listened to
sí	Ébō wèé síe	-	and Ebo cooked
chị́	Óti wèé chía	-	and Oti ruled
tò	Ò wèé tòó	-	and he praised
kọ́	Yá wèé kọ́ọ	-	and he narrated
kwú	Yá wèé kwúo	-	and he spoke (siad)
kwụ́	Há wèé kwụ́ọ	-	and they paid etc.

The vowels that can be used as the imperative suffix and/or the narrative suffix of the verb, and for that matter, as the vowel suffix of Igbo verbs, are constrained in the same manner. In each case it is an open vowel that is usually used as the vowel suffix. Furthermore the vowel suffix in each case is identically constrained with respect to agreement with the vowel that immediately preceds it. The vowel suffix which is the second vowel in the sequence agrees with

the vowel that immediately preceds it in terms of vowel harmony features as well as in terms of the features of 'frontness' and 'backness' or in terms of the features of 'spread' and 'rounded'.

We may observe that in the examples of the vowel affix morphemes discussed above, when a high or close vowel precedes in the sequence, the high vowel does not contract or lose its syllabicity and form a diphthong with the vowel that follows it, as we noted in the previous examples where consecutive vowels occur within the same lexical morpheme, even where the tone of the high vowel is identical with that of the following vowel. This is exemplified in the imperative and/or narrative verb forms.

4.1.3. THE DIPHTHONGS IN THE STANDARD DIALECT.

Diphthongs are characterized by the change or transition from one vowel position to another. The existence of diphthongs in Igbo has never been discussed in the previous studies on Igbo phonology. The phonological process which we described above, where we observed that a high vowel followed by another vowel within a morpheme (where both vowels bear identical tones) contracts and forms a diphthong with the vowel that follows it, has been handled differently by the other writers. Green and Igwe (1963), Nwachukwu (1975) and others treat this process as a case of prominent palatalization of the consonant segment that precedes the high vowel in the morpheme. Consequently in the works by these authors those words where this phonological process occurs are transcribed with the "y" prosodic feature to represent the palatalization, as in the following examples.

bị́á	is transcribed as	byá	
áhị́á	is transcribed as	áhyá	
áhị́hị́á	is transcribed as	áhị́hyá	or as ahyhya
éhìhiè	is transcribed as	éhìhyè	or as ehyhye etc.

The obvious reason for treating this phonological phenomenon with a "y" prosody is the 'y' glide which is heard at the juncture of the two vowels in the sequence. We do not however accept this system of transcription in these cases. One main reason why we cannot accept such a system of transcription, i.e. with 'y' prosody, is because of the confusion and inconsistency this would involve in the writing of this language. This inconsistency which is discussed elsewhere in this thesis will be briefly mentioned here. Thus, for instance, in the works written by these authors who use the 'y' prosody in their transcriptions, words such as bị́á, chị́á, fió etc., (when these verb roots occur in the infinitive and some other forms or tenses) are written with the 'y' prosody as bya, chya, fyo etc. However, when the same verbs are used in the imperative form, they are written as bị́á, chị́á, fió etc, i.e. without the 'y' prosody. In other words, the same words are written differently at different verb forms, one time with a 'y' and at another time without a 'y'. Under the same considerations, whereas these authors would write bị́á etc. as bya because of the glide heard at the juncture of the high vowel and the following vowel in the utterance, they would not write words such as sụ́ọ́, 'clear a bush', kụ́ọ́, 'knock', ñụ́ọ́, 'drink', sió, 'cook' etc. using the 'y' or the 'w' prosody, even though from phonetic point of view these words are pronounced and perceived in the same manner as described above for 'bị́á', i.e. the 'y' or 'w' off-glide is heard at the juncture of the close vowel and the vowel that follows, the high vowel is contracted and the tone of the morpheme is mainly realised on the final vowel. In other words, the use of the prosody by these writers has been restricted only to those very few cases where a close front vowel occurs and even here the 'y' prosody has not been used consistently; it is used for certain forms of the verb and not used for certain forms of the same verb. Secondly, the prosodic system of transcription has not been extended to other words or forms with close back vowels where the same phonological phenomenon is present. It should therefore be noted that the use of 'y' prosody in the writing of those words where a close vowel is immediately followed by another vowel in Igbo does not only lead to inconsistency, as noted above, but also to confusing a phonetic transcription with a phonemic transcription.

Certain phonological differences exist between the words given under (a) and (b) below.

(a)		(b)		
bi̱á	'come'	bi̱á	-	come (imp.)
bi̱à	'throw sand etc. on somebody'	bi̱á	-	throw sand on somebody (imp.)
ri̱à	'be sick, suffer from'	ri̱á	-	be sick (imp.)
fió	'tie'	fìó	-	tie (imp.)
fiò	'miss a target'	fió	-	miss (imp.) etc.

The difference lies in the fact that whereas the words in the (b) column are perceived as two-syllable words consisting each of CV-V structure, those words in the (a) column are perceived as one-syllable words consisting each of a consonant and a diphthong. In other words, the vowel sequence in the words of the (b) series is realised as two fully syllabic vowels, each vowel with its own independent tone, while the sequence of vowels in the words of the (a) series is realised as diphthongs where the tone of the syllable is carried by the final vowel in the sequence.

We made spectrograms of words representing the two types of vowel sequence given baove. Spectrograms of the following words with vowel sequences similar to those described for the (a) and the (b) series above, were made.

bi̱á 'come' representing the (a) series, spectrogram 1;

bi̱á 'come' (imp.) representing the (b) series, spectrogram 2;

ábi̱à !type of dance' representing the (a) series, spectrogram 3;

Ọbí bi̱á 'let Ọbi come' representing the (b) series, spectrogram 4;

áfi̱fi̱á 'grass' representing the (a) series, spectrogram 5;

fi̱fi̱á ' twist around' (imp.), representing the (b) series, spectrogram 6;

fió 'tie up' representing the (a) series, spectrogram 7;

áhi̱á 'market' representing the (a) series, spectrogram 8;

ọ́ri̱à ' sickness' representing the (a) series, spectrogram 9.

Comparing the spectrogram of bịá, bịà, ábịà and Ọbịbịá (cf. spectrograms 1, 2, 3 and 4 respectively) with respect to the patterns of _ịa_ in the spectrograms, we can observe that the patterns are some how similar in the four spectrograms. For instance, they have the same type of formant transitions from _i_ to _a_. However, certain differences can be observed between the patterns. For example, the patterns of ịa in spectrograms 2 and 4 (representing the (b) series) have longer duration than those in spectrograms 1 and 3 (representing the (a) series). In the former, apart from the transition period between the vowels, we have the steady states of the individual vowels, of ị and of _a_, clearly shown in the spectrograms. The duration of _ịa_ in bịá, spectrogram 2, is 40 milliseconds, 16 milliseconds of which represents the steady state of ị. The duration for the transition from b to the steady state of ị in the spectrogram is 4 millisecs. and that for the transition from ị to the steady state of _a_ is 10 milliseconds. The duration for the steady state of _a_ is 10 milliseconds.

In spectrgogram 4 the duration for _ịa_ is 35 milli-seconds of which 5 milliseconds represents the transition from b to the steady state of ị. The duration for the steady state of ị in the spectrogram is 13 milliseconds; the duration for the transition from ị to the steady state of _a_ is 7 milliseconds and the duration for the steady state of _a_ is 10 milliseconds.

The patterns of _ịa_ in spectrograms 1 and 3 (representing the(a) series) have shorter durations than those for the same vowel sequence as noted in spectrograms 2 and 4. In the spectrogram of bịá (spectrogram 1) the duration for ịa is 18 milliseconds when this sequence is pronounced slowly and 14 milliseconds when it is pronounced in normal tempo. For both types of pronunciations of ịa which are represnted in spectrograms 1 (a)-(b), the ịa patterns consist mainly of the transition from the position for ị to that for _a_ where the F2 and the F3 in the spectrograms fall steadily from the position for ị to that for _a_ and the F1 rises steadily from the position for ị

to the position for a. This as we mentioned earlier at the beginning of this section, is what characterizes a diphthong.

In the spectrogram of ábịà (spectrogram 3) the duration of ịa is 18 milliseconds, when this word is pronounced slowly, and 14 milliseconds when it is pronounced in normal tempo. Similar to what we observed in spectrogram 1, of bịá, in the spectrogram of ábịà, the second formant of ị after curving upwards from the release of b and reaching the steady state for ị begins to curve downwards to the hub of a . The F1 also curves upwards from the position for ị to the position for a. Once more, the whole pattern for ịa in both spectrograms represents mainly that of transition from one sound to another, that is, ịa in this context is a diphthong.

Similar comparison of the spectrogram of áfịfịá and fịfịá, (spectrograms 5 and 6 respectively), will show that the patterns of ịa in both words are characterized by a longer duration for the ịa in fịfịá, which is about 40 milliseconds, and by a short duration for the ịa in áfịfịá, which is about 20 milliseconds. In the ịa pattern in the spectrgram for fịfịá the duration for the steady state of ị is about 18 milliseconds and that for the steady state of a is about 15 milliseconds, whereas in the pattern of ịa in the spectrogram of áfịfịá (representing the sequence in the (a) series) the second formant of ị steadily curves downwards from its position for ị to its position for a, and the first formant of ị makes a steady curve from its position for the ị to its position for the a, once more indicating that the vowel sequence in the latter case is typically that of a diphthong.

What has been described above regarding the vowel sequence in the words of the (a) series is true of the io and the ịa sequences in the spectrograms of fió, áhịá and óríà (see spectrograms 7 - 9).

Apart from and in addition to the auditory evidence, the way these vowel sequences are perceived, the data from the spectrograms described above constitute the strongest evidence in support of the claim we make regarding the existence of diphthongs in Igbo and consequently regarding the treatment of such vowel sequences in this language.

The diphthong in Igbo, it should be understood, is a phonologically derived phenomenon. It is the product of certain phonological rules which apply whenever the structural conditions are met. These conditions have been described above.

Apart from the examples discussed here where diphthongization results, there are other interesting cases in the language where this phonological process of diphthongization is present.

Sometimes the morpheme nyé (which when used in isolation means the verb -'give')is used with other verb roots to form compound verb roots, as shown in the following examples.

gbúnye - kill and give

kúnye - scoop and give, scoop into

bànyé - enter into

dànyé - fall into

zụ́nye - buy/purchase and give to somebody

gánye - walk into, pass through a hole etc.

The morpheme yí/yị́ when it occurs with verb root is used as an allomorph of nyé. Thus the above words can be rewritten with the yí/yị́ morpheme with the same meanings as above. For example,

gbúyi - kill and give to somebody

kúyi - scoop into

bàyị́ - enter into

dàyị́ - fall into

zụ́yị́ - buy and give somebody

gáyị́ - pass through a hole etc.

In the latter cases, when both the root morpheme and the suffix morpheme (in this case yí/yị́) have identical tones (i.e. high tones), the yí/yị́ morpheme tends to be contracted thus:

[kuiˆ]

[zɔɔIˆ]

[gaIˆ] etc.

The vowel sequence that results from this process is usually perceived as a diphthong. Thus when the high vowel is contracted it loses its syllabicity and independent tone, and the tone of the syllable is realised mainly on the vowel that is combined with the high vowel. When this happens the close vowel forms a diphthong with the vowel that co-occurs with it (which in this case is the vowel that precedes it).

If the vowel sequence that results from the process has unidentical tones, as in bàí or dàí, diphthongization does not apply. This demonstrates once more that diphthongs in this language are phonologically derived through the operation of certain phonological rules.

What has been described here about diphthongs in Igbo forces us to review the syllabic structures in this language. As we mentioned earlier in the discussion, in the previous works on this language the existence of diphthongs in the language has never been taken into account and consequently the effect which this phonological process has on the syllabic structure of the language has not been considered in these previous works. Further discussions on the implications of this phonological process on the syllabic structure of Igbo will be given in the next section.

4.2. THE SYLLABLE STRUCTURE.

The syllable is a phonological unit, ' a unit at a higher level than the phoneme or sound segment, yet distinct from the word or the morpheme'. Most speakers of a language find it comparatively easy to identify the syllable in their language, infact much easier than to identify the phonemes. However, despite this relative ease to be identified, the syllable is not easy to define in strict linguistic terms. The main problems connected with the difficulty in defining the syllable can be related to the ways in which this phonological concept is liable to be interpreted. Our interpretation of the syllable, the way we determine what constitutes a syllable, is often influenced by the way we pronounce and/or conceive the words containing the syllables.

Characteristic of the syllable in most languages, i.e. the way the syllable is determined in these languages, is the acoustic energy involved in speech production which usually manifests itself through peaks of prominence in pronunciation. Equally important for our assessment of syllables is the way speakers of a language perceive and arrange their language. These criteria are crucial to our judgements about the syllable in that the syllable is a linguistic as well as a psychological reality. It is these complex properties associated with this linguistic concept that make the definition of the syllable difficult.

Igbo has a relatively simple syllable structure. Most of the syllables in the language are open syllables. The syllable structure of Igbo can be summarized as follows:

$$(C)\ \begin{matrix} T \\ S \end{matrix}$$

where C stands for consonant; T for tone and S for syllabic.

A syllable peak in Igbo is any tone-bearing unit and in the language this can be either a vowel or a syllabic nasal. Any of

the following can constitute a syllable in Igbo.

V

CV

N

N represents a syllabic nasal which is usually homorganic with the consonant that follows it.

As shown in the phonetic and phonemic descriptions of the consonant sounds of the Standard dialect (cf. chapter 2), Igbo has some double articulated consonants. In the local orthography these consonants are written as digraphs, for example, gb, kp, kw, gw, nw. The phonetic and phonemic descriptions of these sounds are given in chapter 2.

On the basis of these double articulated consonants, Dunstan (1966/1969) introduces an additional syllable structure for Igbo. This was represented as C_1C_2V, eg. /kwa/. Dunstan remarked that "only /ɣ/ or /w/ can occur in C_2 position. If /w/ occurs in C_2 position, the consonant in C_1 position may be any velar plosive, /ŋ/ or /ɦ̃/, eg. ịkwa. If /j/ occurs in C_2 position, the consonant in C_1 position may be a bilabial plosive, an alveolar plosive, /r/, /h/, eg. ịpyã̀, ọ́ryè. Following a bilabial plosive, /r/, /h/, or /ɦ̃/, /j/ is represented as 'y' in the orthography in some publications by Green and Igwe, eg., ịbya. In orther publications /j/ is represented by either /i/ or /ị/, depending on whether the other vowels in the word are of raised set or the lowered set, eg., ibie, ịbịa, ..."[49]

Igbo has no consonant clusters. This has been clearly pointed out in most of the previous works published on Igbo phonology. In the phonetic and phonemic descriptions of the consonant system of Igbo given by other writers, as well as in the present work, it has also been stressed that the double articulated consonants in Igbo constitute each one unit of phoneme.

49. Dunstan,E. 1969 ed., Twelve Nigerian Languages, pp. 91-92.

With regard to the /j̇/ glide and the interpretation of this by Green and Igwe and some other writers on the language, arguments against this system of transcribing the glide in the orthography have been given above. The inconsistency which we noted earlier about this system of transcription is most clearly evident from the above extract taken from Dunstan (1969), where it was stated that /j̇/ is sometimes represented as 'y' and at other times as /i/ or /ị/ without any reasonable justification for one or the other. Even the conditions stated in the extract cannot, for that matter, be taken seriously, in that it is violated each way in the examples used for illustration. Thus we have ịbya, ịpya, orye, on the one hand and ịbịa, ibie, on the other, where the vowels that occur with the close vowel in the words (on both cases) have the same feature of either 'raised' or 'lowered'.

Though we have argued extensively against such interpretation of the palatalized consonants in the language as contained in some publications by Green and Igwe and later in Dunstan (1966/1969), where the consonants are followed by two vowels the first of which is close vowel, we shall add one more argument here.

The basic assumption that underlies this view put forward in Green and Igwe (1963 and elsewhere) and in Dunstan (1969) about the interchange of 'y' and /i/,/ị/ or of 'w' and /u/, /ụ/ in the transcriptions is that in this language, a glide, /y/ or /w/ can change to a vowel under certain environments or conditions. Thus, viewed from another angle, the root morphemes are byá, pyá, ryà, fyó, fyò etc, and in the imperative and/or narrative constructions the 'y' becomes /i/ or /ị/, giving bịá, rịá, fìó and fìó respectively. Such a claim would be difficult to defend or justify in the language. No where has it ever been shown in the phonology of this language that a glide,'y', can change to /i/ or /ị/ or vice versa and that 'w' can change to /u/ or /ụ/ and/or vice versa under any conditions or environments. As clearly illustrated in the arguments given earlier, even contracted close vowels do not as such change to glides in Igbo.

We have shown in 4.1.3. above that a contracted high vowel forms a diphthong with the vowel it occurs with in the word in Igbo. Treating this phonological phenomenon in Igbo in this manner provides a much more accurate and realistic account of the phonological process involved in these structures. It also acquires great support and generalization in the phonology of Igbo, because in this way we are able to account not only for those cases which have often been mentioned in the previous literature on Igbo phonology, but also for the cases that have escaped mention in these studies but where the same process of vowel contraction and subsequent diphthongization are present. For instance, the cases which we mentioned in the discussions above, where, as we observed, the morpheme yí/yị́ is first reduced to a front close vowel which further contracts and forms a diphthong with the vowel that precedes it in the word have not been mentioned in any of the previous studies on Igbo phonology. In the discussions given earlier we have related this latter phonological process with those mentioned in the previous studies, because in both cases it is the same phonological process that is involved. We are equally confident that a more thorough search in the language would reveal other constructions where this process takes place.

In view of how this phonological process affects the syllable structure of the words in which it occurs in this language, we need to revise the syllable structure of Igbo to include those syllables with a diphthong. The revised syllable structure of Igbo is as follows:

V

CV

$C\underset{\wedge}{\overset{\frown}{V}}V$

$CV\underset{\wedge}{\overset{\frown}{V}}$

N

where $\underset{\wedge}{V}$ represents a contracted vowel and the horizontal bar indicates a diphthong.

4.3. THE MORPHEME STRUCTURE.

In the present section we shall concentrate on the descriptive analysis of the structural characteristics of Igbo morphemes. The discussions given here cannot be taken in isolation from what have been stated earlier about vowel sequence or from the discussions about the phonological processes that result from the sequence of segments within a morpheme in the language. In other words, analyses under the three headings given at the beginning of the chapter should supplement each other.

Subsequent to what was stated in 4.1.1. above, we shall distinguish for our present discussions between a lexical morpheme and an affix morpheme. The reason for this distinction will become evident in the analysis. The former, i.e. the lexical morpheme, as indicated in the foot note (149), has a more or less consistent structure in the language whereas the structure of the affix morpheme is sometimes variable.

In the transcriptions of the words given for illustrations in the analysis, the morpheme boundary will be indicated by $\neq$.

4.3.1. THE LEXICAL MORPHEMES.

The lexical morphemes in Igbo are either nominals (nouns), verb roots or any of the structures often referred to as 'content words'. In Igbo there are monomorphemic words as well as polymorphemic words. The monomorphemic words are words that consist of one morpheme. In Igbo these include verb roots and nouns; most nouns in the language are monomorphemic and majority of the verb roots in Igbo are monomorphemic. The monomorphemic word in Igbo can consist of one or more syllables. For example,

jí	-	yam
dí	-	husband
bé	-	place, home
ụ́lọ́	-	house

ńnụ̀nụ	–	bird
ósisi	–	tree
ákwụkwọ̄	–	leaf, book
ímí	–	nose
ǹtí	–	cheek
ńtị	–	ear
ányá	–	eye
gá	–	go, walk
hụ́	–	see
kụ́	–	knock
sí	–	cook
rí	–	eat
zà	–	sweep
kwà	–	push
kwú	–	speak etc.

These are lexical morphemes with generally consistent structures in the grammar. They may consist of CV, VCV, NCV structures or combinations of these with free phonemic distribution.

A polymorphemic word may contain two or more lexical morphemes. Some nouns and compound verb stems are polymorphemic in structure. The following words are polymorphemic.

élu≠igwē	–	sky, heaven
nwá≠ànyị	–	woman
nwá≠okē	–	man, male issue
ánụ≠ọhị̄ā	–	beast
égbè≠ígwē	–	thunder

Énu≠gū (from énu úgwu – top of hill) – name of a town

gá≠lu	-	reach (lit. go-reach)
gá≠fè	-	walk-past
kwú≠de≠be	-	speak and stop at a certain point
gá≠de≠be	-	walk and stop at a certain point
kwú≠lu	-	speak to a point
gá≠mì	-	walk far into etc.

These polymorphemic words have been formed by joining two or more lexical morphemes. The lexical morphemes out of which the polymorphemic word is formed maintain some degree of consistency in their structures. However certain phonological changes such as assimilation, elision etc sometimes occur as a result of the combination of the lexical morphemes in the polymorphemic word structure. These phonological changes are described in the next chapter of the present work.

A polymorphemic verb stem in Igbo may consist of two or three independent verb roots - Rt_1, Rt_2 and Rt_3. In such polymorphemic structures there are certain constraints on the type of verbs that can occur as Rt_2 or Rt_3, i.e. the second or third root morphemes in the structure. The following examples show some of the verbs that occur as the second root morpheme - Rt_2.

Rt_1	Rt_2	
gá ≠ lu	(from gá,'walk, go' and lú,'reach')	- reach
gá ≠ fè	(fè means 'pass')	- walk past
kwụ́ ≠ fè	-	overpay
gá ≠ mì	-	walk deep into (ímì - be deep)
kụ́ ≠ dà	-	knock down (dà - fall)
kụ́ ≠ bà	-	knock into (bà - enter)
kụ́ ≠ do	-	knock unto (dó - place, put)
kụ́ ≠ gbu	-	knock dead (gbú- kill)

hụ́ / zù - see completely (ízù - be complete)

mé / zi - repair (mé - do, zí - show, correct)

gbú / bè - cut (gbú - cut, kill, bè - end)

sí / dè - overcook

gbú / bì - cut (same as gbúbè)

mé / nyị - do-surpass etc.

The verbs that can occur in the Rt_2 position in the compound verb structures of Igbo are limited in number, though they are by far much more than those that can occur in the Rt_3 position. The verbs that can occur in the Rt_3 position in a compound verb construction in Igbo are highly limited in number. I know of only about four verbs, namely, lú - 'reach', bé - stop, bà - enter and dó - put, place, which can occur in the Rt_3 position in a compound verb construction. For example,

Rt_1	Rt_2	Rt_3	
kwú	/ de /	be	- speak and stop at a point
kụ́	/ bà /	lú	- knock inside to a satisfactory point
kụ́	/ be /	do	- knock unfirmly unto
kụ́	/ mì /	ba	- knock deep inside etc.

Note that dó is realised as dé when the former occurs in the Rt_2 position followed by another root morpheme within the same compound verb stem.

For a better understanding of the general structural and phonological characteristics of polymorphemic forms in the language, it will be necessary to know the system of word formation in this language. This will be able to reveal to us how the morphemes are tied up in the structure. It is the nature of the tie or liaison between the constituent morphemes in the word that determines whether the phonological changes would occur or not occur in the structure.

Conjoining of two or more morphemes is used to achieve certain functions in the language, such as to form new words and to achieve certain grammatical functions. The examples discussed above represent the cases where the morphemes are joined together to form new words. Here the consituent morphemes within a word are losely joined together and therefore do not have close and rigid ties between them. Each morpheme is an independent lexical morpheme and does not have strong phonological ties with and/or influence over the other lexical morphemes within the word. In the examples of the polymorphemic words given above, we can note, for instance, that vowel harmony does not occur across morpheme boundaries.

When morphemes are joined with other morphemes to achieve grammatical functions in Igbo, all the constituent morphemes in the structure maintain close and rigid ties. Some of the participating morphemes cannot occur independently or in isolation as lexical morphemes. The morphemes in this case influence each other phonologically. This is characteristic of affix morphemes and other grammatical categories formed by joining together two or more morphemes, such as in the grammatical process of reduplication used in forming verbal nouns and certain type of adjectives in Igbo. These grammatical processes and the phonological implications are discussed in chapter 5.

4.3.2. THE AFFIX MORPHEMES.

An affix morpheme in Igbo can consist of a vowel, V, or a consonant and a vowel, CV, and sometimes a combination of both, i.e. VCV. The majority of affixes in the language occur with the verbs. The nouns take little or no affixes in the grammar. In the Onitsha dialect the -gá suffix is used with the nouns to denote plural; this suffix is not used in the Owerri dialects. The -gá suffix however is used in the Standard dialect to form the plural of nouns as shown in the following examples.

Singular		Plural	
ọ́sisi	- tree	ọ́sisiga	- trees
ḿmadụ̀	- person	ḿmadụ̀ga	- people, persons
éwu	- goat	éwuga	- goats
ụ́lọ̀	- house	ụ́lọ̀ga	- houses
ọ̀bodo	- town	ọ̀bodoga	- towns etc.

The suffix -ga is often referred to as a floating morpheme in that it can occur with either the nominal or the verbal element in the sentence. For instance, each of the pairs of sentences below is acceptable in Igbo.

(a) Ó gbùru ọ́sisiga
(b) Ó gbùgara osisi
he cut down trees

(a) Ọ́ lụ̀rụ ụ́lọ̀ga
(b) Ọ́ lụ̀gara ụ́lọ̀
he built many houses

(a) Ó nwère éwuga
(b) Ó nwègara éwu
he has many goats etc.

Though in the local orthography this morpheme is written as -ga in all cases, however, the vowel of this affix usually agrees harmonically with the word to which the -ga is suffixed.

The verbs and the verbal derivatives in Igbo take many affixes. The number of such affixes that occur with Igbo verbs has not been fully described in any of the studies on Igbo grammar. The present analysis does not attempt to describe every one of those affixes, rather we shall, on the basis of the few examples to be discussed here, concentrate on disclosing the general structural and phonological patterns common to the affixes. The following represent some of the affix morphemes that occur with Igbo verbs.

i. The Infinitive Prefix

The infinitive of Igbo verbs is formed with a vowel prefix, namely, i or ị, which agrees harmonically with the vowel of the root morpheme. For example,

ị ≠ gā	to go, to walk
i≠gè	to listen
i ≠ sī	to cook
ị ≠ sị̄	to say
i ≠ kwū	to speak
ị ≠ kwụ̄	to pay
i ≠ tō	to grow
ị ≠ tọ̄	to unwrap
i ≠ zè	to dodge
ị ≠ zà	to sweep etc.

ii. The Performative Prefix

Like Welmers (1970) we prefer to designate this prefix in Igbo verbs as the performative prefix. Emenanjo (1975) describes it as 'participle prefix'. This is an open vowel prefix that occurs in certain forms of the verb such as the present tense, the future tense and the perfect tense forms. For example,

(a)	Ọ́ nà-a ≠ gá	he is going
	Há nà-é≠gè	they are listening to
	Ányị nà-e≠sí	we are cooking
	Ányị nà-a≠sị́	we are saying
	Ébō nà-ekwú	Ebo is speaking (saying)
	Ébō nà-a≠kwụ́	Ebo is paying
	Ósisi nà-e≠tó	the tree is growing
	Òbí nà-a≠kọ́	Obi is narrating etc.

(b)	Ọ gà-a≠gá	he will go
	Há gà-é ≠ gè	they will listen to
	Há gà-e ≠ sí	they will cook
	Há gà-a ≠ sị́	they will say
	Ị́ gà-e ≠ kwú	you (sing.) will speak
	Ị́ gà-a ≠ kwụ́	you " will pay
	Ósisi gà-e ≠ tó	the tree will grow
	Ụnụ̀ gà-a ≠ kọ́	you (pl.) will narrate etc.
(c)	Há à ≠ gáala	they have gone
	Há è ≠ gèéla	they have listened to
	Há è ≠ kwúola	they have spoken (said)
	Há à ≠ kwụọla	they have paid
	Há è ≠ síela	they have cooked
	Há à ≠ chịala	they have ruled
	Há è ≠ tóola	they have grown
	Há à ≠ tọọla	they have unwrapped etc.

This prefix does not occur in the past tense form of the verb or when a vocalic pronoun, otherwise referred to as the bound pronominal form, eg. Ọ/O, Ị/I, E, are used as the subject of the perfect tense form of the verb.

iii. The Imperative Suffix

The imperative in Igbo is formed with an open vowel suffix. Some examples of the imperative forms of the verb have been given earlier.

gà ≠ á	go!
gè ≠ é	listen!
sì ≠ é	cook!
chị ≠ á	rule!

kwù ≠ ó	speak!, say!
kwụ̀ ≠ ọ́	pay!
tó ≠ o	grow!
tò ≠ ó	praise!
tọ̀ ≠ ọ́	unwrap! etc.

iv. The Past Tense Morpheme

The past tense is formed in Igbo with a -ra suffix. The vowel of the suffix duplicates the vowel of the verb root to which the morpheme is suffixed. In this respect the morpheme is better represented as -rV, where the V element repeats the vowel of the root morpheme. For example,

gà ≠ rà	went
gè ≠ rè	listened to
si ≠ rì	cooked
sị̀ ≠ rị̀	said
kwù ≠ rù	spoke, said
kwụ̀ ≠ rụ̀	paid
tò ≠ rò	praised, grew
kọ̀ ≠ rọ̀	narrated etc.

v. The Dative Case Morpheme.

The dative case is formed with a -ra suffix, which like the past tense suffix we shall represent as -rV suffix. The vowel of this suffix duplicates the vowel of the verb root. to which the dative morpheme is joined. For example,

ị̀ ≠ gā ≠ ra	to go on behalf of
ị ≠ mē ≠ re	to do on behalf of
ị ≠ sī ≠ ri	to cook for
ị́ ≠ kwū ≠ ru	to speak for
ị̀ ≠ kọ̄ ≠ rọ	to narrate to etc.

The imperative forms of these dative-case-verbs are as follows:

gà ≠ á ≠ ra	go on behalf of!
mè ≠ é ≠ re	do on behalf of!
sì ≠ é ≠ re	cook for!
kwù ≠ ó ≠ ro	speak for!
kọ̀ ≠ ọ́ ≠ rọ	narrate to! etc.

Comparing the examples illustrating the -rV dative forms of the verb with those illustrating the -rV past tense forms, it can be observed that whereas the latter have a consistent tone in the grammar, which is always a low tone, the former have no independent or consistent tone, rather the tone varies, conforming to the tone of the syllable that precedes.

vi. The Imperative Morpheme for Stative Verbs.

The stative verbs are those verbs that connote continuous, unterminated state of action. Such verbs in Igbo are irregular verbs and they form their imperatives in a manner different from the way described above. They form their imperatives with an -rV morpheme, where the V element repeats the vowel of the verb root. For example,

Verb root	Imperative form	
bí	bì ≠ rí	dwell
nọ̀	nọ̀ ≠ rọ́	stay
kwụ́	kwụ̀ ≠ rụ́	stand
bụ́	bụ̀ ≠ rụ́	be! (as in bụ̀rụ́ ézè - be the king)
dị́	dị̀ ≠ rị́	be! (as in dị̀rị́ ōji - be (remain) black) etc.

vii. The Perfect Tense Suffix Morpheme.

The suffix morpheme -Vla is used for forming the perfect tense in Igbo. The 'V' represents an open vowel. For example,

Verb root	Perfect tense form	
gá	à ≠ gá ≠ ala	has gone
gè	è ≠ gè ≠ éla	has listened
mé	è ≠ mé ≠ ela	has done
sí	è ≠ sí ≠ ela	has cooked
pị́	à ≠ pị́ ≠ ala	has sharpened
kwú	è ≠ kwú ≠ ola	has spoken (said)
kwụ́	à ≠ kwụ́ ≠ ọla	has paid
tó	è ≠ tó ≠ ola	has grown
tọ́	à ≠ tọ́ ≠ ọla	has unwrapped etc.

With the regular verbs, an open vowel occurs between the root morpheme and the -lá suffix, but with the irregular verbs this open vowel is absent. For example,

hụ́	à ≠ hụ́ ≠ la	has seen
gwá	à ≠ gwá ≠ la	has told
kwé	è ≠ kwé ≠ la	has agreed
jụ́	à ≠ jụ́ ≠ la	has refused etc.

In the spoken form, the vowel of the -lá suffix of the perfect tense verb forms usually agrees harmonically with the preceding vowel(s) in the word, though orthographically the vowel a is generally used in all cases for this suffix. In the Onitsha dialect the variant -gó is used as the perfect tense suffix but without any intervening open vowel suffix, as indicated above, and this morpheme, -gó, does not agree harmonically with the root vowel. In some dialects within the Onitsha dialect group, the morpheme -nó is used as perfect tense marker, and where this morpheme occurs, it behaves in the same manner described above for the -lá suffix.

viii. The Negative Morpheme

The negative morpheme in the Standard dialect is -ghị́, which is suffixed to the root morpheme. For example,

Ọ	gá ≠ ghị̄	he didn't go.
Ò	mé ≠ ghī	he didn't do.
Ò	kwú ≠ ghī	he didn't speak.
Ọ	kwụ́ ≠ ghị̄	he didn't pay. etc.

The imperative form of the negative constructions in Igbo is formed with -là suffix, as in the following examples.

á ≠ gā ≠ là		dont go!
é ≠ mē ≠ là		do not do!
é ≠ sī ≠ là		do not cook!
é ≠ kwū ≠ là		do not speak (say)!
á ≠ kwụ̄ ≠ là		do not pay! etc.

Like the -lá perfect tense suffix, the -là suffix used in forming the imperative negative construction, usually agrees harmonically with the root morpheme to which it is suffixed, even though it is written as -la in all cases.

There are many more such affixes that occur with Igbo verbs. Our intention, to reiterate, is not to provide an exhaustive description of such affixe morphemes used with the verbs. One general observation can be made about the structure of these affix morphemes, with particular reference to those affix morphemes described so far. We may note, for instance, that these affix morphemes have more or less variable structures in the grammar. This is with particular reference to the vowels that occur with the morphemes. According to the phonological behaviour of these vowels, we observe that in the structures sometimes one phonemic unit has two or more different phonetic exponents. This can be seen to operate in two ways; first, when the affix morpheme

consists of a vocalic prefix or a suffix of CV structure, the vocalic segment in the morpheme structure usually has two possible phonetic exponents depending on the vowel harmony feature of the root morpheme. Secondly, when an open vowel suffix is used (which often results into a sequence of two successive vowels in the verbal structure), the open vowel has four possible phonetic exponents, resulting from the agreement of the vowel affix with the vowel of the root morpheme in terms of vowel harmony features and in terms of the prosodic features of frontness and backness.

Using the features L/R (Lowered/Raised) and Y/W (repfesenting frontness/backness) we can conveniently represent the structure of the vocalic segments that appear in these affix morphemes in the following manner:

(a) Infinitive prefix morpheme $^{L/R}(I)^{Y}$

(b) Performative prefix morpheme $^{L/R}(A)^{Y}$

(c) Imperative vowel suffix morpheme $^{L/R}(A)^{Y/W}$ etc.

With regard to the structure of the past tense affix morpheme, the dative affix morpheme and the affix morpheme connoting the imperative of stative verbs, we note that these morphemes are represented by an -rV structure where the V element duplicates the vowels that immediately precedes it. In other words, the structure of this morpheme is the most variable of all the affix morphemes in the language.

The prosodic features, as is evident from the above, helps considerably to capture the phonological shapes of the vocalic segments that occur in the affix morphemes in Igbo, and consequently, this will be useful in stating the phonological shapes of the structures in which these affix morphemes are used. Some of the verbal structures where these affixes are used are exemplified below.

(i) Infinitive verbal form $^{L/R}(\ I\ )^{Y}CV$

(ii) Performative verbal form $^{L/R}(\ A\ )^{Y}CV$

(iii) Imperative verbal form $CV^{L/R}(A)^{Y/W}$ etc.

It becomes evident both from the above structural patterns of the verb forms as well as from the discussions presented earlier that in the different grammatical forms of the Igbo verb, the verb root retains a consistent structure while the structure of the affix morpheme varies. As pointed out above, the nature of the vowel that occurs in some of the affix morphemes is such that one phonemic unit has different phonetic exponents. Thus in (i) above, the infinitive morpheme which is usually a close front vowel is phonetically realised as either i or ị, similarly the performative morpheme which is an open front vowel, as in (ii) above, is phonetically realised as either a or e. The imperative morpheme, which is an open vowel suffix, is phonetically realised as either a, e, o or ọ.

What has been stated here is characteristic not only of the tense forming affixes in the Igbo verbs, it is also applicable to most of the affixes with which the aspects of these verbs are formed. By the aspect morphemes we mean those affixes used with Igbo verbs which do not connote tense, but which rather modify the action of the verb with respect to completion, inception, continuity etc of the action described by the verb. The following are few examples of such aspect morphemes in Igbo.

ix. The Inceptive-Continuative Aspect Morpheme

The morpheme wá/wé is used to denote the inceptive-continuative aspect of Igbo verbs. For example,

verb root	inceptive-continuative aspect form	
gá	gá ≠ wa	start (and continue) to go, walk
gè	gè ≠ wé	start (" ") to listen
má	má ≠ wa	start (" ") to know
mé	mé ≠ we	start (" ") to do

sí	sí ∕ we	start (and continue)	to cook
chị́	chị́ ∕ wa	start (" ")	to rule
kwú	kwú ∕ we	start (" ")	to speak
kwụ́	kwụ́ ∕ wa	start (" ")	to pay
tó	tó ∕ we	start (" ")	to grow
kọ́	kọ́ ∕ wa	start (" ")	to narrate etc.

x. The Completive Aspect Morpheme

The morpheme chá (sometimes pronounced cháa) is used to denote the completive aspect of Igbo verbs, i.e. when this morpheme is used with the verb it denotes the completedness of an action. For example,

verb root	completive aspect form	
gá	gá ∕ cha	finish going
gè	gè ∕ chá	finish listening to
sí	sí ∕ cha	finish cooking
rí	rí ∕ cha	finish eating
rị́	rị́ ∕ cha	finish climbing
tó	tó ∕ cha	finish growing
kwú	kwú ∕ cha	finish speaking
kwụ́	kwụ́ ∕ cha	finish paying etc.

This morpheme usually does not conform to harmonic agreement with the verb it occurs with. Some speakers however try to subject it to vowel harmony agreement with the root morphemes. With the majority of speakers however, i.e. irrespective of their dialects, chá is used in all cases. In the local orthography, the latter is adopted, just as in the examples given above.

xi. Benefactive Aspect Morpheme

The morpheme tá/té is used to form the benefactive aspect of the verbs in Igbo. For example,

verb root	benefactive aspect form	
zụ́	zụ́ ⁄ ta	purchase
zú	zú ⁄ te	acquire through stealing
má	má ⁄ ta	acquire through knowledge of
mụ̀	mụ̀ ⁄ tá	acquire through learning
mé	mé ⁄ te	acquire through doing
gụ́	gụ́ ⁄ ta	acquire through reading etc.

We can mention only a few of these aspect and other morphemes that occur with the verbs in Igbo; these morphemes in one way or another modify the meaning or the action described by the verb. These morphemes, to reiterate, are not tense forming affixes in the sense that they do not essentially express the time linear of the action of the verb. They also co-occur with the tense forming morphemes discussed earlier. The full number of such morphemes and their meanings in the grammar have not been described in any of the existing works on this language. Emenanjo (1975) described about 60 of such morphemes that tend to modify the meaning and the action expressed by the verb in Igbo, however we know that a careful study would reveal that these morphemes are much more than that number. Generally it is not easy to find adequate terminologies to designate some of the morphemes or to adequately express the grammatical meanings which the morphemes have in the language. Most of the morphemes have no English or Latin equivalents, and some writers on the grammar of Igbo who had tried to correlate some of these verbal affixes in Igbo verbs to what appears to be their equivalents in the grammar of these better known and better studied languages have given incorrect interpretation of some of the affix morphemes described above. For instance, Adams (1934) who modelled his

analysis of Igbo grammar on Latin grammar, and also Ogbalu F. C., who in his many publications on Igbo grammar tries to model his analysis of the grammar on English grammar, have both described the "completive aspect morpheme" as indicating the morphological meaning of 'past participle'. However this morpheme, as we know it, does not express the temporal or time reference of the action of the main verb, but rather merely expresses the 'completed' state of the action indicated by the verb. Since our objective in the present analysis is neither towards a morphological nor an exhaustive description of these affix morphemes, but rather a summary analysis of the structural patterns of the morphemes, we shall direct our discussions to the latter.

One thing that can be generally said about the structure of the affix morphemes discussed above is that the vowel segments that occur in them most often behave in the manner we described above. That is, the vowels alternate or change according to the harmonic features of the vowel of the root morpheme they occur with. A summary of the structure of the root morphemes together with the affix morphemes that occur with the verbs is presented below.

The Phonological Structure of Igbo Verbs

Grammatical Forms	Phonological Structure
Verb root/stem	CV(CV)
Infinitive	$^{L/R}[\ I\ ]^{Y}CV$
Present Tense	nà- $^{L/R}[A]^{Y}CV$
Future Tense	gà- $^{L/R}[A]^{Y}CV$
Past Tense	CVrV*
Perfect Tense	$^{L/R}[A]^{Y}CV^{L/R}(A)^{Y/N_1}{}^{L/R}[A]^{Y}$

Imperative	$CV^{L/R}[A]^{Y/W}$
Dative Construction	$CV^{L/R}(A)^{Y/W}\ \underline{rV}^{*}$
Aspects	$CVC\ \begin{matrix}L/R\{[I]\}^{Y}\\L/R\{[A]\}^{Y}\end{matrix}\ (\ C\ \begin{matrix}L/R\{[I]\}^{Y}\\L/R\{[A]\}^{Y}\end{matrix}\ )$

Square brackets enclose those segments that obligatorily occur while round brackets enclose those segments that optionally occur in the structures (i.e. they may not occur with certain verbs or with certain forms of the same verb). Braces enclose the segments either of which can occur; in other words, some structures have close vowels while some have open vowels and the vowel harmony conditions apply in both cases.

The V element of the rV morphemes copies the vowel that precedes it in the structure. To indicate this unique behaviour of the vocalic element of this morpheme, this morpheme has been underlined and the V marked with asterics in the structural formulae.

4.3.3. THE VERBAL DERIVATIVES

What we have noted above about the nature of the vowels that occur in the verbal affixes in Igbo is not restricted to these affix morphemes only, but can be generalized to the affixes that are used in the verbal derivatives in this language. It is often the case that in these derivatives such as the gerund, the agentive nouns, the cognate complement objects etc., the vowels that are used in the affixes have each two phonetic exponents, as will become evident in the discussions below.

4.3.3.1. THE VERBAL NOUNS

The gerund in Igbo, as in most other languages, is derived from the verb. In Igbo the gerund can be derived from a simple verb root as well as from a compound or complex verb stem, and the gerund derived from both cases differ structurally. For the latter, i.e. the compound or complex verb stems, the derivation of the gerund

is a more or less straightforward process. This is acheived by prefixing a homorganic syllabic nasal to the compound verb stem. For example,

compound/complex verb stem	verbal noun	
gá ≠ lu	ń ≠ ga ≠ lu	reaching
gá ≠ de ≠ be	ń ≠ ga ≠ de ≠ be	going and stopping at a point.
chè ≠ kwú ≠ be	ń ≠ chè ≠ kwú ≠ be	hoping on something
gá ≠ mì	ń ≠ ga ≠ mì	going far into
tụ́tụ̀	ń ≠ tụtụ̀	picking
gósi	ń ≠ gosi	illustrating
bé ≠ pù	m̀ ≠ be ≠ pù	cutting out
bà ≠ tá	m̀ ≠ bà ≠ tá	entering towards
mé ≠ zi	m̀ ≠ me ≠ zi	repairing etc.

The gerund of simple verbs is formed by prefixing an open back vowel to the verb and reduplicating the verb root. The reduplication may be complete or partial; complete, when the vowel of the root morpheme is a close vowel, and partial, when it is not a close vowel. For example,

simple verb root		verbal noun	
kwú	'speak'	ò ≠ kwú ≠ kwu	speaking
kwụ́	'pay'	ọ̀ ≠ kwụ́ ≠ kwụ	paying
sí	'cook'	ò ≠ sí ≠ si	cooking
sị́	'say'	ọ̀ ≠ sị́ ≠ sị	saying
rí	'eat'	ò ≠ rí ≠ ri	eating
rị́	'climb'	ọ̀ ≠ rị́ ≠ rị	climbing

gá	'go, walk'	ọ ≠ gị ≠ ga	going, walking
tá	' chew '	ọ ≠ tị ≠ ta	chewing
té	'scrub'	ò ≠ tí ≠ te	scrubing
gè	'listen'	ò ≠ gi ≠ ge	listening
dó	'put, place,	ò ≠ dú ≠ do	placing
tò	'praise'	ò ≠ tu ≠ to	praising
tó	'grow'	ò ≠ tú ≠ to	growing
dọ́	'pull'	ọ ≠ dụ́ ≠ dọ	pulling
kọ̄	'narrate'	ọ ≠ kụ́ ≠ kọ	narrating
má	'know'	ọ ≠ mụ́ ≠ ma	knowing
mé	'do'	ò ≠ mú ≠ me	doing
kpó	'gather'	ò ≠ kpú ≠ kpo	gathering
kpọ́	'call'	ọ ≠ kpụ́ ≠ kpọ	calling etc.

The open back vowel prefix in these examples has two phonetic exponents - either o or ọ - depending on the harmonic quality of the stem vowel.

What concerns the second vowel in the structure, how it changes in different environments, and the general phonological patterns manifested in the constructions, these are discussed in the next chapter.

Certain nominals are derived from some of the verbal nouns of simple verb roots. It will be interesting in this respect to compare the open back vowel prefix used in the construction of the verbal nouns with the initial vowel segments in these derived nominals. The following examples will illustrate this point.

verb roots	verbal nouns	derived nominals
kwú 'speak'	ɔ̀kwúkwu 'speaking'	ékwùkwú 'talkativeness'
zá 'reply, answer'	ọ̀zị́za 'replying'	ázị̀zá 'a reply, an answer'
kwé 'agree'	ɔ̀kwúkwe 'agreeing'	ɔ̀kwukwé 'faith'

mé	'do, behave'	òmúme	'doing, behaving'	òmumé	'behaviour'	
rí	'eat'	òríri	'eating'	érimeri	'festivity' feast'	
kọ́	'narrate'	ọ̀kúkọ	'narrating'	ákụkọ	'story, news'	
sụ́	'speak (a language)'	ọ̀súsụ	'speaking (a language)'	ásụ̀sụ́	'a language'	
jụ́	'querry'	ọ̀jụ́jụ	'querrying'	ájụ̀jụ́	'question'	etc.

Comparing the open back vowel prefix of the verbal nouns in the examples above with the initial vowel segments of the nominals derived from these verbal nouns we may note that there appears to be certain constraints on the type of vowels that can occur in these positions. In the case of the gerunds, only an open back vowel can occur in the initial position and in the case of the nominals derived from the gerunds only open vowels can occur in the initial position. However, more important to our purpose is the fact that whereas in the former, i.e. the gerunds, the initial vowel constitutes one phonemic unit with different phonetic exponents, with respect to the vowels that occur initially in the nominals derived from the gerunds, we cannot say with any serious justification that any one vowel is chosen to occur in this position and that this vowel is made to develop different phonetic alternants in accordance with the harmonic qualities of the vowels of the root morphemes it occurs with. Rather all we can say with some certainty is that any of the open vowels in the language can be used in this position and that the open vowels chosen for this purpose agree harmonically with the stem vowel.

This fact illustrates in a most lucid manner the point we are trying to make about affix morphemes in this language. In other words, when an affix morpheme is introduced into another morpheme the vowel segment of this affix morpheme usually tends to develop different phonetic alternants, but when, as in the examples above, the (derivational) process does not require the introduction of an 'external' affix morpheme, but rather an 'internal' phonological

change within the structure, the point of one unit of phomene developing different phonetic alternants in different structures does not arise. This also helps to explain certain points about the derivational history of the gerunds and the derived nominals illustrated in the examples above, with reference to the verb roots from which both categories are derived. In the discussions given earlier, we assumed that the nominals are derived from the gerunds; it can however be argued that both categories are independently derived from the verb, and not necessarily that the former (the nominals) are derived from the latter (the gerunds). This would amount to saying that the nominals, like the gerunds, are derived through the process of prefixation and reduplication. It can also be argued, as has been done in some publications by Larry Hyman, that the initial vowel segments of the derived nominals are nominal vowel prefixes. None of these arguments can be seriously entertained both in view of what has been stated above and more especially in the way we have seen these affix morphemes behave in the examples discussed so far in this thesis. It will also be important to note, in this respect, that the vowel prefix in Igbo is much more liable to develop different phonetic alternants than when the vowel is used in the suffix morpheme (or as a suffix morpheme).

4.3.3.2. THE AGENTIVE NOUNS

The agentive noun is derived in Igbo from the verb by prefixing a low tone open back vowel to the verb root or stem. For example,

verb root	agentive noun phrase	
kwú 'speak'	ọ̀kwú ókwu	- lit. 'a speaker of speech', one who talks a lot.
kwụ́ 'pay'	ọ̀kwụ́ ụ́gwọ̀	- lit. 'a payer of debt'
rí 'eat'	ọ̀rí ńri	- lit. 'eater of food'
rị́ 'climb'	ọ̀rị́ ēlu	- lit. 'climber of heights'

gá 'go'	ọ̀gá	ìje	- lit.	'goer of journey'
	ọ̀gá	ōzi	- lit.	'goer of message'
sí 'cook'	ọ̀sí	ńri	- lit.	'cooker of food'
sị 'say'	ọ̀sí	àsịrị	- lit.	'teller of tale', i.e. one who gossips
dé 'write'	ọ̀dé	ākwụkwọ	lit.	'writer of book', i.e. a writer or a secretary.
gụ́ 'read'	ọ̀gụ́	ākwụkwọ	lit.	'reader of book' i.e. one who reads a lot
hụ́ 'see'	ọ̀hụ́	ụ̀zọ	lit.	'seer of sight' etc.

In the examples above, the agentive nouns are underlined. With respect to the vowel prefix in the agentive nouns, we note that like that of the verbal nouns, this consists of one phonemic unit which develops two phonetic alternants.

4.3.3.3. THE COGNATE COMPLEMENT OBJECTS

It is hard to talk of transitive and intransitive verbs in Igbo. This is so because in Igbo every verb in a sentence has an object. Even when the object is not specifically mentioned it is understood. For instance, in some languages, such as English, some verbs are used intransitively, eg. sleep, speak, walk etc., and in a sentence these verbs do not require any direct object. Utterances such as 'I am sleeping'; he is speaking; we are walking etc., where no direct objects are used with the verbs, would be normal and acceptable in these languages. In Igbo, however, such utterances would be unacceptable unless there is an object, usually a direct object, to go with the verb. Thus the above utterances in English will be expressed in Igbo as 'á nà ḿ àrábụ ụrā'; ọ́ nà èkwú okwū'; ányị nà àgá íjè respectively. These are literally translated as 'I am sleeping sleep'; he is speaking speech; and we are walking walk.

Most of the objects that go with the verbs in Igbo are formed from nouns that are in cognate relationship with the verbs, or at least nouns that are semantically related to the verbs. For example,

íkwū	okwu	lit.	to speak speech
íjē	íjè	lit.	to walk walk
ị́hụ̄	anya	lit.	to see eye
ị́rāhụ	ụra	lit.	to sleep sleep
ị́sị̄	asị		to tell lie
íkpē	ikpe		to judge a case
íkpē	ekpere		to pray prayer etc.

Sometimes a complement object form which is formed from the verb is used in place of a noun object in the contexts where the noun object would not be required. The complement object forms are always cognate with the verb they occur with. For example,

ó kwère òkwé or ó kwènyere òkwénye		lit.	he agreed agreeing
ọ́ gàra àgá		lit.	he went agoing, i.e. he went
ó jère èjé		lit.	" " " " " "
ó bùru èbu		lit.	it is big abig, i.e. it is big
ọ́ gọ̀rọ àgọ́		lit.	he denied denying, i.e. he denied
ó jiri èjí		lit.	it darkened darkening, i.e. it has darkened.
ọ́ nyị̀rị ànyị		lit.	it surpassed surpassing, i.e. it surpassed handling
ọ́ chàra àchá		lit.	it is ripe ariping, i.e. it is ripe (usually of bright colour) etc.

These complement forms (which are underlined in the examples) are not nouns, even though Green and Igwe (1963) and Emenanjo (1975)

described them as nouns. The complement forms cannot, for instance, be used as nouns or occur independently from the verbs with which they are cognate. Thier occurrence is always tied up with the verb; they cannot be separated from the verbs; they do not allow other words, such as adjectives, adverbs etc. to occur between them and the verbs. For instance, whereas (i) below is acceptable, (ii) is not acceptable.

(i) ó jère ógologo íjè 'he walked a long walk'

(ii) * ó jère ógologo ēje

In the structure of the complement forms we can observe that an open front vowel is prefixed to the verb root or verb stem. The open front vowel prefix has two phonetic exponents, i.e. it can be phonetically realised as either a or e.

We shall conclude the discussion by noting that the structure of affix morphemes in the language is in some way different from that of the lexical morphemes, with particular reference to the vowel segments that occur in these structures. In the former (i.e. the affix morphemes) unlike in the lexical morphemes, one vowel phoneme may have two or more phonetic exponents. Thus whereas in the structure of the lexical morphemes the whole range of the 8 (eight) phonemic vowels in the language can be utilized, in the structure of the affix morphemes we are restricted to use only a four or two phonemic vowel system, depending on whether the vocalic segment of the affix morpheme is constrained with respect to the vowel harmony agreement only or whether it is constrained with respect to both the vowel harmony agreement and agreement in terms of the features of rounded/unrounded. If the vowel of the affix morpheme is constrained only with respect to the vowel harmony agreement, then the morpheme structure operates on four phonemic vowel system. If the vowel of the affix morpheme is constrained with respect to the vowel harmony agreement as well as to agreement in terms of the features of rounded/unrounded, the structure in

this case operates on two phonemic vowel system. The phonemic shapes of the vowel segments in the morpheme structures in Igbo can be briefly summarized as follows:

The Phonemic Shapes of the Vowel Segments in Igbo Morphemes

Lexical Morphemes	Affix Morphemes
All the 8 phonemic vowels in the language occur in free distribution. The phonemic vowels are: a e i ị o ọ u ụ	(i) Morphemes where the vowel segment does not change. The vowel segment often found in this category is usually /a/. For example, the suffix morpheme –chá
	(ii) Morphemes where the vowel segment copies the vowel of the morpheme that precedes it. This is characteristic of the –rV suffix. Any of the 8 phonemic vowels can occur as the vowel of this affix morpheme, i.e. depending on the quality of the vowel that is copied.
	(iii) Morphemes where the vowel segment is made to conform to the vowel harmony features, i.e. agrees harmonically with the preceding vowel. Four phonemic vowel system operates thus: $L/R_{(I)}{}^{Y}$ – i/ị; $L/R_{(I)}{}^{W}$ – u/ụ $L/R_{(A)}{}^{Y}$ – a/e $L/R_{(A)}{}^{W}$ – o/ọ

	(iv) Morphemes where the vowel segment agrees both in the vowel harmony features and the feature of roundness with the vowel that immediately precedes it. In this case two phonemic vowel system operates. For example,
	$L/R_{(I)}{}^{Y/W}$ - i, u or i̤, ṳ
	$L/R_{(A)}{}^{Y/W}$ - e, o or a, o̤

4.4. THE MORPHEME STRUCTURE CONDITIONS

The morpheme structure conditions attempt to state certain facts that are implicit in most natural languages. These facts can be summarized as follows.

(i) Every language has its own sound system which can be phonetically as well as phonologically defined. In the phonetic description of speech sounds, the respective sounds are defined in terms of the articulatory and acoustic properties that are relevant for the production of the sounds. In the phonological description we rely on those phonetic properties of the sound only to the extent that they are functional in the ability of the respective sounds to bring about contrasts in meaning between minimal pairs of words. In other words, in the phonological description we treat the speech sounds in their capacity to be used in the language to make meaningful utterances.

(ii) Every language has certain conditions that govern how units of speech sounds can be combined in the morpheme and/or lexical structures of that language. The morpheme structure conditions attempt to state these conditions and/or constraints relevant to the co-occurrence of the phonemes of a language. In doing this the morpheme structure conditions help to reveal certain regularities and/or redundancies that result from this process.

Redundancy in language is the end product of predictability. The two concepts are mutually inter-related, in the sense that what is predictable in a given context often becomes redundant in that context. Similarly, statable generalizations in a language imply, in a way, some degree of predictability. When, for instance, we say that /p/, /t/, /k/ are stops in a given language, we indirectly imply that for contrasting these sounds in that language the phonetic property of Stop is a predictable feature for these sounds, and consequently that this feature is redundant for contrasting these sounds in that language, and that what is significant for the contrast of these sounds lies in those other features not shared in common by the sounds.

Generalization, predictability and consequently redundancy are common phenomena in any human language. They are always present in our normal speech and other linguistic behaviour and they are present in almost every aspect of our language, in phonology, in semantics as well as in the syntax. In phonology redundancies abound, and these redundancies can be grouped under two main categories. Some redundancies arise from those phonetic properties shared in common by a given set of sounds, while some redundancies arise from the sequence of phonemes within a morpheme or within a word. The former is treated under segmental structure conditions; the latter is treated under sequence structure conditions. The case of /p/, /t/, /k/ mentioned above constitutes an example of segmental structure redundancy that arises from the phonetic properties shared in common by the set of segments. One example of the segmental structure redundancy in Igbo phonology would be the case of double articulated consonant phonemes in the language, namely, /gb/, /kp/, /gw/, /kw/ and /ŋw/. These are all velar consonants. Redundancies such as these exist in every language, and such redundancies become evident from a comparative study of the structure of the segments that constitute the phonemes of a language.

The sequence structure conditions state, among other things, what segments in a given language can co-occur within a morpheme, or negatively, what segments cannot co-occur within a morpheme. They also state what segments can and do occur in certain positions of the word, and what segments cannot occur in the initial, medial or final positions within a morpheme. We know, for instance, that in the English language, the phoneme /ŋ/ cannot begin a word. In Igbo two consecutive consonants cannot occur within a morpheme unless the first of such consonants is a syllabic nasal. The sequence structure conditions may also state the type of modifications certain segments acquire as a result of the influence of the other segments that occur in the same morpheme or in the same word. Examples of sequence structure redundancies exist in most languages. The process which voices a voiceless consonant or devoices a voiced consonant in certain environments represents one type of sequence structure constraints. The restrictions on the occurrence of two consecutive vowels within a morpheme in Igbo (whereby one of the vowels must be a close vowel) constitute an example of sequence structure constraints in this language.

The morpheme structure conditions (MSCs) therefore state the type of constraints, redundancies etc. which hold at the systematic phonemic level. The MSCs state those constraints and redundancies that result from the segmental structure conditions as well as those constraints and redundancies that result from the sequence structure conditions in any given language. Following Stanley (1967) we shall distinguish three types of conditions that operate in the MSCs, namely, the If - then condition, the Positive condition and the Negative condition. These three conditions have been described earlier in this thesis (cf. 1.4. above). Using these conditions we shall state the MSCs relevant to the Igbo phonology.

4.4.1. THE SEGMENTAL STRUCTURE CONDITIONS

The segmental structure conditions state the constraints on the feature composition of phonological units. The are designed to state the feature redundancies on segments, that is, those features which can be predicted through the other features present in the same segment or group of segments. Since these constraints operate on the phonological level, we refer to them as phonological segmental constraints. The following are some of the segmental structure conditions that operate in Igbo phonology.

Igbo has some double articulated consonant phonemes, namely, gb, kp, gw, kw, ŋw. These consonant phonemes share certain features in common, namely, they are all velar consonants and the double articulations with respect to each of the phonemes involve articulations in the velar and the labial regions. These feature redundancies relevant to the double articulated consonants in this language are expressed through the MSCs 1 and 2 below.

MSC 1. If : [< X Y > stricture]

⇓

then : [9 3 place]

(where X and Y represent any two separate values of stricture)

This MSC states the structure constraints that operate on the double articulated consonant phonemes in Igbo, namely, that any segments with two separate but simultaneous values of stricture has invariably two values of place, which in this case are 9 and 3 values of place, representing the labial and the velar places of articulation. The corollary of the MSC 1 would be MSC 2 below.

MSC 2. If : [X Y place]

⇓

then : [A B stricture]

(where X and Y represent any separate values of place and A, B, any separate values of stricture).

This MSC states that any segment with two separate values of place also has two separate values of stricture. Greater generalization is achieved through MSC 2 than through MSC 1, in that the former, i.e. MSC 2, describes constraints common not only to the double articulated consonant phonemes but also to the affricates. Affricates, as we argued in chapter 3, should be defined with two separate values both with respect to stricture and place.

There are two affricates in Igbo, namely, /ch/ and /j/, both of which are palatal consonants and each of the affricates is characterized by two strictures which are sequential in nature. The release phase of the strictures for the affricates is such that a stop release is followed by a fricative release. All this is expressed in the following segmental MSC.

MSC 3. If : [6, 3 stricture]

⇓

then : (i) [4 4 place]

⇓

(ii) [6 <3 2> release]

This MSC states two segmental structure constraints characteristic of affricates in Igbo, namely, that they are articulated in the hard palate region and that they have two phases of release – a stop release and a fricative release.

According to the multivalue distinctive feature system adopted in the present work, the vowel segments are differentiated from the consonants by, among other things, the fact that vowels are not specified through the feature of place. That is, vowels have zero value of place. This is represented by the following MSC.

MSC 4. if : [≤ 2 stric ture]
[+ syllabic]

⇓

then : [0 place]

With this MSC we can state the full phonological matrix for the vowel segments. This can be represented as follows :

$$\begin{bmatrix} \leq 2 & \text{stricture} \\ 0 & \text{place} \\ 3 & \text{glottal state} \\ + & \text{syllabic} \end{bmatrix}$$

where ≤ 2 means 2 or less value of stricture.

The features of 'syllabic' and 'glottal state' (i.e. voiced) are redundantly specified for the vowel segments, and this redundancy is expressed by MSCs 5 and 6 respectively.

MSC 5. if : $\begin{bmatrix} \leq 2 & \text{stricture} \\ 0 & \text{place} \end{bmatrix}$

$\Downarrow$

then : $\begin{bmatrix} + & \text{syllabic} \end{bmatrix}$

MSC 6. if : $\begin{bmatrix} \leq 2 & \text{stricture} \\ 0 & \text{place} \end{bmatrix}$

$\Downarrow$

then : $\begin{bmatrix} 3 & \text{glottal state} \end{bmatrix}$

The segments in this language do not contrast through the feature of 'length'. That is, this feature is redundant in the segmental strctures in the language. MSC 7 states this redundancy.

MSC 7. if : $\begin{bmatrix} \geq 1 & \text{stricture} \end{bmatrix}$

$\Downarrow$

then : $\begin{bmatrix} 1 & \text{length} \end{bmatrix}$

Any consonant which is syllabic in Igbo is a nasal. In other words, the feature of nasality is predictable for such consonants. This is stated by the following MSC.

MSC 8. if : $\begin{bmatrix} \geq & 3 & \text{stricture} \\ + & & \text{syllabic} \end{bmatrix}$

$\Downarrow$

then : $\begin{bmatrix} + & \text{nasal} \end{bmatrix}$

Many other MSCs such as the ones discussed above which describe those circumstances where certain features of a segment or group of segments can be predicted from the feature composition of that segment or the group of segments, can be easily illustrated in Igbo, or for that matter in any language. Take for instance, there is only one lateral consonant phoneme in Igbo and this consonant is produced in the alveolar region. In the analysis presented in chapter 3, this consonant has been partly defined through the feature of stricture. This means that once we know the stricture value for this consonant the feature of place of production can be predicted, i.e. becomes redundant. The same can be said about the rolled consonant in Igbo.

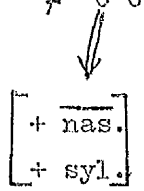
With MSCs such as those described above some feature savings will be achieved in phonological analysis. Fewer number of features would be required for specifying the segments in phonology. This constitutes one great advantage which the MSCs have in phonological analysis. Such features which can be predicted from the overall feature composition in the structure of a given segment or group of segments can be conveniently taken care of through the MSCs. The morpheme structure conditions in this way provide a neat and accurate means of stating those redundancies which are either contextually or noncontextually generated in the phonology of a language. The MSCs thus make it possible for us to express certain generalizations in phonology relating to the phonetic/phonological properties of the segments.

4.4.2. THE SEQUENCE STRUCTURE CONDITIONS

The sequence structure conditions, as indicated earlier, state the conditions and constraints that operate in the sequence of segments within a morpheme. The conditions that govern the co-occurrence of segments in Igbo are more or less straightforward due to the simple syllable structures that exist in this language. The following are some of the sequence structure conditions that operate in Igbo phonology. Some of the conditions and constraints relevant to the sequence structure in the phonology have been partly described in the preceding sections.

When two consecutive consonants occur within a morpheme in Igbo, the first consonant in the sequence is syllabic, i.e. it becomes a tone bearing unit. Only nasals can occur as the first consonant in such a sequence. This sequence structure condition is represented by the following MSC.

MSC 9. if : / C C V /



This MSC is in a way correlated to MSC 8. The following words will illustrate the sequence structure condition described by MSC 9.

ńnà – father

ńne – mother

ńmà – knife

ńmā – beauty, good

ńdị – those

ńdụ – life

ńgbe – when

ḿbà	–	town, country
ḿbè	–	tortoise
ḿbọ	–	nail
Bénde	–	name of a town and province
díḿkpa	–	brave and strong young man
ǹke (ŋ̀ke)	–	which
ǹgá (ŋ̀gá)	–	jai
ńka (ŋ́ka)	–	old age etc.

It is evident from the above examples that the syllabic nasal that results from the sequence structure conditions described above is homorganic with the consonant that follows it in the sequence. That is, the syllabic nasal is assimilated to the feature of 'place' of the consonant that follows it. This sequence structure constraint is formalized thus :

MSC 10. if : $\begin{bmatrix} 6 \text{ strict.} \\ + \text{nasal} \\ + \text{syll.} \end{bmatrix} \begin{bmatrix} \geq 1 \text{ strict.} \\ - \text{syll.} \\ X \text{ place} \end{bmatrix} \begin{bmatrix} \leq 2 \text{ strict.} \\ + \text{syll.} \end{bmatrix}$

$\Downarrow$

then : $\begin{bmatrix} \_\_\_\_ \\ + \text{nasal} \\ + \text{syll.} \\ X \text{ place} \end{bmatrix}$

where X represents any value of place.

Another sequence structure condition which relates to the syllabic nasal in Igbo is that any consonant which ends a word or morpheme in Igbo is a syllabic nasal. For example,

dúḿ	–	all
ǹjem	–	travelling
Díḿ	–	personal name

fém̀ - onomatopoeic word indicating quick or sudden transit

gwóm̀ - onomatopoeic word indicating the sound of a falling huge object etc.

/m/ usually occurs in such final positions. MSC 11 states these sequence structure conditions in Igbo.

MSC 11. if : ——— C ≠ ≠

⇓

then : [6 stric. 9 place + nasal + syll.]

Other sequence structure conditions in Igbo include the following negative conditions.

No morpheme in Igbo begins with two consecutive vowels. MSC 12 states this negative sequence structure condition.

MSC 12. ~ ≠ V V —— ≠

(where ~ indicates negation)

No morpheme in Igbo begins with three consecutive consonants. This is expressed by the following negative MSC.

MSC 13. ~ ≠ C C C —— ≠

Similarly, there is no sequence of three or more consecutive vowels within a morpheme in Igbo. This is represented by MSC 14.

MSC 14. ~ ≠ V V V ≠

A morpheme does not end with two consecutive consonant segments. This is expressed by the following negative MSC.

MSC 15. ~ ——— C C ≠ ≠

The conditions described by the MSCs given above operate in all types or categories of morphemes in the Igbo language.

4.5. THE LEXICAL CATEGORIES

From the point of view of structure it is necessary to distinguish two major lexical categories in Igbo, namely, the nominal and the verbal categories. Adjectives, pronouns, adverbials and quantifiers have the same structural characteristics as the nominals.

Perhaps one of the main criteria by which nominals are distinguished from the verbal category is the fact that the verbs unlike the nouns or adjectives are heavily inflected in the language. Igbo verbs are inflected for tense, mood and aspects. In addition to these, the verbs in Igbo take a lot of affixes through which different modifications of an action are expressed. Even the grammatical category of case, which in most languages is expressed through inflexion of the noun, is expressed in Igbo through verbal inflexion. The nouns, on the other hand, are rarely inflected in Igbo.

Majority of nominals in Igbo begin with a syllabic segment which in most cases is a vowel; some nouns begin with a syllabic nasal consonant segment. Comparatively, very few nouns in the language begin with nonsyllabic segment. All verb stems in Igbo, on the other hand, begin with nonsyllabic segments, i.e. consonants that are nonsyllabic.

These consitute the two main criteria under which the verbal structures can be distinguished from the nominal structures in Igbo.

4.5.1. THE NOMINAL MORPHEME STRUCTURE

The nominal morpheme structure in Igbo can be represented as follows:

$$\underset{\text{Nom.}}{\left[\left\{\begin{matrix}\text{V}\\(\text{N})\end{matrix}\right\}\right.}\ \text{C}\ \left\{\begin{matrix}\text{V}\\(\hat{\text{V}})\end{matrix}\right\}\ \text{V}\ \underset{\text{Nom.}}{\left(\ \text{CV}\ (\text{V})\ \right)\ ]}$$

The lexical morpheme structure formalized above states that a nominal in the language can minimally consist of either CV, VCV, VCVV or VCV̂V structure. The nominal morpheme structure in this language is obviously more complex than that of the verb sten. There is no noun with NCGV or only VC structure in the language. Theoretically, a nominal morpheme can be of any length, in practice, however, nominal morphemes with more than four syllables are very rare in the language. Examples illustrating the above structural patterns of nouns in Igbo have been given in the earlier discussions in this chapter or can be found elsewhere in the thesis. Some examples are however provided below for easy reference.

dí	–	husband
jí	–	yam
gị́	–	you (sing.)
yá	–	he/she/it
mụ́	–	I
há	–	they
bé	–	place, home
áka	–	hand
ísi	–	head
ánya	–	eye
ọ́nyà	–	trap
ózè	–	king, ruler
ézɛ̄	–	teeth

àla	–	land
ími	–	nose
ńdụ̀	–	life
ńdị̀	–	those
ǹgá	–	jail
ńkụ	–	wood (dried)
ǹke	–	which
ńchà	–	soap
ḿbà	–	town, country
m̀gbe	–	when
ḿbè	–	tortoise
áhị̀a	–	market, trade
ọ́hị̀a	–	bush
ágụ̀ụ̄	–	hunger
ójiī̄	–	black (adj.)
ọchiè	–	old, ancient
ákpàti	–	box
ágadī̄	–	old age
ńkị̀tā̄	–	dog
ósisi	–	tree
àmyị̀nya	–	horse
òbodo	–	town
ńnukwū̄	–	big (adj.)
óberē̄	–	small (adj.)
ókokpòro	–	bachelor
ákị̀rị̀ka	–	old tattered house
ógologo	–	tall etc.

4.5.2. THE VERBAL MORPHEME STRUCTURE

A verb stem in Igbo can consist of a verb root, a verb root plus an aspect morpheme or two or more verb roots joined together to form a com This constitutes the structure type for the majority of verb stems can be forin Igbo. Verbs with this type of stem have been referred to earlier

$$\underset{\text{Vst.}}{[\ C\ (\underset{\frown}{V})\ V\ (C\ V)\ ]}_{\text{Vst.}}$$

(where $\underset{\frown}{V}$ represents a nonsyllabic vowel which forms a diphthong with the vowel that follows it).

This structural formula shows, among other things, that a verb stem in Igbo always begins with a consonant segment. Most verb stems in Igbo are monosyllabic words with CV structure and few verb stems have $C\underset{\frown}{V}V$ structure. The stems of compound verbs are formed by joining two or more independent roots. There are few verb stems with CVCV structure where the constituent CV morphemes cannot occur as independent verb roots. Some examples illustrating the different types of verb stems in Igbo are given below.

cannot occur as independent verb roots. Some examples illustrating the different types of verb stems in Igbo are given below.

This constitutes the structure type for the majority of verb stems in Igbo. Verbs with this type of stem have been referred to earlier as simple verbs. The following are examples of verbs with CV structure.

dé	write
dà	fall
dó	put, place
bà	enter
bè	cut
bì	end
bí	dwell
chó	want, look for

ché	wait for
chè	think
chụ́	pursue
gá	go, walk
gè	listen to
gó	buy, purchase
gọ́	deny
gụ́	read
hụ́	see
fè	worship, cross, pass
mé	do
kọ́	narrate
kụ́	knock
zụ́	buy, purchase
zụ̀	feed, rear up
zù	meet etc.

(ii) Verb stems with CVV structure

Verbs with this type of structure are few in Igbo. Such verbs are also referred to as simple verbs. The following are some examples of verbs with this type of structure.

bi̍á	come
ri̍à	suffer from, be sick of
ri̍ọ́	beg (also yọ́)
fi̍ó	tie
fi̍ò	miss (a target) etc.

(iii) Verb stems with CV̂VCV structure

These are compound verbs where each of the consituent root morphemes (CV̂V and CV) can occur as independent verbs. It is characteristic of the compound verbs in this language (and we refer specially to those compound verbs whose constituent morphemes can each occur as independent verb) that the meaning of the compound verb is more or less directly derived from the meanings of the verb root with which the compound verb is formed. This has to be specially born in mind, eventhough the translations we give of these compound verbs have been based on the English equivalents to such meanings as portrayed by the compound verbs. The following are few examples of compound verbs with CV̂VCV structure.

bi̱álu (from bi̱á, 'come', and lú, 'reach') -come to.

ri̱áfè (from ri̱à, 'be sick', and fè, 'pass') - be sick past a given time or measure.

bi̱ábà (from bi̱à, throw eg. sand, and bà, enter) - throw (eg. granular objects) into. etc.

(iv) Verb stems with CVCV structure

We shall treat the verbs with this type of structure under three categories.

(a) Where the constituent root morphemes can occur as independent verbs, and where the meaning of the compound verb is derived directly from the combined meanings of the consituent verb roots. For example,

hụ́zù (from hụ́, 'see', and zù, 'be complete') - see completely (entirely)

dábà (from dà, 'fall', and bà, 'enter') - fall into

mézi (from mé, 'do', and zí, 'correct') - repair

gálu (from gá, 'go', and lú, 'reach') - reach

gǎfè (from gá, 'walk', and fè,'pass') - walk past

kṵ́gbu (from kṵ́, 'knock', and gbú, 'kill') - kill by a knock'

mébì (from mé, 'do', and bì, 'end') - spoil

kṵ́dà (from kṵ́, 'knock', and dà, 'fall') - knock down etc.

(b) Where only one of the constituent CV morphemes can occur as independent verb, and where the other CV morpheme, eventhough it can be shown to be a verb root in the language, but the meaning it has as a verb root would be different from that presupposed in the meaning of the complex verb stem. For example,

kṵ́zi (zí, 'show, correct') - teach

méli (mé, 'do') - defeat, conquer etc.

The morpheme kṵ́ when used as a verb means 'knock' but when it is joined with zí, to connote 'teach', the morpheme kṵ́ cannot be said to have the meaning of 'knock'. Note, for instance, there is a homophonous compound verb, kṵ́zi, which means 'repair by knocking', where the morpheme kṵ́ has the meaning of 'knock'. Thus although it can be correctly argued in some cases that the meanings of the constituent CV morphemes in the compound verbs are incorporated in some way into the meaning of the compound verbs, however it should be equally admitted that this does not apply in all cases.

(c) Where none of the constituent CV morphemes can occur synchronically as independent verb, or where if they can be identified as independent verb roots, the meanings they have as independent verbs cannot be related to what they connote when used as complex verbs. For example,

tṵ́tṵ̀ pick

zúzù fool around

gósi show, demonstrate etc.

Diachronically, however, it could be shown that some of the CV constituent morphemes in the above stems were independent verb roots. Some evidence, for instance, seem to point to the fact that tụ́ at some time in the history of this language used to occur as an independent verb root, however, in the synchronic grammar it has lost this capability. We can also assume that when tụ́ used to occur as an independent verb root it had the meaning that connotes a momentary action. We are able to make these assumptions about tụ́ because synchronically, tụ́ is used with other verb roots, and the verb stems formed in conjunction with this morpheme, tụ́, always have the connotation of 'brief action'. For example,

métụ	touch
dụ́tụ	(dụ́ - 'push or poke with long (pointed) object') - touch with pointed object.
rítụ	(rí - eat), - eat a little
sítụ	(sí - cook), - cook for a brief moment etc.

In all these verbs tụ́ connotes an action done for a brief moment of time.

(v) Compound stems with CVCVCV structure

The structural characteristics of the morphemes that can occur in the position of the third CV morpheme or the second CV morpheme in the above compound verb stem havebeen discussed earlier in this chapter. The following are examples of some verbs with this structure.

kwúdebe	(kwu - 'speak'; dó - put, place; bé - end, stop) - speak and stop at a point
módebe	- do and stop at a point
kpókọwa	- begin to gather up
chịkọ̀ba	- gather together and take inside
kwụ́dèbé	- stand close (firm) by somebody etc.

The description of the nominal and the verbal morpheme structures of Igbo given in this chapter will help to correct the assumption made in Hyman (1975 : 112) concerning the structure of Igbo lexical morphemes. Hyman claims that " each lexical morpheme in Igbo consists of an initial consonant, an optional /y/, and a vowel". Such a claim is deficient in a lot of ways, in that most of the nominals in Igbo, as shown above, usually begin with syllabic segment, which can be either a vowel or a syllabic nasal, and as pointed out above, very few nouns in Igbo begin with nonsyllabic consonant segment. The generalization implied by Hyman's statement does not hold either for the lexical structure of nominals or for the verbal structure in Igbo. Similarly, the claim made by Hyman that "nouns (in Igbo) are typically VCV" cannot be regarded as an adequate description of the nominal structures in the language. We have shown in the discussions above, the different shapes the nominal and the verbal morpheme structures in the language can take. What concerns the /y/ element in these structures, this has been seriously reviewed in the discussions given earlier in this chapter.

CHAPTER 5.

THE PHONOLOGICAL PROCESSES

Phonological processes entail those phonological means which a language employs to relate the surface syntactic structures, through the more abstract underlying phonological representations to the more concrete systematic phonetic representations. In some languages this involves such processes as assimilation, dissimilation, contraction, ellipsis, permutation, to mention a few. Most often, not every one of these phonological processes is present in a given language.

In the present chapter we shall discuss those phonological processes, such as nasalization, consonant and vowel assimilation, vowel contraction, vowel harmony etc. which are known to be present in the phonology of the Igbo language. What concerns the phonological processes which characterize the tonology in this language, and which in themselves constitute a big topic, these will be treated under a separate chapter. Most of the phonological processes discussed here, i.e. apart from the vowel assimilation, operate within the morpheme boundary. The process of vowel assimilation in Igbo operates across word boundary.

5.1. NASALIZATION

It was stated earlier, in chapter 3, that the features of nasalization and aspiration do not play distinctive roles in the phonology of the Standard dialect, eventhough in some of the dialects of Igbo these features are phonologically significant, i.e. they can be used to contrast minimal pairs of words in these dialects, notably the southern dialects of Igbo. However, we feel that in the phonological analysis of the Standard dialect, or for that matter of any of the dialects where these features do not occur, these phonological features - nasalization and aspiration - ought to be mentioned, eventhough in passing.

In the phonetic descriptions we gave of some utterances in chapter 2, we noted that some segments, notably the vowel segments, are nasalized in certain environments. We observed, for instance, that the vowel segments are nasalized when they occur with nasal consonants. This represents a natural phonological process of assimilation whereby the vowels assimilate the nasality of the consonant segments in an utterance. This type of nasalization occurs in many languages, and it can be regarded as constituting a low level phonetic rule in the phonology of these languages. In the Standard dialect of Igbo, the nasalization that results from this process of assimilation does not carry any contrastive values in the segments that are nasalized. The natural phonological process of nasalization described above is expressed through the following rule.

PR 1. $V \longrightarrow [\ +\ \text{nasal}\ ] \quad / \quad [\ +^{C}\text{nasal}\ ]\ \_\_\_$

5.2. LABIALIZATION

Igbo has labialized consonants which contrast phonemically with the nonlabialized counterparts. These consonants, which have been described in chapter 2, should be distinguished from those cases where labialization comes as a result of the phonological influence which contiguous segments have on one another in an utterance. This usually happens when a rounded back vowel immediately follows a consonant segment in a morpheme, whereby the production of the consonant is often accompanied by lip rounding. The production of these two types of labialized consonants in Igbo is characterized by different degrees of lip rounding. In the first type of labialized consonants, labialization constitutes an essential feature in the production of the consonant phoneme, and the type of lip rounding associated with such consonants is essentially that of tightly drawing together of the corners of the lips, as in the production of [ɑ͡], which is formed simultaneously and in conjunction with the

other articulatory properties necessary for the consonant segment. That is, the production of such labialized consonants can be conveniently described as the [ʷ] articulation superimposed on that of the consonant. The consonants produced with this type of labialization have been described in chapter 2. These include /kw/, /gw/ and /ŋw/; they phonemically contrast with their nonlabialized counterparts. The contrasts are illustrated in the following examples.

áka	–	hand
ákwa	–	cry, mourning
éke	–	python
ékwe	–	tom-tom
ɨkǭ	–	to narrate
ɨkwǭ	–	to grind
àkú	–	arrow
àkwú	–	nest
íkū	–	to scoop
íkwū	–	to speak
ákuko	–	tale, story
ákwukwǭ	–	leaf, book
ɨgā	–	to go, to walk
ɨgwā	–	to tell
ɨgǭ	–	to deny
ɨgwǭ	–	to mix by turning with spoon
ǫgu	–	fight
ǫgwù	–	medicine
ǫgù	–	hoe
áŋū	–	bee
áŋwū	–	sun, mosquito
ɨŋū	–	to drink
ɨŋwū		to die
ɨŋē		to step over
ɨŋwē		to own

ị̀gā	-	to go, to walk
ị̀gwā	-	to tell
ígè	-	to listen
ígwè	-	iron etc.

In the second type of labialized consonants, labialization is phonologically conditioned. Naturally when a consonant is immediately followed by a back (rounded) vowel, that consonant is rounded under the articulatory influence of the vowel. In a sequence of two consecutive vowels within a morpheme, CV^1V^2, where the first vowel in the sequence, the V^1, is a close back vowel, the consonant which precedes the two vowels is labialized, and the lip rounding in this case is not as close or tightly sustained as in the first type of labialized consonants, but nevertheless is sustained much longer than would be required if the consonant were followed by only a close back vowel. In the transcription of the words where this latter type of labialization is present, the labialization is represented with a 'w' prosody. For example,

/gụ́ọ/	[gʷɔ]	-	read.
/kụ́ọ/	[kʷɔ]	-	knock
/dụ́ọ́/	[dʷɔ]	-	poke with pointed object
/kwụ́ọ/	[kwʷɔ]	-	pay
/kwúe/	[kwʷe]	-	speak
/kwúo/	[kwʷo]	-	speak
/ŋụ́ọ/	[ŋʷɔ]	-	drink
/ŋwụ́ọ/	[ŋwʷɔ]	-	die
/gụ́ọ/	[gʷɔ]	-	read
/gwụ́ọ/	[gwʷɔ]	-	cure etc.

As can be seen from the above examples, the phonemically labialized consonants also undergo this latter type of labialization, i.e. they can be further labialized just like any other consonant in the language. The type of labialization just described can be expressed through the following phonological rule.

PR 2 $\quad C \longrightarrow [+ \text{labial}] \; / \; \text{——} \; \begin{bmatrix} \leq 2 \text{ stric.} \\ 1,2 \text{ height} \\ + \text{back} \end{bmatrix} \begin{bmatrix} \leq 2 \text{ stric.} \\ + \text{syll} \end{bmatrix}$

The PR 2 above will be able to account for the phonological process of labialization in Igbo phonology, that is, where this feature is phonologically derived.

The structural description given for the phonological process of labialization in Igbo is similar to that required for palatalization in this language. In a CV^1V^2 morpheme structure where the V^1 is a close front vowel, the C element of the structure is palatalized. In the transcription of the words containing this type of vowel sequence, palatalization is represented with a 'y' prosody. For example,

bịá	[$b^{y}\overset{\wedge}{ɪ}a$]	- go, walk
áhịa	[$ah^{y}\overset{\wedge}{ɪ}a$]	- market
bịá	[$b^{y}ɪa$]	- go (imp.)
fió	[$f^{y}io$]	- tie (imp.)
fió	[$f^{y}io$]	- tie etc.

This type of phonological process of palatalization can be expressed through the following rule.

PR 3. $\quad C \longrightarrow [+ \text{palatal}] \; / \; \text{——} \; \begin{bmatrix} \leq 2 \text{ stric} \\ 1,2 \text{ height} \\ - \text{back} \end{bmatrix} \begin{bmatrix} \leq 2 \text{ stric} \\ + \text{syll} \end{bmatrix}$

A point needs mention here with regard to the phonetic transcriptions of the words where either palatalization or labialization occurs in Igbo. In most of the previous works on Igbo it has been customary to transcribe these words by replacing the close vowel with either the 'w' or the 'y' prosody just as this would be acceptable in English pronunciations. We have used the same method of transcriptions in the words where labialization occurs in the above examples. Using this method words like bịá, rịá, fió, áhịá etc. would be phonetically transcribed as [bʲa] , [rʲa] , [fʲo] , [ahʲa] respectively. In my opinion this does not represent an accurate interpretation of the ideal Igbo pronunciations of these words. A strict adherence to the English phonology while interpreting certain Igbo pronunciations could be misleading especially in this respect. English is a stress language which means that certain sounds could be suppressed during pronunciations. In the Igbo language no sounds are suppressed as such during pronunciations. We shall use some English words to illustrate this point, by noting how the same words can be pronounced by an English speaker and an Igbo speaker who has learnt these words. The majority of Igbo speakers, just as the other people who learn English as a second or third language try to pronounce the English words on the bases of the rules of the phonology of their first language or mother tongue as the case may be. The following sample words have been chosen for the comparison.

	English speaker	Igbo-English speaker
science	[saʲəns]	[saʲens]
sight	[saʲt]	[saʲɪt]
night	[naʲt]	[naʲɪt]
fight	[faʲt]	[faʲɪt] etc.

As indicated in the phonetic transcriptions of these utterances, in the speech of the Igbo-English speaker the close vowel is realised after the palatalization, whereas in the speech of the English speaker this vowel is either completely supressed as a result of being unstressed or else realised as a schwa.

Similarly in those words in Igbo where labialization or palatalization is followed by a close vowel, the close vowel is realised after the labialization or the palatalization, and consequently this should be reflected in the phonetic transcriptions of the utterances. Thus utterances such as kúọ, kwúọ, gụ́ọ, dụ́ọ etc. should be phonetically transcribed as [$k^{W}uo$] , [$kw^{W}uo$] , [$g^{W}ɔ$], and [$d^{W}ɔ$] respectively.

5.3. FRICATIVIZATION

Fricativization constitutes one of the phonological processes in Igbo. This is the process by which certain stops, usually bilabial plosive consonants, are fricativized in Igbo in certain phonological environments. Through this process p and b change to f and v respectively when they precede a close back vowel, i.e. when they are followed by u or ụ. In the discussions given in chapters 2 and 3 we observed that when b occurs in verb forms, though this is restricted to the verb ịbụ̄, 'to be', the b changes to the fricative β . The following examples illustrate the phonological process of fricativization described above.

ịbù ⟶ ịvù - big, massiveness

ịbū ⟶ ịvū - to carry

ịbu ⟶ ịvu - load

ị̀bụ̀ ⟶ ị̀vụ̀ - to dig up (uproot), eg. a tree

ị̀bụ̀ ⟶ ị̀vụ̀ - to hatch

ị̀bụ̄ ⟶ ị̀β ụ - to be

ɟpù	→	ɟfù	- to go out
ɟpù	→	ɟfù	- to snatch
ɟpū	→	ɟfū	- to germinate, to have a hole
ɔpúpu	→	ɔfúfu	- germinating, having a hole
m̀pụ	→	m̀fụ	- the act of snatching
ɔ̀ụpụ̀	→	ɔ̀fụfụ	- going out etc.

The phonological process of fricativization described above will be expressed through the following rule.

PR 4. $$\begin{bmatrix} 6\ \text{stric} \\ 9\ \text{place} \\ 6\ \text{release} \end{bmatrix} \rightarrow \begin{bmatrix} 3\ \text{stric} \\ 8\ \text{place} \\ \langle 3\ 2\rangle\text{release} \end{bmatrix} \ / \ \text{---} \ \begin{bmatrix} 2\ \text{stric} \\ +\ \text{syll} \\ +\ \text{back} \end{bmatrix}$$

In the discussions given earlier in the thesis the process of fricativization described above was treated as a case of phonemic alternations between the dialects, however what this actually means is that only the forms with p or b are acceptable in the Standard dialect, i.e. in the literary form of the language. In the spoken forms or the colloquial forms of these words both the forms with p or b as well as the forms that are fricativized do co-exist in the individual dialects. It may also happen that in a given dialect the fricativized forms may be used more often but this does not mean that the forms with p or b are never used in that dialect.

In the preceding chapters it was also pointed out that the fricative [f] which is not derived through this process of fricativization often change to β or Φ , i.e. bilabial fricatives, in the colloquial forms of speech, when the [f] occurs in an open syllable structure, i.e. when it is followed by a vowel. Some examples that illustrate this have been given in chapter 1, and these will be repeated here.

ífe	[íβe]	- thing
ífè	[íβè]	- to worship
áfà	[áβà]	- name
ófi	[éβi]	- cow
ófe	[óβe]	- soup
ìfe	[ìβe]	- light, brightness
ífò	[iΦò]	- folk tale
ọfọ́	[ɔΦɔ́]	- an emblem of worship
ífō	[iΦō]	- to mention
ífù	[iΦù]	- to be missimg
ụ́fụ	[ʊ́Φʊ]	- pain etc.

Obviously this represents the same phonological process which chages the bilabial stops into fricatives in the environments stated above. The phonological process that reduces [f] to bilabial fricatives when the former is followed by a vowel can be expressed by the following rule.

PR 5. $$\begin{bmatrix}\text{3 stric}\\ \text{8 place}\\ \text{<32>release}\\ \text{1 glott. state}\end{bmatrix} \longrightarrow \begin{bmatrix}\text{3 stric}\\ \text{9 place}\\ \text{<32>release}\\ \text{1 glott. state}\end{bmatrix} / \_\_ \begin{bmatrix}\text{2 stric}\\ \text{+ syll}\end{bmatrix}$$

The phonological process of fricativization described above, it should be stressed, is not restricted to any one dialect or major group of dialects of Igbo, but rather operates across the different major groups of dialects. Furthermore, the fricativised forms, or the further reduced fricatives, usually represent the colloquial forms of speech which are not reflected in the literary language.

What concerns the phonological change of [f] to β and Φ as described above, this presents an interesting question with respect to the sound changes that occurred in the southern dialects.

We mentioned earlier in chapter 1, certain diachronic sound chages that occurred with respect to the Onitsha and Owerri groups of dialects. We noted, for instance, that in some cases where /f/ is used in the Onitsha dialects, in the Owerri dialects this is replaced by /h/. Some examples that illustrate this have been given in chapter 1. Taking this into consideration we shall summarize some of the f $\longrightarrow \{\beta, \phi\}$ changes as follows.

	Onitsha dialects	Owerri dialects	Fricativised form	
/ífe/	ífe	íhe	[íβe]	thing
/áfà/	áfà	áhà	[áβà]	name
/éfi/	éfi	éhi	[éβi]	cow
/áf̣if̣ia/	áf̣if̣ia	áḥiḥia	[áβɪβɪa]	grass
/f̣f̄ū/	f̣ū	f̣h̄ū	[ɪ́ɸō]	to see
/áf̣uf̣u/	áf̣uf̣u	áḥuḥu	[áɸoɸo]	suffering

etc.

Since these phonological changes of /f/ to β and ɸ occurs in some dialects of Onitsha and Owerri, and since there is no evidence in the phonology of this language that shows that /h/ changes to β or ɸ under any conditions, we can assume that in some of the Owerri dialects the rule that changes /f/ to β and ɸ took place before the rule that replaces /f/ with /h/ in these dialects.

5.4. VOWEL AND CONSONANT ASSIMILATION

5.4.1. CONSONANT ASSIMILATION

Consonant assimilation is rare in Igbo phonology. This is due to the segmental and sequence structure conditions which do not permit consonant clusters in the syllable structures of this language.

However from the discussions given earlier in the thesis we observed that some form of consonant assimilation do exist in the language in the only permissible sequence of two successive consonant segments within a morpheme. We observed, for instance, that in any sequence of two consecutive consonant segments within a morpheme in Igbo, the first of such consonants in the sequence must be a syllabic nasal (cf. NSC 17). We also noted that in the morpheme structure involving the presence of a syllabic nasal certain assimilatory process results between the two consonants. The syllabic nasal, for instance, is homorganic with the consonant segment that occurs after it in the structure, i.e. the syllabic nasal is assimilated to the following consonant with respect to the feature of PLACE. This consonant assimilation in Igbo is expressed through the following rule.

PR 6. $$\begin{bmatrix} \text{6 stric} \\ \text{+ nasal} \\ \text{+ syll.} \\ \alpha \text{ place} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{6 stric} \\ \text{+ nasal} \\ \text{+ syll} \\ \text{X place} \end{bmatrix} \; / \; \underline{\quad} \; \begin{bmatrix} \geq \text{1 stric} \\ \text{- syll} \\ \text{X place} \end{bmatrix}$$

(where X represents any value of the feature of PLACE)

PR 6 expresses the agreement or assimilation in terms of the feature of <u>place</u> between the syllabic nasal and the consonant segment that follows the syllabic nasal within a morpheme. This phonological rule restates what has been already described through the NSC 17.

5.4.2. <u>VOWEL ASSIMILATION</u>

Vowel assimilation is a familiar phonological phenomenon in Igbo phonology and consequently it has been often mentioned in some of the previous works on the language, especially in Emenanjo (1972)[50] where this was discussed in greater detail. Through this phonological process, if a morpheme which ends with a vowel is

50. Emenanjo, N. 1975. The Igbo Verbal: a descriptive analysis. M.A. thesis, University of Ibadan.

immediately followed by another morpheme or a word which begins with a vowel, the final vowel of the preceding morpheme/word assimilates to the initial vowel of the following morpheme. Let us represent the final vowel of the preceding morpheme/word as V^1 and the initial vowel of the following morpheme/word as V^2. In Emenanjo (1972) the vowel assimilation rule that results from this phonological process is stated thus:

$$V^1\ V^2 \longrightarrow V^2\ V^2$$

The following examples will illustrate the type of vowel assimilation described above.

àkpa, 'bag',	égō, 'money'	[àkpèégō]	bag of money
àkpa,	ọ́kà, 'corn'	[àkpɔ́kà]	bag of corn
àkpa,	ùbé, 'pear'	[àkpúūbe]	bag of pear
égọ̄,	ùbé	[éguūbe]	money for pear
égō,	ọ́kà	[égɔ́kà]	money for corn
àdá, 'daughter',	Obi	[àdóōbi]	Obi's daughter
àdá	Ụ́kà	[àdʌ́àka]	Ụka's daughter etc.

The tone of the V^1 does not assimilate to the tone of the V^2. Assimilation in the above examples works regressively. The rule suggested by Emenanjo correctly accounts for the vowel assimilation in the above examples. Vowel assimilation also occurs in the present and the future tense forms of the verb, that is, between the final vowel of the tense marker morpheme, nà(for the present tense) or gà (for the future tense), and the initial vowel of the verb. For example,

nà-ekwú	[nèekwú]	is speaking
nà-akwụ́	[nàakw]	is paying
gà-osí	[gèesí]	will cook
gà-ekwú	[gèekwú]	will speak etc.

There are certain conditions in the Igbo phonology where vowel assimilation does not occur, eventhough the conditions described above are met. These cases were not mentioned in Emenanjo (1972) or in any of the places where the vowel assimilation in Igbo had been discussed. Note, for instance that vowel assimilation does not take place in the following examples.

ísi, ánụ	[isianɑ̃]	head of animal
ísi, ɛ́wu	[ísiewũ]	goat head
ísi, òké	[ísiõke]	rat head
ǹpi, 'horn', éfi	[ǹpiéfĩ]	horn of a cow
éfi, Obi	[éfiõbi]	Obi's cow
áji, 'hair', ánụ	[ádʒɪanɑ̃]	animal hair
áji, ɛ́wu	[ádʒɪ ewũ]	goat hair
áji, òké	[ádʒɪ õke]	rat hair etc.

This means that when the first morpheme/word ends with a close front vowel, i.e. when the V^1 is a close front vowel, assimilation does not take place. We may also note that in similar cases involving Noun + Noun or Verb + Noun collocations, if the first word ends with a close back vowel, the V^1 in this case does not assimilate to the V^2. For example,

ánụ, ɛ́wu	[ánɑ ewũ]	goat meat
ánụ, òké	[ánɑ õke]	rat meat
ígụ ọ́nụ̃	[íguɑ̃ɔnɑ̃]	to count, counting
ízụ áhịa	[ízɑ̃ ahɪa]	to trade, trading
ánụ ọ́hịa	[ánɑɔhĩã]	wild beast etc.

The constraints on V^1 should be extended to include close back vowels. With the evidence provided above, we shall constraint and modify Emenanjo's rule, thus:

PR 7. $V^i \longrightarrow V^j \; / \; \text{——} \neq \neq V^j$

Conditions: V^i is not a close vowel. The tone of the V^i is not assimilated to that of the V^j.

With this constraint, assimilation will be blocked if the V^i is a close vowel (i.e. either i, ị, u or ụ). PR 7 also gives better structural descriptions required for the operation of the vowel assimilation rule in the language; that is, that one of the vowels should end a morpheme or a word and the other vowel begin the morpheme or the word that immediately follows.

It should be noted that the constraints described above apply rigorously in constructions involving Noun + Noun, Adjective + Noun, Verb + Noun, etc. collocations (that is, when the verb is not inflected with a non-canonical -CV morpheme). In other words, the constraints fully operate when canonical morphemes collocate; sometimes when noncanonical morphemes end the verb (and the morphemes end with a close vowel) the operation of the constraints can be optional.

5.4.2.1. THE CASE OF VOWEL ELISION IN VOWEL ASSIMILATION.

In Igwe (1974 : 32),[51] the type of vowel assimilation described above was treated as vowel elision. However, as the examples given in the discussions above, as well as the examples used by Igwe (cf. p. 33) clearly show, the V^1 of such constructions is not elided or dropped, rather it assimilates to the V^2 in quality except tone. In other words, this phonological process in the language does not involve vowel elision, rather it is a case of assimilation in the phonology.

Igwe also treats as vowel elision, those cases where the prepositional

51. Igwe, G.E. 1974. The Role of Affixation in the Grammar of Igbo.

na is used. In the written literature in Igbo, the vowel of this morpheme is usually dropped, and the elision is indicated through an apostrophe. For example,

na ọ́hịa,	written as	n'ọ́hịa	- in the bush
na ụ́lọ̀	" "	n'ụ́lọ̀	- in the house
na ò̀bodo	" "	n'ò̀bodo	- in the town
na ósisi	" "	n'ósisi	- on the tree etc.

As Nwachukwu (1975 : 47) correctly remarked, Igwe tends to confuse orthography with phonological facts. The elision of the vowel of the prepositional na in the written literature is not intended in any way to represent how this morpheme is phonetically realised in a prepositional phrase; rather this is used in order to conveniently differentiate those cases where the prepositional na is used from the cases where the tense-forming na and/or the conjunction na are used. In the orthography the vowel of the tense-forming na and the conjunction na is not dropped. As Nwachukwu clearly illustrated through measurements of mingograms of utterances containing the prepositional na, phonetically the vowel of the prepositional na is not elided in the utterances. He noted, for instance, that in na + Noun constructions, where the noun begins with a vowel and where vowel assimilation necessarily occurs, the duration of the assimilated syllabic segments is usually longer than when vowel assimilation is not involved, i.e. when the noun does not begin with a vowel.

To this well illustrated argument we shall also like to add the fact that in Igbo the morpheme na is used as:

(i) a preposition

(ii) a conjunction and

(iii) a tense marker (for the present tense)

as the following examples will show.

(i) ná ụ́lọ̀ – in the house

ná áhịa – in the market

nà ò̀bodo – in the town etc.

(ii) jí nà édè – yam and cocoyam

Nwâfọ̀ nà Ézè – Nwafọ and Eze

éwu nà ọ̀kụ́kọ̀ – goat and chicken etc.

(iii) nà-agá – is going

nà-edé – is writing

nà-ekwú – is speaking etc.

Although, as mentioned above, in the orthography the vowel of the preposition na is usually left out, phonologically however, the same type of assimilation obtains for all the three categories of na. For example,

(i) ná ụ́lọ̀ is pronounced as [nɑ́ɑlɔ̀]

ná áhịa " " " [náahɪ̰ʃa]

nà ò̀bodo " " " [nɔobodo]

(ii) jí nà édè is pronounced as [ʤí nèédè]

Nwâfọ̀ nà Ézè " " " [ŋ wáàfɔ nèénè]

éwu nà ọ̀kụ́kọ̀ " " " [éwu nɔ̀ɔkɑ́kɔ̀]

(iii) nà-agá is pronounced as [nàagá]

nà-edé " " " [nèodé]

nà-ekwú " " " [nèekwú] etc.

This shows that the orthographic elision of the vowel of the preposition na is not reflected in the phonology of this morpheme whenever it is used in an utterance.

Nwachukwu (1975:60)[52a] states that 'there exists at the nominal group level, what one can consider as vowel elision ..... This happens when two nominal items, or a nominal item and a lexical formative (a suffix, for example) combine to give rise to a new lexical item, mostly a proper name.' Here Nwachukwu in a way re-echos the same view contained in Igwe (1974); the view which Nwachukwu and I are trying to dispute. Most Igbo proper names and the names of certain items, just as Nwachukwu correctly remarked, are made up of two or more morphemes, and sometimes a proper name in Igbo can consist of a whole sentence where all the words are combined together. Very often in the writing of these names certain sounds are left out, and this usually happens when double vowels occur and vowel assimilation must have taken place. In such cases only one instead of two vowels is usually represented in the written form of these names. The following examples of Igbo names will illustrate this point.

Okeke made up of óke, 'male', and èké, 'market day';
pronounced as [òkéēke]

Nwafọ made up of nwá, 'child', and àfọ, 'market day'
pronounced as [ŋwáàfɔ]

Ọzemena made up of ọ̀zọ́, 'another', and ómēnà, 'dont do/happen'
pronounced as [ɔ̀ zóemēna]

Ezoke made up of ézè,'chief/king', and óke, 'great'
pronounced as [ézòóke]

Agụụbilo made up of ágwù, 'bad spirit', bù, 'is', ílo,'enemity'
pronounced as [ágụ̀ bílo] etc.

52a. Nwachukwu, P.A. 1975. Noun Phrase Sentential Complementation in Igbo. Ph.D. thesis, University of London.

Apart from the proper names, certain nominals are formed in Igbo through this process of combining two or more morphemes. We disagree with Nwachukwu on this respect just as we disagree with Igwe (1974), namely, that the phonology of these nominals and proper names should be approached from the way the nominals are written. Nwachukwu, for instance, states that there is elision in the following proper names:

Ọdemena, even though this is pronounced as [ɔ̀ déɛ̀mɛ̄na] ;

Nkwumezậla, even though this is pronounced as [ńkwuuneezaàla] .

The mere fact that two tones occur in a of zậla in Nwachukwu's transcription clearly indicates that this is a double vowel, just as in such words/proper names as nwầnyị̀, which is pronounced as [ŋwáàɲɪ]; Okâfọ, which is pronounced as [ɔ̀káàfɔ] ; Nwâfọ, which is pronounced as [ŋwáàfɔ] ; ézâlà, which is pronounced as [ézáàla] etc. This represents a general phonological phenomenon in those forms where vowel assimilation occurs in the language. Since, as we mentioned above, the tones of the vowels are not assimilated, it often happens that the tone of the assimilated vowel is usually recovered in the utterance of the forms, and this is particularly evident when the two contiguous vowels have unidentical tones. as in the examples above. In discussing vowel elision in Igbo it is therefore important to differentiate between how these words are written and how they are pronounced, because a direct inference from the former to the latter would be highly misleading.

Certain cases used by both Igwe (1974) and Nwachukwu (1975) to illustrate vowel elision in Igbo appear to suggest a historical process of simplification[52b] in the phonology of Igbo. This process attempts to simplify a compound word with a CVVCV or CVNCV structure into a CVCV structure. Note, for instance, the words in the following examples.

52b cf. Kiparsky (1963) for more detail account of Simplification as a diachronic process in linguistics.

(a)		(b)	(c)	(d)	
nwókē,	made up of	nwá and óke	nwóokē	nwókē	- male issue
ányaanwụ̄,	" " "	ánya and ánwụ̄	ányaanwụ̄	ányanwụ̄	- sun
éligwē,	" " "	élū and ígwē	éluigwē/éliigwē	éligwē	- sky/heaven
Énugwū	" " "	énū and úgwu	énuugwū	énugwū	--name of a town
nwátà,	" " "	nwá and ńtà	nwántà	nwátà	- small child
ńnukwū,	" " "	ńne and úkwu	ńnuukwū	ńnukwū	- big, huge etc.

The compound words that have acheived this degree of simplification are few in the language. It would be preferable to treat these cases as representing a diachronic process of simplification rather than a synchronic case of elision. Though diachronically such words where this simplification occurred can be seen to consist each of two words, in the synchronic sense, they are seen and treated as one word and consequently made to conform (by the speakers) to the more popular structural pattern of two syllable words in the language. Synchronically there are many words (compound words) which are structured exactly like the ones given above and which are used to name particular items, but which do not have the type of simplification noted above. That is, such words are pronounced with double vowels where this is necessary. If we are to treat these few cases in the language as constituting legitimate cases of elision in the synchronic phonology of Igbo, it will be very difficult to explain why elision does not apply in the majority of cases where similar conditions are present. It should also be important to note that the forms where this simplification is said to apply are mainlyso in fast speech, thus in slow speech the forms in the (c) column (i.e. where there is no simplification) can be accepted as normal. Later we shall discuss certain genuine cases of vowel elision in the phonology of Igbo, and we shall see that in such cases not only will vowel elision be predicted through given phonological conditions, but also in such

cases elision necessarily applies whenever the conditions are met otherwise it would result into unacceptable utterance in Igbo.

5.4.2.2. THE CASE OF TONE ASSIMILATION IN VOWEL ASSIMILATION

There is no tone assimilation in the type of constructions described above under vowel assimilation. There are certain cases in Igbo where one may be tempted to think that tone assimilation is involved in vowel assimilation. For instance, certain morphemes such as the preposition na are known to take the tone of the syllable that immediately follows them. The following examples of preposition phrases will illustrate this point.

ná ụ̀lọ̀	-	in the house
ná áka	-	on the hand
ná ísi	-	on the head
nà ìsi	-	lit. in blindness, i.e. in the dark
nà àkpa	-	in the bag
nà òbodo	-	in the town
ná ọ́nwa	-	on the moon etc.

Morphemes such as the preposition na do not have any inherent tone of their own, rather they take the tone of the syllable that follows them. In this sense we cannot talk of tone assimilation in that these morphemes do not have inherent tones. In the constructions that involve vowel assimilation, when the participating morphemes have inherent lexical tones, the tones of the vowels are not assimilated.

Nwachukwu (1975:61) makes mention about what he called 'Tonemic (low tone) assimilation'. He states that whenever nominals with an inherent low-high, low-high-low or low-high-high tone patterns (i.e. nominals beginning with a low tone) are preceded by an item ending on a high tone, be it a noun or a verb, the former have their

initial low tone raised to the level of the adjacent high tones "(p.62). There is more to this claim than Nwachukwu assumes. Judging from the examples used by Nwachukwu to illustrate his claim, (some of those examples will be repeated here), it becomes undoubtedly evident that the raising of the low tone in the examples within the environments described above is optional. Both (a) and (b) in the following examples adopted from Nwachukwu are equally acceptable. The words where the initial low tone is to be raised are underlined.

(a) N'ẹ́bé òké nwụ̄rụna wèlághanị ọ́nyà.

(b) N'ébé óke nwụ̄rụna wèlághanị ọ́nyà.

Since the rat is dead, return the trap.

(a) N'ébé àkwá ā rècherele, lúfùnée hā.

(b) N'ébé ákwa ā rècherele, lúfùnée hā.

Since these eggs have become rotten, throw them away.

(a) N'ébé ìwú màra yá, yá mèé àkhụ.

(b) N'ébé íwu màra yá, yá mèé àkhụ.

Since he is guilty, let him pay a fine.

(a) Ọ́nyé ọ̀kụ́kọ̀ yá fùru, yá jụ̀ọ́ Ekhe.

(b) Ọ́nyé ọ́kụkọ̀ yá fùru, yá jụ̀ọ́ Ekhe.

Anybody whose chicken is lost, let him enquire from Ekhe.

(a) Áchọ̄la ùbá áhwà.

(b) Áchọ̄la úba áhwà.

Do not go after much wealth.

(a) Ákpọ̄la Òkóro m̀gbe í jèe.

(b) Ákpọ̄la Ókoro m̀gbe í jèe.

Do not call Okoro when you are going. etc

The initial low tone in such constructions may or may not be raised, and in actual fact, with the majority of the native speakers uttering these sentences used by Nwachukwu, the low tones would remain unraised. The raising of the initial low tones in the environments only marks very casual form of speech. In the above examples, as well as in the other examples given by Nwachukwu (pp. 62-65), the (a) variants, where the low tone is not raised represent the more standard and normal ways these sentences can be uttered. The (b) variants, where the low tone is raised, are used mainly in very casual speech. Sometimes the raising of the low tone in such circumstances would mark certain dialect accents, and even in the latter case the two variants indicated in the examples would be equally acceptable ... though only the (a) variant would be used in the standard speech form, i.e. in the Standard dialect. ...

The objections we raise here regarding the claim made by Nwachukwu should not be interpreted as a denial of the existence of tone assimilation in the phonology of Igbo. Tone assimilation obviously exists in Igbo phonology but this is differently structured from the claims made by Nwachukwu. For instance, in the type of tone assimilation that is known to exist in Igbo (which will be discussed in the present thesis in the section devoted to tonology), it is hardly the case that a low tone is raised to the same level as the high tone that triggers the raising of the low tone. Nwachukwu's claim constitutes an overgeneralization of the phonological fact. There are, for instance, many cases in the language where the conditions stated by Nwachukwu are met but where, even in the very casual form of speech, to raise the low tone to the level of the preceding high tones would result into unacceptable utterance. Note, for instance, the following examples where the initial low tone that immediately follows a high tone word cannot be raised to the same level as the preceding high tones; the low tone can at the very most be raised to a downstep high, i.e. lower than the preceding high tone, in some of the phrase construction types.

i. éwú Ōkoro nwụrụ - Okoro's goat died.

ii. ányá ōkukọ̀ àkpọ́ọla - the chicken is blind

iii. Íké àgáala áhịā. - Ike has gone to market.

iv. éwú èríele jī. - goat has eaten the yam. etc.

In the above examples the conditions described by Nwachukwu have been met but the low tones cannot be raised to the level of the preceding high tones. Actually the phonological phenomenon described by Nwachukwu applies only with respect to a given phrase construction type in Igbo, and even then the claim gives an incomplete description of the phonological fact.

5.4.2.3. THE CASE OF CLOSE VOWELS IN VOWEL ASSIMILATION

In the discussions given above we claim that when the V^1 is a close vowel it does not assimilate to the V^2. This constraint, we assume, holds not only for the Standard dialect but also for the other dialects of Igbo. Nwachukwu (1975:59) lists the following conditions required for the assimilation of the close vowels in final position,(i.e. the V^1 by our analysis) for his dialect.

(i) with i/ị in final position, there is the additional 'y' prosodic feature which does not, however, prevent regressive assimilation.

(ii) This 'y' prosody is absent if and only if this final syllable is a CV, where the consonant is the alveo-palatal fricative /ʃ/.

(iii) With u/ụ as the final vowel in a morpheme, regressive assimilation takes place unimpeded. (p. 59).

The following examples were used by Nwachukwu as illustrations:

íshi ọrū [íʃọọrū] [53]

[íʃyọọrū]

53. The transcriptions are as in Nwachukwu (1975:59).

ụdị elē	[ùdyeelē]
égwu ọnwā	[égwọọnwā]
ọrụ ochiè	[ọroochiè]
	[ọrụochiè]
égwu ághā	[égwuaghā]
	[égwaaghā]
ụdị ùdele	[ụdyúùdele]
égwu íkē	[égwiikē]
ími Ūme	[ímyuūme]
àsị Ōkoro	[àsyóōkoro] (pp. 58-59).

The claim made by Nwachukwu has not been wholly supported by the examples he used to illustrate the claim. We see,for instance, that the 'y' prosody can occur with /ʃ/, and also that when u/ụ occurs as the final vowel, i.e. as the V^1, this vowel may not be assimilated, i.e. unimpeded assimilation may not occur. We however disagree with the way Nwachukwu transcribed some of the utterances where assimilation occurs, especially with regard to those utterances where the V^1 is a close front vowel. We are strongly of the opinion that the close vowel is not assimilated in these cases, at least it is not assimilated in my speech. Also in my speech the back close vowels are not assimilated. To test our claim and our objections to Nwachukwu's view and transcriptions we carried out some tests with some Igbo speakers using the sample utterances listed below. Some of the informants used for these tests come from the same dialect area as Nwachukwu himself. These include two informants from Owerri town; two informants from Mbaise Division (from a town five miles from Nwachukwu's town).

Both the Owerri town dialect and the Mbaise dialect belong to the same main group of dialects, namely, the southern dialects. Two informants come from Mbano; one informant is from Nkwerre in Orlu and two informants come from the Onitsha dialect areas.

In the utterances used for the tests, final u/ụ's are assimilated unimpeded to the following vowels in the constructions. The utterances were used to represent (a) unambiguous constructions, i.e. where the constructions can be interpreted each in only one sense, and (b) ambiguous constructions, where the constructions can each be interpreted in two senses; in one sense, where the preceding morpheme could be one that ends with u/ụ; in the other sense, where the preceding morpheme could be one that ends with a non close vowel. The utterances were spoken to the informants and their reactions were noted and tape recorded. If Nwachukwu's claim about the assimilation of u/ụ in final position is correct, the utterances would be acceptable to the informants, both for the unambiguous constructions and the ambiguous constructions that represent the cases where the preceding morpheme in the construction ends with a close back vowel, u/ụ. If, on the other hand, our claim about final u/ụ is correct, we would expect that the unambiguous utterances would be unacceptable, and for the ambiguous utterances, the informants can only relate them to the constructions where the preceding morpheme does not end with u/ụ. The following samples of utterances were used for the tests.

(a) Unambiguous utterances

ízù àtọ́	[ízàatɔ́]	- three weeks
ízù ànọ́	[ízàanɔ́]	- four weeks
m̀gbú óbì	[m̀gbóobì]	- heart pain
àkụ́ Íbè	[àkíibe]	- Ibo's wealth

ọ́dụ̀ éhī	[ɔ́dèéhī]	-	tail of a cow
ọ́dụ̀ éwū	[ɔ́dèéwū]	-	tail of a goat
ọ́dụ̀ átụlụ̄	[ɔ́dàátʌlɔ̃]	-	tail of sheep

(b) Ambiguous utterances

[ǹkèégbē]	representing either	(i) ǹkù égbē	' the wing of a kite'
	or	(ii) ǹkè égbē	'something for the kite'
[ǹchéegō]	representing either	(i) ǹché égō	'guard over money'
	or	(ii) ǹchụ́ égō	'chase for money'
[àkwúùdele]	representing either	(i) àkwụ́ ùdelc	'vulture's nest'
	or	(ii) àkwá ùdele	'vulture's egg'
[àkwúùgo]	representing either	(i) àkwụ́ ùgo	'eagle's nest'
	or	(ii) àkwá ùgo	'eagle's egg'
[àkwóòvu]	representing either	(i) àkwụ́ òvu	'dove's nest'
	or	(ii) àkwá òvu	'dove's egg'
[íhɔɔlɔ̃]	representing either	(i) íhu ọ́lụ̄	'area of work'
	or	(ii) íhe ọ́lụ̄	'implement for work'
[íheekē]	representing either	(i) íhu ékē	'python's face'
	or	(ii) íhe ékē	'something for python'
[íhoōbi]	representing either	(i) íhu Ōbi	'Obi's face'
	or	(ii) íhe Ōbi	'something for Obi'
[ɔ́koobì]	representing either	(i) ọ́kụ́ óbì	'chest/heart burn'
	or	(ii) ọ́kọ́ óbì	'rash on the chest'
[ɔ́kaanyā]	representing either	(i) ọ́kụ́ ányā	'eye burn'
	or	(ii) ọ́kọ́ ányā	'rash on the eye'
[ɔ́koofɔ̃]	representing either	(i) ọ́kụ́ áfɔ̄	'stomach burn'
	or	(ii) ọ́kọ́ áfɔ̄	'rash on the stomach'

In the tests, the sample utterances are spoken to the informant and the informant is asked if he or she can make any meaning out of the utterances, if so, to state what he or she understands from the utterance. If the informant cannot make any sense out of the utterance, or finds it unacceptable, the informant is then requested to give his or her own pronunciation of the construction. The informant's reactions, response and pronunciation are tape recorded.

The results of the tests.

The reactions from all the informants with whom we carried out the tests are identical; all the informants found the type (a) of the sample utterances unacceptable. Every informant modified each of the utterances by incorporating the u/ụ vowel into the modified utterances. This lends a strong support to our claim that final u/ụ's are not assimilated to the vowel that follows them. One interesting revelation from these tests is the fact, as one informant, Mr. J. Njọkụ, clearly pointed out to me, that i and ị; u and ụ do not assimilated to each other despite the fact that each pair differs by only one feature. When, for instance, i or u occurs as V^1 and ị or ụ occurs as V^2 in the construction, the i does not assimilate to the ị, nor the u to the ụ, and vise versa. For example,

ụ́dị́ ihe	is pronounced as	[ụ́ dí ihe] ,	'the type of thing'
ụ́kwụ Ìbe	" " "	[ụ́ kwụ́ Ìbe] ,	'Ibe's leg'
ihu Ìbe	" " "	[ihùibe] ,	'Ibe's face'
isi ūbe	" " "	[ísiūbe] ,	'the head of pear'
ndụ̄ ūbe	" " "	[ndụ́ ūbe] ,	'the life of pear' etc.

Especially in cases such as these one would naturally expect an unimpeded assimilation since the participating vowels differ sometimes minimally by only one feature. The informant who pointed out this fact to me comes from Mbaise, from a town within five miles of Nwachukwu's town. He speaks, as he himself assured me, the same dialect as Nwachukwu.

Concerning the group (b) of the samples of utterances used for the tests, the reactions of the informants are the same. That is, when presented with the sample utterances, the informants found them acceptable only for the constructions where u/ụ do not occur as the V^1 (i.e. as the final vowel). But for the constructions where u/ụ occur as V^1, the informants would modify the utterances in line with what has been observed earlier above. That is, the informants do not assimilate the final u/ụ's to the following vowel. This once more validates the claim we made that when u/ụ occur as the final vowel, i.e. as V^1, they do not assimilate to the vowel that follows them.

Occasionally during the tests some utterances from the examples used by Nwachukwu, where i/ị end the initial word in the constructions, are spoken to the informants, using Nwachukwu's transcriptions of the constructions. In each case the informants found the utterances unacceptable, and they would modify the utterances by incorporating the close vowel into the utterances.

In conclusion, we reiterate the claim we made earlier that when a close vowel occurs in the final position of the first morpheme or word and the following word begins with a vowel, the close vowel is not assimilated to the following vowel.

5.5. VOWEL CONTRACTION

The phonological phenomenon we describe here as vowel contraction is virtually the same as what had been termed earlier as vowel reduction. This phonological process in Igbo is characterized by the fact that when a close vowel is immediately followed by another but unidentical vowel within the same morpheme, and both vowels have identical tones, the close vowel is reduced or contracted into nonsyllabic short vowel and the tone of the derived syllable is realised on the final vowel in the structure, i.e. the vowel that cooccurs with the close vowel. This phonological process in Igbo has been described and illustrated earlier in this work. For instance, in morphemes such as these:

bị́á	–	come
ábị́á	–	market, trade
ọ́hị́á	–	bush, forest
ọ́rị̀à	–	sickness, illness
ọ́bị̀à	–	stranger, guest
rị̀à	–	be sick, suffer from
rị́ọ́	–	begs
ụ́lụ̃	–	clay
éhíhíè	–	afternoon
áhịhịa	–	grass, rubish etc.

the close vowels that are immediately followed by another vowel in the morphemes are contracted.

As we mentioned earlier in the analysis, in some of the previous works on Igbo, such as in Green and Igwe (1963), in Igwe (1974), in Carrell (1970 , in Nwachukwu (1975), to mention a few, the surface phonetic form of the contracted close vowel in Igbo has been represented by an approximant, namely, by /y/ or /w/. In the present

work we choose to treat this simply as a nonsyllabic short vowel. Reasons have been given earlier to justify our apparent departure from the previous views (cf. 4.2. above), and the arguments will not be necessarily repeated here.

Vowel contraction in Igbo will be expressed through the following rule.

PR 8. $$\begin{bmatrix} \leq 2 \text{ stric} \\ \leq 2 \text{ height} \\ + \text{ syll} \\ \alpha \text{ tone} \end{bmatrix} \rightarrow \begin{bmatrix} \leq 2 \text{ stric} \\ \leq 2 \text{ height} \\ - \text{ syll} \\ - \text{ tone} \end{bmatrix} / \neq \begin{bmatrix} \geq 1 \text{ stric} \\ - \text{ syll} \end{bmatrix} \_\_ \begin{bmatrix} \leq 2 \text{ stric} \\ \geq 3 \text{ height} \\ + \text{ syll} \\ \alpha \text{ tone} \end{bmatrix}$$

This rule states that a syllabic close vowel (i.e. with the value of 2 or less Height) becomes nonsyllabic (thereby losing its tone) when it is followed by an unidentical vowel but with identical tones, both vowels occurring within the same morpheme.

5.6. REDUPLICATION

Reduplication by itself does not constitute a phonological process, but rather this is one of the grammatical processes employed by many Kwa languages. In Igbo grammar reduplication is used for achieving various grammatical functions such as the formation of abstract verbal nouns from the verb roots, the formation of colour adjectives from nouns and the formation of adverbs or certain ideophonic words from nominals and adjectives. Structurally we will differentiate two types of reduplications in the language, namely, obligatory and optional reduplications. An obligatory reduplication occurs in those cases where the morpheme/word must be reduplicated for the desired meaning to be present. This is characteristic of the grammatical process of the formation of verbal nouns and colour adjectives in the language. Optional reduplication is the type where the morpheme may or may not be duplicated to achieve the desired grammatical meaning. The

formation of adverbs and ideophones, especially what Igwe (1974) treated as triplications, is usually characterized by optional reduplication. For instance, although the words in the following examples are reduplicated,

nwáyọ̀ọ nwáyọọ	-	gradually,
ńgwa n̄gwa	-	quickly,
n'ọ́kụ n'ọ́kụ	-	indicating a quick or hastened action,
zám zám (sám sám)	-	indicating quick and momentary action etc.

the adverbial meaning is still achieved if only one of the morphemes in the reduplicated form is used, and this would be acceptable. This type of reduplication is used to show emphasis. On the other hand, for the reduplicated forms such as:

ńtụ n̄tụ	meaning	'ash colour'
ụ́hie ụ̄hie	"	'reddish colour'
èdó èdo	"	'yellow'
ńzu n̄zu	"	'cream or chalkish colour' etc.,

the two morphemes in the reduplicated forms must be used, otherwise a different meaning would result. When only one of these morphemes in the construction is used it can only mean a noun but not a colour adjective. Thus ńtụ alone means 'ash'; ụ́hie and èdo alone mean each 'a type of pomade locally manufactured' and ńzū means 'chalk', but when these nouns are duplicated as in the examples above, they mean adjectives with respect to the colour of the object from which the reduplication is formed. In this case the process of reduplication is obligatory. The same is true of verbal nouns which are formed by reduplicating the verb roots.

Our interest in reduplication, however, lies on the phonological changes that occur sometimes in this grammatical structure of the words that are duplicated. In this regard we shall examine the structure of verbal nouns in Igbo, by examining how the verbal nouns are formed in this language.

Verbal nouns are formed in Igbo in two main ways. (i) By prefixing a homorganic syllabic nasal to a compound or complex verb root, usually of CVCV structure. (ii) By prefixing o/ọ to a simple verb root of CV structure and then duplicating the root morpheme. In the former, no phonological changes are known to be present in the reduplicated form of the words, whereas in the latter certain phonological changes sometimes occur with respect to the vowel of the root morpheme in the reduplication. This will become evident from the examples given below.

(a) Compound and Complex Verb roots.

Verb root		Verbal noun		
gálu	- reach	ńgalu	-	act of reaching
gáfè	- walk past, cross	ńgafè	-	walking past, crossing
tụ́tụ̀	- pick	ńtụtụ̀	-	picking
gósi	- show, illustrate	ńgosi	-	showing etc.

(b) Simple Verb roots.

(i) When the vowel of the root morpheme is a close vowel (i,ị,u,ụ), no phonological changes occur in the reduplicated forms. For example,

sí	'cook'	ò sísi	-	cooking
sị́	'say'	ò sị́sị	-	saying
tí	'beat'	ò títi	-	beating
rị́	'climb'	ò rị́rị	-	climbing
dì	'bear'	ò didi	-	forbearing
dị́	'become'	ò dị́dị	-	becoming
kwú	'speak'	ò kwúkwu	-	speaking
kwụ́	'pay'	ò kwụ́kwụ	-	paying
dú	'lead'	ò dúdu	-	leading

kụ́ 'knock'	ọ̀kụ́kụ	–	knocking
gbú 'kill'	ògbúgbu	–	killing
fù 'be lost'	òfufu	–	being lost
bú 'carry'	òbúbu	–	carrying
wù 'be famous'	òwuwu	–	being famous
bí 'dwell'	òbíbi	–	act of dwelling
mì 'be deep'	òmimi	–	being deep etc.

(ii) When the vowel of the root morpheme is either a, e, o, or ọ, (i.e. nonclose vowel) changes occur with respect to the root vowel in the reduplicated form, in accordance with the conditions that will be stated later. For example,

ii.(a)	dà 'fall'	ọ̀dịda	–	falling
	tá 'chew'	ọ̀tịta	–	chewing
	dé 'write'	òdíde	–	writing
	té 'scrub, smear'	òtíte	–	scrubing
	ká 'surpass'	ọ̀kị́ka	–	surpassing
	kò 'create'	òkike	–	creating
	zá 'answer'	ọ̀zị́za	–	answering
	zà 'sweep'	ọ̀zịza	–	sweeping
	zè 'dudge'	òzize	–	dudging
ii.(b)	bà 'enter'	ọ̀bụba	–	entering
	bé 'slice'(with a knife)	òbúbe	–	slicing
	pá 'carry'	ọ̀pụ́pa	–	carrying
	pé 'slice'(with axe)	òpúpe	–	slicing
	fé 'fly'	òfúfe	–	flying
	gbá 'sting'	ọ̀gbụ́gba	–	stinging

kpé	'judge'	ɔ̀kpúkpe	–	judging
kpà	'weave'	ɔ̀kp̣ukpa	–	weaving
kwá	'sew'	ɔ̀kwúkwa	–	sewing
kwà	'push'	ɔ̀kwukwa	–	pushing
kwé	'agree'	ɔ̀kwúkwe	–	agreeing
gwé	'grind'	ɔ̀gwúgwe	–	grinding
gwá	'tell'	ɔ̀gwu̱gwa	–	telling
nwé	'own'	ɔ̀nwúnwe	–	owning
nwà	'try, attempt'	ɔ̀nwunwa	–	trying
má	'know'	ɔ̀múma	–	knowing
mé	'do'	ɔ̀múme	–	doing etc.

(ii) When the vowel of the verb root is either o or ọ, changes occur with respect to the root vowel in the reduplicated form. The conditions under which the changes occur will be stated later. For example,

dó	'place, put'	ɔ̀dúdo	–	placing
bó	'accuse'	ɔ̀búbo	–	accusing
fó	'mention'	ɔ̀fúfo	–	mentioning
dọ́	'pull'	ɔ̀dúdọ	–	pulling
bɔ̀	'carve meat'	ɔ̀bubɔ	–	carving meat
tó	' grow'	ɔ̀túto	–	growing
tọ́	'unwrap'	ɔ̀tútọ	–	unwrapping
zó	'hide'	ɔ̀núzo	–	hiding
zọ́	'struggle for'	ɔ̀zúzọ	–	struggling for
kɔ́	'narrate'	ɔ̀kúkɔ	–	narrating
kpɔ́	'call'	ɔ̀kpúkpɔ	–	calling
gɔ́	'buy'	ɔ̀gúgɔ	–	buying etc.

One general observation we can make about the phonological changes that occur in these constructions is the fact that it is always the second vowel in the constructions (i.e. the vowel of the first root morpheme in the reduplicated form) that changes. Other conditions necessary for the phonological changes are as follows.

(a) When the vowel of the root morpheme is either a or e and the consonant segment of the root morpheme is nonlabial, the root vowel in the first of the reduplicated morphemes changes to either ị or i respectively. If the consonant segment of the root morpheme is a labial (and the vowel of the morpheme is either a or e), the change is to either ụ or u respectively.

(b) When the vowel of the root morpheme is either o or ọ, the root vowel in the first root morpheme of the reduplicated form changes to u or ụ respectively, that is, irrespective of the quality of the consonant segment that occurs in the root morpheme.

Hyman (1975:53) described some of the phonological changes noted here (i.e. with particular reference to the cases where a or e changes to ụ or u respectively) as that of assimilation in terms of labiality. Hyman's account cannot be accepted as wholly accurate. For instance, in the examples given above we do not see a and e changing into ọ and o respectively, which should have been expected if the changes only involve that of assimilation to labiality alone. The elements shared in common in all the phonological changes noted above are the facts that (i) nonhigh or nonclose vowels become high/close in the environments;(ii)unrounded vowels; i.e. a and e, are assimilated to the labiality of the surrounding consonants.

We will therefore require two phonological rules to account for the vowel changes in the reduplicated forms of the simple verb roots in the verbal noun structures in Igbo. These rules may be formulated in the following way.

PR 9. $$\begin{bmatrix} \leq 2 \text{ stric} \\ \geq 3 \text{ height} \\ + \text{syll} \end{bmatrix} \rightarrow \begin{bmatrix} \leq 2 \text{ stric} \\ \leq 2 \text{ height} \\ + \text{syll} \end{bmatrix} \quad / \quad \Big[\, C \text{ —— } \Big]_{Rt^1}$$

Condition: the Rt (i.e. the root morpheme) is reduplicated.

PR 10. $$\begin{bmatrix} \leq 2 \text{ stric} \\ + \text{syll} \\ \geq 3 \text{ height} \\ - \text{round} \end{bmatrix} \rightarrow \begin{bmatrix} \leq 2 \text{ stric} \\ + \text{syll} \\ \leq 2 \text{ height} \\ + \text{round} \end{bmatrix} \quad / \quad \begin{bmatrix} \geq 1 \text{ stric} \\ - \text{syll} \\ + \text{labial} \end{bmatrix} \text{ —— } \begin{bmatrix} \geq 1 \text{ stric} \\ - \text{syll} \\ + \text{labial} \end{bmatrix}$$

PR 9 states that a nonhigh vowel becomes high when it occurs as the vowel of the first root morpheme in the reduplicated structure. PR 10 states the assimilation of nonhigh unrounded vowel to rounding when the consonant segments of the reduplicated morpheme is labial. Rule 10 is ordered after rule 9.

The two phonological rules, 9 and 10 acquire wide generalization in the language, in that they describe the phonological phenomena that are commonly present in the structure of certain words in Igbo. It would be important to note, for instance that the phonological changes in the vowels described above are not unique to the verbal noun structures alone, but they are also present in all nominals with matching structures. For instance, in nominals with VCVCV structure in Igbo, where the two consonant segments in the structure are identical, similar phonological chan-ges would occur with respect to the second vowel in the words. Compare the structure of the vowels of the first CV in the following examples.

ázịzá	–	a reply, an answer
ázịzà	–	broom
àkịkà	–	an ant, also used for delicate artistic carving
ámụma	–	fortune telling
ékike	–	being well dressed

ákụkọ - story

ójíjé - mimicry, imitation

òmumé - behaviour

òkwukwé - faith

ákwụkwọ̄ - book, leaf

ábụbā - leaf

ọ̀nwụnwa - temptation

àmyịnya - horse

ọ̀kụ́kọ̀ - chicken

àbụba - fat etc.

Note, however that the mentioned changes in the vowels do not occur in the following words, where the consonant segments in each word are identical.

ósisi - tree

òtíti - middle

ọ̀tụ́tụ - many

ụ̀tụ́tụ̀ - morning

úzuzù - dust

ónìni - melon etc.

It becomes evident from these examples that the principal structural description needed for the above rules (rules 9 and 10) to apply is that (a) the two consonant segments should be identical, (b) that the final vowel is a nonhigh vowel and (c) for the change of a and e to ụ and u repectively, we require that the two consonant segments should be labial or at least have the feature [+ labial] .

In view of this new dimention to the structural description necessary for the operation of the rule that changes the nonclose vowels in the environments described above, we shall reformulate rules 9 and 10 as rules 11 and 12 respectively as follows:

PR 11. $\begin{bmatrix} \leq 2 \text{ stric} \\ \geq 3 \text{ height} \\ + \text{ syll} \end{bmatrix} \longrightarrow \begin{bmatrix} \leq 2 \text{ stric} \\ \leq 2 \text{ height} \\ + \text{ syll} \end{bmatrix} / \begin{bmatrix} C^i \text{ —— } C^jV \\ \text{Nom.} \end{bmatrix}_{\text{Nom.}}$

where C^i and C^j are identical and the V is a nonclose vowel.

PR 12. $\begin{bmatrix} \leq 2 \text{ stric} \\ \geq 3 \text{ height} \\ + \text{ syll} \\ - \text{ round} \\ - \text{ back} \end{bmatrix} \longrightarrow \begin{bmatrix} \leq 2 \text{ stric} \\ \leq 2 \text{ height} \\ + \text{syll} \\ + \text{ round} \\ + \text{ back} \end{bmatrix} / \begin{bmatrix} \begin{bmatrix} X \text{ stric} \\ \{8, 9\} \text{ place} \\ - \text{ syll} \\ + \text{labial} \end{bmatrix} \text{ —— } \begin{bmatrix} X \text{ stric} \\ \{8, 9\} \text{ place} \\ - \text{ syll} \\ + \text{labial} \end{bmatrix} \begin{bmatrix} \leq 2 \text{ str} \\ \geq 3 \text{ ht.} \\ + \text{ syl} \\ - \text{ rnd.} \\ - \text{ bck} \end{bmatrix} \\ \text{Nom.} \end{bmatrix}_{\text{Nom}}$

Where X means any value of Stricture and the brace reads 'either - or', that is, either 8 or 9 values of Place.

With these two rules we can now phonologically derive the Igbo verbal noun forms, as in the following examples, where changes occur in the root vowels in the reduplicated forms. For example,

(i) zó 'hide'

/ òzózo / through reduplication

òzúzo through PR 11.

òzúzo - hiding

(ii) zè 'dudge'

/ òzeze / through reduplication

òzize through PR 11.

òzize - dudging

(iii) bó 'accuse'

/ òbóbo / through reduplication

òbúbo through PR 11.

òbúbo - accusing

(iv) bó 'slice (with a knife)'

/ ɔ̀bébe / by reduplication

ɔ̀bíbe by PR 11

ɔ̀búbe by PR 12.

ɔ̀búbe - slicing (with a knife)

(v) bà 'enter'

/ ɔ̀ḅaba / by reduplication

ɔ̀ḅiba by PR 11.

ɔ̀ḅuba by PR 12.

ɔ̀ḅuba - entering

(vi) kwé 'agree'

/ ɔ̀kwékwe / by reduplication

ɔ̀kwíkwe by PR 11.

ɔ̀kwúkwe by PR 12.

ɔ̀kwúkwe - agreeing

(vii) dó 'place, put'

/ ɔ̀dódo / by reduplication

ɔ̀dúdo by PR 11.

ɔ̀dúdo - placing

(viii) mé 'do'

/ ɔ̀méme / by reduplication

ɔ̀míme by PR 11.

ɔ̀múme by PR 12.

ɔ̀múme - doing etc.

The phonological rules we have formulated to account for the phonological changes that occur in some of the reduplicated verbal noun forms in Igbo, can be seen in a way to describe certain sequence structure constraints in the language. This type of sequence structure constraints requires a complex system of conditions that are not readily obvious except through the system of analysis provided here. Note, for example, the following words some of which are not acceptable, i.e. are not possible morphemes, in Igbo, because in such words the conditions relevant to the morpheme structure constraints have been violated. The unacceptable words/morphemes are indicated with asterisk.

Okolo

*okoʻko

okuko

*ọkọkọ

ọkụkọ

*amama

amụma

amala

amaka

amada

*ogogo

ogugo

*ọgọgọ

ọgụgọ

*agaga

agịga

*ngaga

ngụga

ngugu

ngụgụ

*ngege etc.

What this means therefore is that in any morpheme structure involving a $C^1V^1C^2V^2$ structure, where both C^1 and C^2 are identical and V^2 is a nonclose vowel, the type of phonological changesor the phonological shapes of the V^1 which have been described above will necessarily be present otherwise this would result into an unacceptable or improbable word in the language. When the C^1 and the C^2 are not identical,the changes in the V^1 do not necessarily occur, and the words so formed may be acceptable or at least they would be possible morphemes in the language. When, however, the final vowel in such morpheme structures is a close vowel, the V^1 must also be a close vowel (i.e. in the morpheme structures where both the C^1 and the C^2 are identical). Note that the following are not possible morphemes in Igbo, except if it is a borrowed word or where each of the CV morphemes in the structure constitutes an independent morpheme, both of which are joined together to form a compound word or a compound verb root, in which case they cannot be treated as a one morpheme word. For example,

*ababị

*ababụ

*amamụ

*ememi

*omomi

*ebebi

*ezezi

*ototi

*eteti

*ezezi

*okoki etc

whereas okiki, omimi, ekiki, ekike, etiti, ebulu, abụbụ , ọkịkị etc are all possible morphemes in the language.

5.6.1. A LEGITIMATE CASE OF VOWEL ELISION

When verbs with CVV root morpheme are reduplicated to form verbal nouns, the final vowel of the root morpheme is elided in the first root in the reduplicated form. In the verbs with this type of root structure the first vowel in the sequence is usually a close vowel. This is illustrated in the following examples.

Verb root		Verbal noun		
bi̩a	- come	ò̩bi̩bi̩a	-	coming
ri̩a	- be sick	ò̩ri̩ri̩a	-	being sick
lú̩o̩	- secure with a notch	ò̩lú̩lu̩o̩	-	securing with a notch
lùo	- wither away	òluluo	-	withering away
fió	- tie	òffio	-	tying
fiò	- miss a target	òfifio	-	missing a target etc.

This phonological process of vowel elision can be represented through the following rule:

$$\text{PR 13.} \qquad V \longrightarrow \phi \; / \left[\underset{\text{Nom}}{C^1V^1} \text{ —— } \underset{\text{Nom}}{C^2V^2V} \right]$$

where the C^1 and the C^2 are identical; V^1 and V^2 are identical and both vowels are close vowels. In other words, both C^1V^1 and C^2V^2 are identical.

The phonological phenomena described by PR 13, i.e. the phonological shapes of the vowels that occur in the reduplicated forms of the verbal nouns, are present in the following nouns.

éhìhìe	-	afternoon
éhi̩hi̩a	-	grass
ńri̩ri̩a	-	sickness
Ò̩gú̩gù̩ó̩	-	personal name etc.

Note, however, that there is no vowel elision in the following words,

áhịara	–	weaver bird
Áhịarā	–	name of a town (also in my dialect this can mean ' leaking pot') etc.

because the two consonant segments in the structures are not identical. PR 13 therefore can be generalized not only for the reduplicated morphemes with the type of structures indicated above, but also for all lexical morphemes in the language where the structural conditions are met. PR 13 also constitutes the only genuine case of vowel elision that I know of in the language.

We shall also like to use such morphemes with CVV structure, first to further substantiate the claim we made earlier that final high vowel does not assimilate to the quality of the following vowel, and secondly to show that the regressive assimilation of contiguous vowels can extend to any number of vowels occurring in the environment described. Consider the following examples.

i.	bịá óbe à	[bì éebeà]	–	come here!
ii.	áhịa òbodo	[áh ɪ oòbodo]	–	town market
iii.	gàá óbe áhụ̀	[gèéebaah]	–	go there!
iv.	kwụ̀ọ́ ụ́gwọ̄	[kwɔ̀ ɔ́ɔ gwɔ̄]	–	pay! (lit. pay debt)
v.	kwùó íhe à	[kwùíiheà]	–	say this!
vi.	kpòó íhe à	[kpìíiheà]	–	gather up this! etc.

It is evident from the above examples that high or close vowels are not assimilated when they occur as final vowels before another morpheme that begins with unidentical vowel. In (v) above, /u/ is not assimilated to the following unidentical close vowel. Examples such as (ii) and (vi) above show that tow or more successive vowels in the final position can all be assimilated, that is, that this process can only be checked either by a consonant segment or by a high vowel.

5.6.2. SOME ALTERNATIVE ACCOUNT OF THE IGBO VERBAL NOUN FORMS

In the analysis presented above, some phonological rules have been introduced to account for the phonological changes that result from the process of reduplication involved in nominalization forms in Igbo, and for some of the nominals derived from the verbal in Igbo.
nouns, are obvious. The formula captures certain generalisations on certain words in the language, the structures of which words are similar to those of the derived verbal nouns or the nominals derived from the verbal nouns, provide independent justification for the phonological rules.

There are other ways in which this problem can be considered. Another way to treat reduplication in this language is through the Prosodic Analysis framework. Using the prosodic features and a phonological formula similar to the one suggested in Carnochan (1960/1970), we can represent the nominalized words which involve reduplication in the following way.

PF 1. $R/L \left[\; (A)^{W} \; (\; C \; I \;)^{y/w} \; CV \; \right]$

PF 1. $R/L \left[\; (A)^{W} \; (\; C \; I \;)^{y/w} \; CV \; \right]$

nic

(where the C elements are identical and R/L states the harmonic agreement of the vowels in the structure).

l noun

forms in Igbo, and for some of the nominals derived from the verbal nouns, are obvious. The formula captures certain generalisations about the structure of such nominals in the language. The formula, for instance, makes the following predictions about the structure of the verbal nouns in Igbo:

(i) The first vowel that occurs in the structure is always a rounded open vowel, phonetically realised as either o or ọ, depending on the harmonic set of the root vowel.

(ii)Only close vowels can occur as the second vowel in the structure and this close vowel has four possible phonetic exponents, namely, i, ị, u, ụ. The decision about whether the close vowel is to be realised as a front unrounded vowel or as a back

rounded vowel depends on the quality of the final vowel in the structure. Thus the second vowel has a 'y' prosody when the final vowel is an unrounded vowel, and a 'w' prosody when the final vowel is a rounded vowel.

The final vowel in the structure can be any of the eight phonemic vowels in the language. The formula shows also that the vowels that occur in the construction agree harmonically.

The phonological formula, the PF 1, above, gives a neat account of the structure of the verbal nouns in Igbo. The formula states most of the structural constraints which we attempt to achieve through the phonological rules.

However, the account of the verbal nouns given by the phonological formula, PF 1, will run into certain difficulties. For instance, in the structure of the nominals derived from the verbal nouns, we observed that apart from the open back/rounded vowel o/ọ, other vowels such as a/e as well as syllabic nasals can occur at the initial position. Similarly the PF 1 would give incorrect phonetic out-put when, for instance, the consonant segments in the structure of the verbal noun is a labial, in which case the second vowel is always of the 'w' prosody, i.e. either u or ụ, irrespective of the quality of the final vowel, as the following examples will once more illustrate.

Verb root	verbal noun	
bé	ò búbe	and not *ò bíbe
bà	ọ̀ bụba	and not *ọ̀ bịba
kwá	ọ̀ kwụ́kwa	and not *ọ̀ kwɨ́kwa
kwé	òkwúkwe	and not *òkwɨ́kwe
gwá	ọ̀ gwụ́gwa	and not *ọ̀ gwɨ́gwa
gwé	ò gwúgwe	and not *ò gwɨ́gwe

fé	òfúfe	and not	*òfífe
fà	ọ̀fụfa	and not	*ọ̀fịfa
mé	òmúme	and not	*òmíme
má	ọ̀mụ́ma	and not	*ọ̀mịma etc.

The incorrect phonetic out-puts of these verbal nouns (marked with asterisk in the above examples) which are unacceptable in Igbo, would result from the PF 1. Therefore, whereas the phonological formula, the PF 1, gives an accurate account of the structure of some of the verbal nouns in the language, it will be very costly to such analysis if it is extended, as it should be, to account for those cases mentioned above; such cases obviously cannot be handled by the PF 1. The situation, however, can be better handled through the phonological rules we have introduced.

The alternative analysis through the Prosodic Analysis discussed above runs into these difficulties because it fails to take into account the derivational history of the verbal nouns in this language. This derivational history entails, among other things, that the verbal nouns are formed in Igbo through the prefixation of an open back vowel and the reduplication of the root morpheme. The prosodic analysis approach mentioned above takes into account only the surface phonetic forms of the verbal nouns. The occurrence of i/ị as the second vowel, when the root vowel is an open front vowel, a or e, and the root consonant is a nonlabial, or the occurrence of u/ụ when the root vowel is a or e and the root consonant is a labial, (or when the root vowel is o or ọ and the root consonant is either a labial or nonlabial), should be treated as cases of phonological change, which presupposes that these forms are derived from the underlying forms (underlying representations) where such changes are not present. That is, we require certain generative phonological rules which would relate these surface phonetic representations to their underlying representations. The phonological rules proposed above will fulfil this purpose. These rules have been sufficiently constrained to handle the structural changes involved in the verbal noun forms/constructions in Igbo.

5.7. VOWEL HARMONY

5.7.1. INTRODUCTION

The term 'vowel harmony' has been used to cover a wide range of phonological phenomena. These phonological phenomena have all one common characteristic, namely, that of agreement of the vowel segments within or beyond the morpheme boundary, with respect to given phonological feature or features.

Vowel harmony is known to occur in many languages across the world. Apart from the more familiar cases such as the Altaic and the Finno-Ugric languages, and the Kwa languages of West Africa which have been mentioned in various literature, vowel harmony occurs in many other languages, such as the Ainu language, the Korean language etc. (Aoki 1963); Robins (1958) reports of vowel harmony in Yoruk, an Algonkian language of Northwestern California. There are also many other languages where vowel harmony has been reported.

From both the number and the diversity of the languages in which vowel harmony occurs, it cannot be expected that the vowel harmony systems would be identical in all these languages. Both the way vowel harmony operates and the very features that are involved in the harmony would not be the same in every one of these languages. For instance, some languages such as Igbo, Ewe, Akan etc. have only vowel harmony, not accompanied by consonant harmony. In some languages such as classical Mongolian (Lightner 1965), Tigre (Palmer 1956), Lhasa Tibetan (Sprigg 1961), a vowel harmony system may also involve consonant harmony.

With respect to the manner in which vowel harmony operates in some languages, Aoki (1968) provides a typological classification based on the following criteria:

(a) the feature or features in harmony;
(b) symmetric vs nonsymmetric harmony
and (c) alternations in harmony.

With respect to the feature or features involved in vowel harmony, Aoki distinguishes a 'total harmony' and a 'partial harmony'. Total harmony characterizes complete identity by the harmonising segments. This is the case where one segment is completely assimilated to another segment. This can generally be expressed by a rule such as

$$X \longrightarrow Y \ / \ Y \text{ ——}$$

(where X and Y are used to each represent a unit of phoneme, and not the bundle of features that are involved in the harmony)

X is not specified for any features in the lexicon but acquires its features from Y through the operation of a phonological rule such as the one given above. Some examples of total harmony include the illative singular suffix in Finnish, the separative singular suffix in Yurok, pronominal prefix in Yurok, perfective suffix in Kwanyama, first and second person pronominal prefixes in Koru and Hadi, the past tense (-ra form) suffix in Igbo, and the distributive prefix in Acoma.[54] Total harmony, which entails complete assimilation of the features of one segment by another segment, is comparatively rare in the phonology of many languages especially in the type of feature assimilation that is usually involved in vowel harmony. What is generally common in most languages with vowel harmony is. partial harmony, in the sense that the harmonising segments usually share certain features in common. This is the context in which we mainly speak of vowel harmony in Igbo.

Symmetric harmony characterises the system in which the harmonizing series exist in equal power or equal ratio. Under such system the language has what we may call balanced pairs of harmonic sets in its vowel system, and the co-occurrence of vowels and/or consonants within a structure is determined by the harmonising sets in the system. Many languages with vowel harmony system have the symmetric harmony. Some examples of languages with symmetric harmony include

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54. H. Aoki (1968: 142) 'Toward a typology of vowel harmony' International Journal of American Linguistics, 34: 142-45.

the Altaic languages, the Finno-Ugric languages and the Kwa languages in West Africa.

Asymmetric harmony does not have balanced paired harmonic series within the vowel system as the symmetric harmony system, rather in the asymmetric harmony we have a system in which one harmony series dominate in terms of its ability and privilege to assimilate the vowels of the non-dominant group. Thus in such a system the presence in a word of a vowel from the dominant series changes the quality of the vowels of the nondominant group, but not vice versa. An example of a language with asymmetric harmony is Koryak (Jakobson 1942), where the low vowels comprise the dominant series and 'if a member of a complex contains low vowels, the high vowels of its other members change into corresponding low phonemes.'[55]

One of the main differences between symmetric and asymmetric harmony systems lies in the fact that languages with symmetric harmony tend to develop phonemic alternants in the vowel system, or what we may call harmonic pairs. A close look into the vowel system of such languages will reveal the fact that the vowels are paired up into different harmonic sets or series. For example, the eight vowels in Igbo are paired into two equal harmonic sets, namely, a, ị, ọ, ụ and e, i, o, u; similarly the vowel system of Finnish consists of eight vowels, six of which are harmonically paired thus, a - ä, o - ö, u - ü and the remaining two vowels i and e are harmonically neutral vowels. Also important for both Finnish and Igbo, as well as for some languages with symmetric harmony, is the fact that the vowels from the different harmony sets are each phonemic under certain contexts and non-phonemic, i.e. form allophones, in certain contexts. For the languages with asymmetric harmony the vowels mainly form allophones, that is, when the vowel is harmonically assimilated and when it is not. The vowels of such languages cannot be divided into harmonic sets in the same sense as in symmetric harmony system. In other words, whereas for the symmetric harmony,

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55. Jakobson 1942:610, see also Aoki (1968).

vowel harmony principally involves a choise between two alternatives, either from one harmonic series or the other, for the asymmetric harmony such a choice does not arise because there are no two way alternatives to choose from.

The third criterion is alternation. Although vowel harmony by implication requires that the vowels of a language be classed into different harmony groups, corresponding to the co-occurrence conditions of vowels within a morpheme in the language, however, it can be the case that in some languages the vowels used in the different harmony groups do not alternate, but rather in such languages these conditions are there only to maintain some'internal concord' in the morpheme or in the word. One example of a language where this type of harmony system is present would be a language with asymmetric harmony since in such a case harmony is achieved merely through assimilation of the dominant feature.

As it is usual with most cases of typological classifications, there can be instances of overlapping of these harmony types in any one language. This means that some languages may have both the symmetric as well as the asymmetric systems, though in varying degrees. For instance, a language which is predominantly symmetric in its vowel harmony system may have some cases of asymmetric harmony.

5.7.2. SOME VIEWS ABOUT VOWEL HARMONY

Vowel harmony is a widely discussed subject in phonology. For some dicades now linguists have found the vowel harmony a very exciting area in phonological analysis and consequently various phonological theories have been propounded with respect to vowel harmony. Vowel harmony has been described for many languages using the framework of Prosodic Analysis.[56] In generative phonology,

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56. Carnochan, J. (1960/70) 'Vowel harmony in Igbo'; Palmer, F. R. (1956) 'Openness in Tigre, a problem of prosodic statement'; Sprigg, R.K. (1961) 'Vowel harmony in Lhasa Tibetan' etc.

vowel harmony has attracted no less attention and wide discussion.[57] As a result of this wide interest on vowel harmony certain views have been established about this phonological process.

Perhaps the greatest problem about vowel harmony and the areas in which opinions differ in respect of this phonological phenomenon is not so much about the very nature of this phenomenon as about determining the corpus or the unit of the grammar on which vowel harmony is to be considered, and about how vowel harmony should be represented in the lexicon.

The Prosodic Analysis views vowel harmony as a phonological phenomenon illustrating prosodic elements of structure which occur on the syntagmatic level. Vowel harmony has as its corpus or area of operation, the entire unit of grammatical structure such as the syllable or successive syllables within a word, the word and/or certain grammatical constructions. For example, in the following phonological formula illustrating the prosodic account of vowel harmony in Igbo (Carnochan 1960), vowel harmony is taken to dominate the entire range of grammatical construction.

$$L/R \left[\_ (A)^{W} (CVA)^{y/w} \right]$$

In the analyses of vowel harmony within the framework of generative phonology differences of opinion exist with respect to the unit of structure in which vowel harmony operates and the way vowel harmony is to be represented in the lexicon. Treating vowel harmony as a surface structure phonology, generative phonologists attempt to establish the Deep Structure representation from where the surface structure is derived. Also closely connected with this is the problem of determining how vowel harmony should be represented in the lexicon. On these respect three main points of view have been expressed in generative phonology.

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57. Lightner, T. (1965); Zimmer, K.E. (1967); Kiparsky, P. (1968), to mention a few. Vowel harmony also gets mentioned in other works not specifically devoted to this topic, such as in the SPE, (Chomsky and Halle 1968) etc.

(i) Some phonologists, (Carrell 1970; Bach 1967; Chomsky and Halle 1968; Zimmer 1967), consider vowel harmony as feature of the segment, whereby "the lexical entries specify the feature [∝ tns] (i.e. talking about vowel harmony in Igbo) for the first vowel segment only, the feature [∝ tns] is specified for all other vowels by a phonological rule."[58] We shall come back later to Carrell's analysis. The segmental approach, as this point of view is known, treats vowel harmony as the property of the segment, and in terms of how the vowel harmony is to be represented in the Deep Structure, only one vowel in the word (usually the first or the last vowel) is fully specified for the harmonizing feature(s) and the other vowels in the word are represented by means of archiphonemes and the harmonising feature(s) is specified for these other vowels by a phonological rule.

(ii) Some generative phonologists,(Lightner 1965), treat vowel harmony as a suprasegmental feature, the property of the root morpheme. According to this view the roots are specified with completely abstract markers, on the basis of which each vowel in the root and in the affixes attached to the root is simultaneously specified for the harmonising feature by the vowel harmony rule. This is known as the Root-Marker Convention,and it'assumes as a fact about language that each phonological segment of a word is associated with abstract markers of the root.'[59] Thus "if we associate this abstract marker with each root of the language, we no longer need to specify the (harmonising) feature for any vowel."[60] This system, like the segmental system, uses archiphonemes to represent the unspecified vowels of the root in the underlying representation, prior to the application of the vowel harmony rule.

(ii) The third view in generative phonology about vowel harmony, (Stanley 1967, Kiparsky 1968), treats vowel harmony as a morpheme structure condition in the language. The morpheme structure

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58. Carrell, P. 1970 p. 113.

59. Lightner, T. 1965, p. 243, foot note 9.

60. Lightner, T. 1965, idem.

condition theory first formulated by Stanley (1967) was later used by Kiparsky in analysing vowel harmony in the Finnish language. According to this view vowel harmony is treated as a phonological constraint on the co-occurrence of vowels in the morpheme structure of the language and this is stated as a morpheme structure condition for that language. Kiparsky's analysis differs from the two views described above for generative phonology through the fact that it does not use archiphonemes in the underlying representations of vowel harmony. The theoretical framework for this analysis is based on the theory of markedness and it proposes that "dictionary representations be fully specified for every phonological feature. Archiphonemes appear in the form of their fully specified, maximally unmarked representatives. .... This means that every root vowel is fully specified in the dictionary as a front or back vowel, whereas the variable archiphonemes of the endings (a - ä , o - ö, u - ü), whose surface form is always determined by vowel harmony, are represented in the dictionary in their unmarked forms a, o, u."[61] One significant fact about the morpheme structure condition approach is that unlike the other views mentioned above, it recognizes two types of harmony (corresponding to the different ways the harmony is structured in the language) that can exist in a language, namely, the root harmony and the affix harmony. The two types of harmony are differently structured in the language in that whereas the root harmony is independently motivated, affix harmony, wherever it occurs, is usually motivated by the root harmony. Similarly, whereas affix morphemes tend to develop allomorphs in such languages as a result of vowel harmony, this is not so with root morphemes.

We shall look at some of the implications involved in the three views described above with regard to the underlying representation of vowel harmony in generative phonology.

The segmental approach treats vowel harmony from the point of view of assimilation, following which the first vowel of the word

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61. Kiparsky, P. 1968 p. 23.

is specified for the harmonizing feature and the vowel harmony rule would operate to condition the subsequent vowels in the word into harmonic agreement. The serious implication of this view is the implicit claim that once we know the harmonic features of the first vowel in the word we can predict about the subsequent vowels in that word. However, as Lightner (1965) demonstrated in his article, this is not always possible, and the chances of such predictability greatly diminishes as other extra features are introduced into the harmony system, such as in the languages where consonant harmony is also involved (i.e. where the harmonizing features are relevant for both the vowel as well as the consonant segments). In other words, it is not always possible to predict consonant harmony from the features of the first vowel of a word. It should also be noted that on the basis of the harmonizing features alone, it will not be possible in certain contexts in Igbo to predict the phonetic realisation of the subsequent vowels in the word from the first vowel in that word. This is often the case where an open vowel occurs as a suffix in Igbo; under such situation we have a sequence of two consecutive vowels without an intervening consonant (the first vowel in the sequence ending the root morpheme and the second vowel in the sequence occurring as an affix that immediately follows the root morpheme). In such situation two phonological rules would necessarily apply, namely, a vowel harmony rule and another rule which requires the agreement by the second vowel in the sequence in terms of the feature of backness (i.e. [$\pm$ back]). In other words, the second vowel in the sequence agrees with the immediately preceding vowel in terms of the feature of backness. What is important here is that for the operation of this latter rule, it is the [$\pm$ back] quality of the first vowel in the sequence that is taken into account, not necessarily the quality of the first vowel in the word or for that matter of the other vowels that precede this sequence of two consecutive vowels in that word. Examples that illustrate this point will be discussed later in more detail; for the meantime, however, we shall use the following few words as illustration.

In the following words otie, apia, akwụọ, okmuo, egbuo, asụọ, esuo etc., where the root morphemes are underlined, the final vowels are affixes, an open vowel affix which is phonetically realized as e, a, o or ọ (it is phonetically realized as o or ọ when the preceding vowel is a back vowel). It is obvious that from the harmonic quality alone of the first vowel in these words we cannot predict the phonetic form of the vowel suffix except after the application of the rule that requires that consecutive vowels agree in terms of the feature of backness.

The phonological rule deviced by Carrell (1970) to handle vowel harmony in Igbo, (the rule is represnted below),

$$[\,V\,] \rightarrow [\alpha\ \text{tns}] \;/\; X \begin{bmatrix} V \\ \alpha\ \text{tns} \end{bmatrix} C_0 \text{ --- } Y$$

requires a left to right operation. Vowel harmony in Igbo operates both progressively as well as regressively. The above rule by Carrell would not be able to account for the right to left operation (i.e. regressive operation) of vowel harmony in Igbo. This point also repudiates the claim that it is the first vowel of the word that assimilates the other vowels in the same word, in that as Lightner had argued, the decision about what vowel assimilates which is purely arbitrary and in the case of Igbo this becomes very obvious.

The root marker approach would be able to handle the progressive and the regressive harmony in that the abstract marker assigns the same feature to the root and the co-occurring affix(es). Lightner (1965) however dismisses considerations based on assimilation as relevant in vowel harmony analysis. For Lightner the same abstract feature can dominate both the root morpheme and the affixes. However, even though this is possible with the structure of languages like the classical Mongolian on which Lightner's analysis was based, such a claim would be inappropriate for languages like Igbo where vowel harmony can dominate a whole stretch of utterance, which may comprise more than one lexical unit. Further-more we would

disagree with Lightner in dismissing assimilation from vowel harmony, in that the treatment of vowel harmony from the point of view of abstract root marker does not necessarily preclude any possibility of incorporating other rules which would take assimilation into account. Igbo provides an example of a language with root harmony as well as affix harmony, and the affix harmony is basically assimilatory by nature.

There are some languages such as Uigur (Nadzhip 1971), Nez Perce (Zimmer 1967:169, foot note 13) where the morpheme that determines the vowel harmony of a word need not be the root. In Uigur, for instance, we have a case where "when an affix ... is joined to monosyllabic words .... the accent is shifted to the affix."[62] As the following examples will illustrate, in Uigur it is the affix that assimilates the root vowel.

bar	'to go'	beriš	'going'
bær	'to give'	beriš	'giving'
al	'to take'	elin	'to be taken'
mal	'cattle'	meli	'his cattle'
maj	'fat, butter'	mejim	'my butter'
baj	'rich'	bejiš	'enrichment' etc.[63]

This runs counter to Lightner's claims.

Out of the three views mentioned above, the morpheme structure approach appears to be the most appropriate both from the point of view of how vowel harmony operates and especially from the point of view of how vowel harmony should be represented in the lexicon. This approach clears us, for instance, of the inconsistencies that result from the use of archiphonemes which both the segmental approach and the abstract root marker system propose. The morpheme

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62. Nadzhip 1971, Modern Uigur. Translated into English by D. M. Segal, Moscow: Izd. Nauka. p. 53.

63. ibid

structure approach has other advantages over the other two views; for instance, it recognizes the difference between root harmony and affix harmony. As Kiparsky (1968:24) remarked, it is not plausible to derive both the root harmony and the affix harmony by a single rule, because they have different sets of constraints. Kiparsky therefore proposes that "in addition to a vowel harmony rule, which assimilates affixes to stems, there (should) be a morpheme structure condition which states that certain vowels cannot co-occur within roots."[64]

The morpheme structure approach would be ideal for the treatment of vowel harmony in Igbo. For a more adequate analysis of Igbo vowel harmony we need to distinguish between the root harmony and the affix harmony; the root harmony characterizes a morpheme structure condition in the language, by which only vowels from a given harmonic set can co-occur within a lexical morpheme. The affix harmony describes a situation in which the affix vowel is assimilated harmonically by the root vowel.

In the analysis of vowel harmony in Igbo to be presented here, we shall first provide a description of how vowel harmony operates in this language. It is on the basis of this description that we will be able to make any generalizations in the form of rules about vowel harmony in the language. Proceding from this general descriptive analysis, we shall go on to examine the different views that have been expressed on vowel harmony in Igbo language. Finally, we shall suggest proposals on how vowel harmony in this language can be conveniently handled.

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64. Kiparsky (1968,a) "How Abstract is Phonology?" M.I.T. Mimeo. p. 24.

5.7.3. THE DESCRIPTION OF VOWEL HARMONY IN IGBO

Vowel harmony is the most widely known aspect of Igbo phonology. This is evident from the many references made about Igbo vowel harmony in various literature on phonology that relate to vowel harmony generally or where vowel harmony is discussed for other languages. Carnochan (1960) gave the first systematic analysis of vowel harmony in Igbo language. That article together with the description given about this phonological phenomenon in the language in Ladefoged (1964) have greatly helped to popularize this aspect of Igbo phonology. I.C. Ward (1936) and infact all those who worked on Igbo language usually make mention of the vowel harmony system in this language. However, the objectives in these works have not been to provide what we may regard as a comprehensive analysis of this system in the language. Both in Carnochan (1960) and in these other works where the vowel harmony system in Igbo has been discussed, the description of the vowel harmony system in this language is limited, based on few samples of words and constructions from the language, consequently some of the generalizations about the vowel harmony based on these data have been not very adequate. The objective of the present part of our analysis is, as indicated earlier, to describe and possibly to review afresh the different ways in which vowel harmony operates in Igbo. This, we hope, will enhance any general statements we shall make about vowel harmony in this language.

The Standard dialect of Igbo has 8 phonemic vowels which we arrange here into two groups representing the different harmonic series that exist in the language.

Set A	Set B
a	ẹ
ị	i
ọ	o
ụ	u

Diacritical marks are used to orthographically differentiate the vowels of one group (Set A) from their counterparts in the other group (Set B).

Some dialects of Igbo, such as the Ụkwụanị or Kwàle dialects, the dialect spoken in the Onitsha town (Williamson 1966), some dialects spoken in the Afikpo province, have, in addition to the 8 vowels, another vowel /ɛ̀/. In these dialects /ɛ̀/ co-occurs with the vowels of set A. In the Kwale dialects and in some of the dialects spoken in Afikpo province, where /ɛ̀/ occurs, this vowel has very restricted distribution; it occurs only in word-initial positions, and where /ɛ̀/ occurs in these dialects, in the Standard dialect /a/ would be used. For example,

in the dialects with /ɛ̀/	in the Standard dialect	
ɛ̀ka	áka	- hand
ɛ̀vọ	áfọ	- stomach
ɛ̀nya	ányа	- eye
ɛ̀kwa	ákwa	- cry etc.

The occurrence of /ɛ̀/ in these dialects is limited to only few words such as the ones given above, and in the majority of other cases these dialects use /a/ like the Standard dialect.

The situation in the Onitsha town dialect is different. Whereas in the Onitsha town dialect ɛ̀ka, ɛ̀vọ, ɛ̀nya, ɛ̀kwa etc. would be unacceptable (these words would be prounced with /a/ as in the Standard dialect), however, in the Onitsha town dialect the use of /ɛ̀/ is more widely distributed than in the other dialects where /ɛ̀/ is used. Note, for instance the use of /ɛ̀/ in the following words in the Onitsha town dialect.

Onitsha town dialect	Standard dialect	
ʃvɛ̣	ífe	– thing
àvɛ̣	èfe (ùwé)	– shirt, dress
ʃvɛ̣ lɛ̣̄	ífelē	– shame, shyness
ávɛ̣ lɛ̣	éfele	– plate etc.

From the point of view of vowel harmony, the important thing here is that in the dialects that use /ɛ̣/, this vowel co-occurs with the vowels of set A.

In some of the previous studies on Igbo language, Ward (1936), Dunstan (1967) etc., two types of /e/ sound have been distinguished in the language, both represented as [e] and [ɛ] respectively. Both [e] and [ɛ] have been described as half-open front vowels, though [ɛ] tends to be more open than [e]. Williamson (1966) represents the variety of /e/ that is used in the dialects mentioned above as [ɛ]. This is the sound we represent as /ɛ̣/ above. This sound however is phonetically different from the type of [ɛ] sound which Ward and Dunstan referred to. The sound which Ward refers to occurs in all dialects of Igbo including the Standard dialect and in the language it is used as an allophone of /e/, and like /e/ it is produced with the tongue root in advanced position. The /ɛ̣/ sound discussed above is produced with the tongue root in retracted position, and as mentioned earlier, it does not occur in all dialects of Igbo. These three varieties of the /e/ sound can be briefly described as follows:

[e] is a half-open front vowel. It occurs in words like èfo, ézè (king, chief), àke, ényi etc. This sound is more close than any variety of English /e/.

[ɛ] is an allophone of [e] and it is orthographically written as e. It is more open than [e]. This is the sound referred to by Ward and Dunstan. This sound occurs in words such as ife, éke, ézē, (tooth), ime etc. This sound is close to the English /e/ sound, such as in words like wet, set, get, met etc.

[ɛ̣] The main phonetic difference between [ɛ̣] and [ɛ] lies in the fact that [ɛ̣] is produced with the tongue root in retracted position, whereas in the articulation of [ɛ] the tongue root is not retracted. This easily explains why [ɛ̣] co-occurs with the vowels of set A.

The occurrence of /ɛ̣/ in some dialects of Igbo and the very fact that this vowel occurs in some local dialects within various main dialect groups of Igbo (in the Onitsha town dialect within the northern group; in the Kwale dialects within the Western group and in the Afikpo dialects within the Eastern group) reveals some interesting diachronic facts about the vowel system in this language. This vowel, as we indicated earlier, does not occur in the Standard dialect. However, as we mentioned above, the occurrence of /ɛ̣/ has been reported for the Ụkwụanị dialects (Williamson 1968) and for the Onitsha town dialect (Williamson 1966). This vowel also occurs in the speech of some students from Afikpo Division, whom I had the opportunity to work with at the University of Ibadan. This shows that the use of /ɛ̣/ is fairly spread within the main dialect groups of Igbo. One obvious conclusion we can draw from this is that the Igbo language at some earlier stage had a 9 vowel system, which is arranged in a more or less symmetric harmonic series as follows.

Harmonic series A – ɛ̣ ị ọ ụ
a

Harmonic series B – e i o u

As a result of some 'vowel shift' in which /ɛ̣/ is lost in some of the dialects, only 8 of these vowels are retained in these dialects including the Standard dialect.

Within this early vowel harmony system (which included all the 9 vowels), /a/ was a neutral vowel. This claim is well justified by the fact that in the few areas, notably in some few examples of nominals in Igbo, where the present vowel harmony system does not

apply, it is always the case that the only vowel from set A that occurs with the vowels from set B is /a/. For example,

ȁkpó - the pharynx

òlomá - orange

Ákpo - name of a town

àdu - in my dialect this means 'uncultivated area'

ágadī - old age

Ádàzi - name of a town

àjodu - old widow etc.

The following words have been borrowed from other languages into Igbo.

ȁgazi - spoon (borrowed from the Hausa language)

ákpàti - box (borrowed from the Yoruba language)

Note that in these examples of nominals /a/ co-occurs with almost all the other vowels from set B except /e/. That is, there are no examples of nominals that I know of in Igbo where /a/ co-occurs with /e/. It appears therefore that even at this early stage of the language, /a/ and /e/ were harmonically opposed; they cannot co-occur within the same morpheme. This restriction on the co-occurrence of /a/ and /e/ within the same morpheme has in a sense paved the way for the development of the later vowel harmony set up, that is, after /ɛ̣/ has been lost in some of the dialects. In other words, as a result of the loss of /ɛ̣/ in these dialects including the Stan-dard dialect, the earlier 9 vowel system was reduced to an 8 vowel system which was symmetrically arranged with respect to vowel harmony; whereby /a/ ceased to be a neutral vowel in the vowel harmony system and became grouped with the vowels of set A. Similar diachronic changes in the vowel systems, with the final result of forming a more systematic or symmetrical vowel harmony system, have been reported for some languages in West Africa (cf. Williamson 1974, Elugbe 1973 and Hoffmann 1973).

5.7.3.1. VOWEL HARMONY IN LEXICAL MORPHEMES

As indicated earlier, any realistic analysis of vowel harmony in Igbo language would recognize two types of harmony that can operate in Igbo words, namely, the root (lexical) morpheme harmony and the affix harmony. By the former we mean the type of vowel harmony that operates on lexical morphemes in Igbo such as verb roots, nominals and other lexical morphemes in the language.

The vowel harmony constraints in Igbo requires that the vowels that occur in a lexical morpheme such as a monomorphemic word and a verb root, be chosen from one and only one harmonic set. That is, vowels from across the harmonic sets do not co-occur in the same morpheme. For example,

Vowels from harmonic set A		Vowels from harmonic set B	
ékà	– hand	ékè	– python
ájỳ	– dizziness	éjù	– snail
ákwà	– cry	ékwè	– tomtom
ọ́jị	– iroko tree	òjí	– black (adj.)
ụ́kụ	– leg	úkwù	– big, great
		úkwû	– waist
úkwụ	– palm tree	úkwà	– cover (n.)
ńtị	– ear	ìntì	– cheek
ọ́cọ̀	– inlaw	ógō	– height
sị́	– say	sí	– cook
kwụ́	– pay	kwú	– speak
ákụkwọ̄	– book, leaf	ékwúkwo	– rivalry
àkwụ́kwụ̀	– epilepsy	ékwùkwú	– talkativeness
ọ́gwụ̀	– medicine	ógwū	– thorn etc.

With the exception of very few nominals, some of which have been mentioned earlier, in Igbo nouns, verb roots, lexical morphemes always have their vowels chosen from only one of the harmonic sets.

When two or more lexical morphemes are joined together to form compound words or compound verb stems, vowel harmony does not operate across the morpheme boundaries. For example,

bịálu	(bịá + lú, lit. come-reach)	- reach
kwụ́do	(kwụ́ + dó)	- stand by
gázù	(gá + zù)	- cover completely by walking
fébà	(fé + bà)	- fly into
zụ́nye	(zụ + nyé)	- buy and give to somebody.
kụ́do	(kụ́ + dó)	- knock onto etc.

The vowel harmony that operates within the lexical morpheme in Igbo is independently motivated in the language. As we indicated earlier, it functions as a morpheme structure condition in the language, which requires that the vowels that occur in a lexical morpheme be selected from the same harmonic set.

One aspect in which the lexical morpheme harmony differs from the affix harmony is that in the lexical morpheme harmony the harmonic contrasts between the vowels are phonemic. In other words, in such morphemes we can differentiate minimal pairs of words only on the basis of the harmonic contrasts that exist between the vowels. This is clearly illustrated in the examples given earlier. The following pairs of words, for instance, differ only through the harmonic contrasts of the vowels.

ákà	- hand	and	ákè	-	python
ụ́kwụ	- leg	"	ụ́kwụ	-	big, great
gwá	- tell	"	gwé	-	grind
sị́	- say	"	sí	-	cook
bụ́	- be	"	bú	-	carry
zọ́	- scramble for;		zó	-	hide
tọ́	- unwrap		tó	-	grow etc.

It is under this consideration that we treat the whole range of vowels (i.e. the eight vowels)in Igbo as each phonemic. We cannot say the same thing about these vowels when they occur in affixes, because in this case these vowels are often in complementary distribution as the following description will illustrate.

5.7.3.2. AFFIX HARMONY IN IGBO

The vowels of affixes in Igbo agree with the root vowels with respect to the features in harmony. Affix harmony in the language is mainly assimilatory by nature. With regard to the affix harmony, Igbo has both progressive and regressive harmony assimilation. The prefixes are characterized by regressive harmony assimilation and the suffixes by progressive harmony assimilation. The following examples illustrate affix harmony in Igbo.

(i) Infinitive prefix (i/ị)

The infinitive prefix in Igbo is a close front vowel which is phonetically realized as either i or ị depending on the harmonic quality of the root vowel. For example,

infinitive prefix	verb root			
I	kwú	→	ikwū	- to speak
I	kwụ́	→	ịkwụ̄	- to pay
I	sí	→	isī	- to cook
I	sị́	→	ịsị̄	- to say
I	sá	→	ịsā	- to wash
I	sè	→	isè	- to draw
I	sò	→	isò	- to follow
I	sọ́	→	ịsọ̄	- to fear
I	bà	→	ịbà	- to enter
I	bè	→	ibè	- to cut
I	bị́	→	ịbị̄	- to be
I	bú	→	ibū	- to carry etc.

(ii) Bound pronominal morphemes.

Igbo has two types of pronominal morphemes in the singular; one type is the 'free' pronominal morphemes such as mụ́ 'I', gị́ - 'you' (sing.), yá - 'he/she/it'. These exist as independent words and can occur either before or after the verb. They can be used as the subject or object of the verb. For example,

gwá mụ̄ - tell me

nyé yā - give him/her/it

ányị̀ sị̀rị̀ gị́ - we told you (sing.)

mụ́ mère yá - I did it

yá nyère mụ́ - he gave me

gị̀ gwàrà yá - you (sing.) told him/her. etc.

The second type of singular pronoun in Igbo is the bound pronoun. The term bound is used to describe the syntactic behaviour of these pronominal forms in Igbo. For instance, these pronouns cannot occur independently of the verb they are used with and the syntactic positions of these pronominal forms are fixed, not free or flexible as the ones described above. The bound pronouns always precede the verb in the sentence, and when they are used, they occur always as the subject of the verb. However, what is more important to our analysis, with respect to the harmonic behaviour of the bound pronouns, is the fact that they behave like vowel prefixes, agreeing to the harmonic quality of the vowel of the root morpheme. The following are the bound pronouns in Igbo:

i/ị - 2nd person singular (you sing.)

o/ọ - 3rd person singular (he/she/it)

e/a - indefinite pronoun

The bound pronominal morphemes conform to vowel harmony by assimilating to the harmonic quality of the verb. For example,

ị sìrì	–	you (sing.) cooked
ị̀ sị̀rị̀	–	you (sing.) said
ó sìrì	–	he/she cooked
ọ́ sị̀rị̀	–	he/she said
é sìrì	–	it was cooked , somebody cooked
á sị̀rị̀	–	it was said, somebody said
ị kwùrù	–	you (sing.) spoke, you said
ị̀ kwụ̀rụ̀	–	you (sing.) paid
ị bù	–	you (sing.) carry
ị̀ bụ̀	–	you (sing.) are
ó sèrè	–	he/she drew
ọ́ sàrà	–	he/she washed
é sèrè	–	somebody drew
á sàrà	–	somebody washed
é kwùrù	–	somebody spoke/said
á kwụ̀rụ̀	–	is was paid, somebody paid etc.

(iii) Performative prefix (a/e)

The performative prefix in Igbo is an open vowel which is phonetically realized as either a or e, depending on the harmonic quality of the root vowel. For example,

há nà a̲kwú	–	they are speaking/saying
há nà a̲kwụ́	–	they are paying
há a̲kwáola	–	they have spoken/said
há a̲kwụ́ọla		they have paid
Ike gà a̲sí	–	Ike will cook
Ike gà a̲sị́	–	Ike will say etc.

The performative prefix is underlined in the examples.

(iv) Agentive noun prefix (o/ọ)

Agentive nouns are formed in Igbo with an open back vowel prefix which is phonetically realized as either o or ọ, for animate nouns, and with a syllabic nasal prefix, n or m, for inanimate nouns. We are concerned with the agentive noun forms for the animate nouns. The following examples will illustrate the harmonic agreement of the open back vowel prefix of the agentive nouns with the vowel of the verb from which the agentive noun is formed. In the examples the agentive noun prefix is underlined.

o̲gbọ́ ọ̄sọ	–	a runner (of run)
o̲kwụ́ ụ̄gwọ	–	a payer (of debt)
o̲kwú ō̄kụm	–	a speaker (of speech)
o̲sí n̄̄ri	–	a cooker (of food)
o̲sị́ ā̄sị	–	a lier (a teller of lies)
o̲gọ́ ō̄si	–	"a goer of message"
o̲bí ǹdụ	–	" a liver of life" i.e. one who endulges in pleasure. etc.

(v) Verbal noun prefix

Verbal nouns are formed in Igbo through the prefix o/ọ and duplication of the root morpheme. The vowel prefix agrees harmonically with the vowel of the verb root from which the verbal noun is formed. For example,

verb root	verbal noun
kwú	ọkwúkwu
kụ́	ọkwụkwụ
sí	ọsísi
sị́	ọsị́sị
gọ́	ọgọ́gọ
gọ̀	ọgigọ
kú	ọkúku
kụ́	ọkụ́kụ

(vi) The -"ra" suffix morphemes

This suffix morpheme which has attracted more attention than any other suffix in Igbo grammar, is used to express three different morphological functions in the language. It is used as the past tense morpheme; it is used to express the dative case and it is used for forming the imperative of stative verbs. Of the three grammatical functions this suffix expresses, only the past tense form is usually mentioned. The past tense -ra suffix was discussed in Carnochan (1960), in Green and Igwe (1963) and also mentioned in Aoki (1968) and in other places. Because of the considerable attention given to this suffix morpheme and the different opinions that have been expressed about the "-ra" suffix, we shall not only describe here how this morpheme behaves when it occurs with the verb root, but also later we shall try to reanalyse this suffix in the light of what has been said about it and the evidence from our description.

(a) The -ra suffix morpheme indicating past tense.

This suffix morpheme, usually represented as "-ra" suffix, is not written or pronounced as "ra" in all cases; it only appears as "ra" when the co-occurring root morpheme end with "a", as the following examples will show.

gàra - went

gère - listened to

gòro - bought

gọ̀rọ - denied

sìri - cooked

sị̀rị - said

kwùru - spoke, said

kwụ̀rụ - paid

bùru - carried

sùre - washed etc.

(b) The "-ra" suffix morpheme indicating dative case.

This suffix morpheme behaves exactly like that used to express the past tense, i.e. with respect to the verb root it is used with. For example,

ị́gō̄ra	–	to go for somebody/on somebody's behalf
ísī̄ri	–	to cook for someone
ísère	–	to draw for somebody
ị́sā̄ra	–	to wash for someone
ị́kwā̄ru	–	to speak for someone
ị́kwụ̄rụ	–	to pay for someone / on someone's behalf
ị́gō̄ro	–	to buy for someone
ị́kọ̄rọ	–	to narrate to someone etc.

(c) The "-rɔ" suffix morpheme indicating the imperative form for stative verbs.

The stative verbs in Igbo, i.e. verbs that express actions which show permanent state, and/or the verbs that express progressive unterminated action, form thier imperative differently from the other verbs. Such verbs (the stative verbs) from their imperative with the "-rɔ" suffix, which behaves exactly like the other "-rɔ" suffixes described above. For example,

bìrí ébe à – dwell here (from the verb ị́bī̄ – to dwell)

nọ̀rọ́ ébe à – stay here (from the verb ị́nọ̀ – to stay)

kwụ̀rụ́ ébe à – stand here (from the verb ị́kwụ̄ – to stand)

dị̀rị́ – be! (from the verb ị́dī̄ – to be)

bụ̀rụ́ ézɛ̀ – be the king/chief (from the verb ị́bụ̄ – to be)

dùrú yā̄ ụ̀ɔ́ – lead him/her away (from the verb ídū – to lead) etc.

One general observation we can make about the behaviour of the "--ra" suffix morpheme is that the vowel of this morpheme always repeats the vowel that precedes it.

(vii) The perfect tense suffix morpheme (-la/--le)

The vowel of this suffix morpheme harmonizes with the vowel of the root morpheme even though in the orthography this suffix morpheme is written as -la in all cases. In the examples below this morpheme is written as it is pronounced with the verbs it occurs with.

àgáala	-	has gone
èɡeéle	-	has listened to
èsfele	-	has cooked
àchi̩ala	-	has ruled, has gathered
ètóole	-	has grown
àkó̩ola	-	has narrated
èkwúole	-	has spoken, has said
àkwi̩ola	-	has paid etc.

(viii) The -wa/--we suffix morpheme

When this suffix morpheme occurs with the verb it expresses an inceptive and continuative state of an action. The vowel of the suffix morpheme agrees harmonically with the vowel of the ver root. For example,

gáwa	-	starts to and continues to go/walk
gèwé	-	starts to and continues to listen
sáwa	-	starts to and continues to wash
siwe	-	starts to and continues to cook
chi̩wa	-	starts and continues to rule
tówe	-	starts and continues to grow
kó̩wa	-	starts and continues to narrate
kwúwe	-	starts and continues to speak
kwi̩wa	-	starts and continues to pay etc.

(ix) The -ta/-te suffix morpheme.

The meaning which this suffix has when it occurs with verbs has been variously interpreted by some authors (cf. Welmers 1970, Williamson 1972) as indicating an action performed toward the speaker and/or indicating an action performed for the interest of the speaker. When this morpheme occurs with a verb of motion, it usually implies an action performed towards the speaker. For example, both bànyé and bàtá mean 'enter' (the type of reply that would be given to somebody knocking at the door). However, the former is only acceptable if the action is not directed towards the speaker, such as, if the speaker is standing outside the room into which the door leads; and for the latter, bàtá, to be acceptable, the action should be directed towards the speaker, i.e. the speaker must be inside the room/house the door leads into. When this suffix morpheme occurs with verbs other than verbs of motion, it indicates a 'resultative action' by the verb. For example,

mụ́ta	-	acquire (children) through birth
mụtá	-	acquire through learning
zụ́ta	-	acquire through buying
nwóto	-	acquire, possess, own
gbúte	-	acquire through killing (e.g. hunting)
síte	-	acquire through cooking
sáta	-	acquire through washing etc.

As can be seen from the above examples, the vowel of this suffix morpheme agrees harmonically with the vowel of the verb root.

(x) The imperative suffix morphemes.

To form the imperative of verbs in the singular in Igbo, an open vowel suffix is used which is phonetically realized as either a, e, o or ọ depending, first on the quality of the root vowel with respect to the feature of backness and secondly, with respect to the harmonic quality of the root vowel. For the formation of the

plurals of the imperative of these verbs, the morpheme -mù/-mụ̀, the vowel of which agrees harmonically with the verb, is added to the imperative singular forms of these verbs. For example,

verb root			imperative sing.	imperative plural
gá	-	go, walk	gàá	gàámụ̀
sá	-	wash	sàá	sàámụ̀
gè	-	listen	gèé	gèémù
sè	-	draw	sèé	sèémù
tá	-	chew	tàá	tàámụ̀
té	-	scrub, smear	tèé	tèémù
sí	-	cook	sié	siémù
tí	-	beat	tìé	tiémù
rị́	-	climb	rị̀á	rị̀ámụ̀
chị́	-	gather, rule	chị̀á	chị̀ámụ̀
tó	-	grow	tòó (+óó)	tòómù (+óomù)
tò	-	praise	tòó	tòómù
tọ́	-	unwrap	tòọ́	tòọ́mụ̀
kọ́	-	narrate	kòọ́	kòọ́mụ̀
gbú	-	kill	gbùó	gbùómù
kwú	-	speak	kwùó	kwùómù
sụ́	-	speak (language)	sùọ́	sùọ́mụ̀
kwụ́	-	pay	kwụ̀ọ́	kwụ̀ọ́mụ̀ etc.

(xi) The negative suffix morpheme.

Negation is formed in Igbo verbs through the suffix morpheme -ghi/-ghị, the vowel of which agrees with the harmonic quality of root vowel. For example,

ọ gágh̀ị - he/she didn't go

ò góghì - he/she didn't listen to

ọ sághị - he/she didn't wash

ò sóghi - he/she didn't draw

ò sighì - he/she didn't cook

ọ sịghị - he/she didn't say

ò kwúghi - he/she didn't speak/say

ọ kwụ́ghị - he/she didn't pay etc.

(xii) The -kwáa (-kwá)/-kwée (-kwé) suffix morpheme

This suffix morpheme is used to express warning or polite command, hence we can call it 'admonitory' suffix morpheme. The vowel of this morpheme agrees with the harmonic quality of the root vowel. For example,

gàkwáa - be sure you went to

gèkwée - be sure you listen to

sìkwée - be sure you cooked

rị̀kwáa - be sure you climbed

tòkwée - be sure you praise

tọ̀kwáa - be sure you unwrap

kwù̀kwée - be sure you speak/say

kwụ̀kwáa - be sure you pay

lùkwée - be sure you reach

hụ̀kwá - be sure you see

gwàkwá - be sure you tell

jụ̀kwá - be sure you refuse etc.

There are very few affixes in Igbo (usually certain suffix morphemes that indicate aspects of the action of the verb, such as those described above) which do not conform to vowel harmony. That is, the vowels of these affix morphemes do not agree with the harmonic quality of the root morpheme, when such harmonic quality is different from that of the affix morpheme. I know

of only two of such affix morphemes in Igbo, namely, the -cha suffix morpheme and the -kwa suffix morpheme expressing completive aspect and the repetitive aspect respectively.

(xiii) The completive aspect suffix morpheme (-cha).

The completive aspect is formed in Igbo with the suffix morpheme -chá (-cháa). This morpheme expresses the completed state of an action. For example,

ị́gā̀cha	-	to finish going
ísècha	-	to finish drawing
íkwūcha	-	to finish speaking
ị́kwụ̄cha	-	to finish paying
ísī̀cha	-	to finish cooking
ítṑcha	-	to finish growing
írī̀cha	-	to finish eating, also to eat up
ímḕcha	-	to finish doing etc.

(xiv) The repetitive aspect suffix morpheme (-kwa)

When this suffix morpheme occurs with the verb it shows the repetition of an action. For example,

ị́gā̀kwa	-	to go again
ígè̀kwa	-	to listen to something once more
ísī̀kwa	-	to cook again, to warm after having been cooked.
íkwūkwa	-	to speak/ say once more
ímḕkwa	-	to do again, to repair etc.

It is evident from the exam-ples that the vowels of these two affix morphemes do not conform to vowel harmony. As we stated above, affix morphemes that behave like this are very few in the language; in the majority of cases these affixes conform to vowel harmony by assimilating to the harmonic quality of the verb root.

The number of harmonising affixes described above cannot be regarded as exhaustive wi-th respect to such affixes that occur with Igbo verbs, through the list of affixes described above includes the greater part of the affixes that have been described or used in some Igbo grammar books. As we mentioned earlier, Igbo verbs use a lot of affixes, the majority of which has not been successfully described in any Igbo grammar book. To the native speaker of the language, these affixes and their grammatical functions are psychologically real; to the linguist, who strives to categorize these affixes in terms of the conventional notions in morphology, it is, however, often difficult to find adequate terminologies to describe the functions these affixes fulfil in the language. Most of the Igbo grammarians had their basic training on English morphology and some of the affixes we encounter in Igbo often have no equivalents in English grammar at least in the sense that most of the concepts are not expressed through affixes in the English language. A little illustration with sentences that express command of some sort in Igbo would be appropriate. For example,

(a) gàá áhịā̄ – go to market (in the singular)

(b) gàánụ̀ áhịa – " " " (in the plural)

(c) gàkwáa áhịā̄ – be sure you (sing) go to market.

(d) gàkwáanụ̀ áhịa – " " " (pl.) " " "

(e) gàánụ́ áhịā̄ – go to market now (in the sing.)

(f) gàánụ́nụ̀ áhịa – " " " " (in the plural).

The (a) and (b) sentences express simple command, usually expressed in English through the imperative form. The (c) – (f) sentences express polite command or request by the speaker, but the two pairs of sentences show the different contexts under which the request is made, each pair showing the singular and the plural forms, and all these expressed through different affixes.

The majority of affixes in Igbo conform to vowel harmony, assimilating to the harmonic quality of the root morpheme. From the examples of affix harmony illustrated above we can see that this type of vowel harmony in Igbo can operate both progressively and regressively; progressively, with respect to suffix harmony and regressively with respect to prefix harmony and the nature of the harmony is mainly assimilatory. Furthermore, from the discussions given above along with the illustrative examples, with particular reference to the examples in (x) above, we can see that when two consecutive vowels occur in affix harmony wi-thin a word, other form of feature agreement between the contiguous vowels is required in addition to the features generally associated with vowel harmony in Igbo. For instance, we can see that in this case the contiguous vowels, apart from the vowel harmony features, also agree with respect to the feature of backness. Finally, from the discussions given above together with the supporting examples, we can see that the type of harmony that operates in the "-ra" suffix morphemes is very different from what we have generally associated with vowel harmony in this language.

5.7.3.3. SOME VIEWS ON THE OPERATION OF VOWEL HARMONY IN IGBO

Before going on to discuss the phonological rules that will be required to account for the vowel harmony in Igbo, we shall first discuss some of the views that have been expressed regarding the operation of the vowel harmony in this language. We are not concerned here with every available view that has been expressed about vowel harmony in Igbo. Most of the more relevant views on this regard are discussed or commented on in the course of this work. We are rather concerned with those views which make claims that are inconsistent with the operation of vowel harmony in Igbo. In some of the works where Igbo vowel harmony has been discussed or where mention has been made about Igbo vowel harmony, certain views have been expressed and some of the views make claims that are not consistent with or accurate about the operation of the vowel harmony in Igbo. Two of such views will be discussed here.

(i) Carrell (1970 : 115) claims that "the auxiliary in Igbo (i.e. the na and ga morphemes) are governed by the vowel harmony". We find this claim to be inaccurate. The fact is, whenever these morphemes, which function as auxiliary verbs in Igbo, occur with the verb, as in the following examples:

Ọ́ nà èdé	-	he is writing, he writes
Ọ́ nà àgá	-	he is going
Ọ́ nà èsí	-	he is cooking
Ọ́ nà èkwú	-	he is speaking /saying etc.
Ọ́ gà èdé	-	he will write
Ọ́ gà àgá	-	he will go
Ọ́ gà èsí	-	he will cook
Ọ́ gà èkwú	-	he will speak / say etc.

a situation is created which requires the operation of the vowel assimilation rule. Vowel assimilation in Igbo is described in 5.4.2. above. Through the operation of the vowel assimilation rule the above examples are phonetically realized as follows:

ọ́ nà èdé	[ɔ́nèedé]
ọ́ nà àgá	[ɔ́nàagá]
ọ́ nà èsí	[ɔ́nèesí]
ọ́ nà èkwú	[ɔ́nèekwú]
ọ́ gà èdé	[ɔ́gèedé]
ọ́ gà àgá	[ɔ́gàagá]
ọ́ gà èsí	[ɔ́gèesí]
ọ́ gà èkwú	[ɔ́gèekwú]

This obviously is not a vowel harmony process in the way we know this phomological process to operate in the language. Rather this is a case of vowel assimilation similar to the ones discussed earlier in this work. One strong proof that shows that the auxiliary verbs discussed above do not harmonize with the verb they occur with is the fact that the bound pronouns, such as in the examples above, are always a, ị, or ọ irrespective of the vowel assimilation that results. In other words, if the auxiliary morpheme were to harmonize with the root morpheme, then the bound pronouns would automatically harmonize as well with the auxiliary morpheme.

(ii) As we mentioned earlier, Aoki (1968) claims that the "-ra" suufix form in Igbo represents a total harmony, i.e. he considers this as a case of vowel harmony. Aoki made this observation by inference from Carnochan (1960), where the -ra suffix was treated as an instance of vowel harmony in Igbo. In the discussions given both in 4.3.2. and in (vi) above, we can get a clear picture of how this suffix morpheme behaves whenever it occurs with the verb root. In other words, the vowel of this suffix <u>always</u> copies the vowel that precedes it in the structure. Although Carnochan (1960) and later Aoki (1968) considered this phenomenon as an instance of vowel harmony, it appears however that these "-ra" suffix forms represent a phonological process that is much more than just a vowel harmony, especially in the context of Igbo language. The phonological process portrayed by these suffix forms differs generally from the phonological process where the harmonizing vowels in Igbo agree with respect to a given feature; rather in case of the -ra suffix forms we have a process whereby a vowel completely copies all the qualities of another vowel.

The process illustrated by the examples of the -ra suffix morphemes represents a part of a more general phonological process that expresses one kind of morpheme structure condition in the language. We shall describe the phonological process that characterizes this morpheme structure condition as <u>'final vowel echo'</u>. This is the condition whereby the final vowel of a morpheme, usually a word, tries to echo the vowel that precedes it in the structure, or

stated otherwise, the final vowel repeats the vowel that precedes it in the structure. A casual glance at the structure of lexical morphemes in Igbo will easily reveal this. Some final vowels in some lexical morphemes may not echo or repeat the vowels that precede them but in the majority of cases in Igbo this echo is evident. Compare, for instance, the following nouns with VCV structure.

áka - hand
ísi - head
ímí - nose
ányá - eye
ézē - tooth
àkpa - bag
àgba - jaw
áma - compound
ụ́mụ̀ - children
nwátà - child
ụ́kwụ - leg
úkwù - waist
ézè - king, chief
édè - cocoyam
ādá - daughter etc.

A good deal of bisyllabic words in Igbo are structured this way. This cannot be a mere chance or coincidence in the phonology of this language. Notice that there are no nouns in Igbo as

*emu
*emi
*emo
*omi etc.

Such words would be possible in Igbo if only the first vowel is a prefix such as in the verbs.

It would be obviously wrong to assume that all final vowels of every word in the language echoes the preceding vowel, even in the words with VCV structure; all we can say with some degree of certainty is that this happens in a great number of words in Igbo, especially in nouns with VCV structure. It would also be important to note that in nearly all the nouns I can think of in this language (that is, making room for some few exceptions), in which the final consonant segment is a liquid, notably /r/ or /l/, which is followed by a vowel, the final vowel in these nouns often copies or repeats the vowel that precedes it in the structure. Compare the following nouns in Igbo.

àkara	(pronounced	àkala	by	some	speakers)-	'bean cake'
ákàra	(	"	ákàla	"	"	"	)-	'line'
ńgàrá	(	"	ńgàlá	"	"	"	) -	'pride'
ágbàra	(	"	ágbàla	"	"	"	) -	'bad spirit'
ébiri							-	age group
ḿmirī							-	water
èbérè							-	mercy
óberē							-	small
íherē							-	shame, shyness
èkpére							-	prayer
ọ̀bara							-	blood
árịrị							-	millipede,
ára							-	madness
árá							-	breast
àmara							-	kindness
ńgàlaba							-	branch

ákwarà	artery
áhịàra	weaver bird
àchara	elephant grass
ọfọ̀rọ	bamboo
ókporo	rail
ánwụ̀rụ	smoke, tobacco
ụbụ́rụ̀	brain
átụrụ̄	sheep
ḿkpụrụ̄	seed
ǹgwuru	valley , enclosure
ọkpúrù	underneath etc.

The phonological shapes of the vowels that occur after r or l in the above nouns are identical with the cases where r is the consonant segment of an affix. This helps to confirm the fact that what has been observed about the behaviour of the vowel of this suffix morpheme is not an isolated case in the phonology of this language, and also about the fact that the type of vowel echo that is manifested in these cases is,as we observed earlier, a phenomenon much more than vowel harmony which operates in this language.

This process of echo which these final vowels manifest has never been considered as such in any previous study of Igbo phonology. However, such a phonological phenomenon is as important as the vowel assimilation, or the vowel harmony which have been distinguished and described in this language. The process which we define here as 'final vowel echo' should be treated separate from vowel harmony in that the two processes are quite different in the phonology of this language. The vowel harmony in this language, to reiterate, has been treated from the point of view of agreement of the vowels within or across the morpheme with respect to a given phonetic feature. In other words, vowel harmony in Igbo has never been the case whereby

one vowel completely assimilates to the qualities of another vowel; the vowels that enter into harmony maintain each its own quality except for the feature in which the vowels agree.

The process described above as final vowel echo will be represented by the feature [± echo] .[65] Like the lexical morpheme harmony, final vowel echo is a morpheme structure condition in Igbo. We shall represent this morpheme structure condition as follows:

MSC 30. if: X V r V ≠ ≠

⇓

then: [+ echo]

This MSC states that when the final consonant of a word is r and is followed by a vowel, that vowel is marked for the feature of 'echo'.

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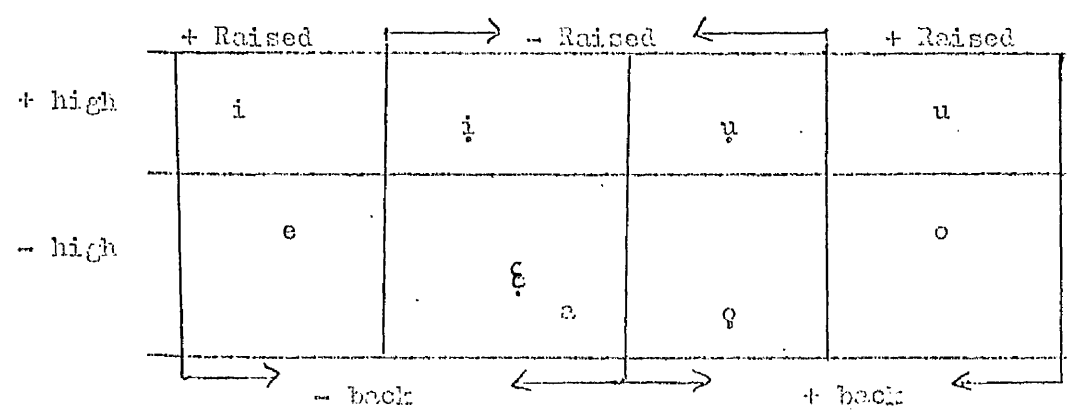
65. This feature, [± echo] , was used by P. Carrell (1970) to describe tone sequence in Igbo. This feature is used here in the sense illustrated in the discussions given above, namely, in the sense of complete vowel quality copying.

5.7.3.4. THE PHONETIC DESCRIPTION OF VOWEL HARMONY

Different opinions have been expressed regarding the phonetic criteria on which the vowel harmonic series in Igbo are to be distinguished.

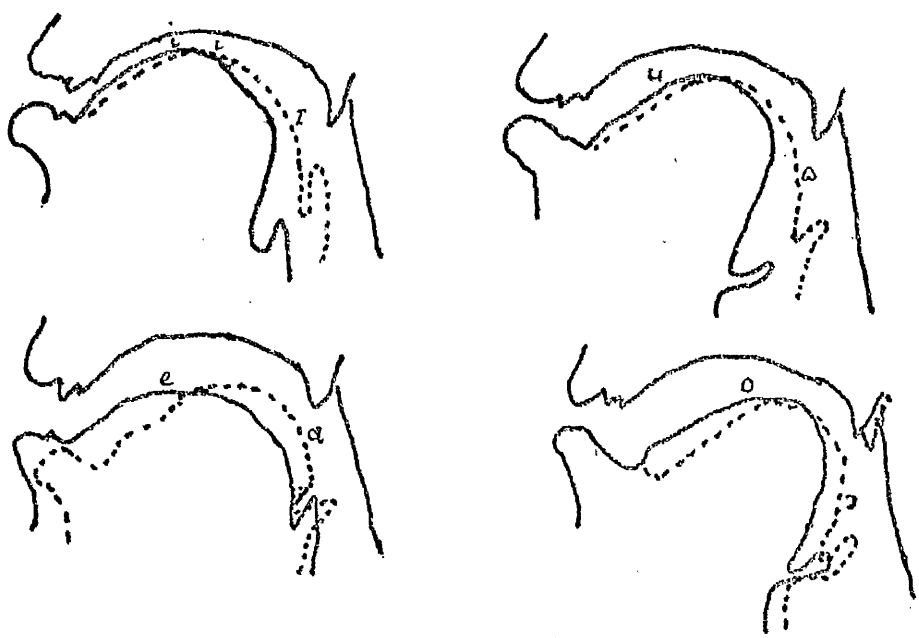
Carnochan (1960) considers these phonetic criteria to consist of the different displacements of the tongue height. According to this view, the series e, i, o, u, are characterized by the Raised state of the tongue height and the counterparts a, ɨ, ɔ, ʊ, are produced in the Lowered state of the tongue height. In other words, the vowel harmony in Igbo is accounted for through the features of Raised and Lowered with respect to tongue height. Most of the other writers on vowel harmony in Igbo have adopted the same view as Carnochan.

This view runs into some difficulties in that considerations based on tongue height alone are more or less relative and there are bound to be some cases of overlapping along this parameter. For instance, as we have indicated above, [ɛ], which is an allophone of [e] in Igbo, does not differ from /ɛ/ in terms of tongue height even though these two vowels are harmonically opposed in the language. The tongue height alone (i.e. the Raised and the Lowered positions of the tongue height) cannot constitute a reliable paremeter for distinguishing the two harmonic series of Igbo vowels. Using the features [± Raised], which the tongue height criteria entail, along with the features [± high], which also is the logical and conventional implication of the tongue height criteria, we can briefly represent Igbo vowels in the following way:



From the above diagram it can be seen that vowels which are [+ high] can be [+ Raised] as well as [- Raised] , and vowels which are [- high] can be [+ Raised] as well as [- Raised] . This shows that the features of [+ Raised] and [- Raised] do not correspond to the conventional tongue height features through which vowels are graded into High, Mid and Low. This also shows some inconsistency in feature labeling since the same segment which is [+ high] can also be [- Raised] , and a segment which is [- high] can also be [+ Raised] and the incompatibility of such features becomes obvious when we realise that both the features [± high] and [± Raised] are each based on tongue height. For these reasons therefore the features Raised and Lowered cannot be taken as adequate and reliable parameters for the phonetic differentiation of the vowels in different harmonic sets in Igbo.

In the study carried out by Ladefoged (1964) he made some tracings from cine-radiology films showing the actual positions of the tongue during the articulation of these Igbo vowels that exist in harmonic contrasts. These tracings which were mentioned and have been discussed in chapter 1, are represented below.



From these tracings Ladefoged was able to provide what we can consider as a more appropriate phonetic parameter for distinguishing the vowels of different harmonic groups in Igbo language. These vowels differ principally through the phonetic property of the displacements in the tongue root position during articulations of the vowels. The role of the tongue root position in the vocalic alternations involved in vowel harmony can be briefly summarized thus: during the production of the vowels of one harmonic set, the tongue root is pushed forward, thereby widening the lower pharyngeal cavity. The vowels produced in this manner are usually referred to as vowels with advanced tongue root (henceforth ATR). In the production of the vowels of the other harmonic set, such advancing or pushing forward of the tongue root is not present, rather the tongue root is actively retracted towards the pharyngeal cavity thereby causing the pharyngeal cavity to be narrowed. This state of the tongue root is usually referred to as retracted tongue root, and the vowels produced in this manner are referred to as vowels with retracted or nonadvanced tongue root, represented as [-ATR] .[66] Following this we shall associate the vowels of the harmonic set A in Igbo, namely, a ị ọ ụ, which are produced with the retracted position of the tongue root, with the feature specification of [- ATR] , and the vowels of the harmonic set B, which are produced with the advanced state of the tongue root, with the feature specification of [+ ATR] .

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66. Stewart 1967. The tongue root analysis has been used for describing the vowel harmony system of some West African languages such as the Akan language (Stewart 1967).

5.7.3.5. THE VOWEL HARMONY RULES

Phonological rules usually operate within certain grammatical boundaries, such as the syllable, morpheme, word or phrase boundaries. Sometimes it could be the case that certain phonological rules do not have any systematic boundary within which they operate. Such rules are, however, very rare in any language due to the very fact that the operation of phonological rules is in effect motivated by the grammatical relationships that exist between members of certain categories in the grammar, such as between contiguous syllables, between the syllable and the morpheme etc.

The operation of vowel harmony in Igbo is constrained by the existence of a lexical morpheme boundary or word boundary. In other words, the vowel harmony can operate in this language within a lexical morpheme, or a lexical morpheme plus affix. Hyman (1975:235) made a very useful observation about the operation of the vowel harmony rules in Igbo, that is, with respect to the grammatical boundary within which the vowel harmony operates in the language. He observed that vowel harmony can be blocked by a strong grammatical boundary. He noted, for instance, that the underlying boundary in /gá ## fè/ (i.e. what we treat here as strong lexical morpheme boundary) blocks the application of vowel harmony. As the boundary weakens, Hyman remarked, vowel harmony may be able to penetrate it. Thus, some speakers pronounce /bú## tá/ as [bútá] (breaking the vowel harmony), while other speakers pronounce it as [bútè] . In the latter case, a ## boundary has weakened to #.[67] This observation about different speakers pronouncing the same word with or without vowel harmony, depending on the type of boundary the speaker associates with the morphemes, gives us a great deal of insight into the operation or the application of the vowel harmony rule in Igbo. As a further illustration of what is implied in the observation made above by Hyman, we would like to look at these few cases. These cases, I hope, will give us a better understanding of the point raised by Hyman's remarks above.

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67. Hyman, L. 1975. Phonology : theory and analysis, p. 235.

Nye and yi are lexical morphemes in Igbo, and both can be used with other verb roots to form compound verbs. When these two morphemes occur in isolation, as verb roots, they have different meanings but when they are used with other verb roots they have the same meaning, and in this sense they can be treated as allomorphs. This is illustrated in the following examples.

bànyé bàyị́	enter into
zànyé zàyị́	sweep into
kpónye kpóyi	gather into
kwụ́nye kwụ́yị́	pay into
bènyé bèyí	cut/slice and give someone
gónye góyi	buy and give someone etc.

In these examples, nyé does not conform to vowel harmony while yí does (by assimilating to the harmonic qualities of the verb root it occurs with). When used as in the above contexts, with the meanings implied in the compound verb forms, nyé can occur as an independent verb root, but yí cannot. In the examples above, there is a strong internal stem boundary between nyé and the verb root it occurs with, just as this is the case when two independent verb roots(lexical morphemes) are used together. However, this strong lexical morpheme boundary weakens when yí occurs with the verb roots, hence the vowel harmony could penetrate. In other words, yí/yị́ in this case is conceived by the speaker as an affix whereas nyé is not.

In certain cases the vowel harmony may be seen to operate across word boundary in Igbo. This could obtain when certain pronominal forms occur with the verb. Examples of bound pronouns have been discussed above, and we have seen that these pronominal forms harmonize with the verbs they occur with. Another example would involve the third person singular pronoun, yá, which as we stated above is a free pronoun. With yá occurring after the verb, sometimes this pronoun harmonizes with the verb. For example,

gwá yā	-	tell him
sị yā	-	tell him
kwụ̀ọ́ yā	-	pay him, pay it
kwǔó yē	-	say it
nyé yē	-	give him, give it
sìé yē	-	cook it etc.

The harmony by the yá pronoun usually occurs in unguarded or colloqùial speech form. In what we may call conscious, guarded or Standard speech form, the yá pronoun does not harmonize with the verb. Thus, unlike the harmony by the bound pronouns, the harmony by the yá pronoun is not reflected in the orthography. When the yá pronoun occurs before the verb it does not harmonize.

One implication these examples coupled with the observation made by Hyman have for the operation of the vowel harmony rule in Igbo is that the decision whether to harmonize a segment that occurs with the verb root, or not, depends on the type of boundary the speaker associates with the morphemes in the construction. That is, when the segment is associated with a weak grammatical boundary, the speaker tends to harmonize that segment with the verb root, but when he associates a strong grammatical boundary (or what we may call word structure boundary) with the morphemes in the construction, he tends not to harmonize the morphemes. The harmonization of the bound pronoun and especially the yá pronoun can be seen in this respect.

With regard to the bound pronouns, we have already explained that they behave, and are treated like any ordinary vowel prefixes in Igbo.

What has been highlighted by these facts is very important for the statement of phonological rules with respect to grammatical boundaries relevant to the operation (application) of these rules, not only for the Igbo language but, I beleive, for other languages. In other words, for the statement of certain phonological rules, a boundary adjustment rule is required. Such a rule would be able to adjust the grammatical boundaries relevant to the operation and/or application of the phonological rules. Apart from the cases discussed above, there are other evidence in the language to support the introduction of such a rule in the phonology. For instance, we have discussed above, those cases where in a sequence of two consecutive vowels within a morpheme in Igbo, whereby the first vowel in such a sequence is usually a close vowel, and where sometimes a rule applies that reduces the close vowel to a nonsyllabic segment thereby making it possible for another rule to diphthongize the vowels in the sequence. On the other hand, sometimes these rules are blocked in an identical sequence of vowels. The blocking of these rules, we should remember, depends on the type of grammatical boundary that exists between the two vowels, which in this case is marked by the occurrence of unidentical tones on the vowels. The application of certain tone rules in Igbo, as we shall see later, requires some boundary statements. Very often the boundary statement relevant for certain rules are given by stating the environments required for the application of the rules. However, in some particular cases the grammatical boundary within which a rule should apply can be subject to modifications which may result into either the strengthening or the weakening of the grammatical boundary, and it is in the cases like this that a boundary adjustment rule would be required.

In the previous analyses of Igbo vowel harmony, certain phonological rules have been proposed to account for the vowel harmony. In Carnochan (1960) the following phonological formula was used to account for the vowel harmony.

$$L/R \left[(A)^{y/w} \quad (CV)^{y/w} \right]$$

This phonological formula, as we indicated earlier, gives a correct prediction of the phonetic exponents of the harmonizing vowels in the structure, including that of the open vowel suffix. We have pointed out above the inconsistencies that would arise through the use of the features of Raised and Lowered for describing vowel harmony in Igbo.

Carrell (1970: 113) used the following phonological rules to derive the vowel harmony in this language.

$$\text{(i)} \qquad [\, V \,] \longrightarrow [\, \overset{V}{\alpha} \text{tns} \,] \;\; / \;\; X \; [\, \overset{V}{\text{tns}} \,] \; C_o \text{ —— } Y$$

$$\text{(ii)} \qquad [\, V \,] \longrightarrow [\, \alpha \text{tns} \,] \;\; / \;\; \text{——} \;\; C_o \; [\, \overset{V}{\text{tns}} \,]$$

Carrell's rules can account for the progressive and the regressive harmony of the affix morphemes. However none of the rules will be able to derive the open vowel suffix morpheme in the harmony. This suffix agrees with the preceding vowel not only in terms of tenseness but also in terms of backness.

In both Carnochan (1960) and Carrell (1970) no attempt was made to differentiate the affix harmony from the root or lexical morpheme harmony in the language. As we made it clear above, vowel harmony in these two categories of morphemes are differently motivated in the language with respect to the phonological rules that would account for the harmony.

In the analysis of the vowel harmony in Igbo that is provided here, we treat the root/lexical morpheme harmony as a morpheme structure condition, and the MSC states that only vowels from

the same harmony set will co-occur in a lexical or root morpheme. We can express this MSC thus:

MSC 31. In a lexical/root morpheme with a vowel sequence of

$\neq X \ldots Y \ldots Z \ldots \neq$

(i) if: $[\ X\ ]$ ⇓ $[+\ ATR\ ]$ then: $[\ Y\ Z\ ]$ ⇓ $[+\ ATR\ ]$ = / e, i, o, u/

(ii) if: $[\ X\ ]$ ⇓ $[-\ ATR\ ]$ then: $[\ Y\ Z\ ]$ ⇓ $[-\ ATR\ ]$ = / a, ị, ọ, ụ /

These MSCs state the co-occurrence conditions of the vowels that occur in a lexical morpheme or in a verb root in Igbo. According to the MSC 31, only vowels from one harmony set, i.e. either e, i, o, u or a, ị, ọ, ụ, can co-occur in a lexical morpheme or in a verb root.

The affix harmony involves assimilation. The vowel(s) of the affix morpheme assimilates the harmonizing features of the vowels of the root morpheme. We shall account for the affix harmony in Igbo through vowel harmony rules.

PR 14. $V \longrightarrow [\alpha\ ATR\ ] \ /\ \neq\neq \text{ —— } \neq\ X\ \overset{V}{[\alpha\ ATR\ ]}\ \neq\neq$

(where XV represents the root morpheme, the vowel of which is specified for the feature of $[\ \pm\ ATR\ ]$. $\neq\neq$ indicates full word boundary and $\neq$ indicates a morpheme boundary).

PR 14, which is a regressive assimilation rule, assimilates the vowel prefix to the harmonic features of the vowel of the verb root.

PR 15. $V \longrightarrow [\alpha\ ATR] \ / \ X \ [\alpha\ \overset{V}{ATR}] \neq C_o$ ——

PR 15 assimilates the vocalic segment of the CV suffix morpheme to the harmonic features of the vowels of the root morpheme.

Both the phonological rules 14 and 15 above will be able to account for the harmonic assimilation of the vowels of the prefix and the suffix morphemes respectively. Though there is a close resemblance between the two rules, we cannot collapse them, because each rule requires a different environment.

With respect to the type of phonological rule or rules that would be required to account for the vowel harmony that operates in the open vowel suffix morphemes in the language, we noted earlier that apart from the usual vowel harmony rules, these morphemes require another rule that would account for the agreement of the vowel suffix morpheme with the vowel that immediately precedes it in terms of the feature of backness, as these examples will further illustrate.

Verb root	Imp. sing.	Imp. plural	Perfect tense form
gá	gàá	gã́ánù̩	àgáala
gè	gèé	gèénù	èɡeéle
sá	sàá	sàánù̩	àsáala
sè	sèé	sèénù	èseéle
rɨ́	rɨ̀á	rɨ̀ánù̩	àrɨ́ala
rí	rìé	rìénù	èríele
mɨ̀	mɨ̀á	mɨ̀ánù̩	àmɨ̀ála
sí	sìé	sìénù	èsíele
tó	tòó (tóo)	tóonù	ètóole
kǫ́	kǫ̀ǫ́	kǫ̀ǫ́nù̩	àkǫ́ǫla
kwú	kwùó	kwùónu	èkwúole
kwɨ́	kwɨ̀ǫ́	kwɨ̀ǫ́nù̩	àkwɨ́ǫla etc.

From these and the other examples given of the open vowel suffix, it becomes evident that whenever a vowel suffix (usually an open vowel) occurs with verbs in Igbo (and this usually results into a sequence of two consecutive vowels in the structure), the vowel suffix agrees with the vowel that immediately precedes it in terms of the feature of backness or rounding, that is, apart from the vowel harmony features. We shall account for these feature agreements by the vowel suffix with the following rule.

PR 16. $$V \longrightarrow \begin{bmatrix} \alpha \text{ ATR} \\ \alpha \text{ rounded} \end{bmatrix} \; / \; X \begin{bmatrix} \overset{V}{\alpha \text{ ATR}} \\ \alpha \text{ rounded} \end{bmatrix} \neq \; —$$

PR 16 together with PRs 15 and 14 will be able to handle all cases of vowel harmony in Igbo, whether the harmony involves agreement by the harmonizing segments in terms of tongue root position only, as is the case with affix harmony generally, or agreement by the harmonizing segments in terms of the feature of tongue root position together with the feature of backness or rounding, as in the case of open vowel suffix harmony.

As in the case of normal vowel harmony agreement in Igbo, where the harmonizing segments agree with respect to tongue root position, and where we noted that when this occurs in lexical or root morphemes, the vowel harmony constitutes a morpheme structure condition in the language, so also the agreement by the open vowel suffix morpheme with the vowel that immediately precedes it with respect to the features of tongue root position and roundness, when this occurs in lexical morphemes (as is usually the case when these morphemes end with double vowels), this becomes a morpheme structure condition in the language, as the following examples will show.

áhịa	–	market
áhịhịa	–	rubish, grass
áhịara	–	weaver bird
ápịa		
ábịa	–	a type of dance

ọ́bị̀à	-	guest, stranger
ọ́hị̀hie	-	afternoon
Ǹbieri	-	name of a town
ḿmehị̀e	-	mistake
ḿmeō	-	blood
ọ́chiè	-	old, antique
àbúǭ	-	two
ḿmụǭ	-	spirit
Ọ̀gụ̀gụ̀ǫ́	-	name of a person
Ọ́tùọ́	-	personal name etc.

It can be seen from these words that when we have a sequence of two consecutive vowels in a lexical morpheme (in a nominal) in Igbo, in which case the first vowel in the sequence is usually a close vowel and the second vowel an open vowel, these vowels agree with respect to the features of tongue root position and rounding. This matches with what has been described earlier for the open vowel suffix morpheme in the language. The phonetic shapes of the second vowels in the sequence described above in these nominals (and I do not know of any nominal in the language where this vowel sequence is present and where similar phonetic shapes are not present) strongly support the claim that the phonological phenomena described by PR 16 constitute certain morpheme structure condition for certain cases in the language.

Before we procede to discuss how the phonological rules proposed here will be used to derive vowel harmony in Igbo words and grammatical constructions, we shall briefly touch on some of the problems mentioned at the beginning of this chapter. We have given a descriptive analysis of vowel harmony in Igbo language, and formulated rules to account for the vowel harmony that operates in this language. Certain basic problems, however, still remain unresolved about vowel harmony. As we indicated in the beginning of this chapter, two main questions have worried phonologists about vowel harmony. First is how we should treat vowel harmony, whether as a segmental feature or as a suprasegmental feature. Secondly, how is the vowel harmony to be represente in the lexicon? We have reviewed all the views relevant to these questions. We favoured the views put forward by Kiparsky (1968), because we find his views much more consistent with the way vowel harmony operates in Igbo. However certain modifications will be necessary on some of Kiparsky's proposals, for these proposals to be fully adequate for the treatment of vowel harmony in Igbo language. The crucial point here is with respect to the use of archiphonemes in the underlying representation of vowel harmony. Kiparsky as we noted, based his analysis on the theory of markedness, and to reiterate, he proposed that the "dictionary representations be fully specified for every phonological feature. Archiphonemes appear in the form of their fully specified, maximally unmarked representatives. ... This means that every root vowel is fully specified in the dictionary as a front or a back vowel (i.e. the features in which the Finnish vowels harmonize) whereas the variable vowel archiphonemes of the endings (a - ä, o - ö, u - ü), whose surface form is always determined by vowel harmony, are represented in the dictionary in their unmarked forms a, o, u".[68]

In other words, the root morpheme and/or the lexical morphemes make use of the whole range of vowels in the vowel system of the language; for the Finnish language this would mean an eight vowel system, out of which six are paired according to harmony relationships thus - a - ä, o - ö, u - ü, and two neutral vowels i and e;

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68. Kiparsky, P. 1968, p. 23.

and for the Igbo language this would mean an eight vowel system all of which are harmonically paired thus - a - e, i - ị, o - ọ, u - ụ. The affix morphemes, on the other hand, make use of only five vowel system in the Finnish language - a, e, i, o, u; and only four vowel system in the Igbo language - e, i, o, u, all of which represent the unmarked series in both languages.

Apparently in the case of /a/ and /e/ in Igbo, no one can say with certainty that any one of these vowels is more marked than the other, that is, on the basis of the theory of markedness. The two vowels, as we know, occur in many languages and in these languages no one of these vowels would be treated as unnatural or less marked than the other. It will be important to remember at this point, what we said about these two vowels with respect to their being eventually paired in the vowel harmony system in this language. In other words, whereas the harmonic pairs in Igbo - i - ị, o - ọ and u - ụ, just as the harmonic pairs - a - ä, o - ö, u - ü, in the Finnish language, may be easily predicted from the point of view of markedness of one set or group of the vowels with respect to the other group, it would not be wholly accurate to say the same thing about /a/ and /e/. On the basis of the predictable phonetic exponents that exist between each harmonic pair mentioned above, all we can say with some degree of certainty about /a/ and /e/ in Igbo (i.e. with respect to their harmonic behaviour) is that in some cases an abstract phoneme, usually an open vowel phoneme, has sometimes <u>two</u> phonetic exponents, and sometimes <u>four</u> phonetic exponents. When there are two phonetic exponents from the abstract phoneme, they are realized as either a or e , and then we say that /a/ and /e/ form harmonic pair. When, on the other hand, we have four phonetic exponents, these can be phonetically realized as a, e, o or ọ, as in the case of the phonetic shapes of the open vowel suffix in Igbo. Cases such as this would require the use of an abstract morpheme in the underlying representation of vowel harmony.

Thus, while we agree with Kiparsky on how vowel harmony should be represented in the root morphemes or lexical morphemes, we will disagree with Kiparsky on the question of how vowel harmony in affix morphemes should be represented. Kiparsky, we noted, proposed that the archiphonemes which would be used to represent the variable vowels of the affix morphemes should appear in their fully specified maximally unmarked form . By subjecting the vowel to be represented through an archiphoneme to the requirements of the markedness theory, Kiparsky disallows the use of an abstract archiphoneme in vowel harmony analysis. The case we have given from Igbo, however, strongly supports the use of an abstract archiphoneme in the underlying representation of the vowel of the affix morpheme. For the underlying representation of the abstract segment that has four phonetic representations, we require an abstract archiphoneme. Carrell (1970) represents this abstract archiphoneme as Æ .

It would be significant to note that the few affixes the vowels of which do not harmonize with the root vowel in the language, such as the -chá (-cháa) suffix, indicating perfective or completive aspect; the -kwá suffix, indicating repeated action, and the -rịrị suffix, indicating persistence in continuing an action; the vowels that occur in these affixes always belong to the marked group, in terms of the markedness theory. That is, these vowels are the ones that are marked to undergo vowel harmony. If the occurrence of the affix vowels were to operate purely on the principles of markedness, we would naturally expect that the vowels that would occur in the affixes mentioned above would come from the unmarked group.

The following archiphonemes will be used in the underlying representation of the vowel segments of the affix morphemes in Igbo.

Æ	which	can	be	phonetically	realized	as	a,	e,	o	or	ọ
A	"	"	"	"	"	"	a	or	e		
I	"	"	"	"	"	"	ị	or	i		
O	"	"	"	"	"	"	ọ	or	o		

U which can be phonetically realized as ụ or u through the operation of the vowel harmony rules.

Using these proposals together with the phonological rules deviced earlier, we can derive the vowel harmony in the affix morphemes in Igbo, such as in the following examples.

(i) / ányị ≠ ≠ A ≠ kwu ≠ Æ ≠ 1A ≠ ≠ ya /

anyị ≠ ≠ A ≠ kwu ≠ Æ ≠ 1A ≠ yA - by boundary adjustment rule.

anyị ≠ ≠ A ≠ kwu ≠ 0 ≠ 1A ≠ yA - by PR 16

anyị ≠ ≠ e ≠ kwu ≠ 0 ≠ 1A ≠ yA - by PR 14

anyị ≠ ≠ e ≠ kwu ≠ o ≠ 1e ≠ ye - by PR 15

anyị ekwuole ye - we have said it

(ii) / Ike ≠ ≠ A ≠ kwu ≠ wA ≠ 1A ≠ ≠ okwu /

Ike ≠ ≠ e ≠ kwu ≠ wA ≠ 1A ≠ ≠ okwu - by PR 14

Ike ≠ ≠ e ≠ kwu ≠ we ≠ 1e ≠ ≠ okwu - by PR 15

Ike ekwuwele okwu - Ike has started to talk

What concerns the final vowel echo which occurs in the "-ra" suffix morpheme, the way this can be incorporated into our analysis, we would like to replace the MSC 30 with a phonological rule which will be formulated as follows:

PR 17. $V \longrightarrow [+ \text{echo}] \; / \; CV \neq r \; \_\_$

This rule will be able to copy the vowel that immediately precedes the "ra" morpheme in the structure.

CHAPTER 6.

TONE

6.0. INTRODUCTION

Igbo is a tone language. Every syllable in Igbo bears a tone. Tone is used in this language, among other things, to form contrast between minimal pairs of words. In the following examples, the words contrast only with regard to tone, that is, the difference in the tones which different words carry constitute the only basis through which the words contrast. For example,

1. (a) ákwá - cry
   (b) ákwà - cloth
   (c) àkwá - egg
   (d) àkwà - bed

2. (a) ísí - head
   (b) ísì - smell
   (c) ísĭ - to cook
   (d) ìsì - blindness

3. (a) bé - place, home
   (b) bè - cut

4. (a) dí - husband
   (b) dì - bear, endure etc.

Tone can be used to bring about the difference between certain sentences and/or clauses in Igbo. For example,

5. (a) ọ́ gàrà áhịá - he went to market
   (b) ọ̀ gàrà áhịá - did he go to market?

6. (a) Íkė́ gàrà áhịá - Ike went to market

(b) Íkė́ gāra āhịa - Ike who/that went to market

In 5(a) and (b) above, the difference between the affirmative and the interrogative sentences (especially when the latter is not introduced through interrogative words in the language) is expressed in Igbo mainly through the difference in the tones of the pronoun. Similarly the difference between 6 (a) and (b) above is introduced through tone.

Tone in Igbo can therefore be seen to have both lexical and syntactic functions. In the lexicon it is used to bring about contrast between minimal pairs of words; in the syntax it is used to express different syntactic relationships between words in a phrase and/or to differentiate certain sentences and clauses.

In terms of the classification made by Pike (1948) of the different tone systems that are used in tone languages, Igbo belongs to languages that have register tone system. That is, in Igbo the segments do not have contour tones. A contour tone, however, may arise in Igbo as a result of the influence which segments have on one another in certain grammatical or syntactic constructions, with regard to the tones which the segments carry. This point will be clarified later in the analysis presented in this chapter.

6.1. PREVIOUS STUDIES

Tone has been discussed in many studies done on Igbo language. Since tone forms an intergral part of the phonology of the Igbo language, it would be difficult to find any work on the grammar of this language where something is not said about the tones used in the language. It will not be necessary to review every work where mention is made about tone in the Igbo language. We shall single out, for our review, only those works where significant contribution has been made on the subject.

The first mention made about tone in the Igbo language, and I should think, the first mention that was ever made of tone in any of the tone languages in West Africa, was by J.F. Schön (1861) in his book 'Oku Ibo' (Ibo Grammar). Schön's book was written before the work by J.G. Christaller on the Asante and Fante language (the Twi language), a tone language, in 1875, where the author made some observations about tone in that language. In his book, Oku Ibo, Schön stated that "for want of a better word, we point out a great peculiarity, not only of the Ibo, but of many African languages, in speaking of intonation (Betonung,) which must not be confounded with accentuation. It consists in the raising or sinking of the voice: the former we denote with the acute (´), and the latter with the grave (`) accent. This raising or sinking of the voice does not merely affect the form of the word itself, but its import likewise, and is the only means of distinguishing the meaning of words which would otherwise require to be represented by the very same signs."[69] Schön gave some illustrations of words that minimally contrast through tone in Igbo, and he concluded his remark with the note that "we would strongly recommend to all who may write in Ibo to pay special attention to this subject."[70]

The phonological phenomenon of tone has not escaped mention in this first grammar book on Igbo language. As Schön clearly observed, though for lack of a better terminology, tone was described as intonation in most of the early works on tone languages, the phonological significance of tone in a tone language differs markedly from that of intonation in nontone languages. This point has been well illustrated by Pike (1948).

One of the early major contributions to the description of tone in the Igbo language was by I.C. Ward (1936). In her book, 'Introduction to the Ibo language', Ward gave what up till date can be considered as the most detailed description of the tonal structure of the Igbo language.

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69. J.F. Schön, 1861, Oku Ibo: Grammatical Elements of the Ibo Language. London, pp. 5 - 6.

70. ibid.

Ward distinguished three basic tones in the language, namely, High, Mid and Low tones. Of these three tones, she noted that only the High and the Low tones do occur independently in Igbo. That is, in monosyllabic words, it is only these two tones that can be found. The occurrence of the Mid tone, Ward noted, is more restricted in the language. Ward distinguished five tone classes for Igbo. By tone classes, we mean, the tone patterns or the types of tone sequence that occur in disyllabic nouns in Igbo. The five tone classes distinguished by Ward are as follows:

Tone Class I - High-High tone nouns, such as ákwá, ísí etc.

Tone Class II - Low-Mid tone nouns, such as òke, àrụ, àkwa etc.

Tone Class III - High-Low tone nouns, such as ḿbè, ézè, ákwà etc.

Tone Class IV - Low-Low tone nouns, such as àlà, ìtè, àkwà etc.

Tone Class V - High-Mid tone nouns, such as ágụ̄, ézē̄, égō̄ etc.[71]

The tone of each class of noun is that on which the word is spoken in isolation. Ward (1936: 23-34) described what she termed as the "tone patterns" which illustrate the changes which the different tone classes undergo in certain syntactic constructions, such as when two nouns are used in genitival relationship.

Comments on Ward (1936)

Our reaction to Ward's description of Igbo tones, the way this is presented in her book, is mainly one of deep admiration at her ability to accurately perceive and describe most of the subtle and intricate points in Igbo tones, both in the lexical contexts of these tones and especially in the behaviour of the tones when they occur in certain constructions. No single writer on Igbo tonology has made as much significant and useful observations about Igbo tones and tonation as Ward did. It can be said with all certainty that the description and/or analyses of Igbo tonology started with and

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71. I.C. Ward, 1936. Introduction to the Ibo Language, p. 18.

developed from Ward's work; for instance, in her description of Igbo tones, Ward had noted most of what have occupied the later writers on this subject about Igbo tones. For the features of Downstep and Downdrift which have been the central topics of discussions on Igbo tonology, Ward had observed that "the tone combination of a low tone followed by a high tone is rare in Ibo. In a group consisting of (_ ‾) the second, which can for all practical purpose be considered as a high tone, is usually not so high as the high tone in group (‾ ‾). This is most probably due to the influence of the preceding low tone which pulls down the high tone to a lower level." (p. 16). This, significantly, is why Ward has no Low-High sequence in her tone class groupings. The tonological process of downdrift, which has been described for the Igbo language in some articles written in the 1970s,[72] had been illustrated by Ward on page 17 of her book with the following example:

/égwù ápụ̀á m̀mádụ̀ níle̅ n'a̅nya̅/ , the surface tones of this utterance are represented thus / ‾ _ / ‾ _ ‾ / _ - _ /¬ _ / _ _ /

Ward remarked that in such sequence of tones, "each high tone gradually becomes lower and lower because of the preceding low tone and because of the natural tendency to fall towards the end of a sentence." [73]

What Ward described as Mid tone in Igbo has been analysed as the downstep high tone by recent writers on Igbo tonology. In other words, according to this view held by these writers, there is no Mid tone in Igbo. We disagree with Ward regarding what she treated as rising tone (cf. p. 13 of her book) and also in respect of what she treated as falling tones. Those words where these tone contour occurred in Ward's examples, were written as two syllable words, written as agụ 'hunger', mme 'blood', nile 'all', nka 'this' etc., however, these words consist each of three syllables, as any native speaker would realize, and they are pronounced with double vowels at some places, though only one vowel is used by some people when they write these words. If these words are to be written as they are pronounced, they would be written as follows : ágụ́ụ̄, ḿméē ,

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Footnotes 72 and 73 - see next page.

nīīlē, ǹkéà etc. This means that what Ward considered as tone contours (i.e. falling and rising tones) are in fact sequences of two tones. Ward's mistakes in this case arise as a result of incorrect syllabification of the words.

In their book 'The Descriptive Grammar of Igbo' Green and Igwe (1963) made their contribution to the description of tone in Igbo language. The authors attempted to develop some of the points expressed in Ward (1936) about Igbo tones. Like Ward, the authors recognized three basic tones in Igbo. They noted, for instance, that "in Igbo there are three significant contrastive pitch levels, or tonemes, a high tone, a low tone and a mid tone."[74] With regard to the mid tone, Green and Igwe observed that 'the last (i.e. mid tone) occurs only after a preceding high level toneme. Thus, there is a high-mid tone relationship but no such low-mid relationship. A tone following a low tone on a higher level is a high tone, and a tone following a mid tone on the same level is a high tone. Since a mid tone is only found in relation to an immediately preceding high tone it can itself be followed by a mid tone <u>because it is itself high in relation to what follows</u>."[75] This detailed account of how the mid tone is structured in the Igbo language has led to the eventual conclusion in the more recent analyses of Igbo tonology that mid tone does not exist in this language, rather what we have is a high tone that is downstepped. Green and Igwe concluded their observation about the mid tone with the following remarks," the mid toneme in Igbo is a relative toneme which does not occur in isolation but is found only in relation to an immediately preceding high tone."[76] It is especially this concluding remark by Green and Igwe that later generated some doubts about mid tone in this language, and as we indicated above, led to eventual conclusion that there is no mid toneme in Igbo. This also constitutes one of the main points where the authors, M. Green and G. Igwe, are best remembered in Igbo tonological analysis. One other point where the authors are remembered in Igbo tonology is with respect to their description

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72. cf. Welmers (1970) and Williamson (1971), to mention a few.
73. I.C. Ward (1936), opus cit. p. 16.
74. M. Green and G. Igwe (1963). The Descriptive Grammar of Igbo, p.6.
75. M. Green and G. Igwe (1963), pp. 6- 7.

of the tone classes and tone groups for Igbo, a topic which Ward had earlier discussed. On the basis of the tone classes earlier established by Ward, Green and Igwe developed what they termed as Tone Groups. This attempts to group together those tone classes which undergo similar phonological changes under similar contexts, i.e. when they are used in genitival, or what came later to be known as associative, constructions. On the basis of this, tone classes I and II (i.e. the high - high tone nouns and the low - high tone nouns, the latter being treated as low-mid by Ward), which undergo similar phonological changes when they are used in genitival and/or associative constructions, were classed under the same group. Similarly, tone classes III and IV, which undergo similar phonological changes when they are used in these constructions, were placed under the same group. The arrangement of these tone classes into tone groups is well motivated especially in terms of certain phonological rules which the tone classes undergo in common.

On the basis of the tones which the verb roots carry, Green and Igwe classified the Igbo verbs into two groups, namely, the high tone verbs and the low tone verbs. This classification, it should be stressed, is not based on morphological differences between the verbs. Incidentally, it is only when the verbs occur in the infinitive forms that the difference between the high tone verbs and the low tone verbs becomes evident. When the verbs are used in most morphological constructions, such as in the different tenses of the verbs, there appears to be no legitimate basis for classifying these verbs into different classes. We strongly feel that some morphological criteria, other than tone, would be much more appropriate as the basis for classifying Igbo verbs. For instance, a strong case can be established for classifying Igbo verbs into regular and irregular verbs, on the basis of certain morphological differences that exist between some verbs in Igbo. For example, we mentioned earlier that the imperative is formed in most verbs in Igbo with an open vowel suffix which occurs with the verb root. For example,

7.	verb root	imperative form
	gá	gàá
	gè	gèé
	sá	sàá
	zà	zàá
	sè	sèé
	zè	zèé
	sí	sìé
	tó	tóo
	tò	tòó
	kọ́	kọ̀ọ́
	kụ́	kụ̀ọ́
	kwú	kwùó
	kwụ́	kwụ̀ọ́ etc.

However, we find that certain verbs in Igbo do not take this extra open vowel suffix to form their imperative. In these verbs the imperative is formed with the verb root itself. For example,

8.	verb root	imperative form	
	gwá	gwá (gwà)	- tell
	sị́	sị́ (sị̀)	- tell
	hụ́	hụ́ (hụ̀)	- see
	gwụ́	gwụ́ (gwụ̀)	- finish
	jụ́	jụ́ (jụ̀)	- refuse etc.

We observed earlier that stative verbs in Igbo form their imperative with a "-ra" suffix morpheme. For example,

9.

verb root		imperative form
kwụ́	'stand'	kwụ̀rụ́
bụ́	'be'	bụ̀rụ́
bí	'dwell'	bìrí
nọ̀	'stay'	nọ̀rọ́ etc.

Note, for instance, the different ways in which the imperative of the verb ịdī, 'to be' (in the sense of 'to remain in state of'), can be formed in Igbo. In one sense we say dị́ ótu áhụ̀ , to mean 'be (remain) like that' (implying an indefinite period in which one is commanded to remain in the state), and in another sense we can say 'dìrị́ ótu áhụ̀, to mean 'be (remain) like that' (implying a definite time of continuous, uninterrupted action). Similarly, the imperative of the verb ịzā, 'to reply, to answer' can be either zá (zà) or zàá.

Note also how the perfect tense is formed in the verbs.

10.

verb root	perfect tense form
gá	àgáala
gè	àgeéle
sá	àsáala
sè	àseéle
zà	àzaála
zè	àzeéle
sí	àsíele
tó	àtóole
tọ́	àtọ́ọla
kwú	àkwúole
kwụ́	àkwụ́ọla
but gwá	àgwála
gwụ́	àgwụ́la

jụ́	àjụ́la
jú 'fill up'	èjúle
zá	àzála (àzáala)
hụ́	àhụ́la
sị́	àsị́la etc.
kwụ́ (stand)	àkwụ́rụ́la
bí	èbírile
bụ́	àbụ́rụ́la
nọ̀	ànọ́rọ́la
dị́	àdị́rị́la (àdị́la) etc.

On the basis of such morphological evidence we can classify the verbs in Igbo into irregular and regular verbs, and describe those cases such as zá 'reply, answer', which falls into both classes, as having both the regular and the irregular verb forms. Tone alone, that is, the tone which the verb has in the infinitive form, does not provide significant basis for classifying Igbo verbs.

Generally it should be said that Green and Igwe's analysis marks a step forward in the description of Igbo tones. Their analysis together with Ward's analysis of Igbo tones, and that given in Abraham (1967) (which will be discussed below), constitute the main works where the structure of Igbo tones has been described in great detail. These three works are the only main sources of reference in literature on the descriptive analysis of Igbo tones.

It is true that Green and Igwe could not cover all the points raised by Ward with respect to Igbo tonal structure, however, they managed to develop some of the points, and their greatest contribution in this respect is their description of the structural peculiarities of the "mid tone" in the language and their description of the tone groups, where the tonal interactions in certain grammatical constructions were well worked out. Unfortunately however, unlike I.C. Ward, Green and Igwe could not delve deep enough into other problems related to Igbo tones.

In his book, 'The Principles of Ibo', published posthumously in 1967, R.C. Abraham made a detailed description of Igbo tones. Abraham distinguished "three principal tone levels in Igbo - high, mid and low, each spaced out at an equal interval of pitch from one another."[76] Abraham made diagrammatical illustrations of the pitch levels he associated with the respective tones. Both the tones of isolated words as well as the tones of phrases and sentences were represented in the diagrams. On the whole his was a much more well organized presentation than that of his predecessor, I.C. Ward, although Ward appears to discriminate the tones much more accurately.

Abraham's work appears to be little known and consequently failed to attract the attention of the recent writers on Igbo language. Because of the untimely death of the author, the work did not receive the necessary final touches which it greatly needed. On his description of tones in Igbo, the author's limitations are obvious, in that most of the words used as illustrative examples in the book were not given correct tones, and most of his mistakes, as far as determining the tones is concerned, arose from the fact that Abraham tried to view the Igbo mid tone on the same parallel as the mid tone that occurs in the Yoruba language, a language on which Abraham had finished working before he turned to the Igbo language. For instance, his claim that the Igbo mid tone maintains equal pitch interval in relation to the high and the low tones can only be true of the Yoruba mid tone but not of the mid tone in Igbo. Ward (1936) did clearly illustrate the variability of the pitch levels that can be associated with the mid tone in Igbo. Because of the view which Abraham held about the mid tone in Igbo, he failed to see the different pitch levels which this tone maintains in connected utterances in Igbo.

All the analyses of Igbo tones made after the three main works discussed above, notably those analyses made in the 1970s, have concentrated on some of the points contained in these earlier works. The majority of these recent analyses have been centered around the phenomenon of downstep in Igbo tonology. Tonal downdrift in the language has also received attention in these studies. In the

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76. Abraham, R. C. 1967. The Principles of Ibo, p.8.

recent analyses of Igbo tones attempts have been made to formulate some phonological rules to account for tone changes that occur in certain constructions in the language. Considerable attention has been devoted in the more recent studies to the issue of establishing the underlying tones in the language, with particular reference to what had been earlier described as the mid tone for Igbo. The mid tone, as we noted earlier, came to be treated as downstep. Only the high and the low tones were recognized as the underlying tones in Igbo; the downstep was seen as a derived tone (derived from a high tone). Voorhoeve et al. (1969) and later Williamson (1971) analysed the downstep in the Igbo language. Williamson included some discussions about downdrift in her article. Hyman (1974a) tried to provide some diachronic evidence for the downstep in the Igbo language. Welmers (1970), in an article entitled "Igbo tonology" gave a detailed account of the terrace features of tone which often occur in connected utterance in Igbo. This is what I.C. Ward had described with the example cited above. The tonological phenomena of downstep and downdrift which together form the basis of the terrace features of tone, were noted to be present not only in the Igbo language, but also in other languages with similar tonal structure. We have briefly mentioned some of the recent studies on Igbo tone because most of these works will be discussed and commented on later in the main work.

Finally, any serious review of the studies done on tone in the Igbo language will show that though the works done on this regard are many and varied in nature, however, certain problems still remain unresolved in Igbo tonology, even in those areas that have received extensive treatment, such as the Downstep. One of the problems which is central in Igbo tonology concerns the decision about what to treat as the underlying tones in the language. According to the views expressed by the writers on Igbo tones, we noted that initially, three basic or underlying tones were distinguished in the Igbo language; later, due to the unique behaviour of the mid tone in this language, the recent opinoin is that there are only two basic (underlying) tones in the language, namely, the high and

the low tones, and that what had been considered as the mid tone is a downstepped high tone. Though the issue of downstep in Igbo has occupied the central place in the recent studies on Igbo tonology and the discussions in this regard have been very resourceful, the complex nature of the toneme represented as Downstep in the language has not been helpful in arriving at some satisfactory solution of the problem. In the present thesis we shall go into detail in analysing this 'intermediate' tone in Igbo. Solution to the problems connected with the intermediate tone in Igbo will have great consequences not only with regard to the question of the underlying tones but also on the formulation of the phonological rules which will be used in Igbo tonology. In the discussions that will be given later, we shall propose some alternative views about the downstep in the language.

The analysis we shall give about the structure of tones in Igbo will consist of three main parts - description of the tonal structure in the language; reanalysis of the Downstep and finally, we shall formulate certain rules to account for some of the tone changes discussed in the work.

6.2. TONE MARKING

Indication of tones in written literature otherwise known as tone marking, is essential in a tone language. Different systems of marking the tones of words in a sentence have been adopted in some tone languages. To ensure economy in tone marking, certain tones are left unmarked in the literature in some languages. It is usually what we may consider as the neutral tone (elsewhere referred to as the mid tone) that is unmarked. What constitutes a neutral tone in any tone language is of course very arbitrary. In languages with what we may regard as systematic and stable pitch levels in the tones, where the pitch relationships of the individual tones remain stable and consistent in most cases, tone marking exercise is relatively easy and uncomplicated, and the decision about which tone to mark and which ones to be left unmarked

in the literature is easy to make. In a tone language, such as Igbo, where the relationships between the pitch levels associated with one individual tone (i.e. where the pitch level varies considerably), such as in the intermediate tone in Igbo, the exercise of marking the tones in the literature presents some problem..

Presently, the practice adopted in the marking of tones in Igbo literature has been to mark certain tones in the word and to leave certain tones unmarked, and according to the system being advanced at the University of Ibadan, the high tones are left unmarked while the low tones and the downstep tones are marked. The low tone is marked with a grave accent (̀). Two different methods, according to this system, are used for the marking of the downstep. In one method a raised exclamation mark (!) is used before the syllable with the downstep and then the syllable is marked with an acute accent (́) (usually used for marking high tones). In the second method, the downstep is marked only with a macron (-) (written above the syllable). Williamson, from personal communication, pointed out that the macron is used in the 'popular literature', such as the literature used in the schools, while the use of the exclamation mark notation is only in more serious literature such in articles in journals, or other works of that nature. However, I personally do not see any rationale behind the use of two systems of notation at the same time in the same language to represent the same phenomenon. The macron is widely used in other languages to indicate an intermediate tone (i.e. any tone that comes between the high and the low tones, such as the mid tone). Furthermore, the use of the exclamation notation has not been familiar with many writers and it is most liable to be misunderstood, especially as the syllable with the downstep is marked with an acute accent. For instance, using the exclamation notation method, words like agụ, where downstep occurs on gụ, would be tone marked as a!gú. Not only does this cause some confusion in the interpretation, but sometimes many writers forget to indicate the additional high tone mark after the exclamation mark. For these reasons, we shall prefer the use of the macron only, which does not involve the difficulties mentioned above, to tone mark the syllable with a downstep tone.

Tone marking of the downstep in connected utterance in Igbo presents some problem. For instance, in an utterance such as /onye hụrụ ihe mere ebe a, .../ 'he who saw what happened here, ...', the surface tones of which are represented thus / ¯ ¯/ ¯ -/- -/- -/ _ /, we find that not only are there series of gradual stepping down of the high tones, but also that series of syllables are pronounced on any given level within the steps. In other words, if we choose to mark all the down-step tones (i.e. all the syllables with downstep) in the utterance with the macron, there will be no way of knowing which high tone or group of high tones are lowered in the series of downward stepping of the tones. That is, there is no way we can differentiate series that are pronounced on the different levels of successive downsteps. To resolve this problem, a system is adopted whereby only the first syllable in a series of syllables that are pronounced on the same level of downstep is tone marked, leaving the other syllables unmarked, until another downstep is reached, in which case the same method is repeated all over again. Following this, we can tone mark the above utterance thus:

onye hṵ̄rụ ihe mēre ebe à

In the system of tone marking that is used and promoted at the University of Ibadan for Igbo, all high tones are not marked, all low tones are marked and the downsteps are marked in the manner described above. For example, /onye hụrụ ihe mere ebe a gburu anyịnya/ 'he who saw what happened here killed a horse', the surface tones of which are represented as follows:

/ ¯ ¯ / ¯ ¯ / ¯ ¯ / ¯ ¯ / _ / _ _ / _ _ _/

would be tone marked thus:

onye hṵ̄rụ ihe mēre ebe à gbùrù ànyịnyà.

The system of tone marking used in Nwachukwu (1975) differs from that being followed at the Ibadan University. Nwachukwu used a rather very modified method of tone marking. In his work, the high tones , the low tones as well as the downstep tones are marked. However, in a sequence of syllables and/or words bearing identical

tones, only the first syllable in the series, or the first syllable of the first word, is marked for tone, and the others are left unmarked. Thus, although Nwachukwu chooses to mark all the main tone types in the language, in the sense that no one type of tone is treated as the unmarked in contrast to the other tone types, however, his system of tone marking is more economical than that being adopted at the University of Ibadan. Economy is achieved through Nwachukwu's method, in that not every syllable in a series is marked unless the syllable carries a tone that is different from that of the preceding syllable, whereas in the system being followed at the University of Ibadan, every syllable bearing a low tone is marked. However, how the downstep tones are to be marked was not worked out in Nwachukwu's analysis, at least this is not clear from the way he marked the tones in the examples used in his work.

The system of tone marking which is used in the present work, and which we would strongly recommend for the marking of tones in this language, whether in the so called popular literature, by which it is usually meant literature written entirely in Igbo, or the serious literature, is in principle similar to the one used by Nwachukwu (1975). However, we need to modify Nwachukwu's system of tone marking, in the manner to be described below, to suit our purpose. For the reasons given above, the system of tone marking which is adopted at the University of Ibadan will not be used in the present work.

In the system of tone marking used in this thesis, all the main contrastive tones in the language, namely, the high, the low and the downstep, will be marked. In other words, no tone type in the language will be treated as an umarked series. The high tone is indicated with an acute accent (´); the low tone is indicated with a grave accent (`) and the downstep is indicated with a macron (-). As in Nwachukwu (1975), in a sequence of syllables within the same word which bear identical tones, only the first syllable is marked for tone, and the other syllables in the word are left unmarked. However, if two or more words follow one another in a sentence,

and all the syllables in these adjacent words bear identical tones, the first syllable of each word will be marked for tone. For the downstep, we shall adopt the system described earlier above, whereby only the first syllable in a sequence of syllables that occur on the same level of downstep will be marked for tone, until (and if) the next level of downstep is reached, and the same process is repeated.

This system will be able to make it easy for one to identify every word with respect to the tone (tones) the word carries, and at the same time the system would achieve economy in the marking, in that less syllables would be marked for tone (i.e. in comparison with the system that is adopted at the University of Ibadan). This system has been mainly used in the tone marking of the words used as illustrative examples earlier on in the present work. More examples will be given below to once more illustrate the tone marking system proposed here. Sometimes in the course of a discussion we would decide to mark every syllable in a word, even when the syllables carry identical tones; this, it should be understood, is necessary only as an illustration of an argument or the point of view being put forward, such as to illustrate, for instance, the environment where a tone change occurs. This does not, and should not contradict the system of tone marking being proposed here. The following examples will be used to further illustrate the system of tone marking we propose for the language.

11. áka [¯ ¯]

éke [¯ ¯]

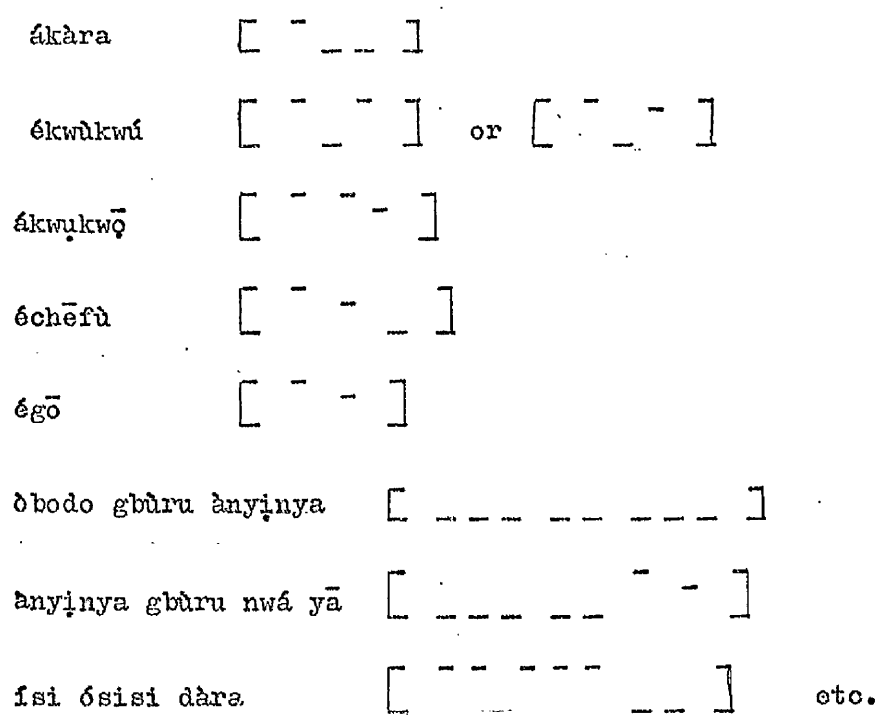
ísi [¯ ¯]

ósisi [¯ ¯ ¯]

àny̩inya [_ _ _]

èbube [_ _ _]

òbodo [_ _ _]



6.3. THE BASIC TONES IN IGBO

For reasons that will be explained later, we shall distinguish three basic tones for the Igbo language, namely, the High tone, the Downstep tone and the Low tone. These basic tones contrast in the manner shown below:

12. (a) ákwa (H H) - cry
ákwà (H L) - cloth
àkwá (L H) - egg
àkwa (L L) - bed, bridge

(b) ńgwa (H H) - haste
ńgwā (H D) - fire

(c) ébe (H H) - where, place
ébē (H D) - yam beetle

(d) ézè (H L) - chief, king, ruler

ézē (H D) - teeth eto.

As we showed in our review of the previous studies on Igbo tones, the early writers on this subject distinguished three basic tones in the language, while recent writers on Igbo tonology recognize only two basic tones for Igbo, namely, the high and the low tones. In the discussions that will follow, we shall provide some justifications for our reverting to the view held earlier regarding the basic tones in the Igbo language. For the meantime however, we would like to briefly note that our main consideration about what to regard as a basic tone centers on the ability of a tone (toneme) to bring about minimal contrast between words. So far as the downstep tone is able to fulfil this distinctive function in the language, we consider the downstep tone as a basic tone in Igbo. We shall designate this toneme in Igbo as a Downstep tone since this is the way this toneme has been called in recent literature. This means that we are using the term downstep to express two different concepts in the tonology, namely, a toneme with contrastive value just as the high tone and the low tone in the language; and the other, describing a phonological phenomenon which states the lowering of a high tone to an intermediate level in certain environments in certain constructions in the language.

6.4. TONE DISTRIBUTION IN IGBO WORDS

For a better understanding of the tonal structure in Igbo language, it would be necessary to give a description of how the tones are used in the words of this language. Furthermore, the description of how the tones are distributed in the language, we hope, will help to clear up some of the points raised in the previous studies about tones in this language.

We can briefly summarize the distribution of tones in Igbo thus:

(i) either a high or a low tone can occur at the initial position of the word (i.e. on the initial syllable of the word) in Igbo;

(ii) a word in Igbo can end with any of the three tones described for Igbo - the high tone, the downstep tone or the low tone;

(iii) with respect to the sequence of tones within a word in Igbo, a high tone can precede or follow a low tone, and in the same way, a low tone can precede or follow a high tone. A downstep tone does not precede a high tone and does not follow a low tone; a downstep tone can precede a low tone and it always occurs after a high tone. In other words, as Green and Igwe correctly pointed out, in Igbo we can have a low - high sequence, a high - low sequence, a high - downstep sequence, a downstep - low sequnce, but not a low - downstep or a downstep - high sequence whithin a word in Igbo.

6.4.1. THE TONE PATTERNS IN IGBO NOMINALS

All monosyllabic nouns in Igbo (and there are very few of them in the language) carry high tone. For example,

13. jí [¯] yam
    dí [¯] husband
    bé " place, home
    nwá " child etc

Similarly, all the monosyllabic pronouns, including the bound pronouns in Igbo carry high tone. For example,

14. ḿ (shortened form of mụ́) - I
    ó/ọ́ (bound pronoun) - he/she/it
    í/ị́ (" ") - you (sing.)
    á/ọ́ (" ") - indefinite pronoun
    gị́ - you (sing.)
    yá - he/she/it

The tones of these monosyllabic nouns and pronouns are very susceptible to change. Thus, it is only when these nouns occur in isolation, or when they occur at the beginning of a sentence or after a low tone word, can it be said with some certainty that the nouns carry high tone; when the monosyllabic nouns occur after a high tone word they always carry downstep tone. This has led I.C. Ward (1936) to say that the monosyllabic pronouns mentioned above, mụ, gị, ya, carry mid tone. The mid tone, now represented as the downstep tone, is seen in Igbo only in relation to the preceding high tone, that is, it does not occur independently in the language. This means that there is no way we can support this observation by Ward. However, it would be important to bear this observation in mind.

6.4.1.1. TONE PATTERNS IN DISYLLABIC NOUNS

Many nouns in Igbo are disyllabic, usually of VCV structure. The grouping of Igbo nouns into tone patterns (cf. Ward 1936) or tone classes (cf. Green and Igwe 1963) was based on the type of tone combinations that occur in the disyllabic nouns in Igbo. This means that the tones the disyllabic nouns carry in Igbo can fall into any of the five tone patterns distinguished by Ward (1936). The tone patterns are treated here under the different tone classes.

(i) Nouns of Tone Class I : High - High tone nouns

These are disyllabic nouns with High - High tones. For example,

15.	ísi	[¯ ¯]	head
	áka	"	hand
	ákwa	"	cry
	ányа	"	eye
	ími	"	nose
	éke	"	python

	ílo	[¯ ¯]	enemity
	égbe	"	kite
	éwu	"	goat
	éfi	"	cow
	áfọ	"	stomach, belly
	ényi	"	elephant
	ékwe	"	tomtom etc.

(ii) Tone Class II Nouns : High - Low tone nouns

These are disyllabic nouns with high- low tones. For example,

16.	ísì	[¯ _]	smell, odour
	ákwà	"	cloth
	ọ́nyà	"	trap
	égbè	"	gun
	ézè	"	chief, king, ruler
	úlọ̀	"	house
	úkwù	"	waist
	íjè	"	travel, walk (n.)
	ńbè	"	tortoise
	ńdụ̀	"	life
	ńkpà	"	need (n.), necessity etc.

(iii) Tone Class III Nouns : Low - High tone nouns

These are disyllabic nouns with low - high tones. For example,

17.	àkwá	[_ ¯]	egg
	ɔ̀kɔ́	"	rat
	ɔ̀kpú	"	hat
	ìsɛ́	"	five

àtọ́	[_ ¯]	three
àn̩ọ́	"	four
ǹkwọ́	"	name of a market day, also used for native week day
èké	"	" " " "
ùkwé	"	song
ùbé	"	pear

(iv) Tone Class IV Nouns : Low - Low tone nouns

These are disyllabic nouns with low - low tones. For example,

18.	àkwa	[_ _]	bed
	ìsi	"	blindness
	àgba	"	jaw
	àkpa	"	bag
	àla	"	land, gound, country
	ènwe	"	monkey
	ìte	"	pot
	ǹdo	"	shade
	ìfe (ìhe)	"	light etc.

(v) Tone Class V Nouns : High - Downstep tone nouns

These are disyllabic nouns with high - downstep tones. For example,

19.	ézē	[¯ -]	teeth
	ébē	"	yam beetle
	óbē	"	cross
	ájā	"	sand
	égō	"	money

ágụ̄	[¯ -]	leopard
óhī	"	theft
ọ́nụ̄	"	mouth
ḿmā	"	beauty
ígwē	"	sky
íyī	"	oath, also means steam, brook
ńzā	"	wren
ụ́gwọ̄	"	debt
íkpē	"	judgement
ụ́lọ̄	"	clay
ímē	"	inside, also means pregnancy
ólū	"	height
ụ́nwụ̄	"	famine
ńgwā	"	fire
ólō	"	mushroom
ńzū	"	chalk
ógō	"	height (in the sense of tallness)
ḿgbō	"	gate or door locally made (especially doors with engraving)
ḿgbọ̄	"	bullet
ńgē	"	single file
éyī	"	rabbit
óyī	"	cold
álụ̄	"	abomination etc.

It can be obviously seen that in the examples of nouns used to illustrate the different tone classes discussed above, more nouns have been used to illustrate the tone class v nouns. This should be seen as a deliberate attempt on our part to vividly refute many incorrect observations made about the nouns that have this type of tone combinations in the language. It has been noted earlier above that the tonological phenomena known as the Downstep has been in the centre of discussions about Igbo tonology in nearly all the studies done so far in the tonology. Consequently a lot of constraints have been given with regard to the occurrence of the downstep tone in the language. It would not be surprising that some of these constraints relate to the very words where this tone is used as a contrastive toneme in the language. For instance, it has been so often observed in the previous studies that the actual nouns where this tone is used as a contrastive tone is very few in the language, that this fact is now taken as 'fait accompli' and consequently taken for granted. Note, for instance, the following observation by Hyman (1974b) about the high - downstep nouns in Igbo: "The H - D nouns are relative rare (and exist only in certain dialects), and with only a handful of doubtful exceptions, all H-D nouns involve an intervocalic voiced consonant. In fact, in some of the dialects covered by Welmers and Welmers (1968a), when the consonant is /g/ no H - H nouns are found, but instead H - D is found corresponding to H - H in other dialects."[77] It is in reaction to such sweeping statements often made about the nouns with downstep tone in the language that we took interest to actually investigate how few are these words with the downstep tone in Igbo. As a result of our investigation, we were able to find that in fact there are more disyllabic nouns in Igbo with high - downstep tones than disyllabic nouns with either low - high tones or low - low tones. For instance, on counting the disyllabic nouns which we could associate with the different tone classes, we found that whereas we could get thirty one nouns with high - downstep tones (which do not include three out of the six nouns Hyman gave as

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77. Hyman, L. 1974. "Universals of Tone Rules", Linguistic Inquiry, vol. V,1, p. 93.

examples, namely, ógwū 'thorn'; ọ́gụ̄ 'twenty' and ụ́gụ̄ 'fluted pumpkin'), we could not get up to twenty nouns with low -low tones, nor up to fifteen disyllabic nouns with low - high tones. We do not intend to say that the numbers of disyllabic nouns discovered for each class of tones are in any way exhaustive, but we hope that this is enough to show the fallacy of the observations about the fewness or the rareness of the nouns that have high - downstep tones in the language, an observation which in may places is now regarded as a matter of fact. If we go back to the other constraints Hyman stated about the words or nouns with high - downstep tones in Igbo, namely, that they are nouns with an intervocalic voiced consonant, and that the consonant mostly found in such cases is /g/, we can see from the nouns listed above with high - downstep tones, that such a claim is not well founded. Welmers worked mainly on the Onitsha dialects, to which my own dialect belongs, and in my dialect we have disyllabic nouns with an intervocalic /g/ but where there is no downstep; rather these nouns have high - high tones, for example, ígu 'stone for grinding, also means flint used for firing gun', ńgu 'long hooked object used for plucking pear' etc. There are other disyllabic nouns not provided in our examples, with hígh - downstep tones, where the intervocalic consonants are voiceless, for example, ụ́kpọ̄ (a type of seed), ụ́kọ̄ (a type of tree), ị́kpọ̄ (used in my dialect and probably in other dialects to mean a carved wooden plate or a small mortar) etc.

By describing the way the tones are used in Igbo words we hope to throw more light into some of the arguments and the various observations made about the tones and features of tone in this language.

6.4.1.2. TONE PATTERNS IN TRISYLLABIC NOUNS

Tone distribution in nouns with three or more syllables is similar to that of disyllabic nouns. That is, in the sense that the whole syllables in the noun can carry high tones only or low tones only, or a mixture of high, low and downstep tones, observing, in the

latter, the sequence restrictions described above, whereby a downstep does not follow a low tone in the same word.

The following tone patterns can occur in a trisyllabic noun in Igbo.

(i) Trisyllabic Nouns with High - High - High tones

Some trisyllabic nouns in Igbo have high - high - high tone sequence. For example,

20.	ósisi	[¯ ¯ ¯]	tree
	áhịhịa	"	grass, rubish
	émume	"	festivity, ritual ceremony
	ọ́kpụkpụ	"	bone
	ékike	"	being well dressed
	ńnekwu	"	hen
	ákụkọ	"	story
	ámụma	"	prophesy etc.

(ii) Trisyllabic Nouns with Low - Low - Low tones

Some trisyllabic nouns in Igbo have low - low - low tones. For example,

21.	ànyịnya	[_ _ _]	horse
	àkara	"	bean cake
	èbube	"	dignity
	ǹkata	"	basket
	àhcara	"	elephant grass
	òbodo	"	town
	ọ̀bara	"	blood
	àchịcha	"	biscuit
	àmara	"	kindness
	ọ̀nwụnwa	"	temptation etc.

(iii) Trisyllabic Nouns with High - High - Downstep tones

Some trisyllabic nouns in Igbo have high - high - downstep tones. For example,

22.	ńkịtā	[¯ ¯ -]	dog
	ịherē	"	shame, shyness
	ézigbō	"	good
	ọ́hụrụ̄	"	new
	ọ́berē	"	small
	ábụbā	"	leaf
	ńkpụrụ̄	"	fruit, seed
	ńmirī	"	water
	ágadī	"	elderly person, old age
	átụrụ̄	"	sheep
	ákwụkwọ̄	"	book
	ányanwụ̄	"	sun
	ńmanụ̄	"	oil
	ńmeē	"	blood etc.

(iv) Trisyllabic Nouns with High - High - Low tones

Some trisyllabic nouns in Igbo have high - high - low tones. For example,

23.	ńmehiè	[¯ ¯ _]	mistake
	ńmadụ̀	"	person
	ákwarà	"	artery, sinew
	ńzuzù	"	stupidity
	ụ́kwarà	"	cough
	ọ́kpụlọ̀	"	dilapidated house etc.

(v) Trisyllabic Nouns with High - Low - High tones

Some trisyllabic nouns in Igbo have high - low - high tones. For example,

24.	ékwùkwí	[¯ _ ¯]	talkativeness
	ásụ̀sụ́	"	language
	ájụ̀jụ́	"	question
	ázịzá	"	reply, answer
	ńkàtá	"	conversation
	éjijé	"	imitation
	ńgàrá	"	pride

Most of these nominals are derived from verb roots.

(vi) Trisyllabic Nouns with High - Low - Low tones

Some trisyllabic nouns in Igbo have high - low - low tones. For example,

25.	ákpàti	[¯ _ _]	box
	ńgbède	"	evening
	éhìhie	"	afternoon
	Ádàzi	"	name of a town
	áhịàra	"	weaver bird
	ákàra	"	line
	ọ́fọ̀rọ	"	bamboo
	échìche	"	thought, thinking
	ákụ̀kụ	"	side
	ókènye	"	old person
	ọ́kwụ̀rụ	"	okro etc.

(vii) Trisyllabic Nouns with Low - High - High tones

Some trisyllabic nouns in Igbo have low - high - high tones. For example,

26.	ọsísi	[_ ¯ ¯]	cooking
	ọkwúkwu	"	speaking
	ọ̀zị́za	"	answering
	ọmúme	"	doing
	ọtíti	"	knocking, beating
	ọ̀kwụ́kwụ	"	paying etc.

This is the tone pattern for nominalized high tone verbs.

(viii) Trisyllabic Nouns with Low - High - Low tones

Some trisyllabic nouns in Igbo have low - high - low tones. For example,

27.	ọ̀kụ́kọ̀	[_ ¯ _]	chicken, fowl
	ụ̀tụ́tụ̀	"	morning
	ọtíti	"	middle, centre
	àgbọ́ghọ̀	"	young lady, female teenager
	ọ̀bérè	"	mercy
	ụ̀bụ́rụ̀	"	brain etc.

(ix) Trisyllabic Nouns with Low - Low - High tones

Some trisyllabic nouns in Igbo have low - low - high tones. For example,

28.	ọkwukwé	[_ _ ¯]	faith, confidence
	ọmumé	"	behaviour
	ọkelé	"	greeting

ò̩tutó	[_ _ ¯]	praise
ò̩nyinyé	"	gift, donation etc.

These nominals are derived from verbs or from other nominalized forms.

(x) Trisyllabic Nouns with Low - High - Downstep tones

Some trisyllabic nouns in Igbo have low - high - downstep tones. For example,

29.	ò̩sụ́kwū	[_ ¯ -]	a type of palm nut
	ò̩jú̩kwū	"	a type of palm tree, also a personal name
	ǹsụ́kō̩	"	crab
	ò̩chụ́chā	"	cockroach
	ǹgwó̩rō̩	"	cripple
	ò̩kpó̩kō	"	a crow (or in the family of crow bird)
	Ǹjó̩kū̩	"	personal name
	à̩gbú̩gbō̩	"	manure etc.

Most trisyllabic nouns fall into one or the other of the tone patterns illustrated above. The nominalized verb forms, for instance, may have all low tones, corresponding to tone pattern (ii), for the low tone verbs and the other derived nominals have one or the other of the tone patterns. One tone pattern we are sceptical to introduce here for trisyllabic nouns is the Low - High - Downstep tones. This is because some of the words we can identify with this type of tone pattern are usually compound nouns, made up of different independent lexical morphemes all joined together to form one word. For instance, words like chínēkè (consisting of a high, a downstep and a low tone), which means 'creator', usually used in Igbo to

designate God the creator, is made up of the words 'ohí nā ōkè' - 'the spirit that creates'. Similarly most of the words we can find that have this tone pattern are personal names, which are usually sentence words in the language, just as most personal names in Igbo, for example, Échēfù, meaning 'never to forget'; Éfōbì, meaning 'never to stop mentioning'; Ézūmà etc.

6.4.2. THE TONE STRUCTURE OF IGBO VERBS

The majority of verb roots in Igbo are monosyllabic, usually of CV structure. Like the nouns in Igbo, the verbs have been classified according to the tone the verb root carries (cf. Green and Igwe 1963). On the basis of the tone the verb root carries, Green and Igwe (1963) distinguished two classes of verbs in Igbo, viz, the high tone verbs and the low tone verbs. These are illustrated below.

6.4.2.1. THE HIGH TONE VERBS

These are verb roots with high tone. For example,

30.	gá	[¯]	go
	dé	"	write
	sí	"	cook
	kwú	"	speak
	sị́	"	say
	gwá	"	tell
	gụ́	"	read, count
	fé	"	fly
	tá	"	chew
	té	"	scrub, smear
	sá	"	wash
	kụ́	"	knock
	tụ́	"	throw etc.

6.4.2.2. THE LOW TONE VERBS

These are verb roots with low tone. Comparatively verbs with low tone are much fewer than those with high tone. The following are examples of verbs with low tone in Igbo.

31.	bà	[_]	enter
	dà	"	fall
	bè	"	cut
	bì	"	end
	dè	"	soak
	dì	"	endure
	dò	"	spy on
	vụ̀	"	hatch
	zè	"	dodge
	zà	"	sweep
	zì	"	send on message
	zò	"	fall (only of rain)
	zù	"	meet, also means 'be complete'
	fè	"	pass, cross
	fè	"	worship
	tò	"	praise
	kọ̀	"	plant by digging etc.

All of what we treat here as simple verbs in the language, i.e. verbs that are mainly monosyllabic in structure, carry one or the other of the tones discussed above, that is, either a high tone or a low tone. The tonal structure of the complex or the compound verbs is discussed next.

6.4.2.3. THE TONAL STRUCTURE IN COMPOUND VERBS

Compound verbs are formed in Igbo by joining together two or more simple verb roots. Sometimes in the language we have verbs which are usually disyllabic in structure, but where either both of the two of the participating CV morphemes or one of the CV morphemes cannot occur independently as a verb root, or even if we can associate such a morpheme with a verb root we know in the language, the meanings which the verb root has in both contexts will be different. This type of verbs which we treat here as complex verbs, to differentiate them from the well known compound verbs, have been described earlier in chapter 4. However, what is more important to our topic is the fact that the tonal structure in both the complex verbs and the compound verbs are very much the same.

Perhaps the most important aspect of the tonal structure of the compound/complex verbs comes from the type of tone changes that occur in the construction of some of the compound verb stems. These changes represent, as we shall see later, a much widely distributed tonological phenomenon in the language. Note, for instance, that in some of compound verbs given below, the basic tone (what is elsewhere treated as the inherent tone) of the simple verb that goes into the construction changes. In the examples, the compound verbs where tone change occurs are underlined.

32.	/dé + gá/	déga	[¯ ¯]	'write-send to'
	/gá + lú/	gálu	"	'go-reach'
	/dà + bà/	<u>dábà</u>	[¯ _]	'fall-enter', fall into
	/dà + lú/	dàlú	[_ ¯]	'fall-reach'
	/zà + fè/	<u>záfè</u>	[¯ _]	'sweep-across',
	/mé + bì/	mébì	"	'do-end', spoil
	/mé + zí/	mézi	[¯ ¯]	repair

/zà + lú/	zàlú	[_ ¯]	'sweep-reach'
/zà + bà/	záàbà	[¯ _]	'sweep-enter', sweep into
/zà + mì/	záàmì	"	'sweep-deepen', sweep deep into etc.

The tone changes that occur in the examples, and the environments under which the changes occur can be briefly described thus: when a low tone verb is joined to another low tone verb in a compound verb construction, the low tone of the first verb is raised to a high tone. When a low tone verb is joined to a high tone verb, no change occurs in the inherent tones of the verbs. Similarly, when a high tone verb is joined to a high tone verb or to a low tone verb, no change occurs in the inherent tones of the verbs.

6.4.2.4. TONE IN VERBAL AFFIXES

Some of the affixes which occur with the verbs in Igbo have independent tones of their own while some affixes acquire their tone from the formatives they occur with. It can be generally noted that verbal prefixes often have independent tone of their own while the suffixes usually acquire their tone from the verb root or, to be more specific, from the syllable that precedes them in the construction. In the following examples, we shall be concerned with the tone that occurs on the suffix morpheme; the tone of the prefix morphemes will be treated separately later.

33.

ịgācha	[¯ - -]	to finish going
ịkwūcha	"	to finish speaking
ịgècha	[¯ _ _]	to finish listening
ịdịcha	"	to finish enduring
ịsècha	"	to finish drawing
ịsācha	[¯ - -]	to finish washing

ɨzūta	[¯ - -]	to purchse
ɨmụ̀ta	[¯ _ _]	to learn
ɨsā̀ta	[¯ - -]	to acquire through washing
ísète	[¯ _ _]	to acquire through drawing
ọ́ gàra	[¯ _ _]	he went
ó sère	"	he drew
ọ́ sāala	[¯ - - -]	he has washed
ó sèéle	[¯ _ ¯ ¯]	he has drawn etc.

The verbal prefixes, as indicated above, carry independent tones. For example, the infinitive prefix i/ɨ carries a high tone irrespective of the tone of the root morpheme it occurs with. For example,

34.

Infinitive prefix	verb root	infinitive verb form
í/ɨ́	gá	ɨ́gā
	gè	ígè
	fé	ífē
	fè	ífè
	sá	ɨ́sā
	sè	ísè
	zè	ízè
	bà	ɨ́bà
	zà	ɨ́zà
	zá	ɨ́zā etc.

It will be important to note that in some of the infinitive verb forms illustrated above, certain tone changes occur with respect to the inherent tone of the root morpheme. We can notice, for instance, that when the high tone prefix occurs with a high tone verb, the tone of the verb is lowered to a downstep. But when

the high tone prefix occurs with a low tone verb, there is no change in the inherent tones of the morphemes.

The open vowel prefix, a/e, which we treated earlier as the performative prefix, carries independent tone which is a low tone. For example,

35.

vowel prefix	verb root	
a/e	gá	àgá
		àgáala
	sí	èsí
		èsíele
	sá	àsá
		àsáala
	kwú	èkwú
		èkwúole
	bà	ábà
		ábàála
	zà	ázà
		ázàála
	zɛ̃	ézè
		ézèéle
	tò	étò
		étòóle etc.

Notice that as we indicated earlier, when the low tone prefix occurs before a low tone verb, the tone of the prefix is raised to a high tone. We have observed similar thing where a low tone verb is joined to another low tone verb to form compound verb. When the low tone prefix is used with (occurs before) a high tone verb, there is no change in the inherent tones of the morphemes.

6.5. THE GRAMMATICAL FUNCTIONS OF TONE IN IGBO

Tone, as we observed at the beginning of this chapter, is used in tone languages for lexical and grammatical functions. In the lexicon, tone is used to differentiate the words in the language. This function of tone, with regard to Igbo language, has been shown in the preceding discussions. In the grammar, tone is used to express certain grammatical relationships existing between words, or the different grammatical changes which a given word undergoes, as well as to contrast different sentence types in the language. Evidently some of the discussions given above about tone, such as the use of tone to form the infinitive in Igbo, relate to grammatical function. Even though in the analyses we state, for instance, that the infinitive is formed by prefixing i/ị to the verb root, or that the past tense in the language is formed with the "-ra" suffix etc., in effect, it would not be realistic or appropriate to ignore the importance of tone in such and other contexts in the grammar. The formation of the infinitive for a high tone verb, for instance, is incomplete without the replacement of the high tone of the verb root with a downstep tone, nor is the formation of the past tense or the imperative in Igbo complete without the replacement of the high tones in the high tone verbs with low tones, i.e. apart from the affixes that are used in such cases. In other words, as Ward (1936) correctly remarked, it will not be realistic to ignore the significance of tone in grammatical formations in a tone language. On this respect, to explore the grammatical functions of tone in Igbo or, for that matter in any tone language, would, in effect, mean reviewing the whole grammar of that language, which is obviously not our intention in the present section. Rather, in the present section, we intend to look into the significance of tone in the differentiation of certain sentence types and clauses in Igbo.

In Igbo different categories of sentences and clauses are distinguished through tone. Tone, for instance, is used to distinguish simple interrogative sentences from their affirmative counterparts; a conditional sentence from the nonconditional ones; a relative clause from nonrelative clauses etc.

6.5.1. SIMPLE INTERROGATIVE SENTENCE

A simple interrogative sentence in Igbo is distinguished from it affirmative counterpart mainly through tone,i.e. the tones that occur on the pronoun which is usually used as the subject of such sentences. A simple interrogative sentence is usually introduced in Igbo with a pronoun which as we mentioned above is used as the subject of the sentence. Even where a noun subject is present in the affirmative sentence, the pronoun (usually a bound pronoun) is still used in addition to the noun, in the interrogative version of the sentence. Compare, for instance, the following sentences.

36. (a) ọ́ gàra áhịa – he went to market
(b) ọ̀ gàra áhịa – did he go to market?

(a) ó sìri ńri – he cooked food
(b) ò sìri ńri – did he cook food?

(a) é gbùru éwu – someone killed a goat, a goat was killed
(b) è gbùru éwu – did anybody kill a goat, was a goat killed?

(a) ányị gbùru éwu – we killed a goat
(b) ànyị gbùru éwu – did we kill a goat?

(a) Íke gàra áhịa – Ike went to market
(b) Íke ọ̀ gàra áhịa – did Ike go to market

(a) Ọ́jị gbùru éwu – Ọjị killed a goat
(b) Ọ́jị ò gbùru éwu – did Ọjị kill a goat?

(a) Ónye ńkuzi tìri yá íhe – the teacher beat him/her.
(b) Ónye ńkuzi ò tìri yá íhe – did the teacher beat him/her?

(a) há tìri yá íhe – they beat him/her.
(b) hà tìri yá íhe – did they beat him? etc.

In the above sentences, the main difference between the affirmative and the interrogative sentences lies on the tone(s) which the pronoun subjects carry, or otherwise on the introduction of a low tone pronoun in apposition to the noun in the interrogative sentence, where such a pronoun is not present in the affirmative sentence.

When interrogative words, such as kèdú, òlée (these are purely interrogative words which are used with a noun or pronoun to give the meaning of what?, which?, or who?), gịnị, 'what?', are used to form interrogative sentence, tone becomes less significant in the structuring of the interrogative aspect of the sentence. The bound pronominal forms are not used in such interrogative sentence constructions, i.e. when the interrogative words are used in the construction. The following examples will illustrate what has been said above with respect to tone when interrogative words are used in interrogative sentences.

37. Íke gàra áhịa - Ike went to market
Kèdú ébe Íke gàra - where did Ike go?
òlée ebe Ike gàra - where did Ike go?
èbée kà Íke gàra - where did Ike go?
ònyé gàra áhịa - who went to market?
kèdú ónye gāra ahịa - who went to market?

Íke gbùru éwu - Ike killed a goat.
kèdú ónye gbūru ewu - who killed a goat?
òlée onye gbūru ewu - who killed a goat?
kèdú íhe Íke gbùru - what did Ike kill
gịnị kà Íke gbùru - what did Ike kill?

In the above sentences we have tried to illustrate the various ways we can form interrogatives of the sample affirmative sentences. In the interrogative forms of a given affirmative sentence, we can note, among other things, that tone becomes a less significant factor in the formation of the interrogative, that is, the tones

which the interrogative morphemes carry in the construction are the tones which these morphemes possess in isolation and there is no deliberate reliance on tone changes with respect to the tones that occur in the affirmative sentences, to bring about the interrogative aspect in the interrogative sentences. The raising of the low tones of the verb in certain interrogative constructions above can be seen as a general phonological or tonological influence of the words in the phrase, but not specifically introduced for the interrogative purpose.

6.5.2. CONDITIONAL SENTENCES

The conditional sentence in Igbo may or may not be introduced by a conditional phrase, such as 'ọ́bụrụ nà' ('if it is/was that'), ási nà ('if to say that') etc. When the conditional sentence is introduced by a conditional phrase, the main verb in the sentence is inflected for tense, and the tones of the conditional sentence do not differ from those of the nonconditional sentence. When, on the other hand, the conditional sentence is not introduced by a conditional phrase, the main verb in the sentence is not inflected for tense and the conditionality of the sentence is expressed partly through the open vowel suffix which is appended to the vero root and partly through the tone which the verb carries. Compare the following sentences.

38(i) (a) Íke bịara - Ike came

(b) Íke gà-àbịá - Ike will come

(c) ọ́bụrụ nà Íke bịara - if Ike comes/came

(d) ọ́bụrụ nà Íke gà-àbị́a - if Ike will come

(e) ási nà Íke bịara - if (to say) Ike had come

(f) ási nà Íke gà-àbị́a - if to say Ike will come

(g) Íke bịá - if Ike comes/came

(ii) (a) ó kwùru ókwu - he spoke

(b) ọ́ gà-èkwú ókwū - he will speak

(c) ọ́bụrụ nà ó kwùru ókwu - if he speaks/spoke

(d) ọ́bụrụ nà ọ́ gà-èkwú ókwū - if he will speak

(e) ásị nà ó kwùru ókwu - if (to say) he had spoken

(f) ásị nà ọ́ gà-èkwú ókwū - if to say he will speak

(g) ó kwúo ókwū - if he speaks/spoke

(iii) (a) ànyị́ hụ̀rụ yá - we saw it

(b) ànyị́ gà-àhụ́ yā - we will see it

(c) ọ́bụrụ nà ànyí hụ̀rụ yá - if we see/saw it

(d) ọ́bụrụ nà ànyị́ gà-àhụ́ yā - if we will see it

(e) ásị nà ànyị́ hụ̀rụ yá - if (to say) we had seen it

(f) ásị nà ànyị́ gà-àhụ́ yā - if to say we will see it

(g) ànyí hụ́ yā - if we see/saw it

(iv) (a) Óti bìri égwu - Oti ended the dance

(b) Óti gà-ébi égwū - Oti will end the dance

(c) ọ́bụrụ nà Óti bìri égwu - if Oti ends/ended the dance

(d) ọ́bụrụ nà Óti gà-ébi égwū - if Oti will end the dance

(e) ásị nà Óti bìri égwu - if to say Oti ended the dance

(f) ásị nà Óti gà-ébi égwū - if to say Oti will end the dance

(g) Óti bié égwū - if Oti ends/ended the dance etc.

In the above examples, we can observe that the verb in the conditonal phrase can be marked for tense when the conditional morphemes are used in the construction (cf. phrases (c) - (f) above), however when the conditional morphemes are not used the verb is not marked for tense, and in the latter case only the root morpheme plus a high tone open vowel suffix are used to express the conditional meaning of the utterance.

There are other sentence constructions in Igbo with similar tonal behaviour. Such sentences which have implied conditional meaning, is often used to express some actions which are sequentially ordered. This will be illustrated by the following examples.

39. (a) Íke gwùruru jí; Óti gwùruru édè - Ike dug yam for himself; Oti dug cocoyam for himself.

(b) Íke gwǔru jī, Óti ègwúru édè - when (if) Ike digs (dug) yam for himself, Oti digs/dug cocoyam for himself.

(a) Ógù gbùru éfi; Ézè gbùru éwu - Ogu killed a cow; Eze killed a goat.

(b) Ógù gbùru éfi, Ézè gbúo éwū - Ogu killed a cow, and Eze killed a goat

(c) Ógù gbúo éfī, Ézè ègbúo éwū - if (whenever) Ogu kills/killed a cow, Eze would kill a goat.

(d) Ógù kwúo ókwū, Ézè èkwúo - whenever Ogu speaks, Eze would also speak.

(e) Ógù kèé íhē, Ézè èkèé - when Ogu shares up (divides) the items, Eze will do the same. etc.

We can observe that the tones of the verbs in the above sentences that express actions that are conditionally and sequentially ordered with respect to one another, are the same with those described earlier about conditional sentences in Igbo. We can also observe that when this type of tone pattern occurs on the verb of the second (final) phrase, it is only the sequential ordering of the actions that is implied, but when this pattern of tone occurs on the verbs of both phrases in the sentence, then conditionality is also implied in addition to the sequential ordering of the actions.

It is equally evident that like the open vowel suffix, any suffix morpheme which is used in place of this vowel suffix carries a high tone as in the second sentence in the above examples.

6.5.3. THE RELATIVE CLAUSE CONSTRUCTION IN IGBO

A relative clause in Igbo is mainly distinguished from the non-relative clauses through tone. The tones of the verb in the clause, which in the nonrelative clause are usually low tones, are raised to downstep. The tonal behaviour in the relative clause may also affect the tone of the noun subject, that is, when the noun ends with a low tone, in which case the low tone is raised to downstep tone which is relatively higher than that of the verb and lower than the preceding high tone, where the noun has a high - low tone pattern, or otherwise the final low tone of the noun is raised to high, when the noun has a low - low tone pattern. The following examples illustrate the type(s) of tone changes that are motivated by the relative clause construction in Igbo.

40. (i) a. éwu rìri jí - goat ate the yam

b. éwu rīri ji - the goat that ate the yam

(ii) a. ànyị́ kwùru ókwu - we spoke

b. ànyị́ kwūru okwu - we who spoke

(iii) a. Òbí gàra áhịa - Obi went to market

b. Òbí gārа ahia - Obi who went to market

(iv) a. Óti gbùru ágụ̄ - Oti killed a leopard

b. Ótī gbūru agụ̄ - Oti who killed a leopard

(v) a. Ọ́jị́ hụ̀rụ ágụ̄ - Ọjị saw a leopard

b. Ọ́jī́ hụ̄rụ agụ̄ - Ọjị who saw a leopard

(vi) a. ḿbè rìri jí - tortoise ate the yam

b. ḿbē rīri ji - the tortoise that ate the yam

(vii) a. òbodo gbàra ọ́sọ - the town fled

b. òbodó gbārа ọ́sọ - the town that fled etc.

6.6. THE DOWNSTEP

The term downstep, as it is used in the present tonological theory, entails a wide range of tone features. Following Winston (1960) and Stewart (1965), this term is used to describe the type of 'Middle' tones defined by Christaller (1875) as 'high tones that abate by one step or successive steps', and also in his dictionary of Akan (1891), as 'the tone following after a high tone and descending by one step in pitch'.[78]

Stewart (1965) distinguishes between 'automatic' and 'non automatic' downsteps. Automatic downstep represents those cases where an intervening low tone causes a drop in the pitch of the high tone that immediately follows. This has been illustrated in some of the examples given in the preceding discussions.

The non automatic downstep represents the case where there is a drop in the pitch of a high tone that is preceded by another high tone, i.e. where there is no visible evidence of a low tone that causes the pitch drop. This type of downstep occurs in words such as,

41	ébē	[¯ -]	yam beetle
	ézē	"	teeth
	ńkịtā	[¯ ¯ -]	dog
	óberē	"	small etc.

In the current views on downstep, it is believed that both types of downstep - the automatic and the non automatic downsteps - are related. It has been argued in Stewart (1965), Williamson (1971), Fromkin (1972) and in other places, that the non automatic downstep is derived from the automatic downstep. Fromkin (1972) argues, for instance, that in certain constructions a low tone bearing segment or morpheme is deleted but the low tone survives to effect the lowering of a following high tone in the construction before the low tone itself is deleted. The lone example which has been used by Williamson (1971) and Fromkin (1972) to illustrate this argument of non segmental

For footnote 78, see the next page.

tone comes from the following pronoun + noun construction, representing a possessive construction in Akan language.

41. / mé ɔ̀ bó/ my stone (to which the following rules apply to derive the downstep)

mé Ø̀ bó – by deletion of the nominal prefix other than tone

mé bó' – by downstep rule

It has been generally argued from this, that for all cases involving the lowering of the pitch of a high tone, where there is no visible low tone in the structure to account for the lowering, a non segmental low tone could be reconstructed to account for the lowering of the pitch in the high tone. Such a non segmental low tone which is not present in the structure is known as the floating tone.

The claims made in the current views about downstep can be summarized as follows:

(i) the automatic and the non automatic downsteps are related in the manner described above;

(ii) all types of downstep tones are not basically different from high tones. Consequently those languages with downstep, such as Igbo, are treated as two tone languages, having only high and low tones.

We find such views about the downstep very inadequate and unacceptable, especially with particular reference to the Igbo language. In Igbo the automatic downstep and the non automatic downstep cannot be treated as the same in that they are functionally different and both are independently motivated in the language. In the preceding discussions, we have shown how the non automatic downstep is used in this language to achieve lexical and different grammatical functions.

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78. Christaller, J.G. 1875. A grammar of the Asante and Fante language called Tshi, Basel Evangelical Mission Society, Basel.

1881 (reprinted 1933). Dictionary of the Asante and Fante language called Tshi, Basel Evangelical Mission Society, Basel.

Through the tonetic relationships between the high tone syllable and the syllable bearing a downstep tone, a lexical contrast can be obtained, such as in the examples given in (12) above, which will be repeated here.

42. a.	ébe	[ˉ ˉ]		where, place
	ébē	[ˉ ˗]		yam beetle
b.	ńgwa	[ˉ ˉ]		haste
	ńgwā	[ˉ ˗]		fire
c.	m̀mà	[ˉ _]		knife
	m̀mā	[ˉ ˗]		beauty
d.	ílo	[ˉ ˉ]		enemity
	élō	[ˉ ˗]		mushroom
e.	ekpe	[ˉ ˉ]		a will
	íkpē	[ˉ ˗]		judgement
f.	ígwē	[ˉ ˗]		sky
	ígwè	[ˉ _]		iron
g.	ézē	[ˉ ˗]		teeth
	ézè	[ˉ _]		king, ruler
h.	ụ́lọ̀	[ˉ _]		house
	ụ́lọ̄	[ˉ ˗]		clay etc.

Similarly, the non automatic downstep is used in Igbo to achieve certain grammatical functions. Examples of some of the cases where the non automatic downstep is used for this purpose have been discussed above.

On the other hand, it would be significant to note that in this language, the automatic downstep is not used to achieve any lexical or grammatical function. The automatic downstep in Igbo is, as Ward (1936) correctly remarked, essentially a natural phonetic process which is due to 'the influence of the preceding low tone which pulls down the high tone to a lower level of pitch', or as Ward also remarked, 'the natural tendency to fall towards the end of a sentence.'[79] Neither of these has any lexical or grammatical implication in the language. In other words, this type of downstep, unlike the non automatic downstep, does not have any lexical or grammatic function in the language. This also shows that the two types of downstep are differently motivated in the language.

It is customary in recent analyses of downstep to postulate non segmental floating tone to account for the downstep wherever it occurs. Thus from the example from Akan language, Williamson (1971: 84) concludes that "if we wish to account for the class 5 nouns (i.e. nouns with high - downstep tones in Igbo), it is clear that a nonsegmental low must also be postulated in their underlying form".[80] That is, words like ọ́nṵ̄, ébē, ézē etc. would be represented as ọ́ `nú, é `bé, é `zé respectively, in the underlying form. Apart from the example discussed from Akan language, Williamson did not provide any evidence from Igbo language to justify this proposal. It has not been shown that these nouns with downstep tones had at any time a low tone segment in their structure, and/or that the low tone segment had been deleted either through a diachronic or synchronic phonological process, just as this was shown in the Akan language. No evidence or proof that would support this claim can be found in Igbo.

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79. Ward, I.C. 1936. opus cit. p. 16.

80. Williamson, Kay 1971. "Some alternative proposals for the Igbo Completive Phrase", Tone in generative phonology, Ian Maddieson, ed. : Research Notes, vol. 3. Dept. of Linguistics and Nigerian Languages, University of Ibadan.

One of the problems about the nonsegmental floating tone hypothesis is the fact that the hypothesis takes a lot for granted; from one isolated case, a series of generalizations are made, with no attempts to justify the hypothesis in the areas covered in the generalizations. Some important questions remain unexplained about the nonsegmental floating tone. For instance, one would seriously question the validity of the very concept and especially the conclusions and the generalizations being made about the floating tone with respect to <u>every</u> occurrence of downstep, such as the one cited from Williamson (1971). The type of phrase construction discussed by both Williamson and Fromkin from the Akan language is very common in the Igbo language, and we would hope in many other languages with this type of tone system. In Igbo, just as in Akan, downstep usually occurs in the structures that match the one discussed from Akan, and apart from this, downstep occurs in other cases within similar constructions as well as in other cases not related to this type of phrase construction. Compare the following constructions in Igbo where downstep occurs.

43.	dé	'write'	ịdē (inf.)	to write
	gá	'go'	ịgā "	to go
	kwú	'speak'	ịkwū "	to speak
	tó	'grow'	ịtō "	to grow etc.

44. /bé Ọbí/ phonetically realized as bé Ōbi [¯ - -]
Obi's place/home.

/ịsi ọké/ " " " ịsi ōke [¯ ¯ - -]
head of a rat

/ịsi ówu/ " " " ịsi ówū [- - ¯ -]
head of a goat

/àgba ówu/ " " " àgba ówū [_ _ ¯ -]
jaw of a goat

/ènwe ọ́hịa/ " " " ènwe ọ́hī̱a [_ _ ¯ -]
bush monkey etc.

45. Òbí gàra áhịa [_ ¯ _ _ ¯ ¯] Obi went to market

Òbí gāra ahịa [_ ¯ ¯ ¯ ¯] Obi who went to market

Íke kwùru ókwu [¯ ¯ _ _ ¯ ¯] Ike spoke

Íke kwūru ókwu [¯ ¯ ¯ ¯ ¯ ¯] Ike who spoke

éfi rìri jí [¯ ¯ _ _ ¯] cow ate yam

éfi rīri ji [¯ ¯ ¯ ¯ ¯] cow that ate yam

Égbò rìri jí [¯ _ _ _ ¯] Egbo ate yam

Égbō rīri ji [¯ ¯ ¯ ¯ ¯] Egbo who ate yam etc.

The above sentences and phrases represent some of the constructions where downstep occur in Igbo, that is, apart from the lexical items (nouns in particular) where downstep occurs as contrastive tone. Out of these constructions, it is only the phrase constructions represented in (44) above, and more specifically, only the first phrase used in the examples, (bé Ōbi), that was used by Fromkin (1972) and Williamson (1971) to determine the very nature of the downstep hitherto treated as the non automatic downstep. This particular type of phrase construction, such as /mé ɔbó/ in Akan, which is phonetically realized as mé bō((the low tone nominal prefix having been lost) which in all respect is similar to the example used in Igbo, only that the low tone segment is not deleted in this case and which I am sure would make no difference in Igbo if the low tone segment were deleted) was specially attractive because of the existence of a low tone morpheme/segment before the high tone that is downstepped. However, as we can see from the examples in (44) above where the phrases have in one way or another the possessive meaning, the downstep occurs also in words with high-high tones when such words are used in the final position in the phrase.

In the latter case there is no low tone segment to account for the downstep, and it would be unrealistic to postulate such a low tone as Williamson did. Perhaps the most revealing fact from the examples contained in (44) above, with respect to the claims made by Fromkin and Williamson (namely, that the downstep that occurs ' bó' is due to the low tone syllable that is juxtaposed to the high tone syllable), is that in the phrase /àgba ówu/ or /ènwe ọ́hịa/ which are phonetically realized as àgba ówū and ènwe ọ́hī̱a respectively; though the first high tone syllables of ówu and ọ́hịa are immediately preceded by low tone, yet these high tones are not downstepped, rather it is the final high tone syllables in these words that are downstepped. In other words, it will not be correct to claim that the downstep that occurs in the words used in these phrase constructions, and this includes the example discussed from Akan, is necessarily due to a low tone that is juxtaposed to the high tone syllable in the word, because,as we have shown from Igbo, the downstep would occur even if such a low tone syllable is not present in the word. Similarly, it will be much more unrealistic to say that all downsteps, that is, all non automatic downsteps, have the same origin and should be accounted for as the downstep that occurs in the possessive phrase constructions, for as we have seen from the examples given above of the areas where downstep occurs in Igbo, not only is it true that the non automatic downstep in Igbo is not necessarily associated with the existence or the presence of a low tone, but also it is equally true that the occurrence of downsteps in the different construction types are differently motivated.

What concerns the nonsegmental floating tone, we should note that Williamson (1971) had developed this notion from a work done earlier by Fromkin and Schachter (1968) on Akan language where the relatedness of the automatic and non automatic downsteps was illustrated with the example mentioned above. According to Williamson (1971) the non-segmental floating tone is postulated wherever a downstep occurs to account for the downstep. In the preceding discussions we have pointed out the inadequacy of the claim that every occurrence of downstep implies the existence of a low tone segment that causes the downstep.

The nonsegmental floating tone theory runs into many difficulties in tonology. In the first place, the very idea of the nonsegmental floating tone and the way this should be used in tonology are not clearly defined. Nonsegmental floating tone is postulated in the lexical items, such as the class 5 nouns; in the infinitive; in the possessive/associative phrase constructions; in the relative clause constructions and in fact in any place and/or construction where downstep occurs. The natural question here is where does the nonsegmental tone come from; according to the analyses given by Williamson (1971), the nonsegmental floating tone is supposed to result from a segment or morpheme which has been deleted or lost in the structure, but whose tone survives. Should it be the case then that a morpheme or a segment has been deleted in every one of these nouns and constructions where downstep is present? Suppose for the moment that this is the case, which is not likely though, and let us suppose that this is the case with the infinitive construction in Igbo; one thing we are not sure about is from where the segment or morpheme was deleted, whether from the words (verbs) that are used in the construction or whether this is a morphological segment, in which case we do not know whether the floating tone is a lexical tone or a morphological tone or both. Suppose that in the case of infinitive construction, this is a low tone morphological segment, i.e. a morphological tone, which is used for forming the infinitive construction; this is so because in the verbs (the high tone verbs) in whose infinitive forms the floating low tone is postulated to account for the downstep that results from the infinitive forms, such nonsegmental floating tone is never postulated when these verbs occur in isolation. The nonsegmental floating tone in this case is therefore a morphological toneme used for the formation of the infinitive. The question here is why this morphological toneme is postulated <u>only</u> with respect to high tone verbs and never for the low tone verbs? If the nonsegmental floating tone is to represent a systematic theory in the language, it should be postulated for both the high tone and the low tone verb infinitive forms. The same argument would also be required for some cases of possessive construction in Igbo where the floating tone is never postulated, and in fact for other similar constructions where

downstep occurs at some places, but where the floating low tone is never postulated in the places where the downstep does not occur. The floating tone is not postulated in these cases because different and unacceptable phonetic out-put would result in these cases. For instance, the introduction of a floating low tone in the infinitive construction of a low tone verb would make the tone of the verb to be raised to high, thereby giving unacceptable result. Generally, the attitude of pick and choose on when to use the nonsegmental floating tone, whereby it is only used when a downstep occurs, shows the inconsistency and contradiction with which this theory is marked.

In the derivational history of mé bó from /mé ɔ́-bó/ given in Williamson (1971: 29), the rule that deletes the nominal prefix was ordered before the Downdrift rule (i.e. the rule that lowers the pitch of the high tone on bó). This has the result of leaving a non-segmental low tone. However we would very much disagree with the ordering of these rules. Within such an environment where a low tone syllable precedes an immediately following high tone syllable in the same word, one would naturally expect that the downdrift rule should apply automatically, and the rule that deletes the nominal prefix would apply later. The reverse would be very unnatural. In other words, if the rules had been allowed to apply in the more natural order, we then would not have a floating tone, hence the nonsegmental floating tone had been arrived at through improbable rule ordering.

The way the nonsegmental floating tone should operate in the derivation of the downstep is not defined. When used to derive a downstep, the operation of the floating tone is totally unconstrained. Thus, it is not only that the floating tone is only introduced when downstep occurs, irrespective of whatever morphological/syntactic construction is involved, as in Williamson (1971), but also in the operation of the floating tone, it is given such power that is rarely seen in any phonological analysis, to hop and skip at will, thereby evading any known constraints, until the floating tone gets to where we want it to be. This makes the floating tone become like a child's game

in phonology. A point of view was expressed in Hyman (1974a) that the floating tone which causes the downstep in the nominals comes from a low tone nominal prefix which has been synchronically lost in these words, and Hyman also claims that all Igbo nominals at one time had such a low tone nominal prefix. Hyman however did not provide one single evidence from the language of a synchronic fact that would lead to such a diachronic rule; perhaps the only evidence was that downstep occurs in these nominals. As we know from most cases of diachronic change in other languages, a diachronic change such as the one Hyman postulates for Igbo usually leaves some vestige, some left-overs, in the synchronic grammar that would lead to the discovery and reconstruction of the proto-types. No such concrete evidence has been given by Hyman (1974a) or by Williamson (1971) or by Voorhoeve et al. (1969), where the floating tone theory has been discussed for Igbọ, to show from any known synchronic example that such a segment ever existed in these nominals. In the known synchronic examples, where a segment is either deleted, assimilated to or merged with another segment as a result of certain phonological processes in the language, we find that the tone of the deleted or assimilated segment is usually not assimilated in the process, and this tone is not left to float around, but rather is always recovered on the segment that remains after the assimilation. For example,

46. /nwáànyị̀/, written as nwanyị̀ (where the two vowels have been merged) is pronounced as [ˉ _ _] - nwânyị̀ ;

/Òkéàfọ̀/, written as Òkàfọ̀ (due to vowel assimilation), is pronounced as [_ ˉ _ _] - Òkâfọ̀

/ágwụ̀ bụ̀ íló/, written as agwụbilo, (due to vowel assimilation), is pronounced as [ˉ _ _ ˉ ˉ] - ágwụ̀bílló etc.

The tones of the assimilated segments in the above and similar examples in the language, do not go or skip to anywhere beyond the environment where the segments had existed. In fact going through all the cases we know of in the language, where a tone-bearing syllable might

have been deleted or merged with another syllable as a result of some phonological or morphological process, (and especially in the cases where such process is not easily known to a non trained native speaker), we cannot find any evidence to support the floating tone hypothesis in Igbo language.

Similarly, the hypothesis that all nominals in Igbo had a low tone nominal prefix has not been proved, and to the best of my knowledge cannot be convincingly proved by Hyman. This is merely an assumption that has not been supported by facts. In the discussions given earlier, we noted that a great many nouns in Igbo have only high tones, and in most of them no downstep occurs. If it were the case that these nouns had low tone nominal prefixes, and that the floating tone of such prefixes causes downstep, or should cause downstep in such nouns, I wonder what explanation can be given for the nonoccurrence of downstep in these nouns. It is true that the prefix o/ọ used in the formation of nominals from Igbo verbs, and more specifically in the formation of verbal nouns and agentive nouns, usually carry low tone, however, we have also such nominals like

47. émume [¯ ¯ ¯], (formed from the verb mé 'do') - ceremony

ázị̀zá [¯ _ ¯] " " " " zá 'reply') - an answer, a reply

ókwùkwú " " " " " kwú 'speak') - talkativeness

ájụ̀jú " " " " " jú 'ask') - question

éjìjé " " " " " jíjè 'mimic, imitate') - mimicry, imitation,

ásụ̀sú " " " " " sú 'speak a language') - language etc.,

which are also derived from verbs, but where the vowel prefix does not carry a low tone. Note also the following cognate verb - noun forms which are most common in Igbo language, and where what we

can regard as the nominal prefix usually carry high tone. For example,

48. kwú - speak
ókwu - speech

jé - go, walk (the same as gá)
íjè - walk (n.), journey

kụ̀ - labour
ọ́kụ̀ - wealth (the result of one's labour)

bú - carry
íbu - load

mụ́ - give birth to
ụ́mụ̀ - children, issue

lụ́ - defile
álụ̄ - abomination etc.

If it were the case that all Igbo nominals had low tone nominal prefix, one would naturally expect that what in all respects can be considered as nominal prefixes in the above examples, should carry low tones; note that even where the verb is a low tone verb, the tone of the vowel prefix is high.

The floating tone, as we mentioned above, is highly unconstrained when it is used to derive a downstep. To illustrate this we had to first give the argument above about the low tone nominal prefix from where the floating low tone is supposed to result in the language. Thus, granted that the hypothesis about the low tone nominal prefix is correct (which we have shown to be completely unfounded in the language), it means that in the underlying forms of nouns such as ńkịtā, 'dog'; átụrụ̄, 'sheep'; íherē 'shame'; ńkpụrụ̄ 'seed'; ágụụ̄ 'hunger', and all the other trisyllabic nouns of similar tonal structure, where downstep occurs on the third (final) syllable, we have to posit a floating low tone initially in such words to account for the downstep as shown below.

49. ` ńkʃtá

` átụ́rụ́

` ʃhéré

` ńkpụ́rụ́

` ágụ́ụ́ etc.

If the floating tone were to be constrained, in line with how tones naturally affect one another in Igbo or in any other tone language, the floating tone would affect only and only the tone adjacent to it. In all the synchronic operation of tones or tone rules in these languages, this is what naturally obtains, even generally in phonology one never finds a case where the structural descriptions of a rule are met and the rule does not immediately apply or skips that environment and goes to apply somewhere else. Rather we note that in the case of the floating tone, it not only skips the first environment but also the second environment both of which meet the structural description that when a low tone precedes a high tone the high tone is lowered in pitch, and goes all the way to lower the third high tone in the succession. This, I should think, makes the floating tone a very strange rule, and in fact the first of its kind in phonology. To get rid of the many awkward positions which the floating tone gets into, such as the one just discussed, Williamson (1971) deviced many rules, such as the Metathesis rule, which is supposed to lift the floating tone and place it where we want it to be, and the Coalescence rule, which would coalesce the floating tone when many of them are used and some of them become redundant. Arguments against these rules can only bring us into a vicious circle. For instance, the metathesis rule is introduced merely to lift the floating tone from the place where it naturally appears and to take it, skipping as many structural descriptions as possible that have been met along the way, to the place where we want the floating tone to be. This, in fact does not get us out of the basic problem, rather it helps to make the floating tone theory more complicating.

The coalescence rule, as indicated earlier, coalesces redundant floating tones, such as in the derivation of éze éwū, which is derived from /ézē éwu/. Using the floating tone theory, this would be represented as / ` ézé ` éwú/ in the underlying form. If we were to allow all the floating low tones to operate in this underlying form, we would have unacceptable phonetic output, something like ézē éwū, which is unacceptable. To resolve this, the metathesis rule transfers the first floating low tone and locates it adjacent to the second floating low tone, thus /ézé ` + ` éwú/, whereby both floating low tones can be merged or coalesced, and other rules would apply to derive ézé éwū. Many questions can be raised here with respect to the operation of these rules. In the first place, the coalescence of consecutive low tones especially when the low tones represent different morphemes in a structure is not supported by synchronic evidence in Igbo. In the synchronic tonology of Igbo, when two low tones, representing different morphemes, are located adjacent to each other, one of the low tones causes the other to be raised to a high tone. This has been partly illustrated earlier where a low tone morpheme which can be either an affix or a verb root, occurs with a low tone verb, and the same phenomenon will be further illustrated in the discussions that will follow later.

Finally, apart from the inconsistencies and contradictions that underly the floating tone hypothesis and the lack of any evidence from the language to support this theory, it is important to note that the effect which this theory would have in tonological analysis would be to destroy the phonological significance of tone in tone languages. According to the way the floating tone has been used in Voorhoeve et al (1969), Voorhoeve (1973), Hyman (1972a), Williamson (1971),and other places, the floating tone is introduced wherever any tone change occurs. This practically amounts to denying the essential functions of tone in a tone language. The functions of tone in a tone language are much comparable to that of phoneme in phonology. As phoneme, tone is used in tone language to achieve both lexical and grammatical functions. That is, in the lexicon tone is used to achieve contrasts between words, and the various

relationships between words and phrases in a sentence or between different sentences in the grammar can be, and is, expressed through the changes in the lexical tones. In the same way, the relationships between words in certain grammatical constructions can affect the tones carried by these words. When, for instance, we have a process of palatalization in phonology, we do not rely on the assumption that some external floating nonsegmental palatal is responsible for the palatalization, and this goes for all the phonological processes that occur in a language. It has always been the understanding in phonology that such changes which the phonemes undergo in the phonological processes result from the different grammatical and phonological relationships that exist between words used in speech. We do not therefore understand why the situation with the changes in the lexical tones of words that enter into certain phonological and grammatical relationships should be treated differently by calling in an external nonsegmental floating tone to account for such changes. This is exactly what the nonsegmental floating tone theory does in tonology.

In the present work, for the reasons given above, we will not incorporate the floating tone theory into our analysis of tone and tone changes. There is no way we can justify the floating tone theory and/or the use of the floating tone to account for genuine tone changes which have essential significance, with essential grammatical and/or lexical information in the tonology and in the language as a whole. In Igbo the existance of a tone basically implies the existence of a segment on which the tone can be realized; a tone cannot practically exist or float about, unless that tone is realized on a segment. Changes in the lexical tones of words that occur in certain constructions will not be accounted for through the floating tone mechanism. Rather such changes in tone will be treated as relating to or significant to the constructions in question, with respect to the words used in the constructions. What concerns downstep, which as we noted, has been the most sensitive point in Igbo tonology, our point of view in this respect has been clearly stated. We shall treat downstep first and foremost on its

own merits, i.e. in relation to the functions which this toneme fulfils in the language. We have shown through the arguments given above that, though this toneme, the downstep, is constrained in the language, with respect to its co-occurrence with low tone, however, we have not seen enough evidence to treat the downstep ˛ as being the same as the high tone in Igbo. In as much as we admit the limitations of the downstep in this language, in the sense that it does not occur after a low tone, we also admit the fact that functionally, the downstep has its own qualities different from that of the high tone. The case of downstep in Igbo and similar tone languages, with reference to the view held about the downstep in Igbo, can be likened to a case of say /sh/ in Russian, or /ŋ/ in English. In Russian, for instance, /sh/ occurs in relatively very few words in the lexicon, just as /ŋ/ in English, and the occurrence of /sh/ in Russian, just as that of the downstep in Igbo, is constrained, in that /sh/ can only be followed by what is known as 'the soft' vowel, i.e. the front vowel, usually /i/. However, similar to what we have about the downstep in Igbo, in Russian morphology, /sh/ is known to occur more often than most other phonemes, despite the constraints; this is due to the fact that in many contexts in the morphology, /t/ and /s/ change to /sh/. Despite all this (a situation that exactly matches that of the downstep in Igbo) it has never been argued or suggested that /sh/ is not an independent phoneme in Russian, different from /t/ or /s/, or that this phoneme,/sh/, is underlyingly /t/ or /s/ in that language. The phonemic status of /sh/ in Russian or of /ŋ/ in English has never been doubted mainly on the basis of the contrast which these phonemes have been able to bring in the respective languages, eventhough such a contrast has been possible only between one or two pairs of words in the language. On this parallel we should treat the downstep as a toneme different from the high tone in Igbo.

In terms of the tone changes that occur in the language,(a point that has been often used against the downstep in Igbo), we find that a high tone can be lowered to a downstep in as much as a downstep can be raised to a high tone in certain constructions, and sometimes in the same type of constructions a high tone can be lowered to a

low tone, and a low tone can be raised to a downstep or to a high tone. To single out only one from the chain of the relationships that exist in the tones of the words that are used in the same type of phrase construction (which is reflected through the changes that occur in the lexical tones of the words), and treat it as an isolated case would not give us a good understanding of the tone or tones in question or of the tone relationships peculiar to such phrase construction in the language. Furthermore, in the analysis which was used to arrive at the conclusion about the downstep - high tone relatedness, it was only the case where downstep occurs in a word with low - high tones that was used in arriving at this conclusion, thereby ignoring the fact that in the same type of phrase construction in Igbo, a downstep occurs in a word with high - high tones which is located in the same environment as the former. In other words, such an analysis can be regarded as incomplete, and the conclusion arrived at through this incomplete evaluation of the facts cannot be regarded as accurate. In the discussions that will follow we shall look into the different constructions where downstep occurs in Igbo language. In the preceding discussions, we have shown that downstep occurs in many words in the language, and in some of the words it serves as the minimal contrast with other words; we also showed that downstep occurs in the infinitive construction of the high tone verbs. When the high tone infinitive prefix occurs with a high tone verb, the tone of the verb is downstepped.

In the discussions on how the relative clause is formed in Igbo (cf. 6.5.3. above) we noted that the main difference between the relative clause and the corresponding nonrelative clause is brought about by the change in the tones of the verb in the clause. This mainly entails the raising of the tones of the verb from low (when the action expressed in the clause is in the past tense) to downstep. Generally the tone pattern of the relative clause in the language is the same whether the action refers to the past tense or not; what usually happens when the action refers to the present or to the future tense is that the vowel prefix or the performative prefix which in either of these cases carries a low tone,

as well as the tense markers 'nà' and 'gà' which also carry low tones, all carry downstep tone in relative clause and the high tone of the verb, where this obtains, is lowered to downstep or rather is assimilated to the downstep tone of the preceding segments. Downstep also occurs in some cases in the completive phrase constructions as well as in the genitival phrase constructions in Igbo. From the syntactic point of view these two types of phrase constructions are formed exactly in the same way, the difference being mainly on semantic basis. Syntactically, both the completive phrase and the genitival phrase constructions are formed through collocation of two nouns; the possessive meaning is implied if one of the nouns, usually the second noun, refers to a human being, but when this noun does not refer to a human being, the completive or associative meaning is implied. However, in Igbo the difference between the two types of phrase constructions is clearly indicated through tone.

6.6.1. THE COMPLETIVE PHRASE CONSTRUCTION

The completive phrase construction has been widely discussed in the previous studies relating to tone in Igbo. This, I think, is due to the systematic tone patterns that can be shown in Igbo through this type of phrase construction. Thus, it was on the basis of the tone patterns manifested through the completive phrase construction that Ward (1936) formulated what she termed as the tone patterns of Igbo, and later Green and Igwe (1963) formed what they called the tone groups in the language, also on the basis of the patterns of tones shown in the completive phrase construction. Voorhoeve et alia (1969) and later Williamson (1971) used the completive phrase construction in Igbo to discuss the downstep and the floating tone theory. We can therefore see that the completive phrase construction has been in the centre, and consequently the main source of all the theories so far formulated about Igbo tonology.

The completive phrase construction, sometimes called the associative construction, is formed in Igbo by juxtapositioning of two nouns, by which it is said that one noun is characteristic of or associated

with the other noun. In some languages this would be interpreted as indicating a possessive case, though as we pointed out above, in Igbo this type of phrase construction is differentiated from the possessive case construction. In the examples of completive phrases to be given below, we shall, for the sake of convenience, number the nouns that are used in the phrase as N^1 and N^2 respectively.

50.(i)

N^1	N^2 (H - H)		
/ísí /	/ ówú /	ísi ówū	[¯ ¯ ¯ -] goat head.
/ ńné /	/ ókó /	ńne ókē	[¯ ¯ ¯ -] mother python
/ àkwá /	/ éké /	àkwá ókē	[_ ¯ ¯ -] python egg
/ òké /	/ ọ́hị́a /	òké ọ́hī́a	[_ ¯ ¯ -] bush rat
/ ụ́lọ́ /	/ ówú /	ụ́lọ́ ówū	[¯ _ ¯ -] goat house
/ ńnà /	/ ówú /	ńnà ówū	[¯ _ ¯ -] father goat
/ àgbà /	/ éké /	àgbà ókē	[_ _ ¯ -] python jaw
/ènwè /	/ ọ́hị́a /	ènwè ọ́hī́a	[_ _ ¯ -]
/ ézē /	/ éwú /	éze ówū	[¯ ¯ ¯ -]
/ égō /	/ áhị́a /	égo áhī́a	[¯ ¯ ¯ -] market money etc.

(ii) N^1 N^2 (L - H)

/ ísí /	/ òkó /	ísi ōke	[¯ ¯ - -]	rat head
/ ányá /	/òkó /	ánya ōke	"	rat eye
/ ùdó /	/ òkpú /	ùdó ōkpu	[_ ¯ - -]	hat pomade
/ àkwá /	/ ísé /	àkwá īse	"	five eggs
/ ụ́lọ̀ /	/ òkó /	ụ́lọ̄ ōke	[¯ ¯ - -]	rat house
/ ísi /	/ ùdó /	ísī ūde	"	pomade odour
/ àgbà /	/ òkó /	àgbá ōke	[_ ¯ - -]	rat jaw
/ ìtè /	/ ùbé /	ìté ūbe	"	pot of pear
/ ézē /	/ òkó /	éze ōke	[¯ ¯ - -]	rat teeth
/ égō /	/ àkwá /	égo ākwa	"	egg money etc.

(iii) N^1 N^2 (H - L; L - L; H - D)

/ ísí /	/ ḿbè /	ísi ḿbe	(no change in tone)	tortoise head
/àkwá /	/ ḿbè /	àkwá ḿbè	"	tortoise egg
/ ísì /	/ égbè /	ísì égbè	"	smell of gun
/ àgbà /	/ ḿbè /	àgba ḿbè	"	tortoise jaw
/ísí/	/ ùgò /	(L-L) ísi ùgo	"	eagle head
/ òkó /	/ ìsì /	òkó ìsi	"	blind rat
/ ísí /	/ ònwè /	ísi ònwe	"	monkey head
/ ùdó /	/ àlà /	ụ̀dó àla	"	peace of the land

N^1	N^2 (H - D)			
/ ísí /	/ ébē /	ísi ébē	(no change in tone)	beetle head
/ àkwá /	/ ńzā /	àkwá ńzā	"	wren egg
/ égbè /	/ ígwē /	égbè ígwē	"	'sky gun' , used to mean 'thunder'
/ àgwà /	/ ágụ̄ /	àgwa ágụ̄	"	leopard colour etc.

(iv)

N^1 (H - L)	N^2			
/ ísi /	/ éwú /	ísì éwū	(no tone change in N^1)	goat smell
/ íjè /	/ ényí /	íjè ényī	"	elephant walk
/ égbè /	/ ígwē /	égbè ígwē	"	thunder
/ ḿkpà /	/ égō /	ḿkpà égō	"	the need of money
/ égbè /	/ ígwè /	égbè ígwè	"	iron gun, metal gun
/ égwù /	/ égbè /	égwù égbè	"	fear of gun
/ ụ́lọ̀ /	/ òké /	ụ́lọ̄ ōke	[¯ – – –]	rat house
/ ísi /	/ òké /	ísī ōke	"	rat smell
/ḿbè /	/ ìsì /	ḿbē ìsi	[¯ – _ _]	blind tortoise
/ ḿbè /	/ àlà /	ḿbē àla	"	land tortoise
/ ọ́nyà /	/ òké /	ọ́nyā ōke	[¯ – – –]	rat trap
/ úkwù /	/ ènwè /	úkwū ènwe	[¯ – _ _]	monkey waist
/ ézè /	/ àlà/	ézē àla	"	king of the land etc.

(v) N^1 (L - L) N^2

/ àgbà /	/ éwú /	àgba éwū (no tone change in N^1)	goat jaw
/ ǹkù /	/ égbé /	ǹku égbē (")	kite wing
/ àgbà /	/ ágụ̄ /	àgba ágụ̄ "	leopard jaw
/ àkpà /	/ égō /	àkpa égō "	bag of money
/ àlà /	/ ụ́lọ̀ /	àla ụ́lọ̀ "	floor of a house
/ ìtè /	/ ígwè /	ìte ígwè "	iron pot
/ àgbà /	/ òké /	àgbá ōke [_ ¯ - -]	rat jaw
/ àkpà /	/ ùbé /	àkpá ūbe "	bag of pear
/ àgbà /	/ ènwè /	àgbá ènwe [_ ¯ _ _]	monkey jaw .
/ àkpà /	/ àgwà /	àkpá àgwa "	bag of beans
/ ǹkù /	/ ùgò /	ǹkú ùgo "	wing of an eagle etc.

(vi) N^1 (H - D) N^2

/ ézē /	/ éwú /	éze éwū [¯ ¯ ¯ -]	goat teeth
/ ógō /	/ áhị́a /	ógo áhị́a "	market money
/ ọ́nụ̄ /	/ òké /	ọ́nụ ōke [¯ ¯ - -]	rat mouth
/ ḿmā /	/ àkwá /	ḿma ākwa "	the beauty of an egg
/ élū /	/ ụ́lọ̀ /	élu ụ́lọ̀ [¯ ¯ ¯ _]	top of the house
/ ógō /	/ ḿbè /	ógo ḿbè "	the height of tortoise
/ élụ̄ /	/ àkwà /	élu àkwa [¯ ¯ _ _]	top of the bed
/ óhī /	/ ìtè /	óhi ìte "	theft of pot etc.

The tone changes illustrated above in the lexical tones of the words used in the constructions, represent the types of tone changes resulting into the tone patterns associated with the completive phrase constructions in Igbo. Some generalization can be made about the changes in the lexical tones of the words used in the completive phrase construction in the language, namely, that when a noun which carries a final high tone occurs in the N^2 position in the construction, the final high tone changes to downstep (usually the lexical tones of nouns that do not end with high tone do not change when the noun occurs in the N^2 position), and when a noun carrying a final low tone occurs in the N^1 position, the final low tone of the N^1 is raised to a high or downstep, if the N^2 in the structure begins with a low tone. The final low tone of the N^1 is raised to high if this noun has all low tones, i.e. is a low -low tone noun; and the final low tone of the N^1 is raised to downstep if this noun has high - low tones, in which case the raised low tone is always lower than the preceding high tone and at the same time, higher than any downstep that would immediately follow (i.e. when the N^2 that follows begins with a downstep). When the N^1 ends with a lexical downstep, the downstep is raised to high in all cases, i.e. irrespective of the initial tone of the N^2.

As we pointed out in our arguments above against the views currently held about the downstep and the floating tone theory, it can be clearly seen from the examples given above to illustrate the tone changes that occur in the completive phrase constructions that such tone changes are systematically patterned in the language. To take only one case from this connected chain of tone changes and treat it in isolation, without relating it either to the other tone changes in the process, or to the phrase constructions that are involved in the process, would not give us an accurate evaluation and understanding of the tones and tone changes that occur in this language. For instance, in the arguments by Fromkin (1972) and Williamson (1971) to support the view that the non automatic downstep is basically derived from the sequence of a low tone followed by a high tone, only the example of the completive/genitival phrase construction

where the N^1 has low - high tones was used to arrive at that conclusion. However, as it can be seen from the examples of the tone changes that occur in similar phrase constructions in Igbo and most probably in the Akan language as well, the same type of tone change involving the lowering of a high tone to downstep also occurs when the N^1 has high - high tones. The serious question here which touches the basis of the conclusion drawn from the argument by Fromkin and Williamson is whether the tone change in question is not due to the particular phrase construction and not necessarily as a result of the sequence of a low and a high tones in the same word. This becomes significantly so, when we realize that in similar onstructions a low tone which is preceded by a high tone within the same word is raised to downstep, as this happens when such a noun occurs in the $N^{\#}$ position and is followed by a low tone or initial low tone word. In the latter case we cannot say with certainty that a low tone precedes the derived downstep, rather the reverse is the case. Similar examples that illustrate a derived downstep, where we cannot posit any low tone in the words from where the downstep is derived, but rather where we have high tones or high tone word preceding the derived downstep, can be seen in the relative clause constructions in Igbo (cf. 6.5.3. above). In other words, the tone changes that occur in these cases, including the derivation of a downstep from a high tone, should be seen mainly from the stand point of the construction which such tone patterns are used to express in the language.

6.6.2. THE GENITIVAL PHRASE CONSTRUCTION

From syntactic point of view, the genitival phrase construction does not differ from the completive phrase construction in Igbo. Both constructions are achieved by juxtapositioning two nouns. The main difference between the two constructions is expressed in Igbo through tone. We shall compare, in this respect, the tone patterns that result from the genitival constructions with those described above for the completive phrase constructions.

51 (i) N^1 N^2 (H – H)

/ éwú /	/ Íké /	éwu Īke	[¯ ¯ – –]	Ike's goat
/ ńnē /	/ Ífé /	ńne Īfe	"	Ife's mother
/ ɔ̀kpú /	/ Íké /	ɔ̀kpú Īke	[_ ¯ – –]	Ike's hat
/ ùbé /	/ Íké /	ùbé Īke	"	Ike's pear
/ ákwà /	/ Ányá /	ákwā Ānya	[¯ ¯ – –]	Anya's cloth
/ ńdụ̀ /	/ Íké /	ńdụ̄ Īke	"	Ike's life
/ àlà /	/ Ányá /	àlá Ānya	[_ ¯ – –]	Anya's land
/ àkpà /	/ Íké /	àkpá Īke	"	Ike's bag

(ii) N^1 N^2 (L – H)

/ éwú /	/ Èké /	éwu Ēke	[¯ ¯ – –]	Eke's goat
/ ísí /	/ Ùdé /	ísi Ūde	"	Ude's head
/ ɔ̀kpú /	/ Òbí /	ɔ̀kpú Ōbi	[_ ¯ – –]	Obi's hat
/ ùdé /	/ Àdá /	ùdé Āda	"	Ada's pomade
/ ụ́lọ̀ /	/ Àdá /	ụ́lọ̄ Āda	[¯ ¯ – –]	Ada's house
/ ákwà /	/ Òbí /	ákwā Ōbi	"	Obi's cloth
/ àlà /	/ Ùdé /	àlá Ūde	[_ ¯ – –]	Ude's land
/ àkpà /	/ Àdá /	àkpá Āda	"	Ada's bag
/ égō /	/ Àdá /	égo Āda	[¯ ¯ – –]	Ada's money
/ ézē /	/ Òbí /	éze Ōbi	"	Obi's teeth etc.

(iii) N^1 N^2 (H - L)

/ ányá / / Íbè/ ánya Ìbe [¯ ¯ _ _] Ibe's eye

/ ísí / / ézè / ísi èze " the king's head

/ ézē / / ézè / éze èze " the king's teeth

/égō / / Ézè / égo Èze " Eze's money

/ àdá / / Égbò / àdá Ègbo [_ ¯ _ _] Egbo's daughter

/ òkpú / / Íbè / òkpú Ìbe " Ibe's hat.

/ égbè / / Íbè / égbē Ìbe [¯ ¯ _ _] Ibe's gun

/ édè / / Íbè / édē Ìbe " Ibe's cocoyam

/ éwú / / Ùgò / (L-L) éwu Ùgo (no change in tone) Ugo's goat

/òkpú / / Ǹzè / " òkpú Ǹze " " " " Nze's hat

/ édè / / Ùgò / " édē Ùgo (no tone change in N^2) Ugo's cocoyam

/ ìtè / / Ùgò / " ìté Ùgo " " " " " Ugo's pot

/ ézē / / Ùgò / " éze Ùgo " " " " " Ugo's teeth

etc.

(iv) N^1 N^2 (H - D)

/ éwú / / Égō / éwu Ēgo [¯ ¯ – –] Ego's goat

/ányá / / Ékwū / ánya Ēkwu " Ekwu's eye

/ ézē / / Égō / éze Ēgo " Ego's teeth

/ ńnē / /Ébō / ńne Ēbo " Ebo's mother

/ òkpú / / ńnē / òkpú ńne [_ ¯ – –] mother's (mumy's) hat

/ égbè / / Ébō / égbō Ēbo [¯ – –] Ebo's gun

/ àlà / / Ébō / àlá Ēbo [_ ¯ – –] Ebo's land etc.

(v) N^1 (H - L) N^2

/ Íbè /	/ Ányá /	Íbē Ānya	[¯ ¯ - -]	Anya's Ibe
/ Égbò /	/ Òbí /	Égbō Ōbi	"	Obi's Egbo
/ Égbò /	/ Ùmé /	Égbō Ūme	"	Ume's Egbo
/ Íbè /	/ Égbò /	Íbē Ègbo	[¯ ¯ _ _]	Egbo's Ibe
/Íbè /	/ Ùgò /	Íbē Ùgo	"	Ugo's Ibe etc.

In such contexts where the N^1 constitutes the object that is possessed, in relation to the N^2, it is not easy to find or figure out the nouns that can possess other human nouns. To achieve this we have to imagine a context in which someone, for instance, wants to know more about a person called Ibe or Egbo , Ike and so on. For instance, an answer to the question such as ' Which Ibe (Egbo, Ike ...) is that?'. It is in such contexts that we can reconstruct the genitival tones in the constructions where N^1 is a human noun.

(vi) N^1 (L - L) N^2

/ Àgbà /	/ Íké /	Àgbá Īke	[_ ¯ - -]	Ike's Agba
/ Òdi /	/ Ùmé /	Òdí Ūme	"	Ume's Odi
/ Ùgò /	/ Íbè /	Ùgó Ìbe	[_ ¯ _ _]	Ibe's Ugo
/ Ùgò /	/ Òdi /	Ùgó Òdi	"	Odi's Ugo
/ Ùgò /	/ Ébō /	Ùgó Ēbo	[_ ¯ - -]	Ebo's Ugo etc.

(vii) N^1 (H - D) N^2

/ Égō /	/ Íké /	Égō Īke	[¯ ¯ - -]	Ike's Ego
/ Égō /	/ Ébō /	Égō Ēbo	"	Ebo's Ego
/ Ébō /	/ Ùmé /	Ébō Ūme	"	Ume's Ebo
/ Ébō /	/ Íbè /	Ébō Ìbe	[¯ ¯ _ _]	Ibe's Ebo
/ Ébō /	/ Ùgò /	Ébō Ùgo	"	Ugo's Ebo etc.

The examples of genitival constructions given above will help to illustrate the type of tone changes that occur in the lexical tones of the nouns used in such constructions in Igbo. They also help to illustrate the differences between the completive constructions and the genitival constructions in Igbo, in terms of the tone patterns associated with these constructions. Perhaps one of the more illustrative examples of the difference between the completive and the genitival constructions would be through the contrast in the tonal structures in the following examples.

52 (i) / ísí ówú /

a. ísi éwū [¯ ¯ ¯ ¯] goat head (comp. const.)

b. ísi ēwu [¯ ¯ ¯ ¯] the goat's head (genit. const.)

(ii) / ísí ḿbè /

a. ísi ḿbè [¯ ¯ ¯ _] tortoise head (comp. const.)

b. ísi ḿbe [¯ ¯ _ _] the head of the tortoise (genit.)

(iii) / íkpē ógō /

a. íkpe ógō [¯ ¯ ¯ ¯] judgement about money (compl.)

b. íkpe Ēgo [¯ ¯ ¯ ¯] Ego's judgement

(iv) / ǒkpú ózè /

a. ǒkpú ózè [_ ¯ ¯ _] crown

b. ǒkpú èze [_ ¯ _ _] the king's crown/hat etc.

In the examples above, the N^1 is attributed generically to the N^2. For instance, ǒkpú ózè, means 'crown/ hat, head wear', the type that all kings wear; similarly, ísi éwū/ ḿbè, means 'head', the type that all goats/tortoise have. This is the general sense the completive

phrase has in Igbo. In the genitival phrase, as shown in the (b) examples above, a possessive case is expressed, whereby N^1 is said to be possessed by N^2, and as in 52 (i) b., and (ii) b., when the genitival case is used with non human nouns, it indicates a case of personification, such as one would get in folk tales where an animal is personified. Otherwise, the genitival phrase is never used for nouns that are nonhuman.

In terms of the difference between the changes in the lexical tone of nouns used in the completive phrase constructions and those used in the genitival phrase constructions in Igbo we shall note the following: (i) when a high - high tone noun occurs in the N^2 position, in the completive phrase, a downstep occurs on the final high tone syllable, whereas in the genitival phrase, a downstep occurs on the initial high tone syllable and the subsequent high tone syllable in the word is assimilated to the downstep. (ii) When a high - low tone noun occurs in the N^2 position, in the completive phrase, no change occurs in the lexical tones of such a noun; in the genitival phrase, the initial high tone of this noun is changed to a low tone, thereby resulting into a low - low tone sequence in the noun. (iii) When a high - low tone noun precedes another noun of similar tone structure, in the completive phrase no change occurs in the lexical tones of both nouns; in the genitival phrase, the final low tone of the first noun is raised to downstep, i.e. in addition to the lowering of the initial high tone of the second noun to a low tone (cf. (ii) above). (iv) When a high - low tone noun precedes another noun with high - downstep tones, in the completive phrase, the lexical tones of the first noun do not change; in the genitival phrase, the final low tone of the first noun is raised to downstep which is tonetically higher than the downstep of the second noun. (v) When a low - low tone noun precedes another noun with high - downstep tones, in the completive phrase, the lexical tones of the first noun do not change; in the genitival phrase, the final low tone of the first noun is raised to high. (vi) When a high - low tone noun precedes a noun with high - high tones, in the completive phrase, the lexical

tones of the first noun do not change; in the genitival phrase, the fianl low tone of the first noun is raised to downstep. Similarly, when a noun with high - low tones precedes another noun with similar tone structure, in the completive phrase no change occurs in the lexical tones of both nouns; in the genitival phrase, the final low tone of the first noun is raised to downstep, i.e. in addition to the lowering of the initial high tone of the second noun to a low tone. Generally, it can be observed that when a high - low tone noun occurs in the N^1 position, in the completive phrase, the lexical tones of this noun can only change if the noun in the N^2 position begins with a low tone (in which case the final low tone of the N^1 is usually raised to downstep which is lower than the preceding high tone in the noun, but higher than the downstep which may follow); in the genitival phrase the final low tone of the N^1 is always raised to downstep irrespective of the initial tone of the noun in the N^2 position. (vii) When the noun in N^1 position has low - low tones, in the completive phrase, the lexical tones of this noun can only change if the noun in the N^2 position begins with a low tone (in which case the final low tone of the first noun is raised to high); in the genitival phrase, the final low tone of the first noun is always raised to full high tone, irrespective of the initial tone of the noun in N^2 position. (viii) When the noun in the N^1 position carries high - downstep tones, in the completive phrase the downstep tone is always raised to high tone in all cases; in the genitival phrase, the tones of this noun is still realized as high - downstep in all cases.

In furtherance of the arguments given above, the use of the non segmental floating tone to account for the tone changes encountered in genitival phrase constructions, especially as the tone changes affect the downstep, will obviously run into greater difficulties. In comparison with the tone changes that occur in completive phrase constructions, the tone changes that are present in genitival phrase will most clearly illustrate the inconsistencies and the apparent contradictions the floating tone theory would entail, especially if we remember that the two types of phrase constructions in the language

have basically the same form of syntactic structure. Even the use of some ad hoc rules to get rid of some of the anomalies in the operation of the floating tone will not be able to clear us from the inconsistencies and contradictions that would be involved. On the other hand, this confirms our view that the tone changes present in these and other constructions in the language should be seen and treated mainly in relation to the constructions, i.e. in the sense of the use by the language to portray these meanings through the changes in the lexical tones.

Finally, the following brief conclusions can be drawn from the above discussions with respect to the distribution of downstep in Igbo.

(i) Like the other two tones in Igbo, namely, the high and the low tones, the downstep is used to bring about lexical contrasts, hence, we consider the downstep as a lexical (basic) toneme in the language. In this respect, the downstep contrasts with the high and the low tones in non-initial position.

(ii) The downstep also functions as a syntactic (grammatical) tone in Igbo, just as the high and the low tones. On the syntactic level, four main tone shifts can occur in Igbo, with respect to the three contrastive tones. We can have the following shifts of tones on the syntactic level:

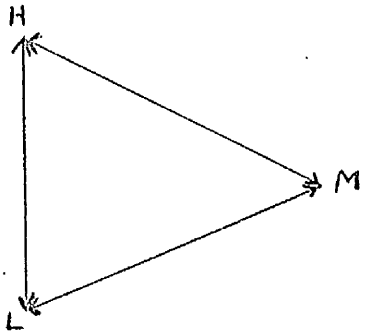
High tone can shift to a downstep, and to a low tone;
Downstep can shift to a high tone;
Low tone can shift to a high tone, and
Low tone can shift to a downstep.

This clearly reflects the sequence restrictions on Igbo tones. These restrictions have been stated earlier, and we can briefly represent them as follows.

Tone sequence relationships in what we may call a symmetrical Three - tone language are represented as triangle A. Tone sequence relationships in Igbo are represented as triangle B.

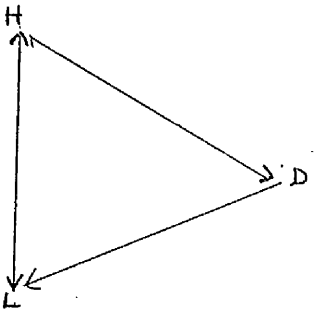
53. (a) Tone sequence relationships in a symmetrical Three-tone language.

Triangle A



(b) Tone sequence relationships in Igbo: a non-symmetrical Three-tone language.

Triangle B



From the point of view of lexical contrasts, in a language with a tone system represented as triangle A, there are nine possible tone patterns in disyllabic words, and 27 tone patterns for trisyllabic words etc. In a language with the tone system represented as triangle B, there can be five possible tone patterns in disyllabic words, namely, H-H, H-D, H-L, L-H and L-L, and 12 tone patterns for trisyllabic words, namely, H-H-H, H-H-D, H-H-L, H-D-D, H-D-L, H-L-H, H-L-L, L-H-H, L-H-D, L-H-L, L-L-H and L-L-L, where the sequence relationships between Low and Downstep are completely lacking and also no sequences with Downstep in the initial position of the word.

With reference to the tone shifts involved in the various grammatical constructions in Igbo, we can note that as a result of the tone sequence restrictions in the language, shifts from high to downstep, and vice versa, are the most common, followed by shifts from low to high.

Tone shifts from high to low and from low to downstep are less frequent and tone shifts from downstep to low are absent in the language. In a language with symmetrical three-tone system, tone shifts that would involve pitch raising from high to low or vice versa would be less probable or very infrequent if ever they occur, because of the tonetic distance involved. Rather a low tone is usually raised to mid and a mid tone to high or a high tone is lowered to a mid and a mid tone is lowered to low. However, because of the absence of sequence relationships involving a low tone followed by a downstep in Igbo, a low tone is raised directly to a high tone.

6.7. THE TERRACED-LEVEL TONE SYSTEM

The terrace-level tone system typifies a tone system in which the high tones and/or the low tones descend by successive steps in a stretch of utterance. The reason for this terracing in the pitch levels of the tones is often attributed to the effects which the alternating low and high tones in the sequence of tones in the utterance have on one another. We shall use the following example which is adopted from Hyman (1975: 227) to illustrate the terrace-level tone system, which is generally known to be characteristic of the Igbo language.

54. Ọ nà - ámụ ịnyà ígwè. He is learning to ride a bicycle.

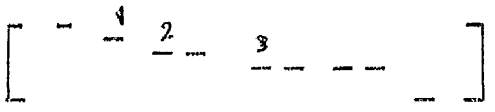
In the above example, it can be seen that both the high and the low tones descend in successive steps. The type of tone terracing illustrated by the above example is sometimes known as Downdrift (cf. Williamson 1971) and also as automatic downstep, though the latter, i.e. automatic downstep, has been used mainly to refer only to the lowering effect which a low tone has on the immediately following high tone. As we pointed out ealier above, the automatic downstep, as illustrated in the example given above, does not have any lexical or grammatic significance in Igbo language. Thus the pitch terrading exemplified above, which result from the alternating high and low

tones in successive sequence, can be blocked by pronouncing all the high tones on the same pitch level and all the low tones on the same pitch level, without any serious consequences on intelligibily. For instance, the sentence can be pronounced thus:

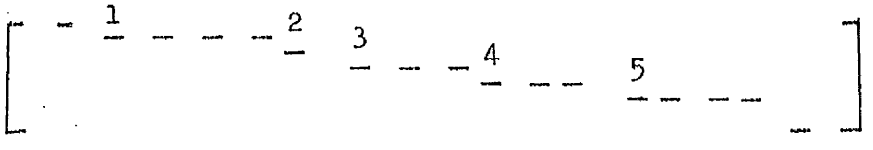
55. Ọ nà - ámụ ịnyà ígwè.

without any oddity in the utterance, and the utterance will be quite acceptable. However a downstep or what is called non-automatic downstep cannot be blocked in Igbo without hindering intelligibility. Similarly, where tone terracing is introduced by downsteps in Igbo, we cannot block the terracing without affecting intelligibility of the utterance. In fact one of the interesting facts about the downsteps that occur within a stretch of utterance in Igbo is the tendency by every successive downstep in the utterance to maintain distinct tonetic distance from the preceding downstep. For instance, we noted in our discussions on completive phrase constructions that downsteps derived in different environments in the phrase maintain distinct tonetic distance, such as the downsteps derived in N^1 and N^2. Similarly, the downsteps derived in the infinitive construction, the completive phrase construction, the relative clause construction etc. each maintains separate tonetic distance from one another. The following examples will illustrate this.

56. ụlọ̄ ōke mēre ihe à .... the house of the rat that did this...



57. ígbū onyo isī bịara ịhụ̄ ihe mēre ebe à .....



' to kill the boss who came to see what happened here ....'

The tone terrace that occurs in (56) and (57) above results from the successive downsteps present in the utterances. Unlike in the case of (55) above, where we observed that the tone terraces can be blocked (by pronouncing all the high tones on the same pitch level) without hindering intelligibility, the tone terraces in (56) and (57) cannot be blocked without making the utterance unintelligible. This point is particularly significant to our arguments on the views expressed by Stewart (1965), Fromkin (1972) and Williamson (1971) about the relatedness of the automatic and the non-automatic downsteps. Apart from the arguments we gave earlier above, based on the functions which the two types of downstep fulfil in the language, the facts illustrated by examples (55) and (56) - (57) above clearly show that the two types of tonal phenomena are not the same, that they are differently motivated in the language, and they maintain different identities in the language. For these reasons, therefore, we would prefer to restrict the term Downstep only to the type that has hitherto been described as the non-automatic downstep, i.e. the one that occurs after a high tone. The lowering of the high tone that is immediately preceded by a low tone, we would like to treat purely as a Downdrift, and not as a downstep; and as it has been demonstrated here and elsewhere, the downdrift phenomenon is not unique to the high tone alone, it also affects the low tones that occur within such successive alternations between the high and the low tones. For this reason, I.C. Ward (1936) treated the low tone that is immediately followed by a high tone, as we have in the nouns with low - high tones such as òké, ùbé, ùkwé, ùdó etc, as mid tone, because, as Ward pointed out, phonetically the low tone in such words are realized on a pitch higher than the low tone in nouns with high - low tones, i.e. where the low tone comes after a high tone, or the low tone in nouns with low - low tones. Similarly, as a result of downdrift in Igbo, low tones that occur at the beginning of a sentence have higher pitch than the low tones that occur at the end of a sentence. This, obviously, is the result of 'amplitude' and 'decay' which are natural phenomena in speech, and in the case of downdrift, it is the result of the pull which contiguous tones have on each other, especially when it involves rising from a low pitch level to a high pitch level.

6.8. TONE RULES

The descriptions of tones and tonal structures presented in the preceding sections will provide the main basis from which we will formulate the tone rules relevant to the Igbo language. In the present treatment of tone rules for Igbo, we will concentrate mainly on those areas where changes occur in the underlying tones of a word when the word is used in certain morphological and syntactic constructions.

Recent discussions on tones and tone rules have generally been concentrated on arguments about the underlying representations of tones, and with particular reference to Igbo, most of the recent discussions on tone and tone rules have been centered around the question of downstep. Questions about what constitutes the downstep in the language, the relationship between the downstep and the other tones, and whether or not the downstep is an underlying tone have been at the center of these discussions relating to tone and tone rules in the Igbo language. In the discussions given above on downstep in Igbo language, our reactions to these previous views and arguments on downstep with respect to the Igbo language, have been clearly stated, and also in the discussions given in the preceding sections, the views we hold on this regard have been made clear.

Generally speaking, the tone changes that occur in Igbo can be summarized under two types of tone changes, namely, phonetic and morphophonemic types of tone changes. Those tone changes that are phonetically motivated in the language are mainly assimilatory by nature. They illustrate the natural phonetic process which results from the articulatory influence that collocated segments or morphemes have on one another. Such phonetic process of assimilation is usually manifested in tonology through the raising or lowering of pitch which sometimes occurs in contiguous tones. For example, as we noted earlier, when a low tone preceded a high tone, the pitch of the high tone tends to be lowered, and this also affects the pitch of the low tone which is usually slightly raised.

The type of tone changes that occur in certain morphological/ syntactic constructions, i.e. the morphophonemic type of tone changes, usually involve changes in the underlying forms of the tone. This is usually the case where one tone is substituted or replaced by another tone within given environments in a given context. Different opinions exist about how the changes that occur in the underlying tones in these contexts should be considered. Some people would prefer to consider this as changes in the underlying tones, in which case one tone is said to change or transform into another tone; some people, however, would prefer to treat them as cases of tone alternation, in which case one tone, say tone X, is said to alternate with another tone, say tone Z, in a given envinronment in a given context. The choice of one or the other of these views is not very crucial in the formulation of tone rules, in as much as the 'rewrite rule' system does not in principle discriminate between both views. With this understanding, therefore, we could sometimes refer to these changes in the underlying tones merely as tone changes, and at other times as tone alternations, as this has been done in certain places in the work. This becomes necessarily so when we find that there is enough evidence to support both views.

6.8.1. TONE ASSIMILATION RULES

The tone changes that are phonetically motivated in Igbo are of three main kinds, namely, tone assimilation, tone spreading and tone copying. The last two represent some aspects of tone assimilation. Tone assimilation in Igbo can be complete, such as when a tone completely assimilates to another tone, or incomplete, such as in the cases involving the raising of a low tone and the lowering of a high tone which have been discussed earlier above. Tone spreading in Igbo represents a case whereby a tone spreads to the neighbouring syllables. In the examples to be discussed, tone spreading represents a progressive operation of tone assimilation. In tone copying, just as in tone spreading, a tone is copied by a neighbouring syllable, usually an affix morpheme. The difference between tone copying and tone spreading lies on the fact that whereas in tone spreading,

the syllables to which the tone spreads have their own independent tones which change as a result of the spreading; in the case of tone copying, the morpheme or syllable on which the tone is copied cannot be said to have any independent tone of its own. Tone copying in Igbo is closely tied up with the phonological process of vowel copying discussed in 5.7. above. It is usually the case in Igbo that the tone of the syllable is also copied in this phonological process.

In the formalization of the tone assimilation rules to be presented below, the features Raised, Lowered and Spread will be used in addition to the conventional features - High, Low and Downstep. This is due to the fact that, as we pointed out earlier, through the operation of these rules, a raised low tone, for instance, does not become a downstep or a high tone, nor does a lowered high tone become a downstep or a low tone. The tone assimilation rules are formalized as follows:

PR 18. Tone Raising Rule

$$\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ raised} \end{bmatrix} \; / \; \underline{\quad} \; \begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix}$$

This rule has the effect of raising a low tone that is immediately followed by a high tone.

PR 19. Tone Lowering Rule

$$\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ lowered} \end{bmatrix} \; / \; \begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \; \underline{\quad}$$

This rule will lower a high tone that is immediately preceded by a low tone. Both PRs 18 and 19 are in effect downdrift rules, i.e. they account for the downdrift phenomena in the language. The type of tone assimilation described by the two rules is mainly that of incomplete assimilation.

Complete tone assimilation in Igbo is the type that occurs when a high tone immediately follows a downstep. This is expressed through the following rule:

PR 20. $\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ tone} \\ +\text{ dnstp} \end{bmatrix} / \begin{bmatrix} +\text{ tone} \\ +\text{ dnstp} \end{bmatrix} \_\_\_\_$

This rule account for the complete assimilation of high tone by a downstep tone, when the high tone is immediately preceded by the downstep tone. This rule will necessarily be ordered after the rule that derives the downstep (where this tone is a derived tone). For example in forms like / ꜜi + gá + lú /, / í + dé + gá / etc. the downstep rule first applies before the tone assimilation rule, to give the acceptable surface forms - ꜜgālu [¯ – –], and íd̄ega [¯ – –] respectively.

6.8.1.1. TONE SPREADING

By tone spreading we mean iterative applications of the tone assimilation rules, the types represented by PRs 18, 19 and 20, to successive low tones or successive high tones until a contrastive tone or a pause intervenes. Through the operation of tone spreading rule, for instance, all the high tones occurring immediately after a lowered high tone and before an intervening low tone or before a pause, are assimilated to the pitch level of the lowered high tone. Similarly, all low tones that immediately precede a raised low tone and before a high tone within the same word or before a pause, are pronounced on the same pitch level as the raised low tone. Thus the tone spreading rule operates both progressively and regressively (i.e. both from left to right and from right to left). This is illustrated in the following examples.

58. ꜜvù ósisi échi [¯ – – – – – / _] to uproot tree tomorrow.

In this example, all the high tones that occur after the lowered high tone before a pause or another non-high tone, are pronounced on the same pitch level as the lowered high tone.

59. ńdị gbūru ósisi áhụ̀ [‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ _]

'those who cut down that tree'

60. ísi ōke ógologo ósisi Īke gbùru [‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ - - -]

'the head of a rat which Ike's tall tree killed'

61. àkwụ́ [_ ‾] 'nest'

62. Ọ̀gakwụ́ [_ _ ‾] personal name

63. àkatakpó [_ _ _ ‾] 'very big, very huge'

As the above examples illustrate,an assimilated tone spreads to neighbouring tones with identical structures, that is, until a contrasting tone or a pause intervenes. Thus a low tone can block the spread of high tones lowered through the operation of PRs 19 and 20; an intervening high tone can block the spread of low tones raised through the operation of PR 18 and a downstep can block the spread of high tones lowered through the operation of PRs 19 and 20.

The sense in which we speak of tone spread in the above discussion differs from the way Hyman (1975: 87) defines this tonological process. Hyman views tone spread as the case in which in a sequence of two contiguous but tonetically different segments, say a low tone followed by a high tone, the tone of the first segment spreads into that of the second segment. Unlike the view we hold about tone spread, the tones of the two segments may not be necessarily the same as a result of the operation of the tone spread rule. The result, for instance, can be that of the development of a tone glide or tone contour. According to Hyman this type of tone spread always works from left to right. What Hyman describes as tone spread does happen sometimes in the speech of some Igbo speakers, but usually in connected utterance and very rarely in isolated words. This, however, cannot be said to be consistent even in the speech of any given speaker, in that this tendency of linking the tones of contiguous segments or spreading the tone of one segment into

the neighbouring segment is closely connected with the tempo in which utterances are produced; thus, when the speaker articulates the words with greater care, the tendency would disappear. The type of tone spread described in this thesis constitutes regular and consistent phonological process in the language.

6.8.1.2. TONE COPYING

It has been mentioned in Welmers (1970) and in other places that certain morphemes and/or formatives in Igbo do not have independent tones of their own and these morphemes copy the tone of the word they occur with. Such morphemes/formatives that have no independent tones of their own, which copy the tone of the word they occur with are the "-ra" suffix morphemes, the prepositional "na" etc. This is illustrated in the following examples.

64.

gà + ra	gàra [_ _]	'went'	
ɟgā + ra	ɟgāra [¯ – –]	'to go on behalf of'	
gàá + ra	gàára [_ ¯ ¯]	'go on behalf of'(imp.)	
sì + ri	sìri [_ _]	'cooked'	
sìé + re	sìére [_ ¯ ¯]	'cook for' (imp.)	
zà + ra	zàra [_ _]	'swept'	
ɟzà + ra	ɟzàra [¯ _ _]	' to sweep for'	
zàá + ra	zàára [_ ¯ ¯]	' sweep for' (imp.)	etc.

65. Prepositional "na"

na àla	nà àla [_ _ _]	on the ground
na élū	ná élū [¯ ¯ –]	on the top
na èteti	nà èteti [_ _ ¯ _]	in the middle
na òbodo	nà òbodo [_ _ _ _]	in the town

na ímè òbodo	ná ímè òbodo [¯ ¯ ¯ _ _ _]	
	'inside the town'	
na ụ̀tụ́tụ̀	nà ụ̀tụ́tụ̀ [_ _ ¯ _]	in the morning
na èhíhiè	nà èhíhiè [_ _ ¯ _]	in the afternoon
na éhìhiè	ná éhìhiè [¯ ¯ _ _]	in the afternoon etc.

The above examples show that the "-ra" suffix morphemes and the prepositional "na" do not have independent tones of their own and that they copy the tone of the segment that immediately follows them (if the morpheme/formative occurs in the ante-position of the word, as in the case of prepositional "na") or the tone of the segment that immediately precedes them (if the morpheme occurs in the post-position of the word, as in the case of the "-ra" suffix morphemes). Note, for instance, the last two examples given above with the prepositional "na"; the word ehihie, afternoon, can be pronounced in Igbo either as èhíhiè or as éhìhiè ; in both types of pronunciation, we find that the tone of the prepositional "na" that is used with this word copies the tone of the first syllable of the word, ehihie. This most clearly illustrates the tone copying nature of this preposition. As a matter of comparison, note that both the conjunctive "na" and the tense forming "na" in Igbo have independent tones of their own. For example,

66. Ébō̄ nà Óti̋ - Ebo and Oti

éwu nà ḿbè - goat and tortoise

élū̄ nà àla - the top and the ground, i.e. every where.

ájā̄ nà ḿmirī̋ - sand and water

nà àzá - is answering

nà ázà - is sweeping

nà èfé - is flying

nà éfè - is worshiping, also, is crossing

nà ètó - is growing

nà étò - is praising etc.

In these examples the conjunctive "nà" and the tense forming "nà" have each an independent tone which is a low tone, and the morphemes do not copy the tone of the words they occur with.

Sometimes in Igbo we have a tonological phenomenon which works in a manner opposite to tone copying. We may describe this phenomenon as tone antithesis. It describes the case whereby a formative/morpheme which is derived from another formative/ morpheme takes a tone opposite to that from which the formative/ morpheme is derived. Note, for instance, the following examples.

67.

Verb root		Vowel prefix	Verbal noun	Derived nominal	
kwú	'speak'	ò	òkwúkwú	ékwùkwú	'talkativeness'
jụ́	'ask'	ọ̀	ọ̀jụ́jụ́	ájụ̀jụ́	'question'
zá	'answer'	ọ̀	ọ̀zị́zá	ázị̀zá	' an answer'
zà	'sweep'	ọ̀	ọ̀zị̀zà	ázị́zà	'broom' etc.

In the above examples, we are more concerned with the tonal structure of the derived nominals. In all probability, these nominals can be claimed to be derived from the verbal nouns. What is important to our discussion is the fact that the tones of the derived nominals are structured antithetically to the tones of the verbal nouns from which they are derived.

6.8.2. THE DOWNDRIFT RULES

In principle, the tone assimilation rules discussed above can conveniently account for the downdrift in the language. These rules (PRs 18 - 20), therefore, form the main parts of the downdrift rules. What we are concerned with in this section is to discuss how the downdrift can and will be derived in the surface phonetic representation.

The downdrift, like the downstep with which the former has been closely associated, is one of the most widely discussed aspects of

tonology. Schachter and Fromkin (1968) and later Williamson (1971) have suggested ways in which the downdrift can be handled in tonology, using a model much similar to what Chomsky and Halle (1968) suggested for Stress in stress languages. Downdrift in tone languages works in a much similar way as stress in stress languages; both processes are characterized by a progressive abatement in pitch/energy in a stretch of utterance.

The analysis adopted here for the derivation of downdrift follows on a line similar to what was suggested in Williamson (1971) except for one point. That is, the pitch adjustment rule which we introduce in our analysis was not used by Williamson. For the analysis of downdrift we would require 3 rules, namely, a rule that assigns phrase boundary, a rule that assigns pitch values to all the high and low tones in the construction and finally, a pitch adjustment rule. Rules 21 and 22 below assign the pitch values of 3 and 1 to all high and low tones respectively.

PR 21. $\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ pitch n+3} \end{bmatrix} \quad / \quad X \text{ —— } Y$

PR 22 $\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ pitch n+1} \end{bmatrix} \quad / \quad X \text{ —— } Y$

The pitch adjustment rule reorders the pitch values according to the number of tones in the utterance; thus starting from the rightmost (i.e. the final) to the leftmost (i.e. the initial) tones, this rule raises all the high tones that occur after a low tone by one value of pitch, and similarly all the low tones that occur after a high tone by one value of pitch. These rules would apply as shown in (68) below.

68. / égwù ápụ́á ḿmádụ̀ nányá /

3 1 3 1 3 3 3 1 3 3 - by pitch assignment rules.

6 3 5 2 4 4 4 1 3 3 - by pitch adjustment rule.

6 3 5 2 4 4 4 1 3 3

Through the operation of these rules, we are able to describe one essential fact about downdrift in tone languages. It has been remarked, for instance, by Williamson (1971) and Fromkin (1972) that in the series or the process of downdrift sometimes a high tone can drift to the pitch level of an initial low tone in a stretch of utterance, as in the example given above. However, despite this fact, the high tone is always perceived as a high tone in such series of pitch drift. The explanation to this lies in the fact that in the series of downdrift, as the high tones drift in pitch so do the low tones; and more importantly, the same tonetic relationship is always maintained between all the high - low or the low - high tone sequences in the utterance, whether it is with reference to the initial low - high, the n^{th} or the last low - high tone sequence in the series. Thus in the example given above, the initial high - low tonetic relationship is represented as 6 : 3, and that of final high - low is represented as 3 : 1, which shows that the same equal tonetic ratio or distance exists between the alternating high and low tones at all stages of the downdrift.

6.8.3. THE MORPHOPHONEMIC TONE RULES

In the type of tone changes that occur in morphological and syntactic structures in Igbo, we have cases whereby one toneme is substituted for another toneme. For instance, in the infinitive construction of Igbo verbs, if the verb root carries high tone, the high tone becomes downstep when the verb root is preceded by the infinitive prefix morpheme which usually carries high tone. Similarly, in the performative construction of the verb in Igbo, the low tone of the prefix morpheme becomes a high tone when the morpheme precedes a low tone verb. These and the other tone changes that occur in various morphological and syntactic constructions in Igbo have been discussed above in the preceding sections. In the present section we shall attempt to formalize these tone changes that occur in morphological and syntactic constructions in the language, using phonological rules.

The Infinitive Downstep Rule

PR 23. $\begin{bmatrix} +\text{tone} \\ +\text{high} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{tone} \\ +\text{dnstp} \end{bmatrix} / \left[\begin{bmatrix} +\text{tone} \\ +\text{high} \end{bmatrix} \neq \text{—} \neq \neq \right]$

Verb Infinitiv

This rule will be able to account for the downstep that occurs on the tone of the high tone verb when the latter is preceded by the infinitive morpheme.

The Performative Tone Rule

PR 24. $\begin{bmatrix} +\text{tone} \\ +\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{tone} \\ +\text{high} \end{bmatrix} / \left[\text{—} \neq \begin{bmatrix} +\text{tone} \\ +\text{low} \end{bmatrix} \right]$

Verb Performative

This rule raises the low tone of the performative prefix when the latter is used with a low tone verb.

The Completive Phrase Tone Rules

The tone changes described for the completive phrase constructions in Igbo will be formalized under the following tone rules.

PR 25. $\begin{bmatrix} +\text{tone} \\ +\text{high} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{tone} \\ +\text{dnstp} \end{bmatrix} / \left[\text{X} \neq \neq \left(\begin{bmatrix} +\text{tone} \\ \pm\text{high} \end{bmatrix} \right) \text{—} \neq \neq \right]$

Compl. Phrase

(where X stands for a noun of any tone class).

This rule will be able to account for the downstep that occurs on the final high tone of the N^2 in a completive phrase.

PR 26. $\begin{bmatrix} +\text{tone} \\ +\text{low} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{tone} \\ +\text{high} \end{bmatrix} / \left[\begin{bmatrix} +\text{tone} \\ +\text{low} \end{bmatrix} \text{——} \neq \neq \begin{bmatrix} +\text{tone} \\ +\text{low} \end{bmatrix} \left(\begin{bmatrix} +\text{tone} \\ \pm\text{high} \end{bmatrix} \right.$

Comp. Phrase

By this rule, the final low tone of the N^1 in a completive phrase (when this noun has low - low tones) becomes a high tone when the N^1 is followed by a noun that begins with a low tone.

PR 27. $\begin{bmatrix}+\text{ tone}\\+\text{ low}\end{bmatrix} \rightarrow \begin{bmatrix}+\text{ tone}\\+\text{ dnstp}\end{bmatrix} \;/\; \left[\begin{bmatrix}+\text{ tone}\\+\text{ high}\end{bmatrix} \text{---} \neq\neq \begin{bmatrix}+\text{ tone}\\+\text{ low}\end{bmatrix} \begin{bmatrix}+\text{ tone}\\\pm\text{ high}\end{bmatrix}\right]$

Comp. Phrase

This rule states that the final low tone of the N^1 in a completive phrase (where this noun carries high - low tones) becomes a downstep, when the N^1 is followed by another noun that begins with a low tone.

PR 28. $\begin{bmatrix}+\text{ tone}\\+\text{ dnstp}\end{bmatrix} \longrightarrow \begin{bmatrix}+\text{ tone}\\+\text{ high}\end{bmatrix} \;/\; \left[\begin{bmatrix}+\text{ tone}\\+\text{ high}\end{bmatrix} \text{---} \neq\neq \text{ X }\right]$

Comp. Phrase

(where X stands for a noun of any tone class)

This rule states that the downstep which occurs in the final position of the N^1 in a completive phrase becomes a high tone, i.e. irrespective of the tone pattern of the noun in N^2 position.

PR 29. $\begin{bmatrix}+\text{ tone}\\+\text{ low}\end{bmatrix} \quad \begin{bmatrix}+\text{ tone}\\+\text{ dnstp}\end{bmatrix} \;/\; \left[\begin{bmatrix}+\text{ tone}\\\pm\text{ high}\end{bmatrix} \begin{bmatrix}+\text{ tone}\\+\text{ high}\end{bmatrix} \neq\neq \text{---} \begin{bmatrix}+\text{ tone}\\+\text{ high}\end{bmatrix}\right]$

Comp. Phrase

This rule raises the initial low tone of the N^2 in a completive phrase (where this noun has low - high tone pattern) to a downstep, when the noun that precedes the N^2 ends with a high tone. This rule will be ordered before PR 25, and both rules would be required to apply whenever the structural conditions described above are met.

The Genitival Phrase Tone Rules

The tone changes that occur in genitival phrases in Igbo, which are expressed in the rules given below, are in many ways similar to those described above for the completive phrases, except for the fact that some of the constraints which are present in the completive phrases are often not necessary in the genitival phrases. The manner in which the tone changes in the two types of constructions differ in Igbo has been descibed in 6.6.2. above.

Rule 29 above is also relevant to genitival phrase constructions in the language. The modifications on the other rules described for the completive phrases, to suit the type of tone changes present in genitival phrase constructions, are reflected in the rules given below for genitival phrases in Igbo.

PR 30. $\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ tone} \\ +\text{ dnstp} \end{bmatrix} \; / \; \left[\begin{bmatrix} +\text{ tone} \\ \pm\text{ high} \end{bmatrix} \begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \neq\neq \text{---} \#\# \right]$

Genit. Phrase

By this rule, the tones of the noun that occurs in the N^2 position in a genitival phrase (where such a noun carries high - high tones) become downstep tones. Obviously this rule has to be ordered after other rules that would derive the final high tone of the N^1 where the nouns that occur in this position happen to carry final low tone. PR 30, for instance, would be ordered after PRs 31 and 32.

PR 31. $\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \; / \; \left[\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \text{---} \neq\neq \text{ X} \right]$

Genit. Phrase

(where X stands for a noun of any tone class)

By this rule the final low tone of a noun with low-low tones, becomes a high tone, whenever this noun is used in N^1 position in a genitival phrase.

PR 32. $\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ tone} \\ +\text{ dnstp} \end{bmatrix} \; / \; \left[\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix} \text{---} \neq\neq \text{ X} \right]$

Genit. Phrase

(where X stands for a noun of any tone class)

This rule states that the final low tone of a noun with high - low tones becomes a downstep whenever this noun occurs in N^1 position in a genitival phrase.

PR 33. $\begin{bmatrix} + \text{tone} \\ + \text{dnstp} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{tone} \\ + \text{high} \end{bmatrix} / \left[\begin{bmatrix} + \text{tone} \\ + \text{high} \end{bmatrix} \text{ —— } \neq\neq \text{ X } \right]$

Genit. Phrase

Condition: N^1 is non-human noun.

(where X stands for a noun of any tone class)

This rule, which states that when a downstep occurs as the final tone of the noun in N^1 position, the downstep is raised to a high tone in a genitival phrase, is identical to PR 28, except for the condition stated above, which usually does not obtain in completive phrase. In the completive phrase a non-human noun cannot possibly occur in this position. It is through the condition stated above that ambiguity would be avoided in those cases where some of the nouns with high - downstep tones are used as personal names, as in the examples given below.

69. / ágō + Úgwu / ágo Ūgwu [¯ ¯ ¯ ¯] Ugwu's money

/ Ágō + Úgwu/ Ágō Ūgwu [¯ ¯ ¯ ¯] Mr. Ugwu's (child called) Ego

70. / ébē + jí / ébe jī [¯ ¯ ¯] yam beetle

/ Ébē + Íke / Ébē Īke [¯ ¯ ¯ ¯] Mr. Ike's (child called) Ebe

71. / ágụ̄ + ógwè / ágụ ógwè [¯ ¯ ¯ _] leopard that lives at (and therefore belongs to) the shrine (bush) called ogwe.

/ Ágụ̄ + Ógwè/ Ágū Ògwe [¯ ¯ ¯ ¯] Mr. Ogwe's (child called) Agụ etc.

PR 34. $\begin{bmatrix} + \text{ tone} \\ + \text{ high} \end{bmatrix} \quad \begin{bmatrix} + \text{ tone} \\ + \text{ low} \end{bmatrix} / \left[\text{ X } \neq\neq \text{---} \begin{bmatrix} + \text{ tone} \\ + \text{ low} \end{bmatrix} \neq\neq \right]$

Genit. Phrase

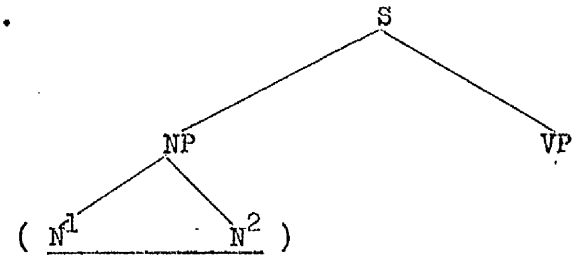
(Where X stands for a noun of any tone class)

This rule states that when a noun with high - low tones occurs as the second noun in a genitival phrase (i.e. in the N^2 position), the high tone of this noun becomes a low tone.

The phonological rules (25 - 34) given above will be able to account for the tone changes that occur in the completive and genitival phrase constructions in Igbo. Unlike rules 23 and 24 which account for the tone changes in the infinitive and performative constructions respectively, and which operate across morpheme boundary, rules 25 - 34 operate across word boundary.

The grammatical corpus within which the completive phrase and the genitival phrase tone rules operate in Igbo is mainly that of complex noun phrase which is represented below, using the conventional tree diagram.

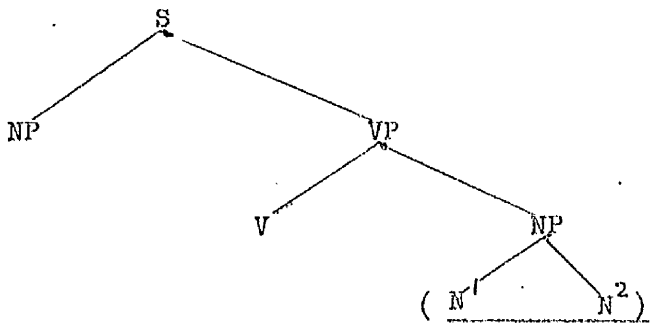
72 (a).



<Completive/genitival tone rule>

For example, (i) ọ́dụ̄ ànyịnya màra mmā - horse tail is beautiful.
(ii) ịsi ọ́wū dàra ọ́nụ̄ - goat head is costly.
(iii) ńne Īke bịara - Ike's mother came.

(b)



Completive/genitival tone rules.

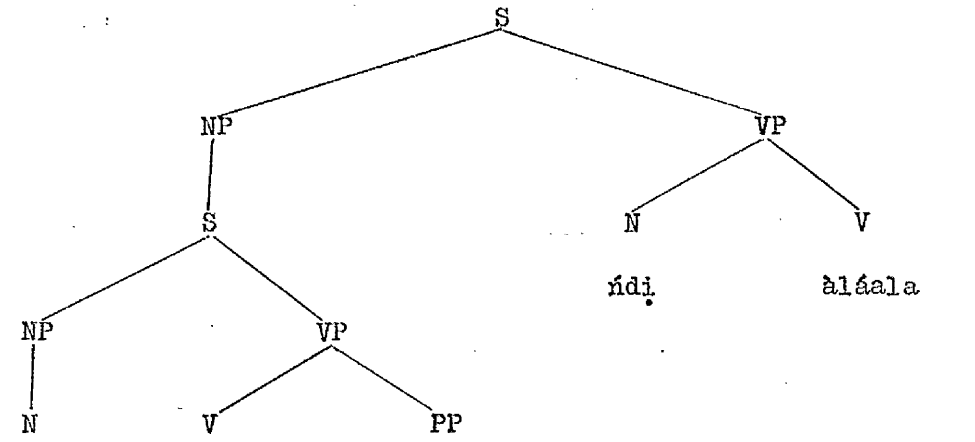
For example, (i) ọ zụ̀rụ ísi éwū - he bought goat head.

(ii) ọ́ gbùru éwu Ēbo - he killed Ebo's goat.

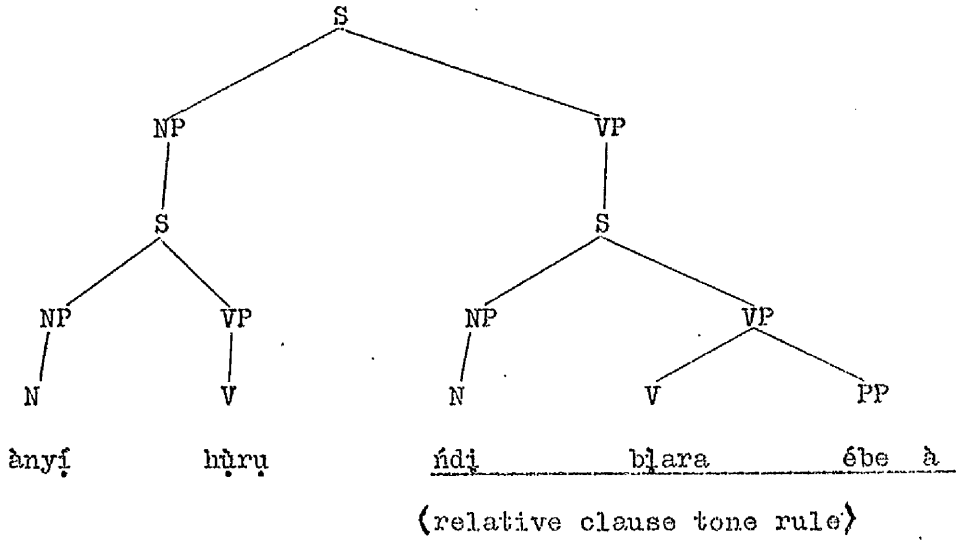
(iii) ọ́ hụ̀rụ ụ́lọ̄ Èze - he saw Eze's house. etc.

The corpus within which the relative clause tone rule operates in Igbo is that of an embeded sentence. This is illustrated below through the tree diagrams.

73 (a) ńdị bī̀ara ebe à àláala - those who came here have gone.



(b) ànyị́ hụ̀rụ ńdị bī̀ara ebe à - we saw those who came here.



The relative clause tone rule is formalized as follows:

The Relative Clause Tone Rule

PR 35. $\begin{bmatrix} +\text{ tone} \\ +\text{ low} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{ tone} \\ +\text{ dnstp} \end{bmatrix} / \left[\left[\begin{bmatrix} +\text{ tone} \\ \pm\text{ high} \end{bmatrix} \underset{\text{NP}}{\begin{bmatrix} +\text{ tone} \\ +\text{ high} \end{bmatrix}} \right] \underset{\text{VP}}{\left[\left[\_\_ \right] \right]} \right]$

Rel. clause

This rule raises the tone of the main verb of the relative clause from low to downstep. After this rule, another rule may apply, namely, the rule of tone assimilation, to assimilate any high tones which immediately follow the main verb in the clause (when the action of the verb refers to the past tense), or the high tones that may immediately follow the initial low tones (when, for instance, the action of the main verb refers to either the present or the future tense), to downstep. Note that this rule, PR 35, always applies, irrespective of whether the action of the main verb in the clause refers to the past, present or the future tense. This is so, because, in the latter cases, i.e. the present and the future tenses, the verb usually has initial low tones, which are raised by this rule to downstep, as the following examples will illustrate.

74. / ónye ńkuzi nà-àbịa ébe à / 'the teacher is coming here'

ónye ńkuzi nā-abịa ebe à ... [_ _ _ _ _ _ _ _ _ _ _]

' the teacher who is coming here...'

75. / ónye ńkuzi gà-àbịa ébe à / ' the teacher will come here'

ónye ńkuzi gā-abịa ebe à ... [_ _ _ _ _ _ _ _ _ _ _]

'the teacher who will come here ...'. etc.

BIBLIOGRAPHY

Abraham, R.C. 1967 The Principles of Ibo: Ibadan, Institute of African Studies, University of Ibadan.

Adams, R.F.G. 1932 A Modern Ibo Grammar: OUP

Afolabi, Adebisi 1970 "The phonological glides of Yoruba", Proceedings 9th W.A.L.C., Freetown

Amayo, A. 1976 A Generative Phonology of Edo (Bini), Ph.D. thesis, University of Ibadan.

Anderson, Stephen R. 1971 "On the description of apicalized consonants", LI 2: 103 - 107.

Anderson, Stephen R. 1976 "Nasal consonants and the internal structure of segments", Language 52: 326 - 343.

Ansre, G. 1963 "Reduplication in Ewe", JAL 2: 128-32

Aoki, H. 1968 "Toward a typology of vowel harmony", IJAL 34: 142 - 145.

Austen, C.L. 1974 "Anatomy of the tonal system of a Bantu language", SAL suppl. 5: 21-33.

Armstrong, R.G. 1966 A Comparative Wordlist of Five Igbo Dialects: Ibadan, Institute of African Studies, University of Ibadan.

Armstrong, R.G. 1968 "Yala (Ikom): a terrace-level tone language with three tones", JWAL 5: 49 - 58.

Arnott, D.W. 1964 "Downstep in Tiv verbal system", ALS 5: 34 - 51.

Bach, E. and R.T. Harms eds. 1968 Universals in linguistic theory: Holt, Rinehart and Winston, New York.

Bagari, D.M. 1971 NP-Complementation in Hausa, M.Phil. thesis, University of London.

Bamgbose, A. 1966a "The assimilated low tone in Yoruba", Lingua 16: 1 - 13.

Bamgbose, A. 1966b A Grammar of Yoruba (West African Language Monographs 5) CUP.

Bendor-Samuel, J.T. 1960 "Some problems of segmentation in the phonological analysis of Terena" Word 16: 348 - 355.

Bendor-Samuel, J.T. 1965 "Phonemic interpretation in some West African languages", Sierra Leone Language Review 4: 85 - 90.

Bendor-Samuel, J.T. 1966 "Some prosodic features in Terena" IMJRF 30 - 39.

Boabi, L. 1963 "Palatality as a factor in Twi vowel harmony", JAL 2: 133 - 138.

Bolinger, D.L. 1958 "A theory of pitch and accent in English", Word 14: 109 - 149.

Bresnan, Joan W. 1971 "Sentence stress and syntactic transformations", Language 47: 257-81.

Campbell, L. 1974 "Phonological features: problems and proposals", Language 50: 52-65.

Carnochan, J. 1948 "A study in the phonology of an Igbo speaker", BSOAS 12: 417 - 426.

Carnochan, J. 1960 "Vowel harmony in Igbo", ALS 1: 155-63.

Carnochan, J. 1961 "Pitch, tone and intonation in Igbo", Proceedings 4th ICPS, Helsinki, 547-54.

Carnochan, J. 1962 "The category of number in Igbo grammar", ALS 3: 110 - 115.

Carnochan, J. 1965 An outline analysis of Igbo, Skrivemaskinta, Oslo.

Carnochan, J. 1967a "Igbo: word classes", Lingua 17: 1-23

Carnochan, J. 1967b "Towards a syntax for Igbo", JAL 2: 222 - 226.

Carnochan, J. 1964 "Pitch, tone and intonation in Yoruba", IHDJ, 397 - 406.

Carnochan, J. and Iwuchukwu Belonwu 1963 An Igbo Revision Course, OUP, Ibadan

Carrel, P.L. 1970 A Transformational Grammar of Igbo, CUP.

Chomsky, N. 1964a "Current issues in linguistic theory", in The Structure of Language, Fordor, J.A. and J.J. Katz eds.

Chomsky, N. 1964b "The logical basis of linguistic theory", Proceedings of the 9th ICL, H. Lunt, ed.

Chomsky, N. 1965 Aspects of the Theory of Syntax, MIT Press.

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

Christaller, J.G. 1875 A Grammar of the Asante and Fante Language, Basel, London.

Christaller, J.G. 1881 A Dictionary of the Asante and Fante Language, Basel, London.

Clements, G.N. 1974 "Vowel harmony in Ewe", SAL 5: 281-301.

Clifton, J.M. 1975 "Nonsegmental tone in Lango", Proceedings 6th Conference on African Linguistics: OSU WPL 20: 99-105.

Contreras, H. 1969 "Simplicity, descriptive adequacy and binary features", Language 45: 1-7.

Cook, Eung-Do 1971 "Vowels and tones in Sarcee", Language 47: 164 - 179.

Courtenay, K. 1974 "On the nature of the Bambara tone system", SAL 5: 303 - 323.

Dinnsen, D.A. 1974 "Constraints on global rules in phonology", Language 50: 29-51.

Dolphyne, F.A. 1965 The phonetics and phonology of the Verbal Piece in the Asante dialect of Twi. Ph.D. thesis, University of London.

Ebert, K.E. 1974 "Partial vowel harmony in Kera", SAL, suppl. 5: 75 - 80.

Elugbe, B.O. 1969 Ika phonemic statement: practical analysis. B.A. Final, University of Ibadan.

Emenanjo, N. 1975 The Igbo Verbal: a descriptive analysis. M.A. thesis, University of Ibadan.

Enem, Edith 1969 An introduction to the phonology of Ọ́ká, a dialect of Igbo. B.A. final, University of Ibadan.

Fordor, J.A. and J.J. Katz eds. 1964 The Structure of Language: Readings in the philosophy of language. Englewood Cliffs, New Jersy, Prentice Halls Inc.

Fresco, E.M. 1970 "Topics in Yoruba dialect phonology", SAL, suppl. 1

Fromkin, V.A. 1971 "The non-anomalous nature of anomalous utterances". Language 47: 27 - 52.

Fromkin, V.A. 1972 "Tone features and tone rules". SAL 3: 47 - 76.

Fudge, E.C., ed. 1973 Phonology: Selected Readings. Penguine Linguistics Reading.

George, Isaac 1970 "Nupe phonology", SAL 1: 100-122.

Gerhardt, Ludwig 1976 (+grave) Considerations. MS. Paper read at the 12th West African Languages Congress, University of Ife.

Gleason Jr., H.A. 1961 "Review of African Language Studies 1" Language 37: 294 - 308.

Gleason Jr., H.A. 1965 Linguistics and English Language. Holt, Rinehart and Winston inc.

Goyvaerts, D.L. and G.K. Pullum eds. 1975 Essays on the Sound Pattern of English.

Green, M.M. 1964a A short Grammar of Igbo. OUP, London

Green, M.M. 1964b "Suffixes in Igbo", ALS 5: 92-114.

Green, M.M. and G.E. Igwe 1963 A Descriptive Grammar of Igbo. Akademie Verlag, Berlin; OUP, London.

Greenberg, J.H. 1970 "Some generalizations concerning glottalic consonants, especially implosives", IJAL 36: 123 - 146.

Greenberg, J.H. 1966 The Languages of Africa. 2nd. revised ed. The Hague, Mouton and co.

Gruber, J.S. 1964 The descriptive features of tone. Mimeo.

Hamp, E.P. 1958 "Vowel harmony in Classical Mongolian" Word 14: 291 - 295.

Halle, M. 1962 "Phonology in a generative grammar", Word 18: 54 - 72.

Hocket, C.F. 1955 A Manual of Phonology. Weverly Press, Baltimore.

Hoffmann, E. 1974 The vowel harmony system of the Okpe monosyllabic verb. unpub. paper.

Hombert, Jean-Marie 1974 "Universals of Downdrift: their phonetic basis and significance for a theory of tone", SAL, suppl. 5: 169 - 182.

Hyman, L.M. 1970a "How concrete is phonology?", Language 46: 58 - 76.

Hyman, L.M. 1970b "The role of borrowing in the justification of phonological grammar", SAL 1: 1 - 48.

Hyman, L.M. 1972a "Nasals and nasalization in Kwa", SAL 3: 167 - 205.

Hyman, L.M. 1972b "A phonological study of Fe-fe-Bamileke", SAL suppl. 4.

Hyman, L.M. 1972c The great Igbo tone shift. unpub. paper presented at the Third Annual Conference on African Linguistics.

Hyman, L.M. 1973a "Notes on the history of Southern Mande", SAL. 4: 183 - 196.

Hyman, L.M. ed. 1973b Consonant types and tones. South California Occasional Papers in Linguistics No. 1 : University of South California, Los Angeles.

Hyman, L.M. 1975 Phonology : Theory and Analysis. Holt, Rinehart and Winston.

Hyman, L.M. and R.G. Schuh 1974 "Universals of tone rules : evidence from West Africa", LI 5: 81-115

Hyman, L.M. and J.O. Skip Robinson 1974 "Review of P.L. Carrel's A Transformational Grammar of Igbo", JL 10: 143 - 152.

Hymes, D.H. 1960 "Lexicostatistics so far", Current Anthropology, vol. 1

Igwe, G.E. 1974 The Role of Affixation in the Grammar of Igbo. Ph.D. thesis, University of London.

Igwe, G.E. and M.M. Green 1967 Igbo Language Course bks. I - III. OUP, Ibadan.

Jakobson, R. 1962 "The phonemic concept of distinctive features", 4th I.C.P.S., Helsinki, 440 - 455.

Jakobson, R. and M. Halle 1956 Fundamentals of Language. Mouton, The Hague.

Jakobson, R., G. Fant and M. Halle 1951 Preliminaries to Speech Analysis. M.I.T. Press, Cambridge, Mass.

Jones, D. 1950 The Phoneme : its nature and use. W. Heffer and sons, Cambridge.

Jensen, J.T. 1971 A diachronic study of vowel harmony in Hungarian. Unpub. paper.

Jensen, J.T. 1974 "A constraint on variables in phonology", Language 50: 675-686.

Jungraith, Mayer H. 1971 "The Tangale vowel harmony system reconsidered", JAL 10: 29 - 33.

Katz, J.J. and P.M. Postal 1964 An Integrated Theory of Linguistic Description. M.I.T. Press, Cambridge, Mass.

Kean, Mary-Louise 1974 "The strict cycle in phonology", LI 5: 179 - 203.

Kenstowicz, M.J. and C.J. Kisserberth 1970 "Rule ordering and the asymetry hypothesis", CLS 5: 504 - 519.

Kim, Chin-Wu and H. Tahlke eds. 1971 Papers in African Linguistics. Linguistic Research, Inc., Alberta, Edmonton.

King, R.D. 1969 Historical Linguistics and Generative Grammar. Englewood Cliffs, New Jersy.

Kiparsky, P. 1968a How abstract is phonology? MIT, Mimeo.

Kiparsky, P. 1968b "Linguistic Universals and Linguistic Change", in Universals in Linguistic Theory, E. Bach and R.T. Hams eds. Holt, Rinehart and Winston, New York.

Kiparsky, P. 1973 "Elsewhere in phonology", in Festschrift for Morris Halle, S.R. Anderson and P. Kiparsky, eds. Holt, Rinehart and Winston.

Kiparsky, P. and C. Kiparsky 1971 "Fact", in Steinberg and Jakobovite eds.

Kisserberth, C.J. 1970 "On the functional unity of phonological rules", LI 1: 291 - 306.

Koutsoudas, A. 1971a "Gapping, Conjunction, Reduction and Co-ordinate Deletion", FL 7: 337 - 386.

Koutsoudas, A. 1971b "On the non-sufficiency of extrinsic order" IULC Mimeo.

Koutsoudas, A. 1972 "The strict order fallacy", Language 48: 88 - 96.

Koutsoudas, A. 1973a "Extrinsic order and the complex NP constraint", LI 4: 69 - 81.

Koutsoudas, A. 1973b "Unordered rule hypothesis", IULC Mimeo.

Ladefoged, P. 1964 A Phonetic Study of West African Languages. CUP.

Ladefoged, P. 1971 Preliminaries to Linguistic Phonetics. University of Chicago Press.

Ladefoged, P. 1975 A Course in Phonetics. Harcourt Brace Jovanovich, Inc.

Langacker, R.W. 1967 Language and its Structure. Harcourt Brace and World.

Lehmann, T. 1972 "Some arguments against ordered rules", Language 48: 541 - 550.

Lightner, T. M. 1965 "On the description of vowel and consonant harmony", Word 21: 244-250.

Lindau, Mona 1975 "(features) for vowels", Working Papers in Phonetics 30, UCLA Phonetics Lab.

Lyons, J. 1962 "Phonemic and non-phonemic phonology: some typological reflections", IJAL 28: 127 - 133.

Lyons, J. 1970a Chomsky. Fontana: William Collins Co. Ltd., Glasgow.

Lyons, J., ed. 1970b New Horizons in Linguistics. Penguine Books, Hazell Watson and Viney Ltd.

Lyons, J. 1971 An Introduction to Theoretical Linguistics. CUP.

Maddieson, Ian, ed. 1971 Tone in Generative Phonology. Research Notes 3. Dept. of Linguistics and Nigerian Languages, University of Ibadan.

Maddieson, Ian 1974 "A possible new cause of tone-splitting-evidence from Cama, Yoruba and other languages", SAL suppl. 5: 205-217.

Makkai, V.B., ed. 1972 Phonological Theory. Holt, Rinehart and Winston, Inc.

McCawley, J.D. 1968 The Phonological Component of a Grammar of Japanese. Mouton, The Hague.

McCawley, J.D. 1970b "A note on tone in Tiv conjugation", SAL 1: 123 - 130.

Meeussen, A.E. 1974 "A note on global rules in Bangu-bangu tone", SAL 5: 95 - 99.

Meier, Paul and Inge, and J. Bendor-Samuel 1975 A Grammar of Izi: an Igbo language. Summer Institute of Linguistics, University of Oklahoma.

Nadzhip, E.N. 1971 Modern Uigur, translated into English by D.M. Segal. Moscow, Izd. 'Nauka'.

Newman, R.M. 1971 "Downstep in Ga'Anda", JAL 10: 15-27.

Nwachukwu, P.A. 1975 Noun Phrase Sentential Complementation in Igbo. Ph.D. thesis, University of London.

Obi, S.C. 1975 'Igbo dialects; The use of intelligibility measures to determine a dialect and a language' (MS).

Oluikpe, B.O. 1975 'The survey of Igbo dialects: the Ngwa experience'. Unpub. paper.

Onwuejiogwu, M.A. 1975 'Lexicostatistics and the concept of mutual intelligibility' (MS)

Palmer, F.R. 1956 "Openness in Tigre", BSOAS 18: 561-577.

Palmer, F.R., ed. 1970 Prosodic Analysis. OUP, London.

Peters, S., ed. 1972 Goals of Linguistic Theory. Prentice-Hall.

Peters, Ann M. 1973 "A new formulation of downdrift", SAL 4: 139 - 154.

Pike, K.L. 1948 Tone Languages. University of Michigan Publications in Linguistics, No.4.

Pike, K.L. and Eunice Pike 1947 "Immediate constituents of Mazateco syllables", IJAL 13: 78 - 91.

Postal, P.M. 1968 Aspects of Phonological Theory. Harper and Row, N.Y.

Pratt, Mary 1972 "Tone in some Kikuyu verb forms", SAL 3: 325 - 378.

Rigen, C. 1972 "On arguments for rule ordering", FL 8: 265 - 273.

Robins, R.H. 1953 "Phonology of nasalized verbal forms in Sudanese", BSOAS 15,1.

Robins, R.H. 1957 "Aspects of prosodic analysis", Proceedings of the University of Durham Philosophical Society 1: 1-12. Reprinted in Makkai ed. 1972, 264-274.

Robins, R.H. 1971 General Linguistics: an introductory survey. Longmans, London.

Ross, J.R. 1972 "A reanalysis of English word stress", (part 1), in Brame, ed. 1972, 229-323.

Sanders, G. 1974 "The application of phonological rules", Language 50: 1 - 27.

Schachter, P. 1961 "Phonetic similarity in phonemic analysis", Language 37: 231-238.

Schachter, P. 1965 "Some comments on J.M. Stewart's 'The typology of the Twi tone system'", Bulletin of the Institute of African Studies, 1. Legon University, Ghana, 28 - 42.

Schachter, P. 1969 "Natural assimilation rules in Akan", IJAL 35: 324 - 356.

Schachter, P. and V. Fromkin 1968 A Phonology of Akan: Akuapem, Ashante and Fante. Working Papers in Phonetics, 9. UCLA.

Schadeberg, T.C. 1973 "Kinga: a restricted tone language", SAL 4: 23 - 48.

Schane, S.A. 1971 "The phoneme revisited", Language 47: 503 - 521.

Schane, S.A. 1972 "Natural rules in phonology", in R.P.Stockwell and R.K.S. Macaulay, eds. Linguistic Change and Generative Phonology, 199 - 229. Bloomington: Indiana University Press.

Schane, S.A. 1973a Generative Phonology. Englewood Cliffs, N.J. : Prentice-Hall.

Schane, S.A. 1973b "The treatment of phonological exceptions : The evidence from French", in B.B. Kachru et al. eds., Issues in Linguistics, 822-835. Urbana, University of Illinois Press.

Schön, J.F. 1861 Oku Ibo : Grammatical elements of the Ibo language. London.

Schuh, R.G. 1972 "Rule inversion in Chadic", SAL 3: 379 - 398.

Skousen, Royal 1972a "On capturing regularities", in P.M. Peranteau et al., eds., Papers from the 8th Regional Meeting of the Chicago Linguistic Society. 567-577.

Skousen, Royal 1972b "Consonant alternation in Fula", SAL 3: 77 - 96.

Smith, N.V. 1967 "The phonology of Nupe", JAL 6 : 153 - 169.

Smith, N.V. 1968 "Tone in Ewe", Quarterly Progress Report No. 88, Research Lab. in Electronics, M.I.T., Camb., Mass. 293-305.

Spencer, J. 1901 A First Grammar of the Ibo language. The Sheldon Press, London.

Spriggs, R.K. 1955 "Tonal system of Lhasa Tibetan", BSOAS 17,1.

Spriggs, R.K. 1961 "Vowel harmony in Lhasa Tibetan", BSOAS 24, 1 : 116 - 136.

Stahlke, Herbert 1971 "On the status of nasalized vowels in Kwa", in C.-W. Kim and H. Stahlke, eds., Papers in African Linguistics. Alberta, Edmonton. 239 - 247.

Stampe, David 1972 "On the natural history of diphthongs", Papers from the 8th Regional Meeting of the Chicago Linguistic Society. P.M. Peranteau et al., eds., 578-590.

Stanley, J.M. 1971 "Niger-Congo, Kwa", in T. Sebeok, ed., Current Trends in Linguistics, 7, Mouton, The Hague, 179 - 212.

Stanley, Richard 1967 "Redundancy rules in phonology". Language 43 : 393 - 436.

Stanley, Richard 1973 "Boundaries in phonology". S.R. Anderson and P. Kiparsky, eds., A Festschrift for Morris Halle, Holt, Rinehart and Winston. N.Y., 185 - 206.

Stevick, E.M. 1969 "Tone in Bantu". IJAL 35 : 330-341.

Stewart, J.M. 1965 "The typology of the Twi tone system". Bulletin of the Institute of African Studies. 1. Legon University, Ghana: 1 - 27.

Stewart, J.M. 1967 "Tongue-root position in Akan vowel harmony". Phonetica 16 : 185-204.

Stockwell, R.P. and R.K.S. Macaulay, eds. 1972 Linguistic Change and Generative Theory. Bloomington, Indiana Univ. Press.

Swadesh, Morris 1934 "The phonemic principle". Language 10 : 117 - 129. Reprinted in Makkai, ed., 1972, 32 - 39.

Swift, L.B., A. Ahaghotu and E. Ugorji 1962 Igbo Basic Course. Foreign Service Institute, Washington D.C.

Tadadjeu, Maurice 1974 "Floating tones, shifting rules, and downstep in Dschang-Bamileke". SAL suppl. 5 : 283 - 290.

Thomas. Elaine 1967 "A problem in tonal analysis". 7th W.A.L.C., Lagos.

Trubetzkoy, N.S. 1969 Principles of Phonology. University of California Press, Berkley.

Twaddell, W.F. 1935 "On defining the phoneme". Language Monograph 16, Baltimore. Reprinted in Joos, ed., 1957, 55 - 80.

Ubahakwe, Ebo 1975 A survey of Igbo dialects : the Aguata-Njikoka complex. M S.

Umeasiegbu, T.O. 1973 Towards a Phonology of Umuchu Dialect of Igbo. Long Essay : Postgraduate Diploma in Linguistics, University of Ibadan.

Uzochukwu, S. 1974 A Preliminary Study of the Phonology of the Dialect of Owerri Town. Long Essay : Postgraduate Diploma in Linguistics, University of Ibadan.

Vago, R.N. 1973 "Abstract vowel harmony system in Uralic and Altaic languages". Language 49 : 579 - 605.

La Velle, C.R. 1974 "An experimental study of Yoruba tone". SAL suppl. 5 : 185 - 194.

Vennemann, Theo 1972a "On the theory of syllabic phonology". Linguistische Berichte 18 : 1 - 18.

Vennemann, Theo 1972b "Sound change and markedness theory : on the history of German consonant system". Linguistic Change and Generative Theory, R.P. Stockwell and R.K.S. Macaulay, eds., 230 - 274.

Vennemann, Theo 1972c "Phonological uniqueness in natural generative grammar". Glossa 6 : 105-116.

Vennemann, Theo 1972d "Rule inversion". Lingua 29: 209-242.

Vennemann, Theo 1973 "Phonological concreteness in natural generative grammar", in R. Shuy and C.J. Bailey, eds., Toward Tomorrow's Linguistics. Georgetown University Press, Washington D.C.

Vennemann, Theo and Peter Ladefoged 1971 "Phonetic features and phonological features". Working Papers in Phonetics. UCLA 21 : 13 - 24.

Voorhoeve, J. 1971 "Tonology of the Bamileke noun". JAL 10 : 44 - 53.

Voorhoeve, J. 1973 "Safwa as a restricted tone system". SAL 4 : 1 - 22.

Voorhoeve, J., A.E. Meeussen, and K. de Blois. 1969 "New proposals for the description of tone sequences in Igbo completive phrase". Journal of West African Languages, 6 : 79 - 84.

Wang, W. S.-Y. 1967 "Phonological features of tone". IJAL 33 : 93 - 105.

Wang, W. S.-Y. 1968 "Vowel features, paired variables, and the English vowel shift". Language 44 : 695 - 708.

Wang, W. S.-Y., and Charles Fillmore 1961 "Intrinsic cues and consonant perception". Journal of Speech and Hearing Research 4 : 130 - 136.

Ward, I.C. 1936 An Introduction to the Ibo Language. Heffer and Sons, Cambridge.

Ward, I.C. 1941 Igbo Dialects and the Development of a Standard Language.

Welmers, W.E. 1959 "Tonemics, morphotonemics and tonal morphemes". General Linguistics 4 : 1 - 9.

Welmers, W.E. 1962 "The phonology of Kpelle". JAL 1 : 69 - 93.

Welmers, W.E. 1963 "Associative a and ka in Niger-Congo". Language 39 : 432 - 447.

Welmers, W.E. 1970 "Igbo tonology". SAL 1 : 255 - 278.

Welmers, W.E. 1975 African Language Structure. University of California Press.

Welmers, B.F., and W.E. Welmers 1968a Igbo : A Learner's Dictionary. African Studies Centre, UCLA.

Welmers, B.F., and W.E. Welmers 1968b Igbo : A Learner's Manual. Private publication by the authors, UCLA.

Williamson, Kay 1966 "The status of /e/ in Onitsha Igbo". JWAL 3 : 67 - 70.

Williamson, Kay 1968 "Deep and surface structure in tone language". JWAL 5 : 77 - 81.

Williamson, Kay 1971a "Downstep/Downdrift", in I. Maddieson, ed., Tone in Generative Phonology. 23 - 33.

Williamson, Kay 1971b "Some alternative proposals for the completive phrase", in I. Maddieson, ed., Tone in Generative Phonology, 83 - 90.

Williamson, Kay 1972 Igbo-English Dictionary. Ethiope Publishing Co., Benin, Nigeria.

Williamson, Kay 1973a "More on nasals and nasalization in Kwa". SAL 4 : 115 - 138.

Williamson, Kay 1973b "The lower Niger languages". Odụma vol. 1 : 32 - 35.

Williamson, Kay 1976 Multivalued features for consonants. MS.

Wilson, R.D. 1966 "A criticism of distinctive features". Journal of Linguistics. 6 : 195 - 206.

Winston, F.D. 1960 "The mid tone in Efik". ALS 1: 188-192.

Winston, F.D. 1973 "Polarity, mood and aspect in Ọhụhụ Igbo verbs". ALS 13 : 119 - 178.

Yen, Sian L. 1968 "Two measures of economy in phonological descriptions". FL 4 : 58 - 69.

Zimmer, K.E. 1967 "A note on vowel harmony". IJAL 33 : 166 - 171.

Zimmer, K.E. 1969 "Psychological correlates of some Turkish morpheme structure conditions". Language 45 : 309 - 321.

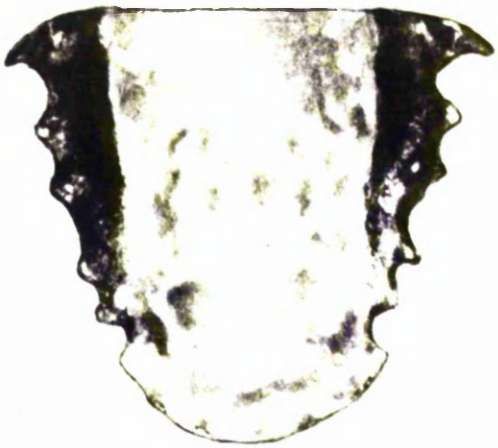
Zimmer, K.E. 1970 "On the evaluation of alternative phonological descriptions". Journal of Linguistics, 6 : 89 - 98.

ABBREVIATIONS

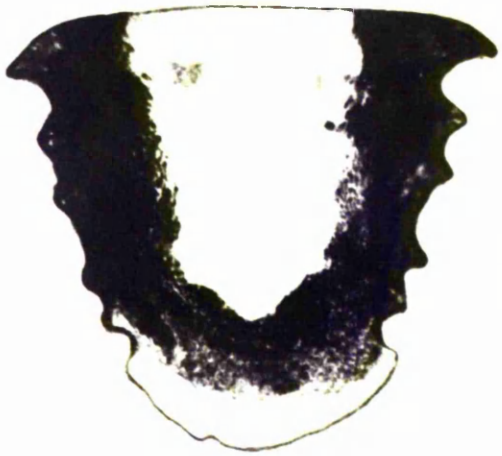
ALS	African Language Studies.
BSOAS	Bulletin of the School of Oriental and African Studies.
FL	Foundations of Language.
CUP	Cambridge University Press.
JAL	Journal of African Languages.
JL	Journal of Linguistics.
JWAL	Journal of West African Languages.
ICPS	International Conference on Phonetic Sciences (Helsinki, Proceedings:)
IJAL	International Journal of American Linguistics.
IHDJ	In Honour of Daniel Jones. (D. Abercrombie, et al., eds., 1964)
IMJRF	In Memory of J. R. Firth. (C.E. Bazell, et al., eds., 1966).
IULC	Indiana University Linguistic Club.
LI	Linguistic Inquiry.
OUP	Oxford University Press
SAL	Studies in African Linguistics. (Suppl. - Supplement publication)
W.A.L.C.	West African Linguistic Conference. (Proceedings:)
WPL	Working Papers in Linguistics.

1. "fi"

2. "fɪ̣"



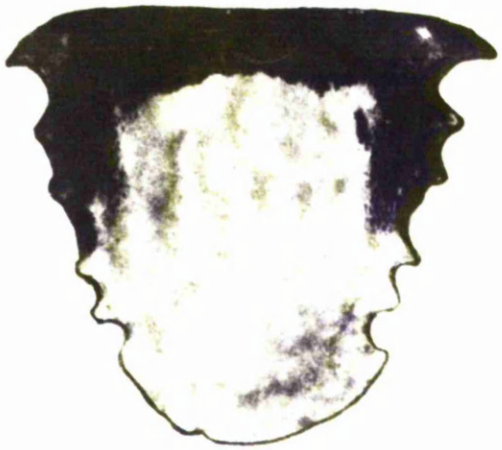
3. "fe"



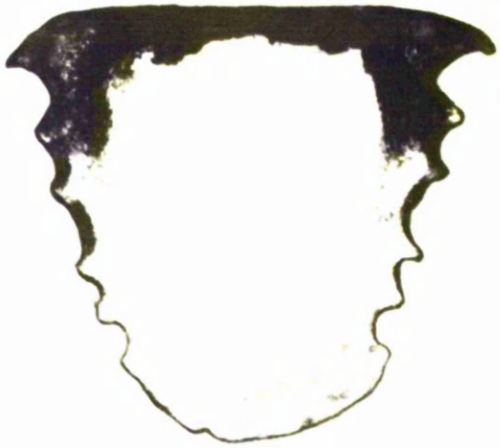
4. "átá"

5. "áda"

6. "ọ́kà"

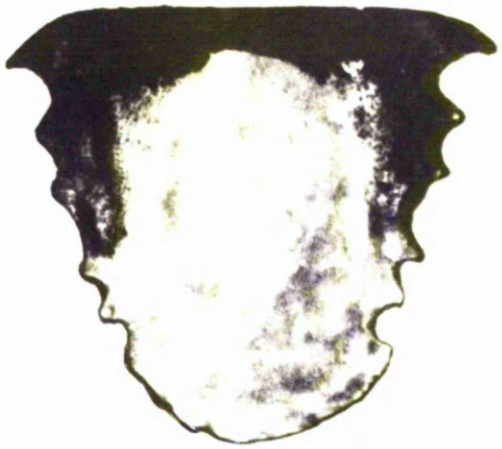


7. "ága

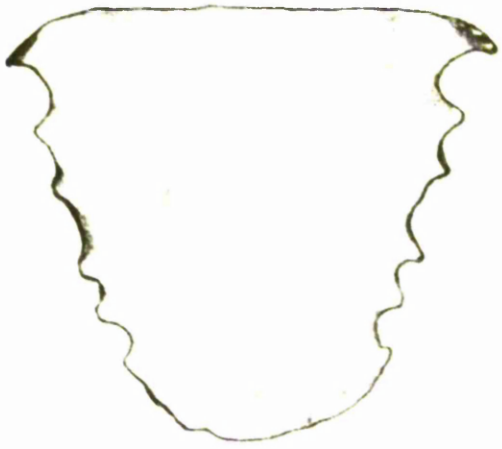


8. "ákwà"

9. "àgwà"

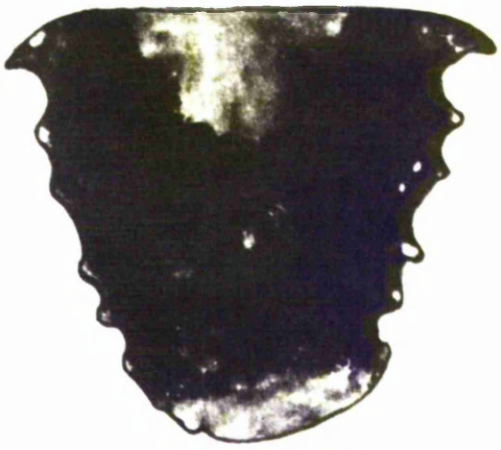


10. "àkpà"



11. "àgbà"

12. "ọchá"



13. "adʒa"

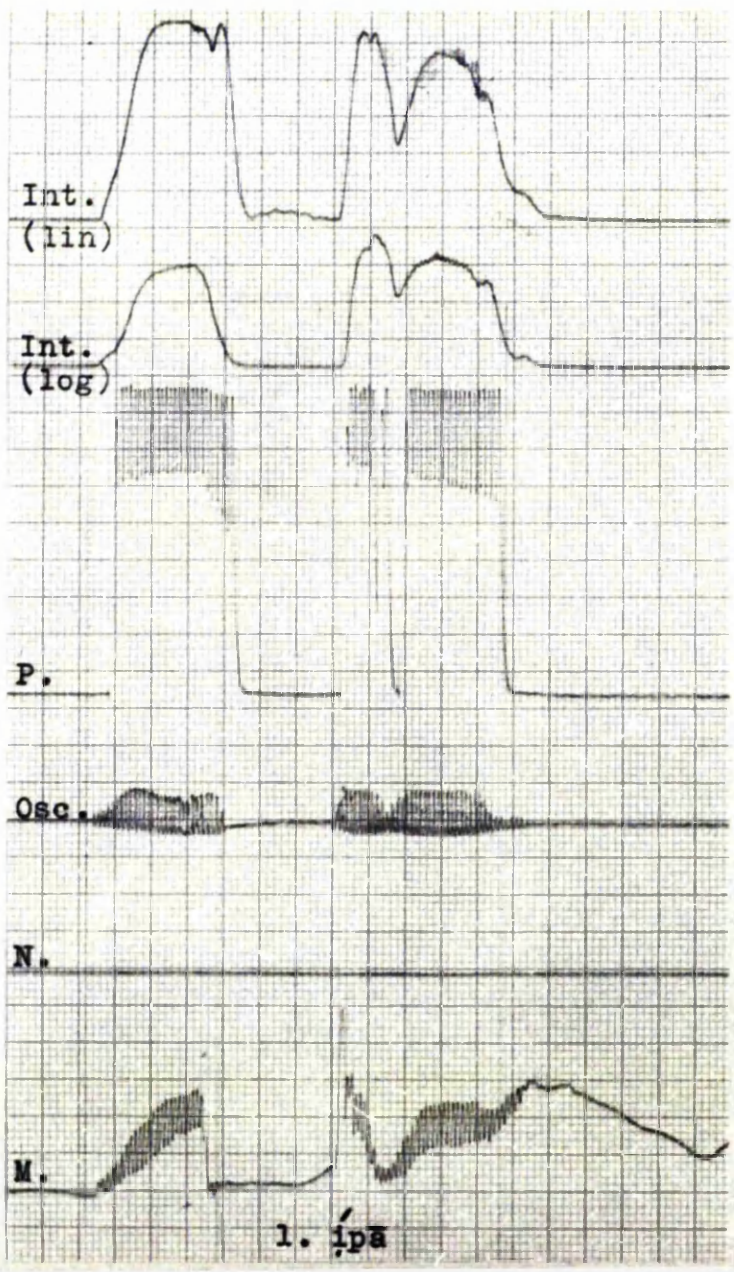
14. "ọ̀sá"

15. "àzá"

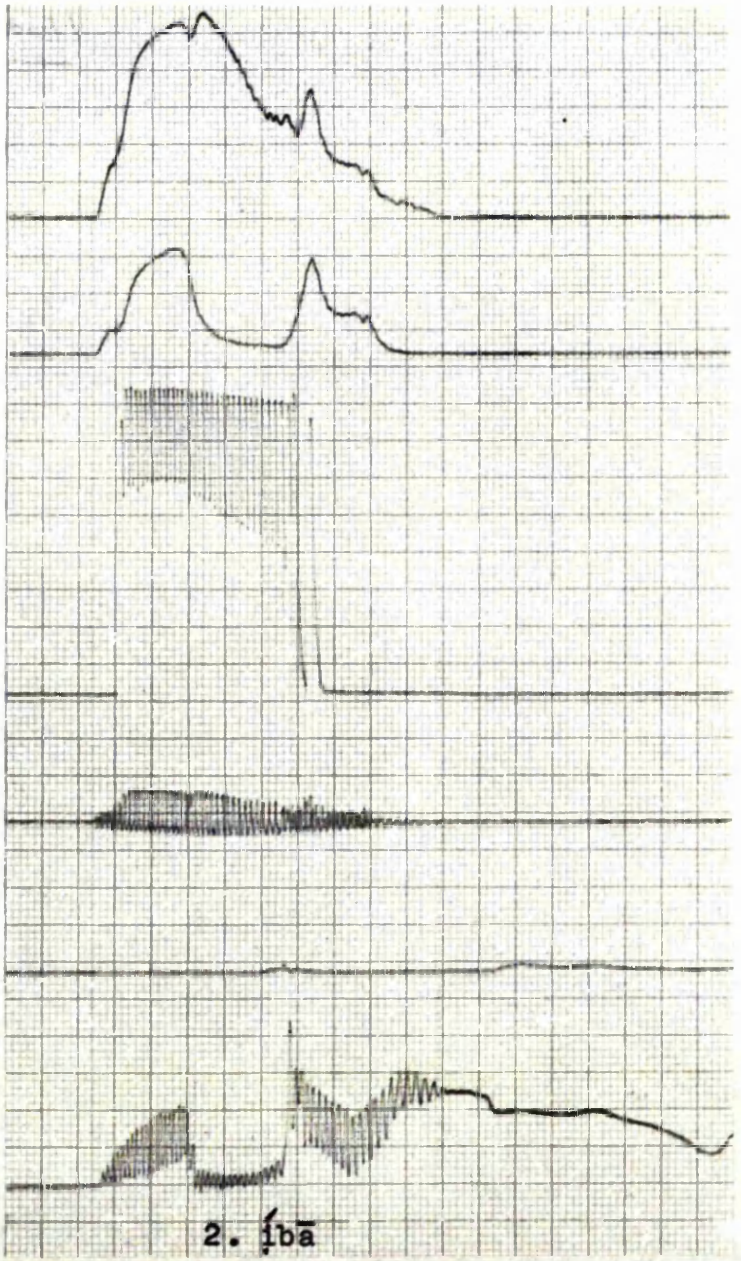
16. "áɣá"

17. "na"

18. "ányá"

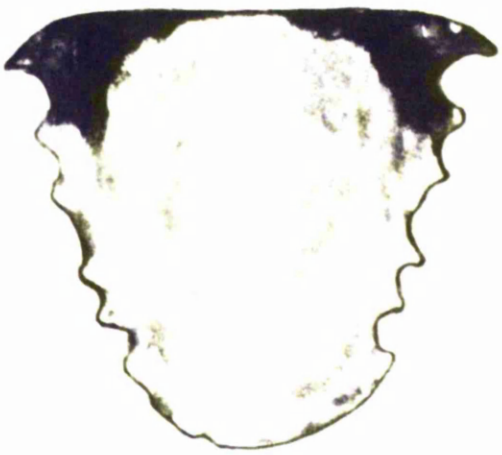


1. ípā

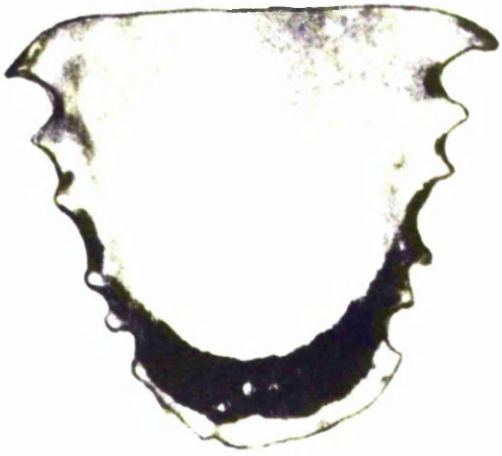


2. ịbā

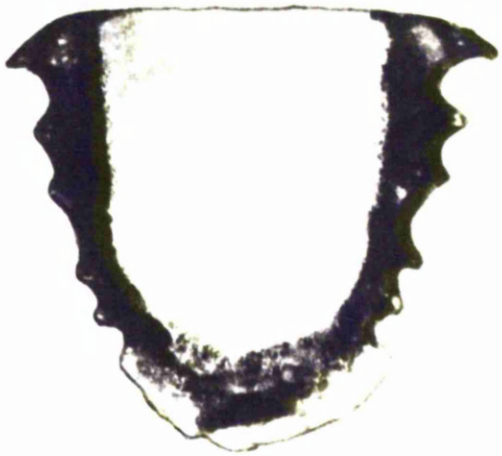
19. "áŋā"



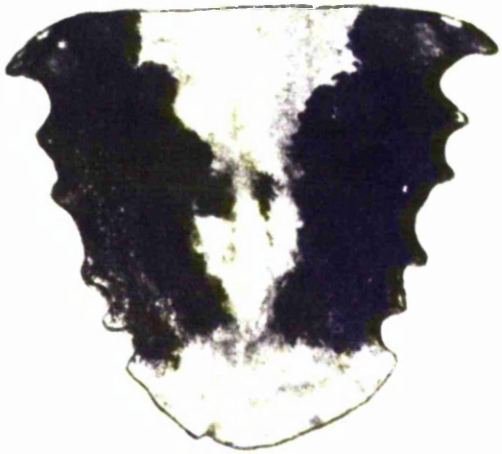
20. "ọ́nwá"



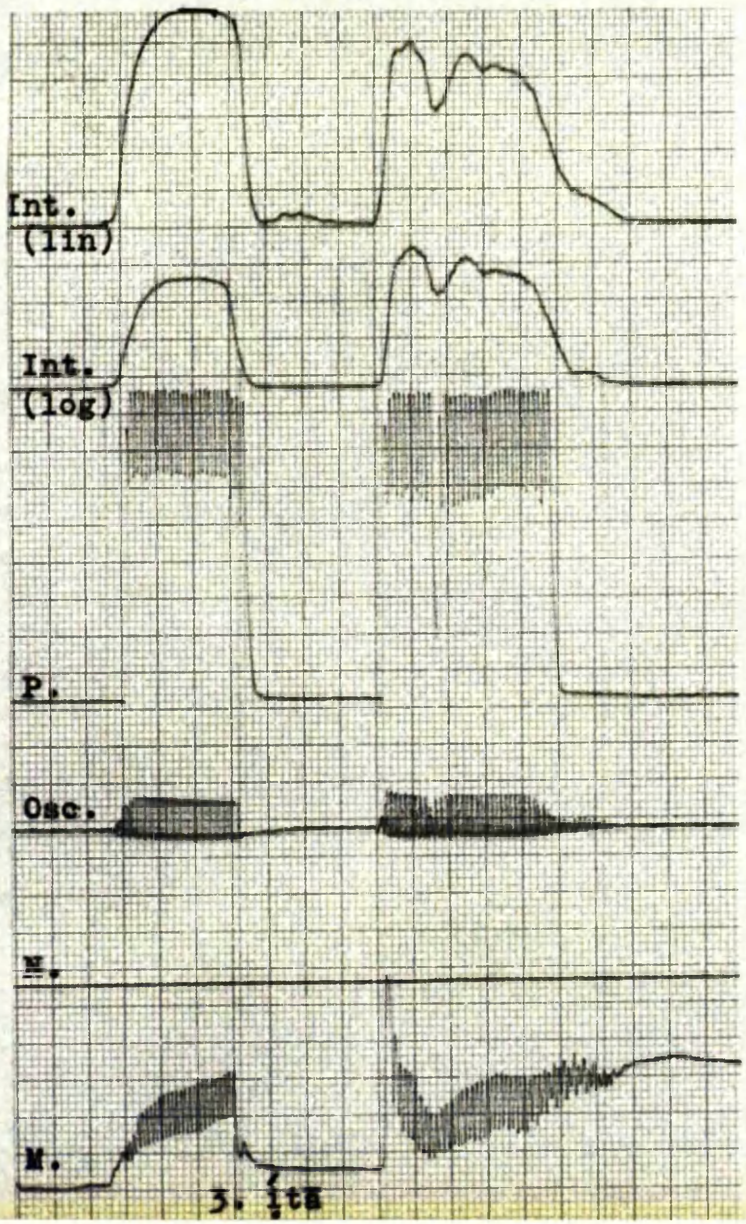
21. "àlà"



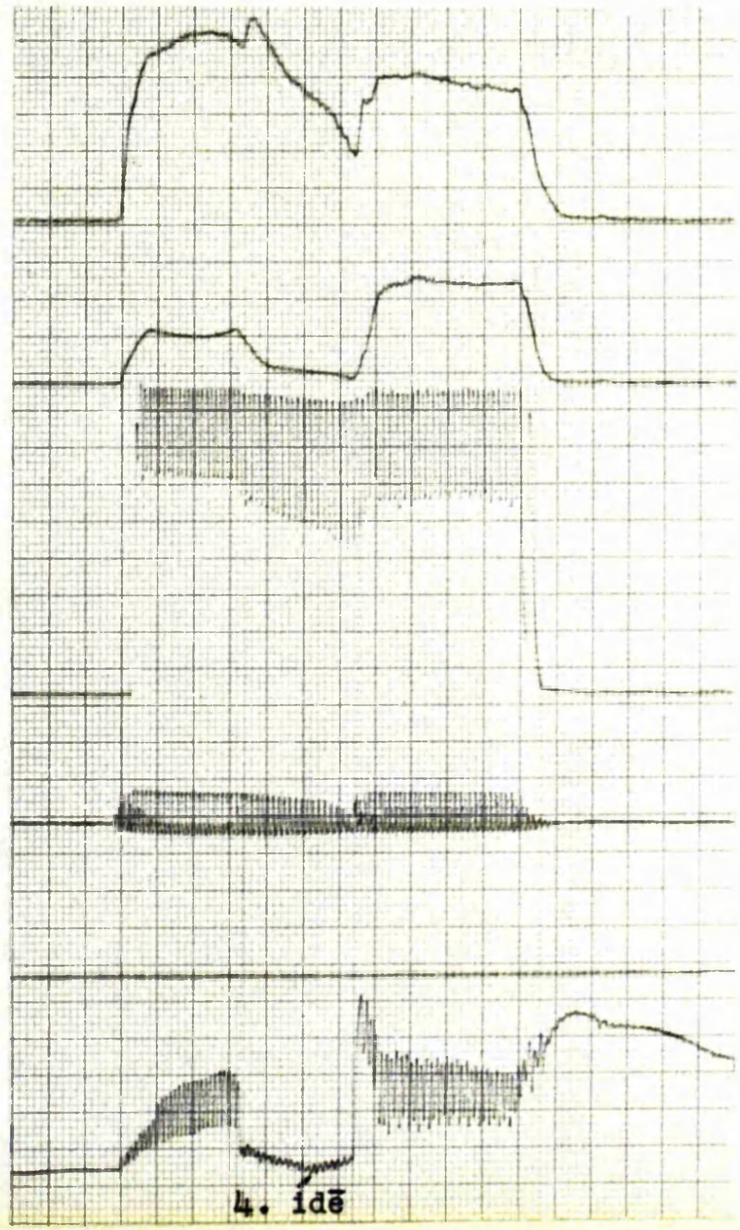
22. "árá"

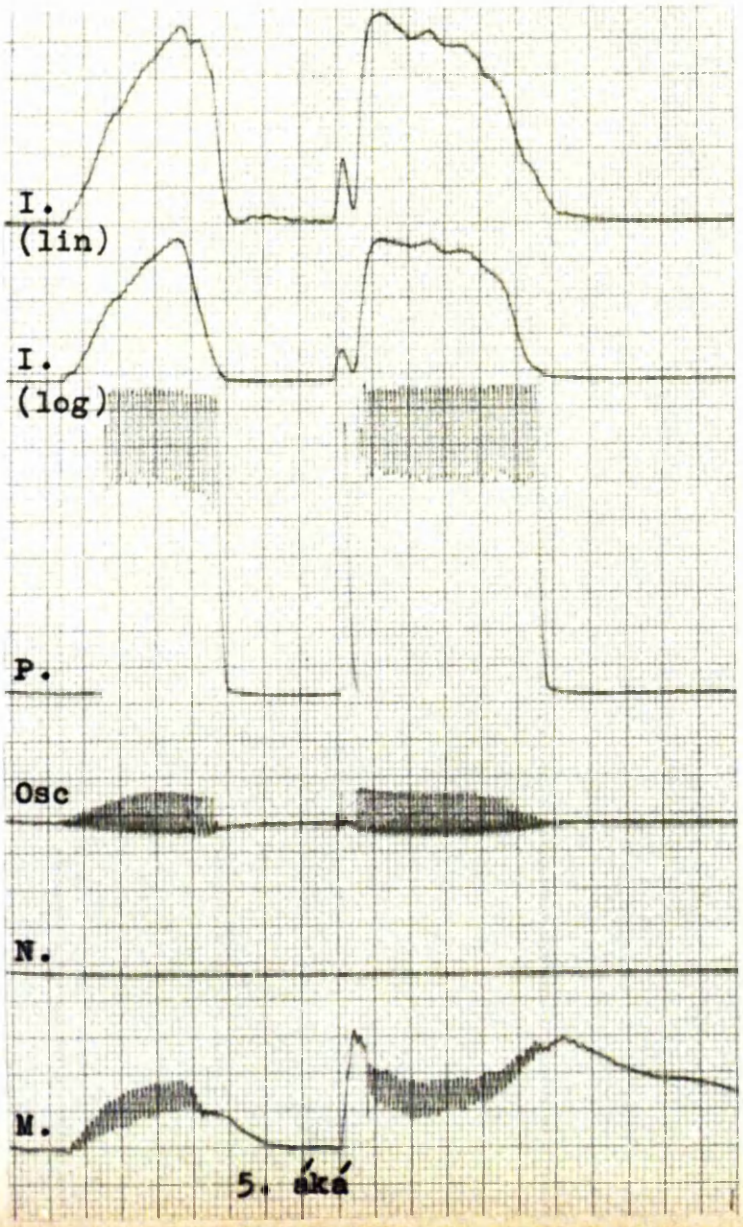


23. "ọ́yà"

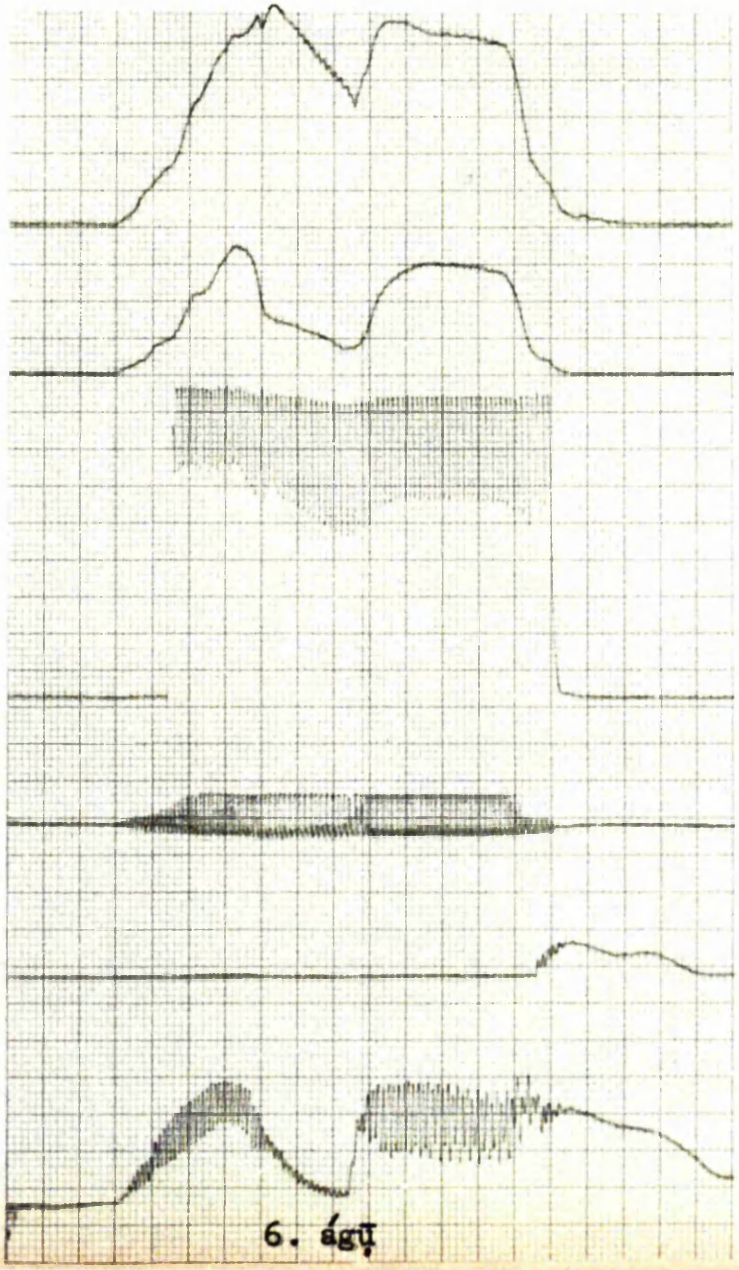


3. ítā

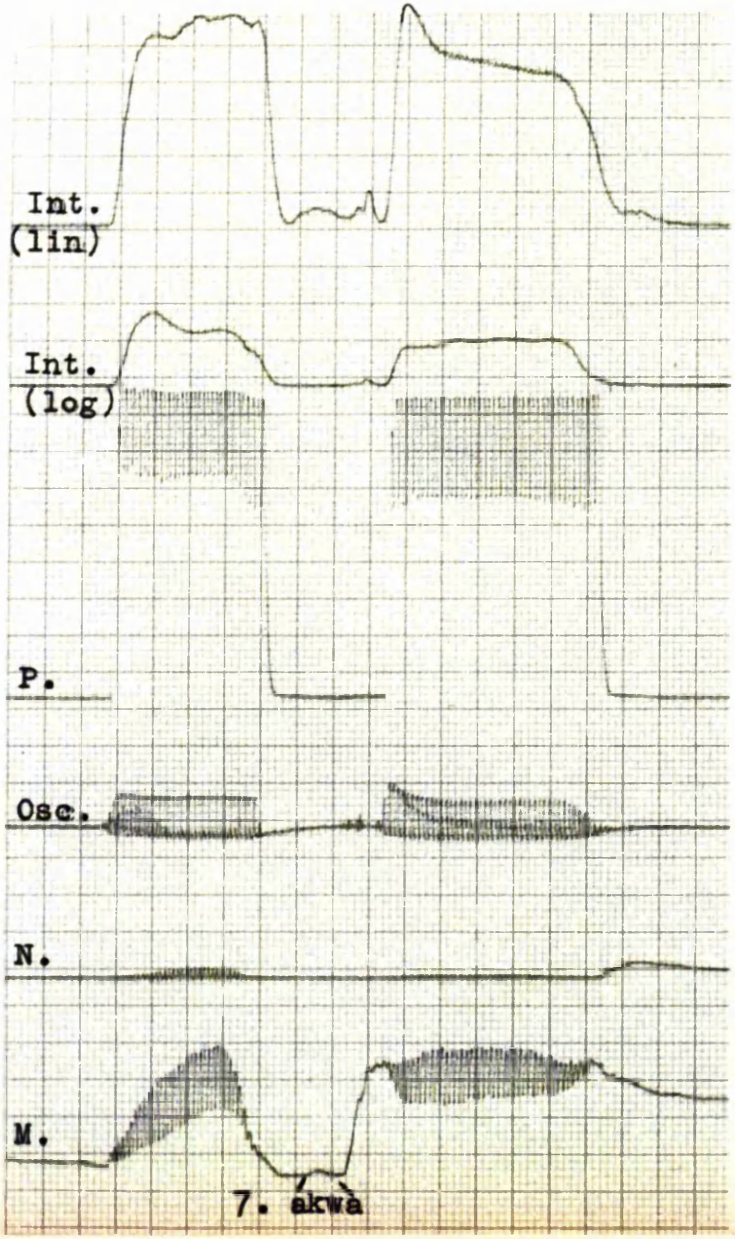

4. idē



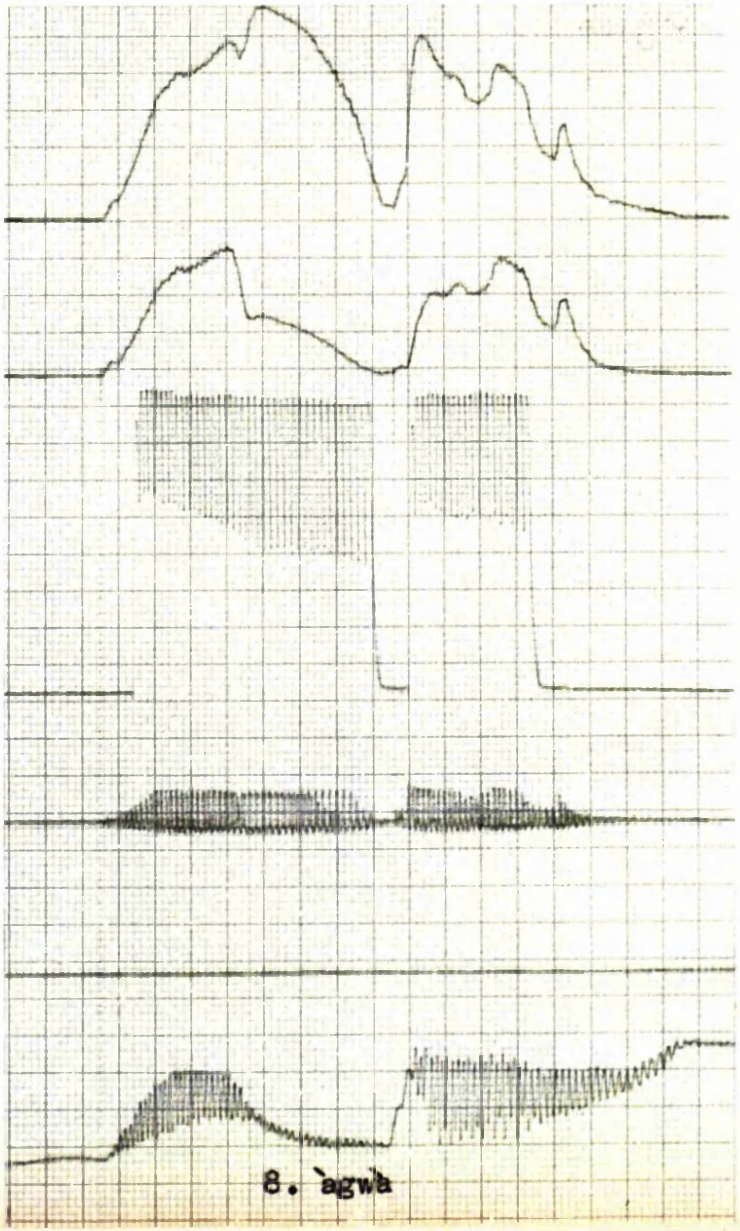
5. ábra



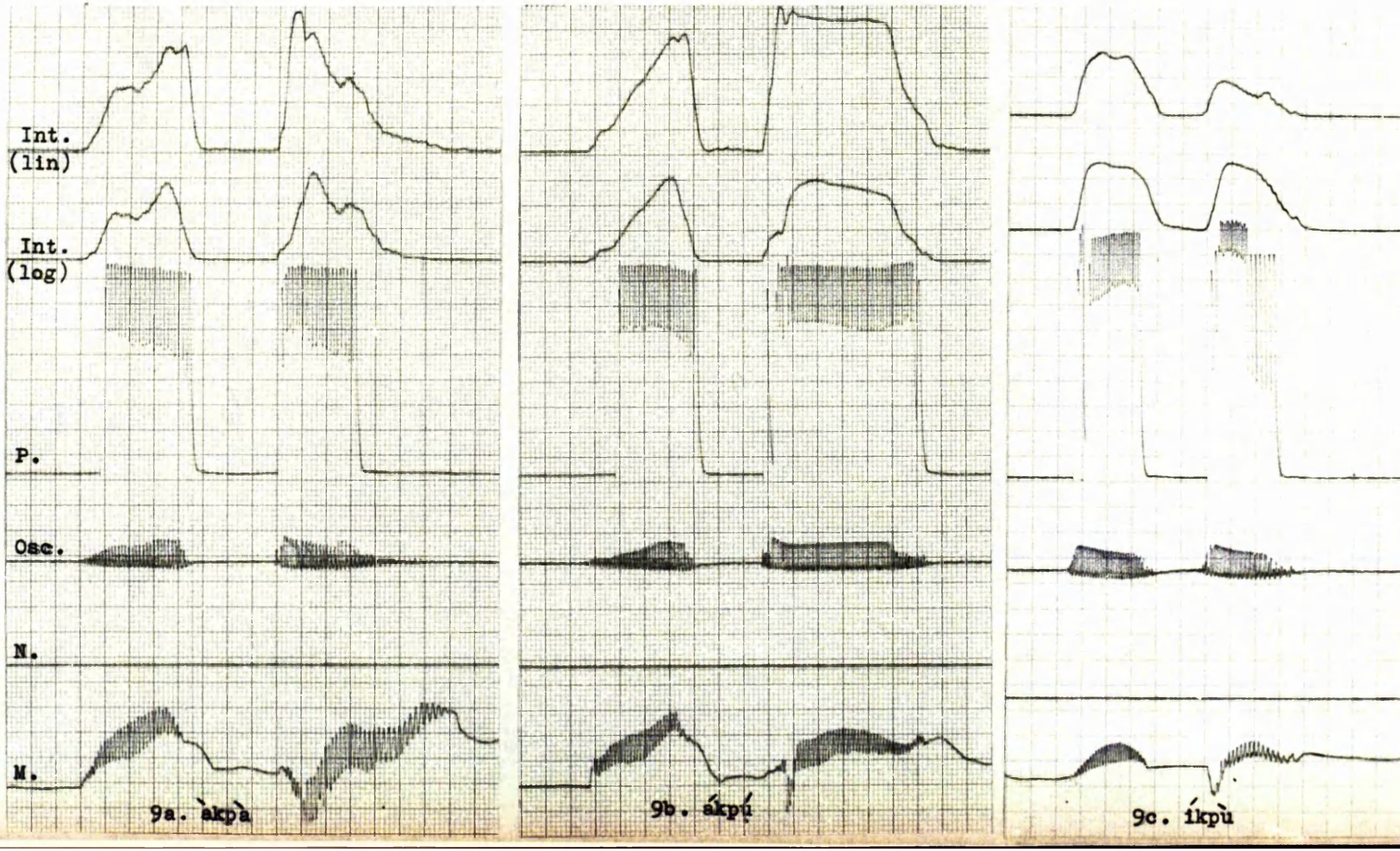
6. ábra

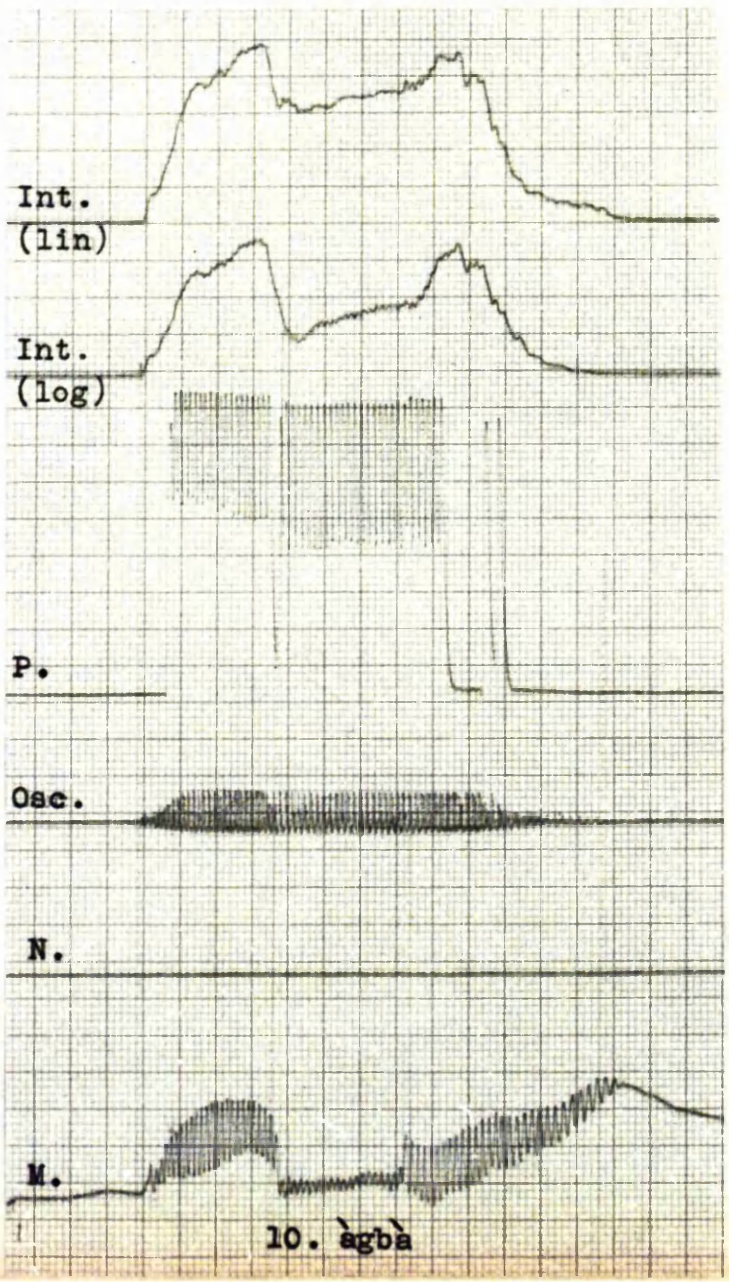


7. ákwà

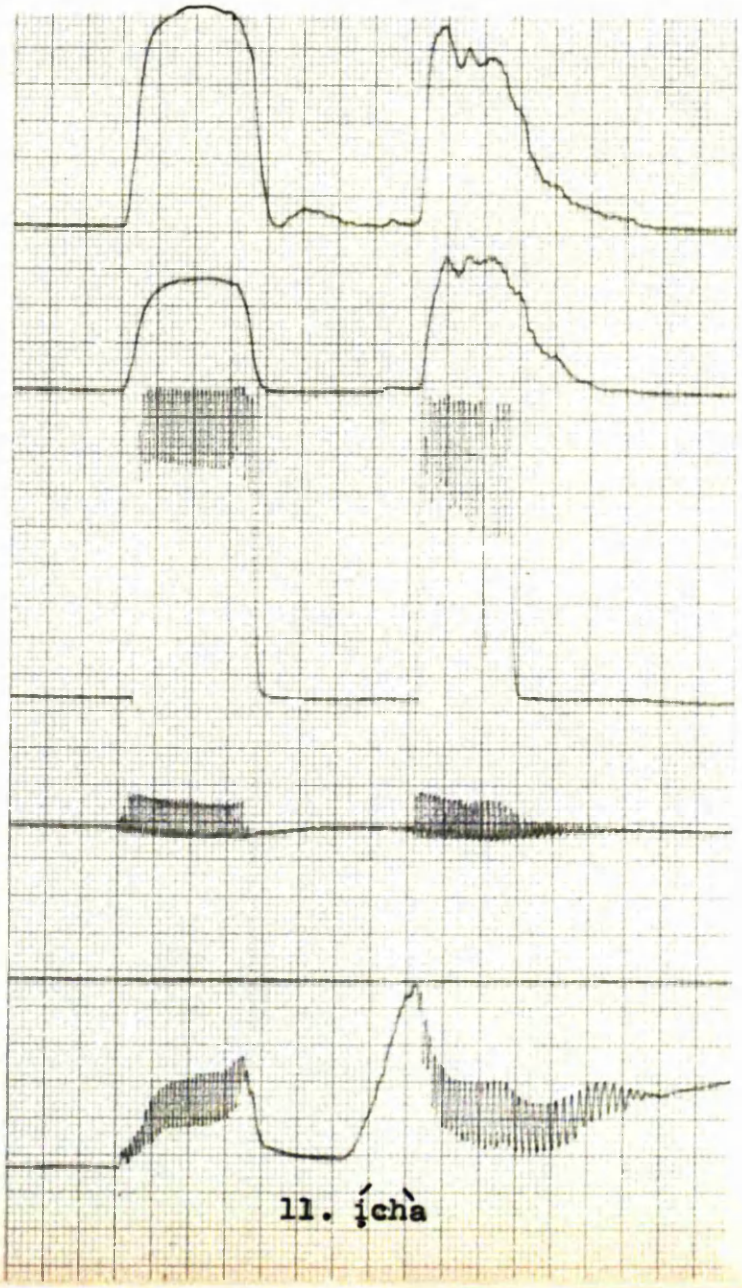


8. àgwà

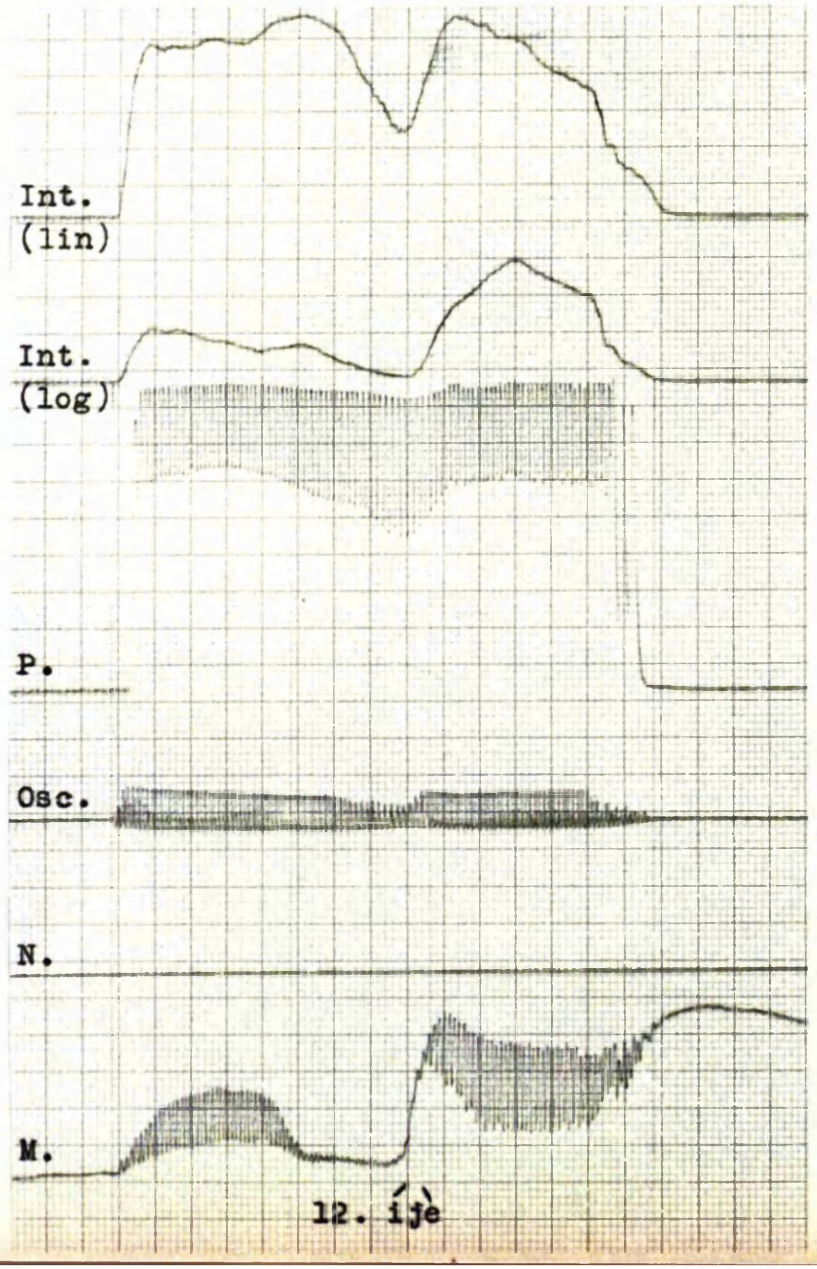

Int.
(lin)
Int.
(log)
P.
Osc.
N.
M.
9a. àkpà
9b. ákpú
9c. íkpù



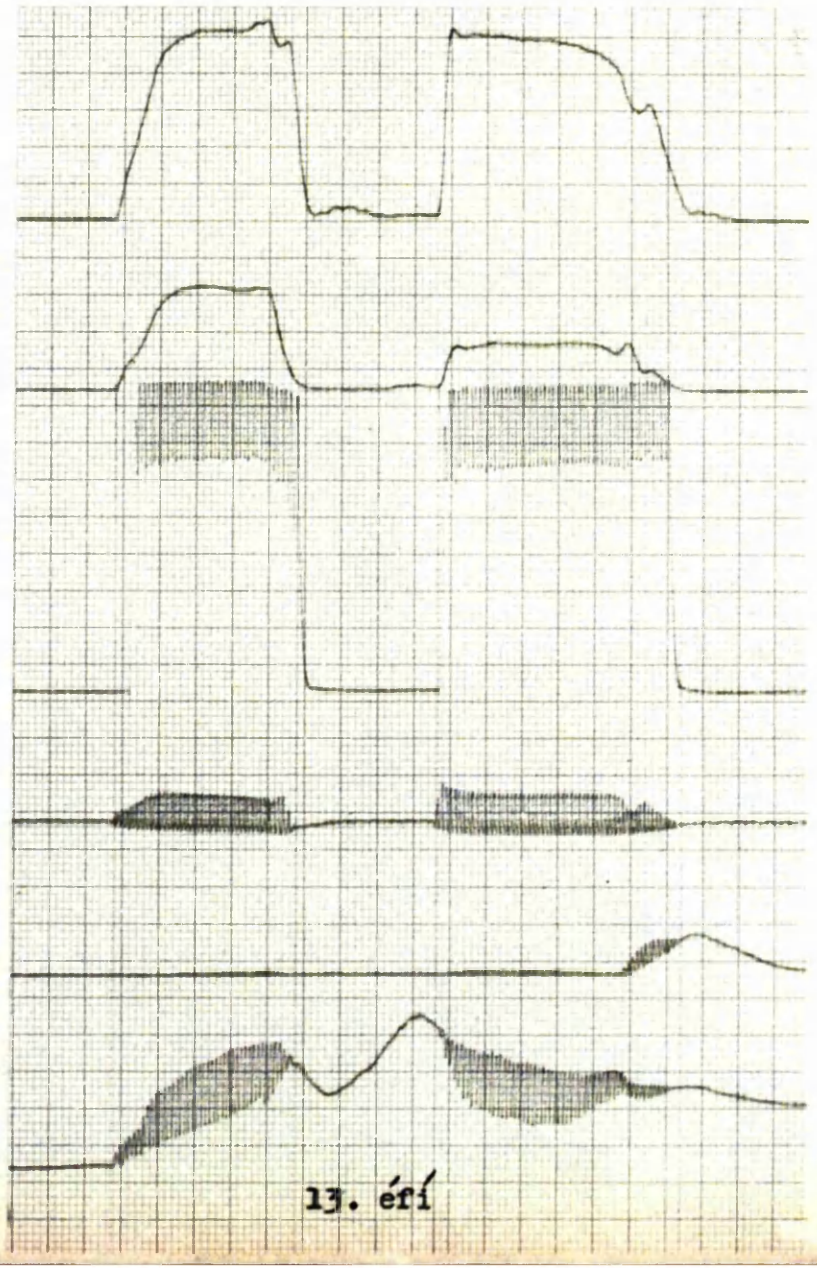
10. àgbà



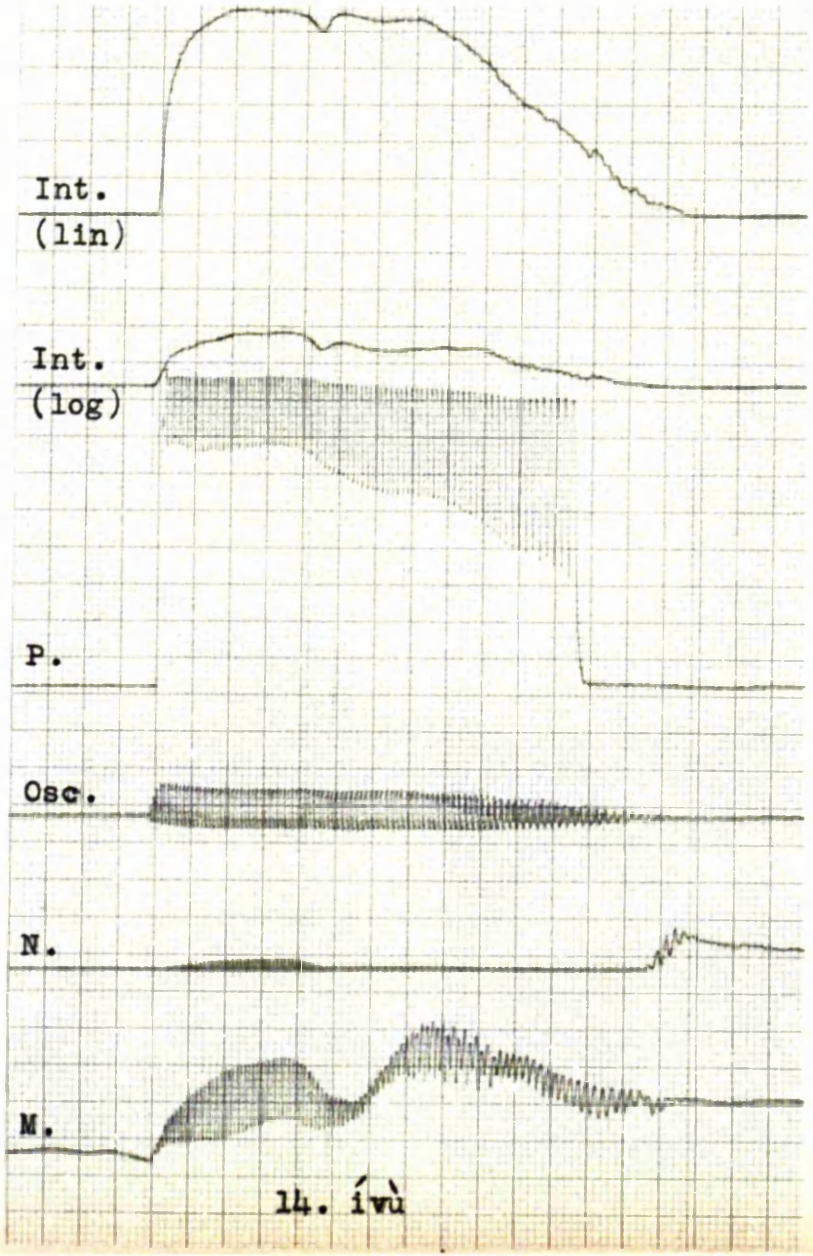
11. ịchà



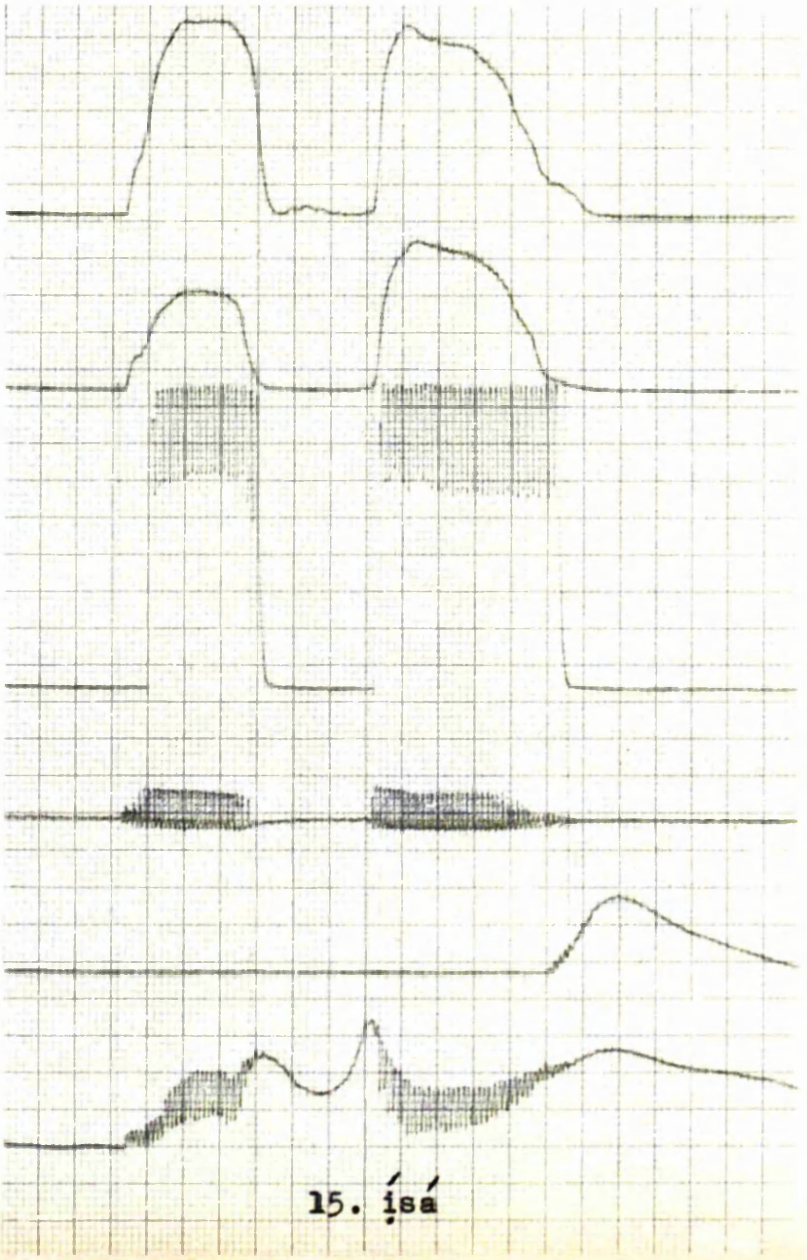
12. íjè



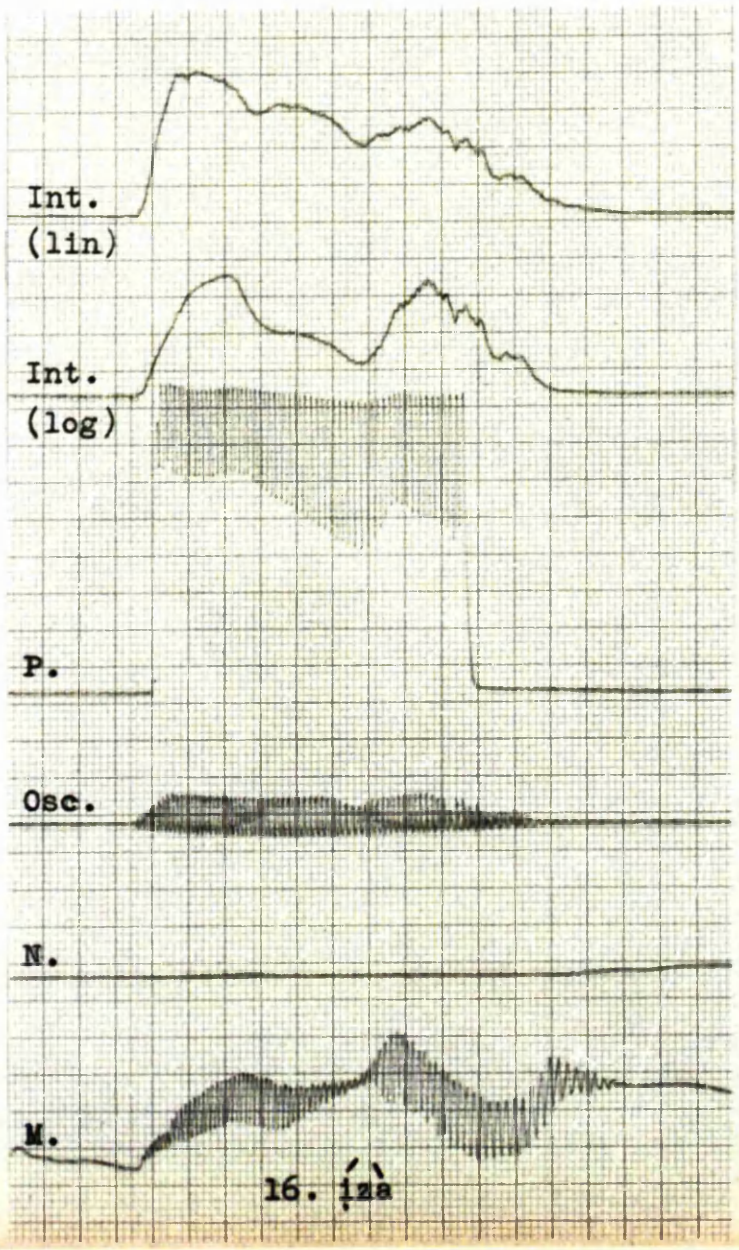
13. éfí



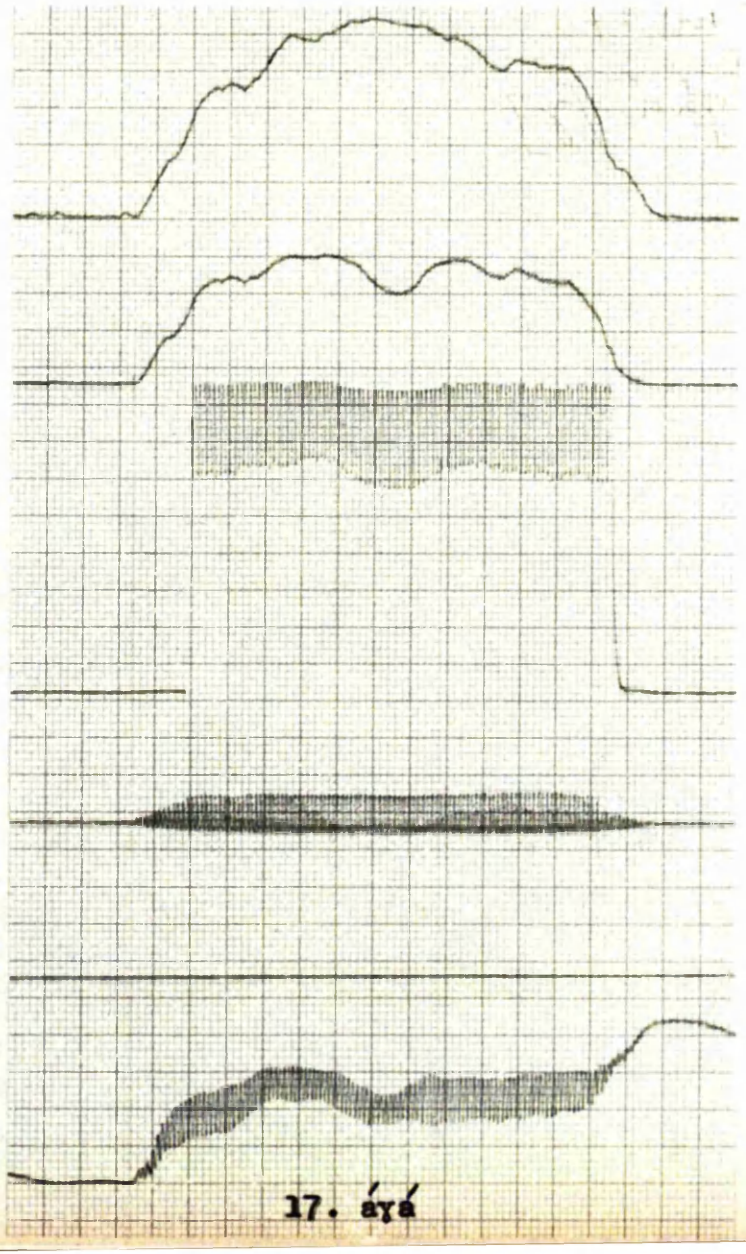
14. ívù



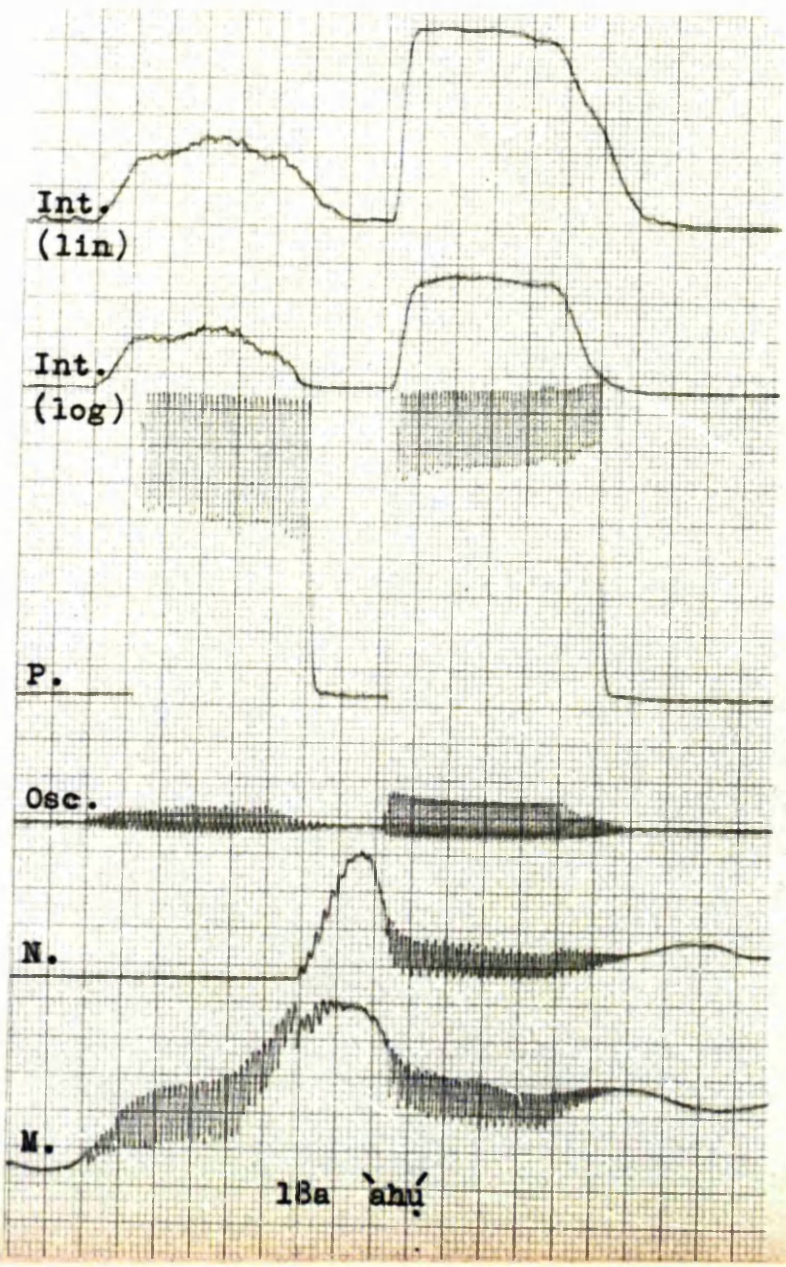
15. ísá



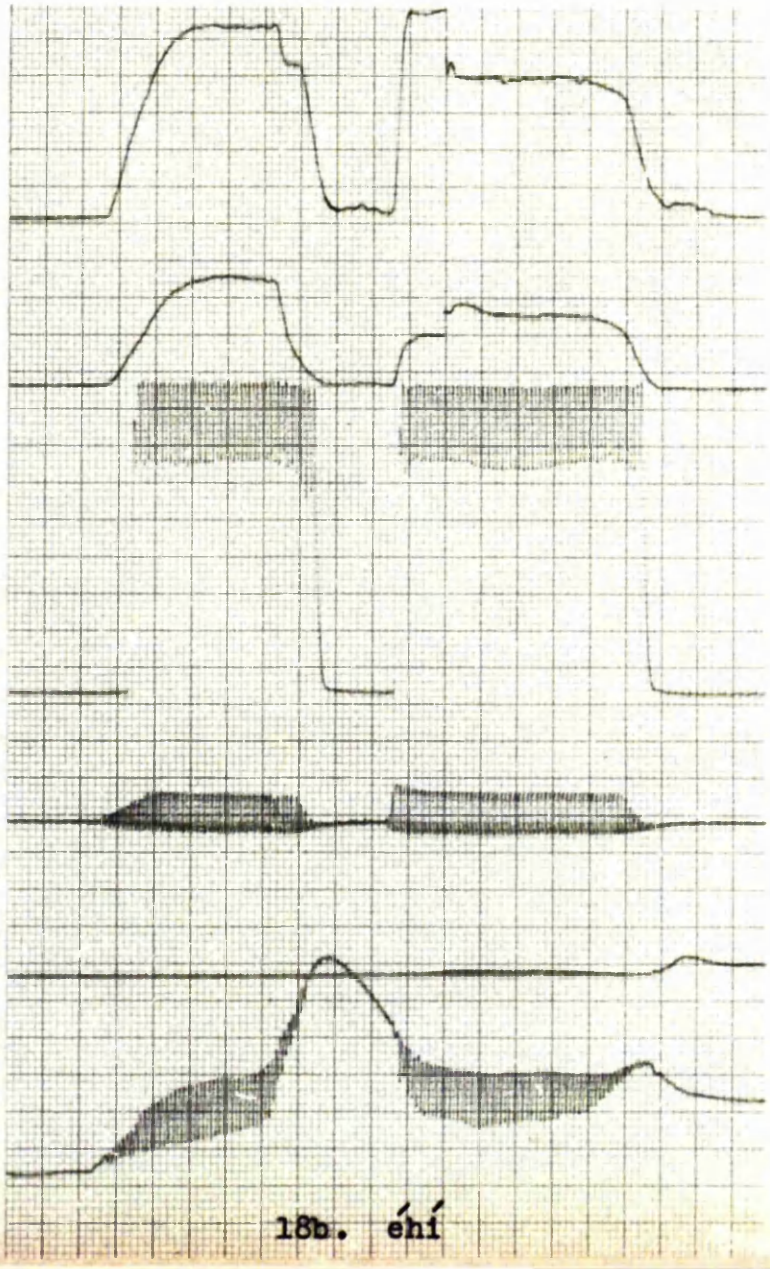
16. ízà



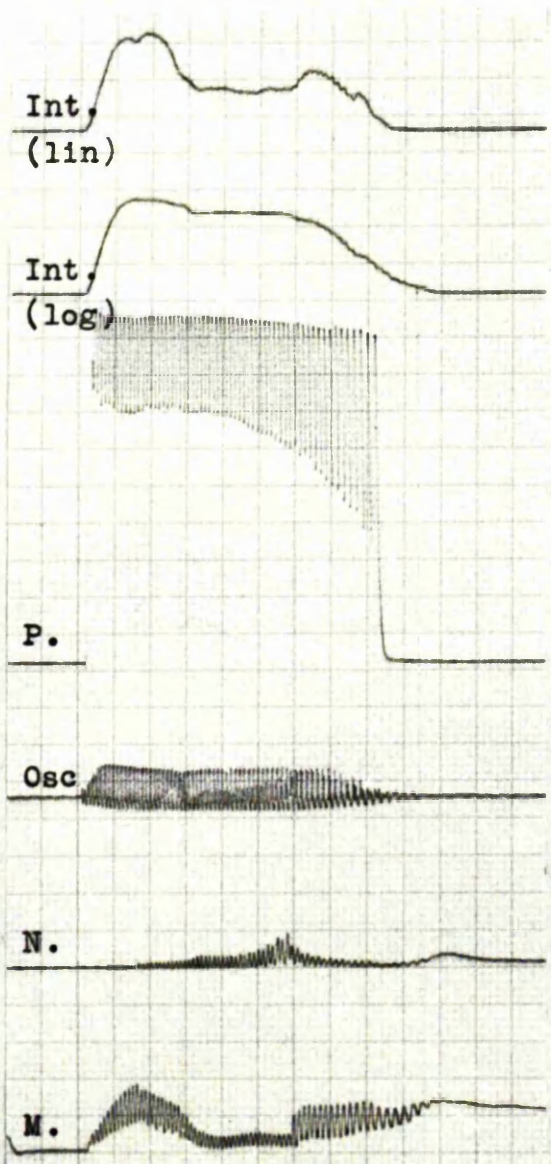
17. áyá



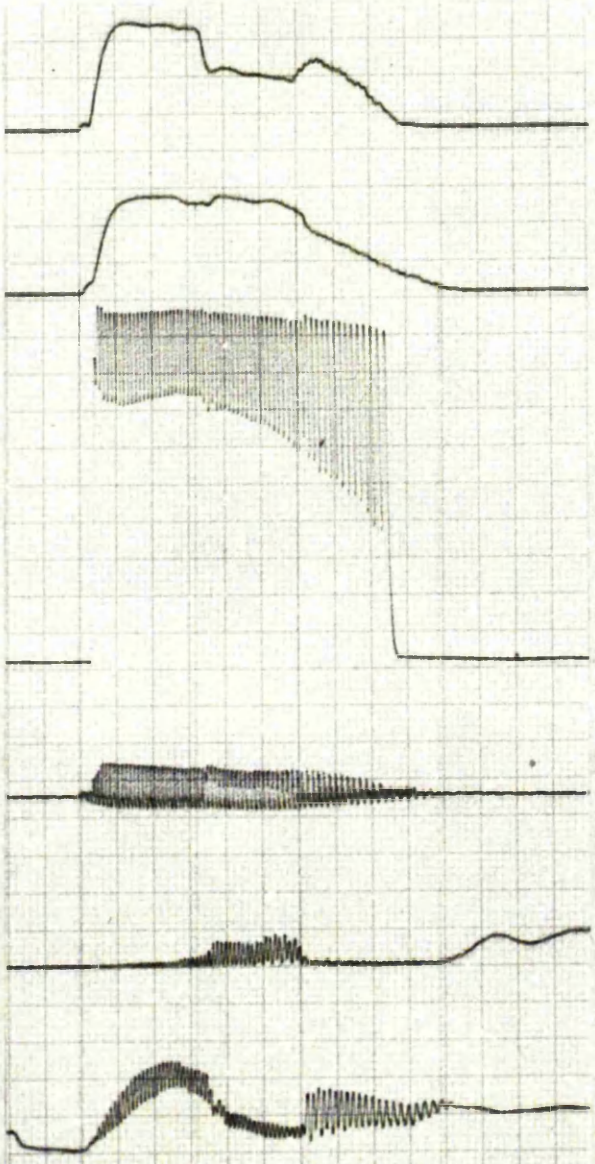
18a àhú



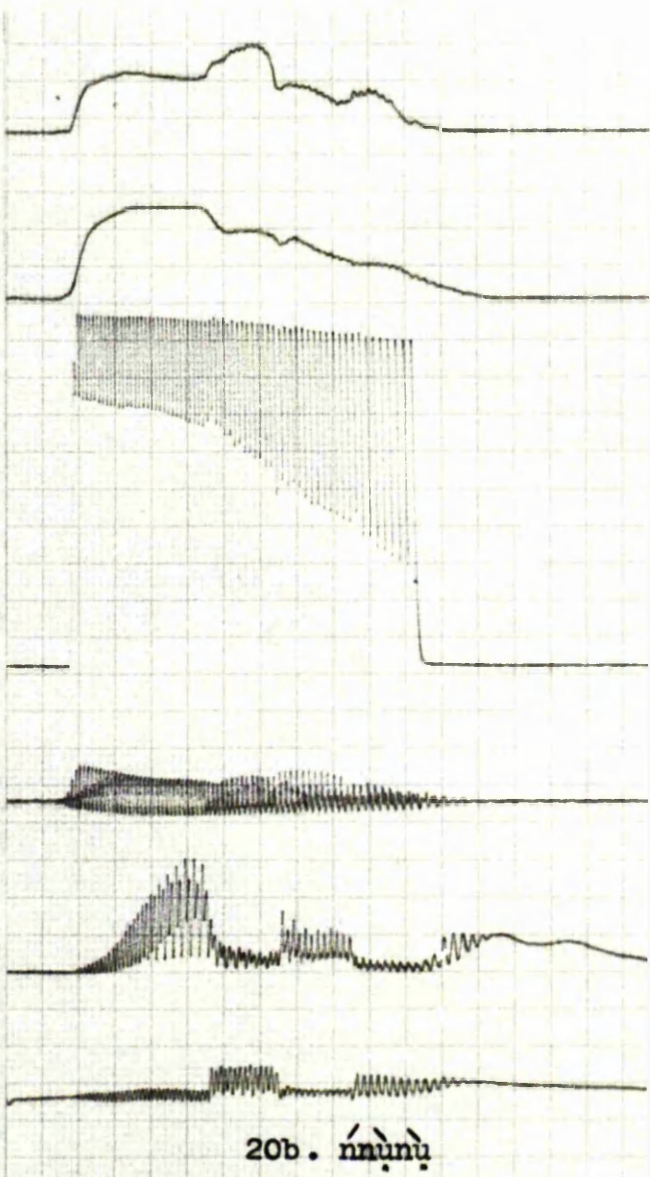
18b. éhí



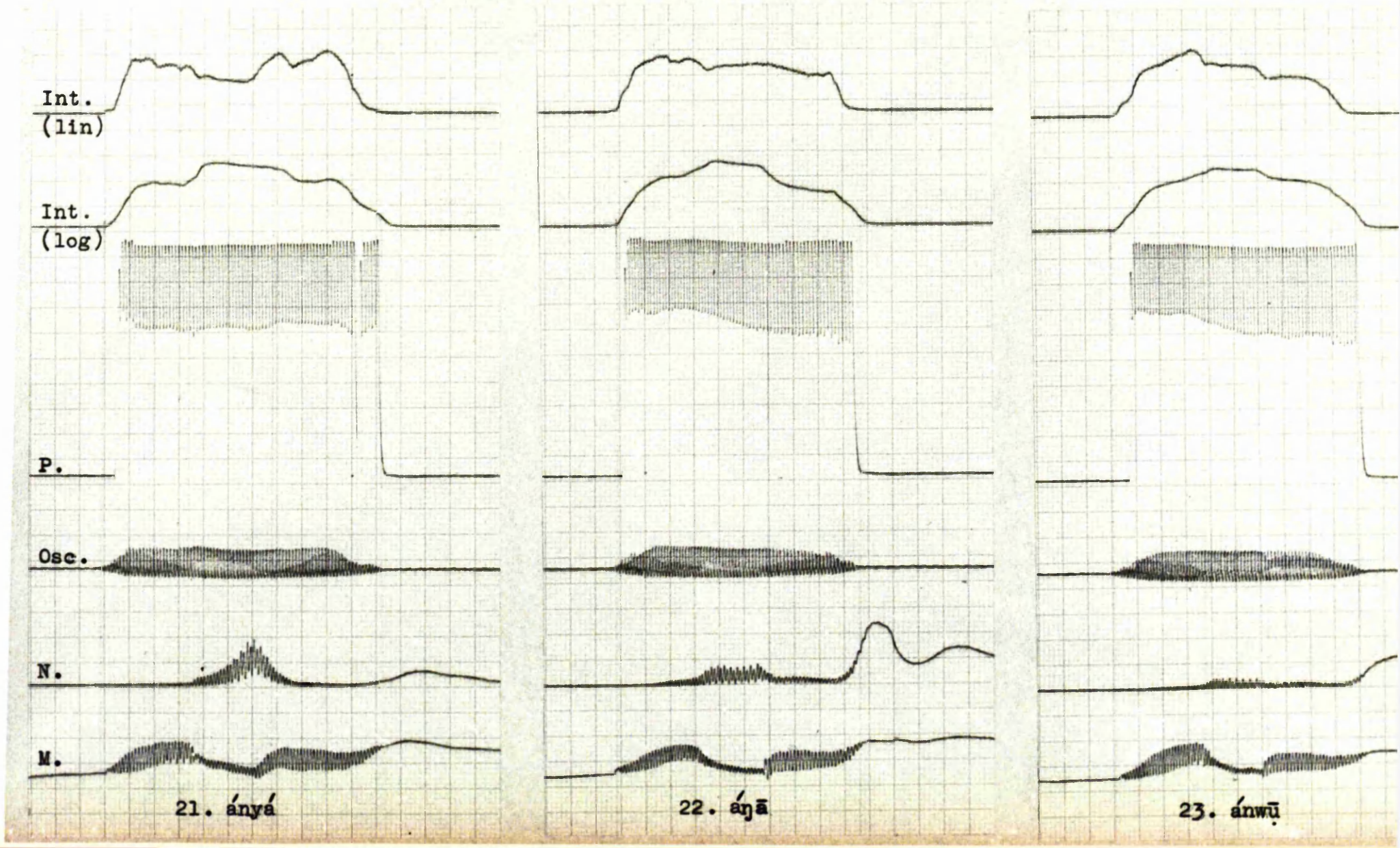
19. ụ́mụ̀



20a. ụ́mụ̀



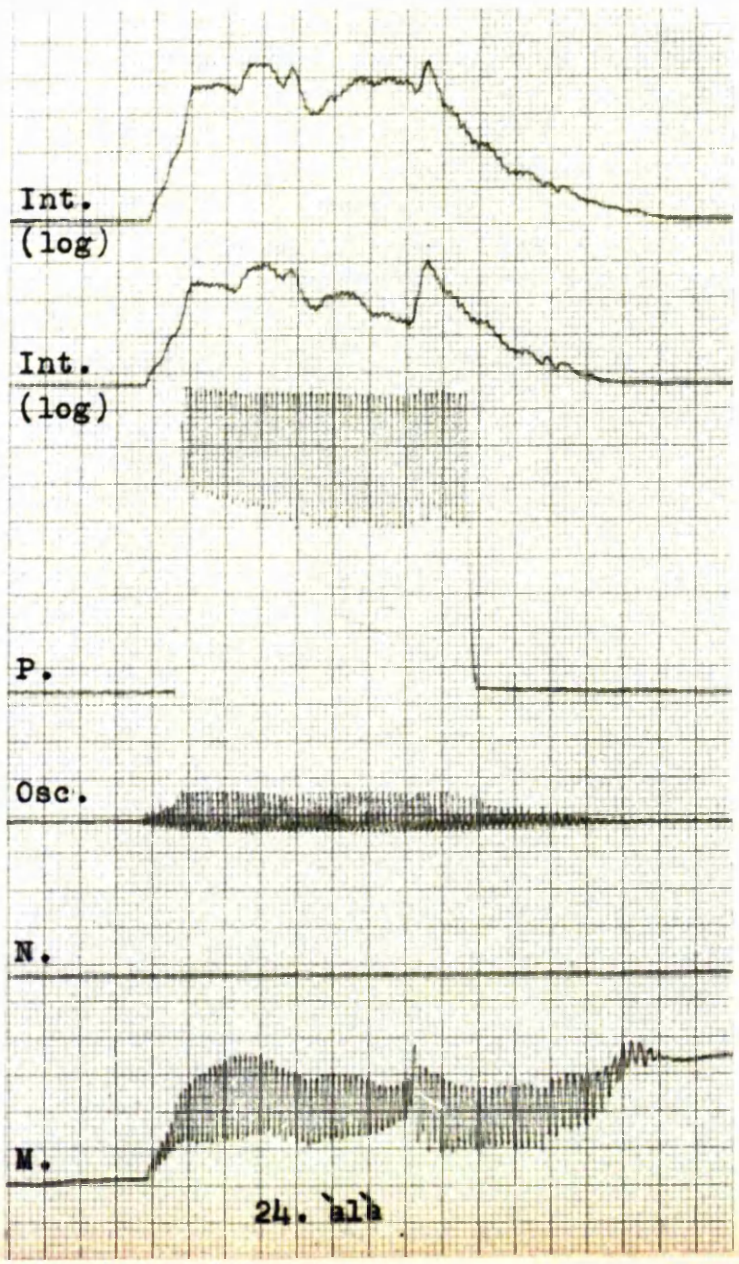
20b. nnụ̀nụ̀



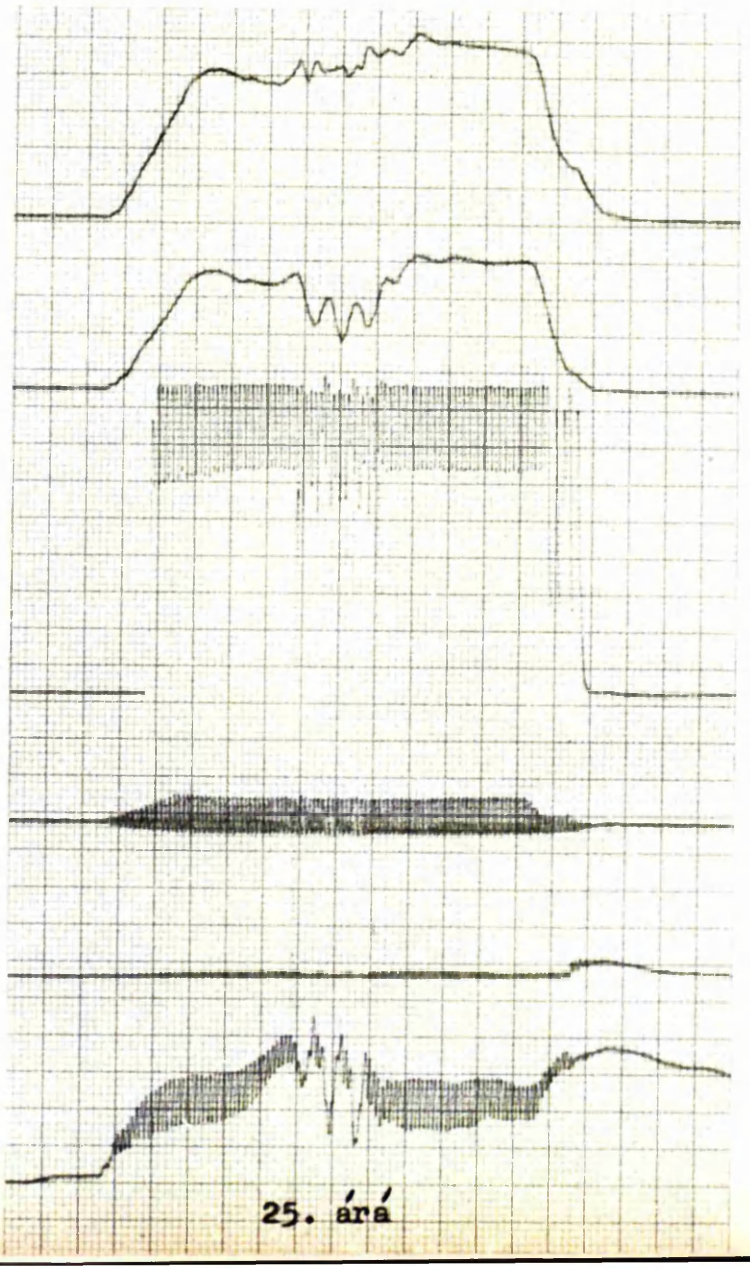
21. ányá

22. áŋā

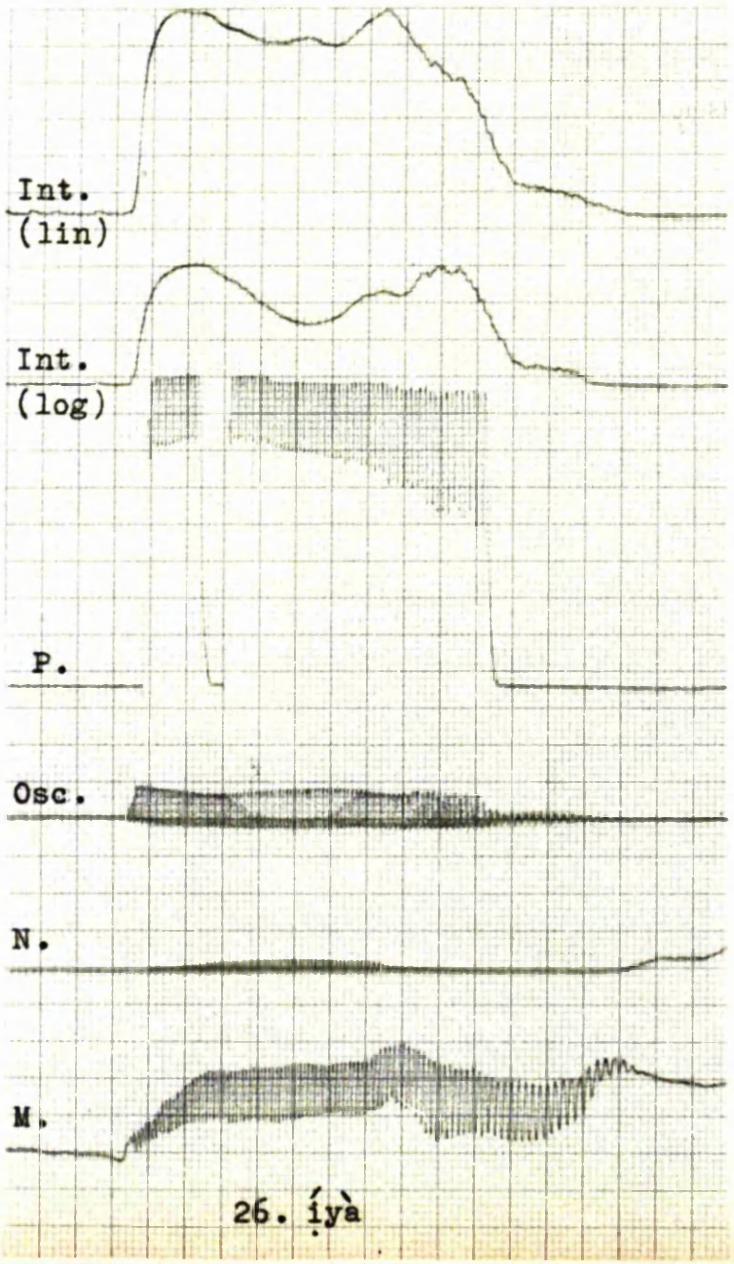
23. ánwụ̄



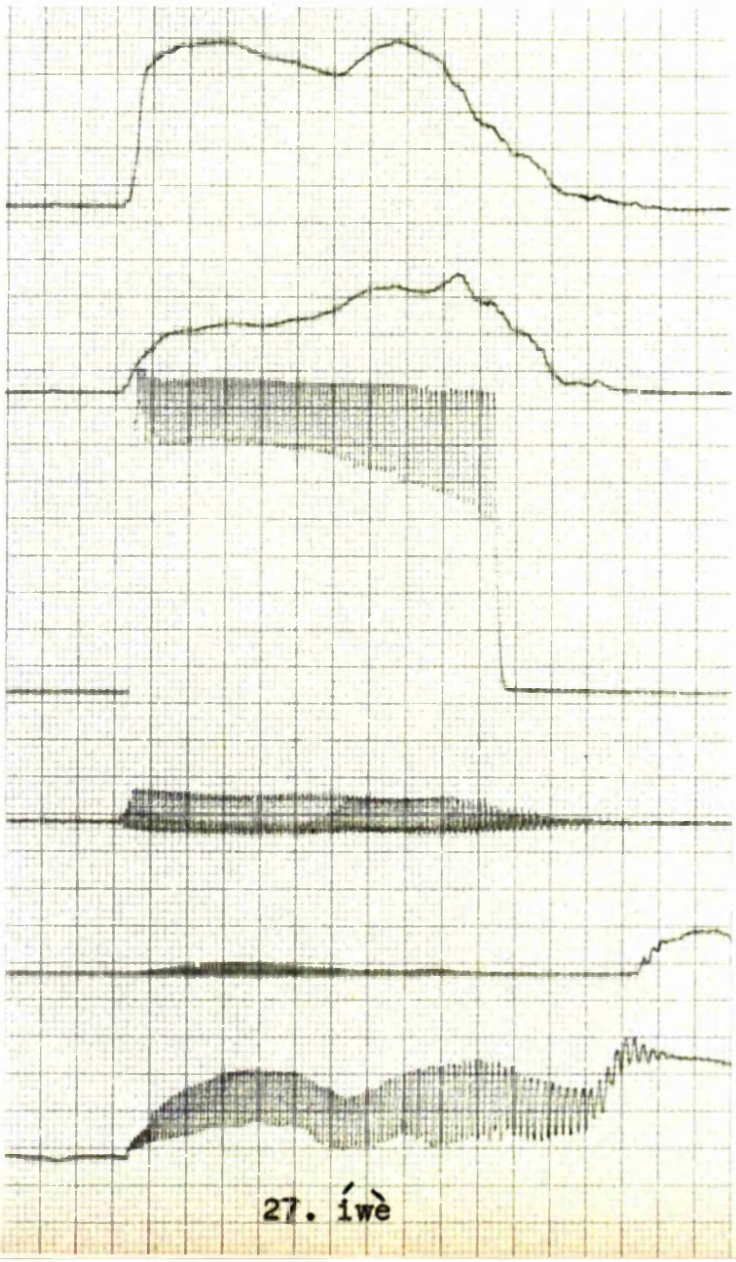
24. ábra



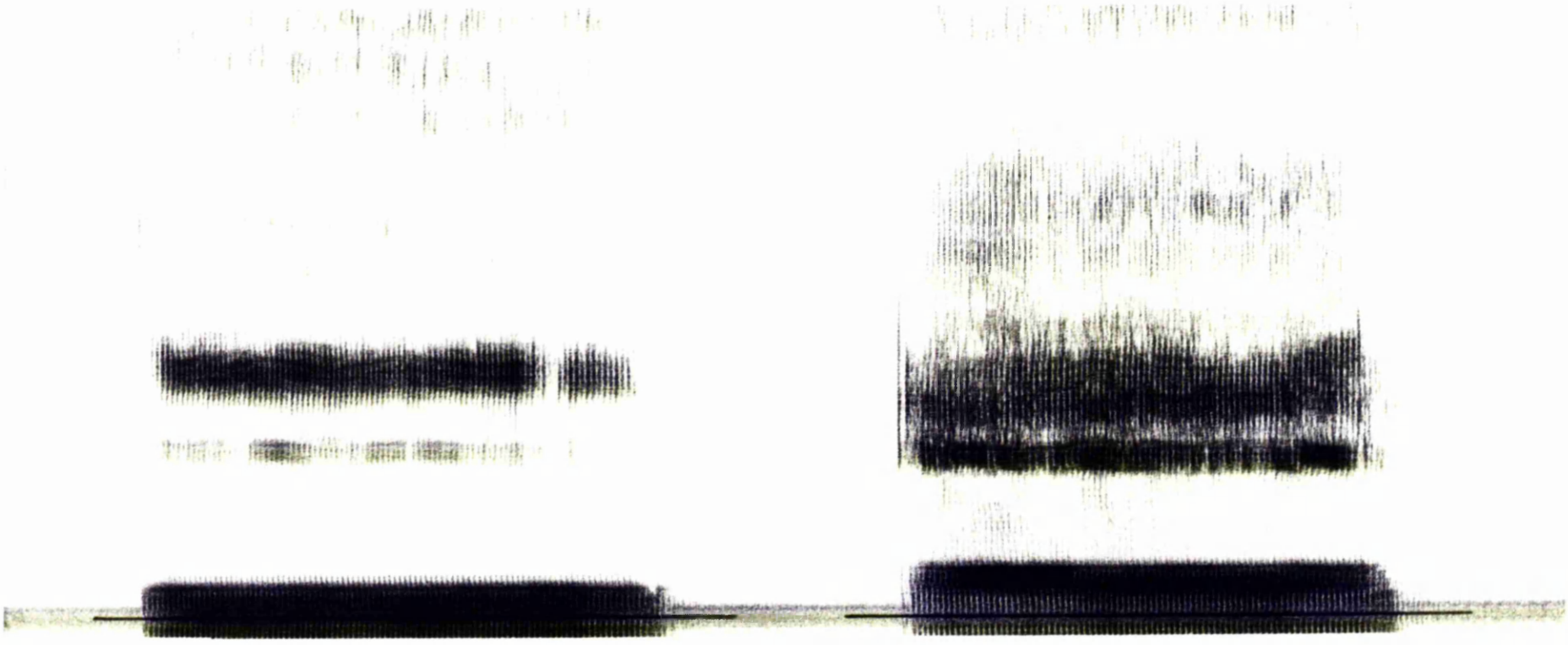
25. ábra



26. íyà



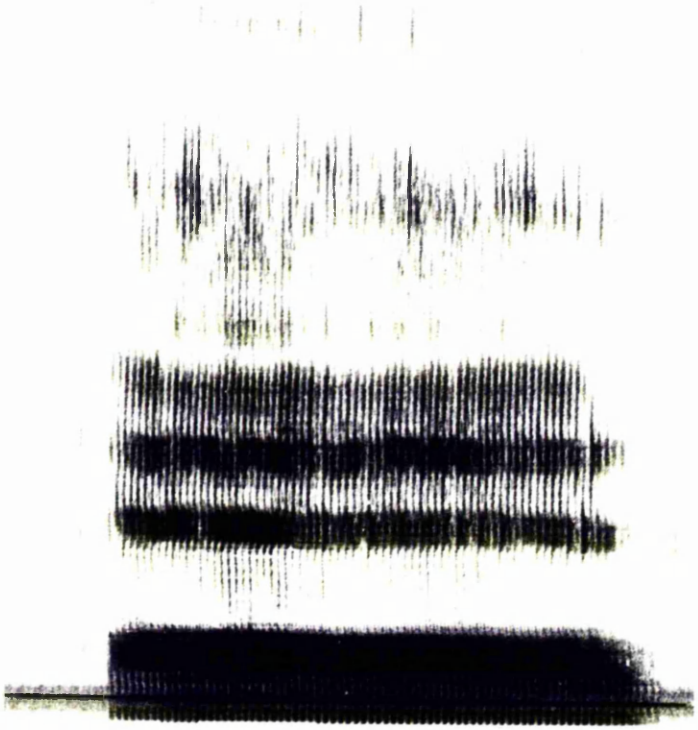
27. íwè



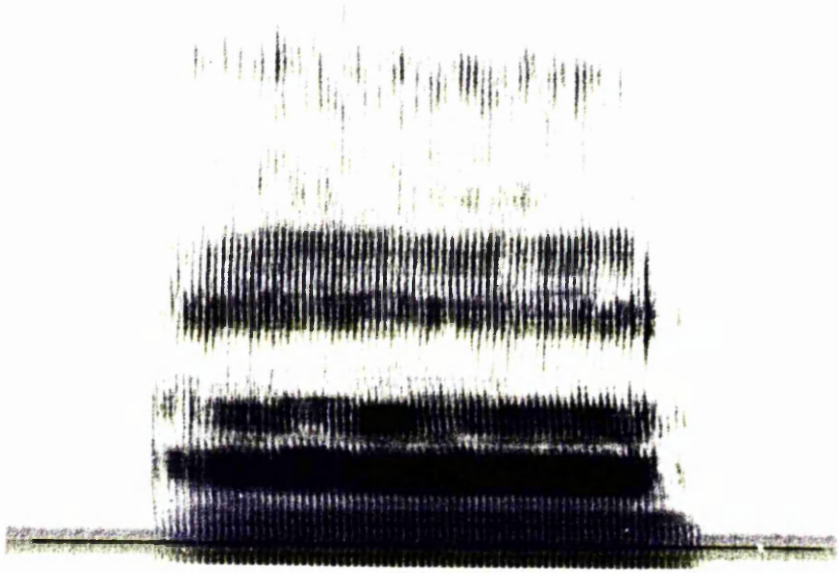
Spec. 1. [i]

Spec. 2. [ɪ]

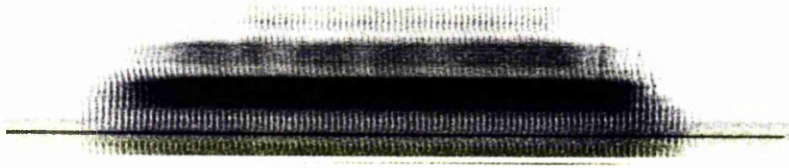
* The symbol [ɑ] has been used under the spectrograms where [ɑ̈] has been used elsewhere.



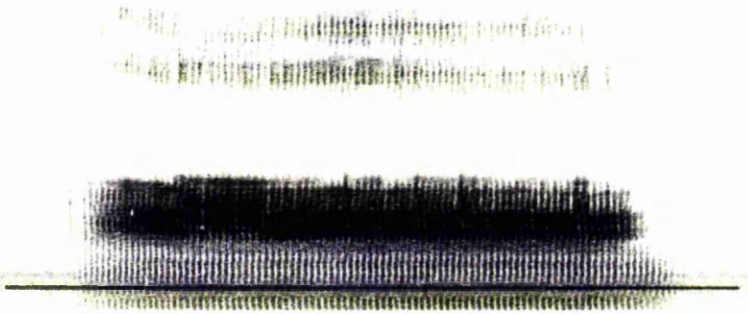
Spec. 3. [e]



Spec. 4. [a]*



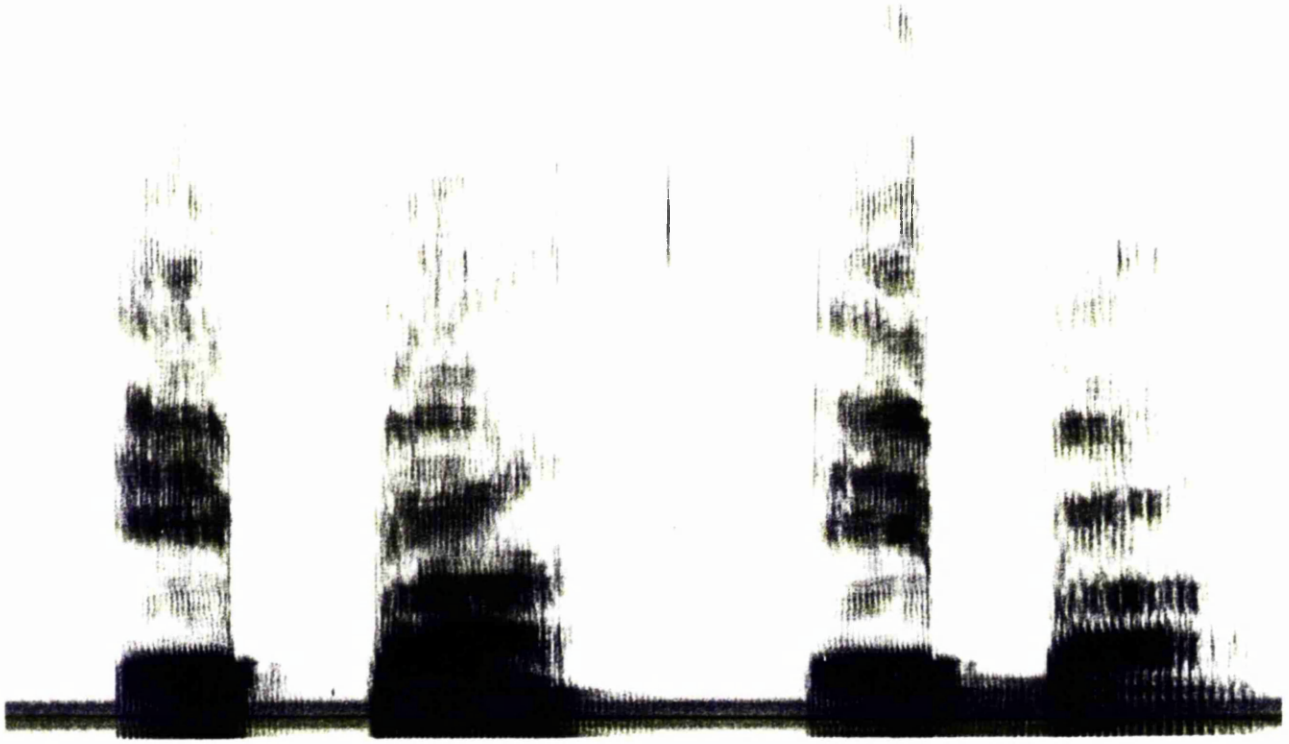
Spec. 5. [o]



Spec. 6. [ɔ]

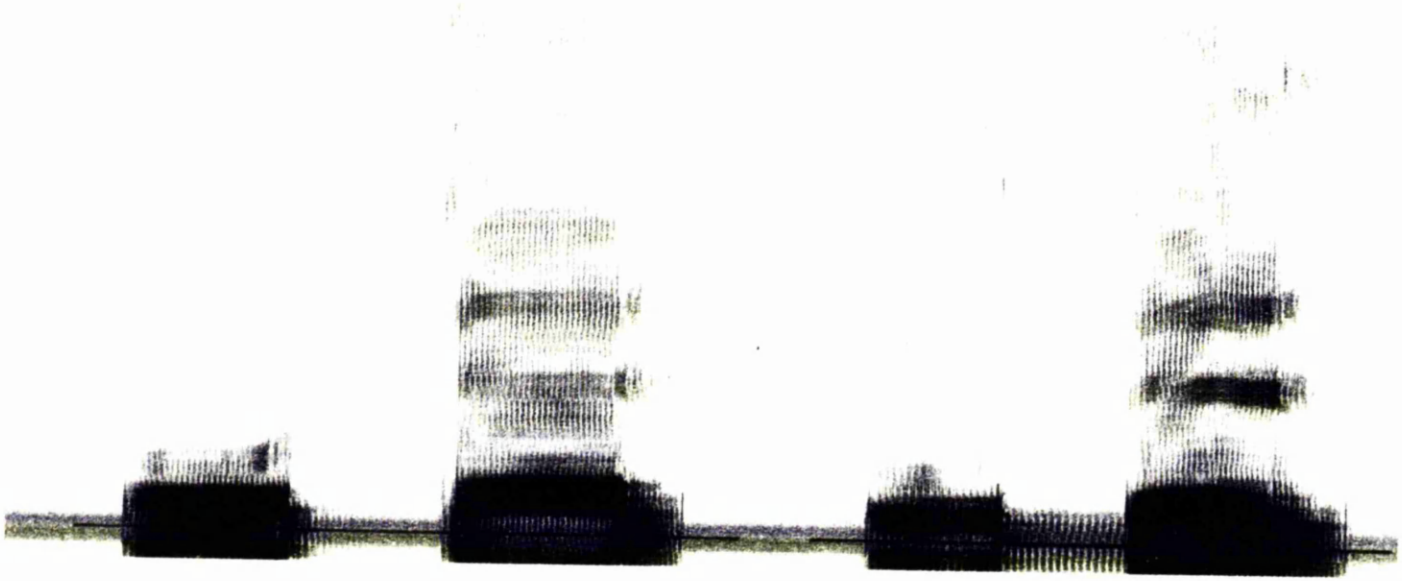
Spec. 7. [ɑ]

Spec. 8. [u]



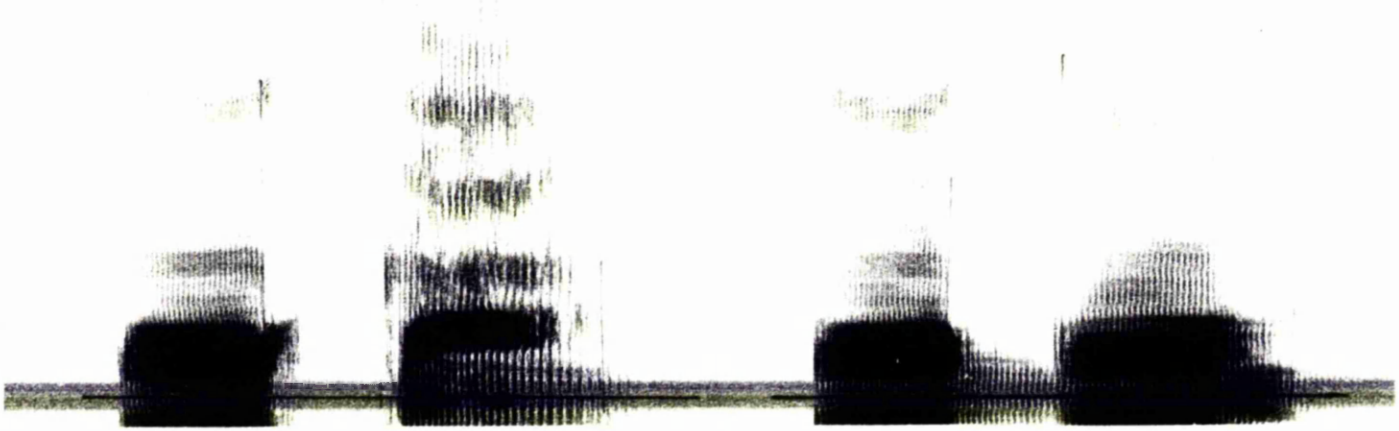
Spec. 9. [ɪ́pā]

Spec. 10. [ɪ́bà]



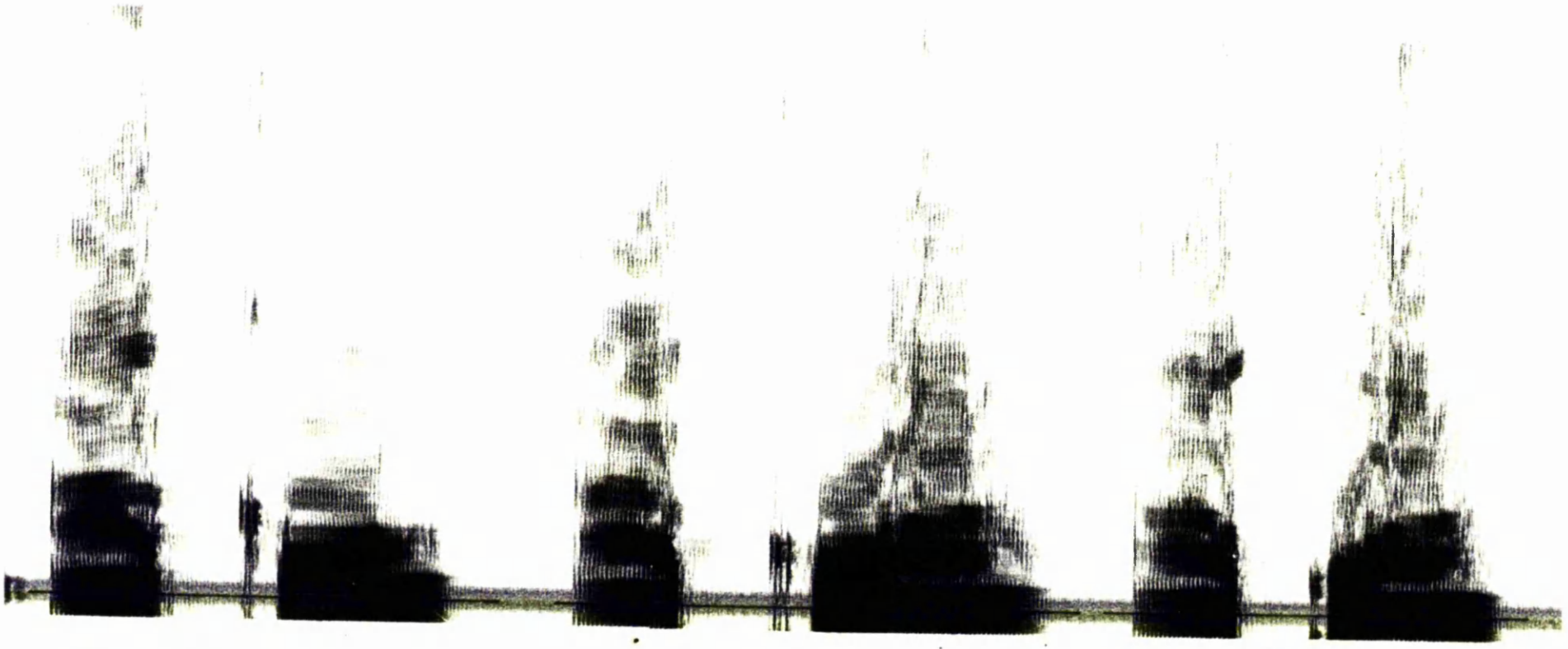
Spec. 11. [úté]

Spec. 12. [ùdé]



Spec. 13. [ɷ́kɑ̀]

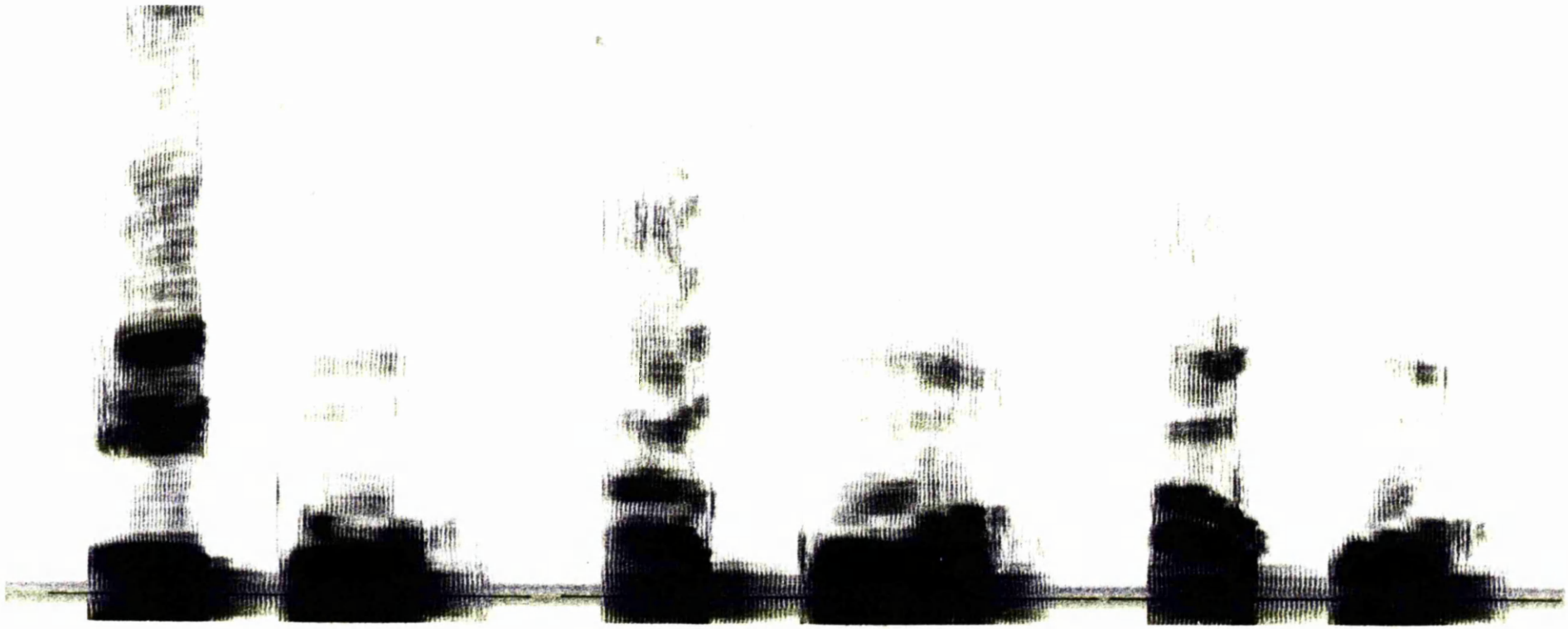
Spec. 14. [ɷ́gɑ̄]



Spec. 15a. [akɷ]

Spec. 15b. [akɷ́á]

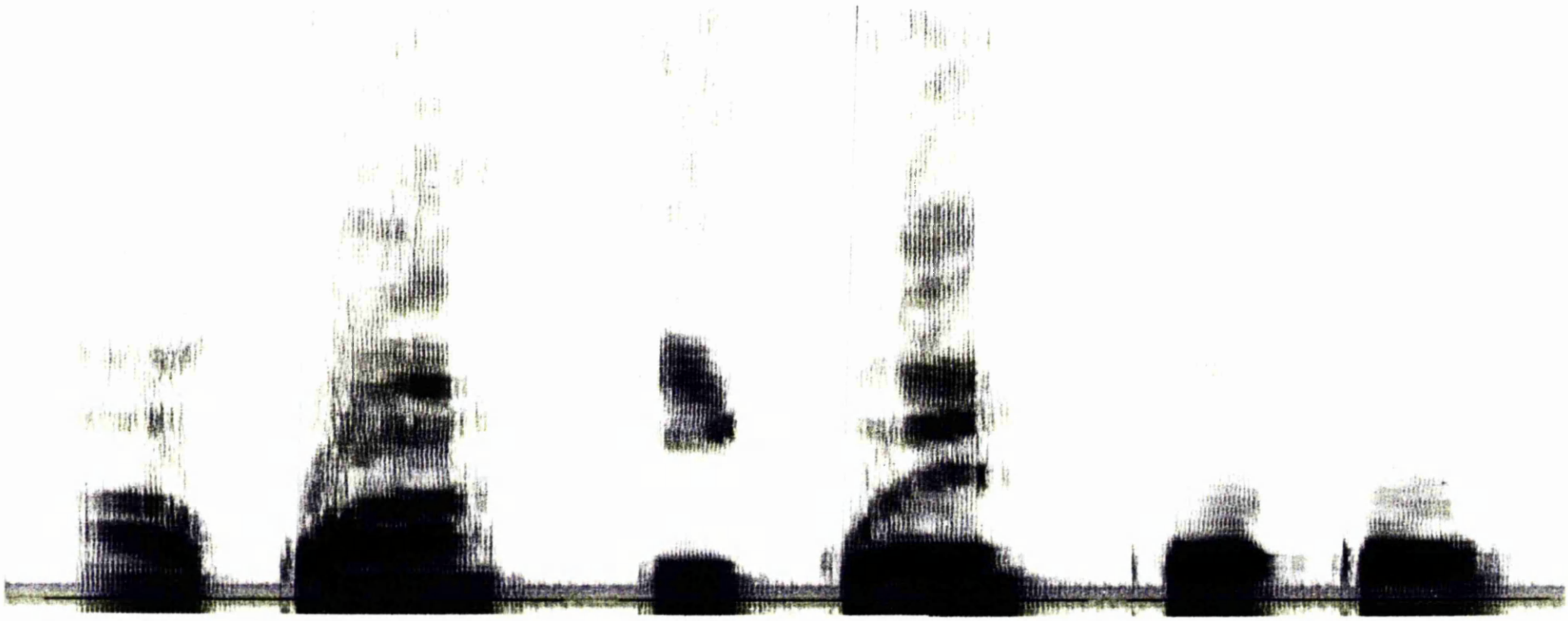
Spec. 15c. [akwa]



Spec. 16a. [ɪ́gʊ́]

Spec. 16b. [ágʊ́ɔ́]

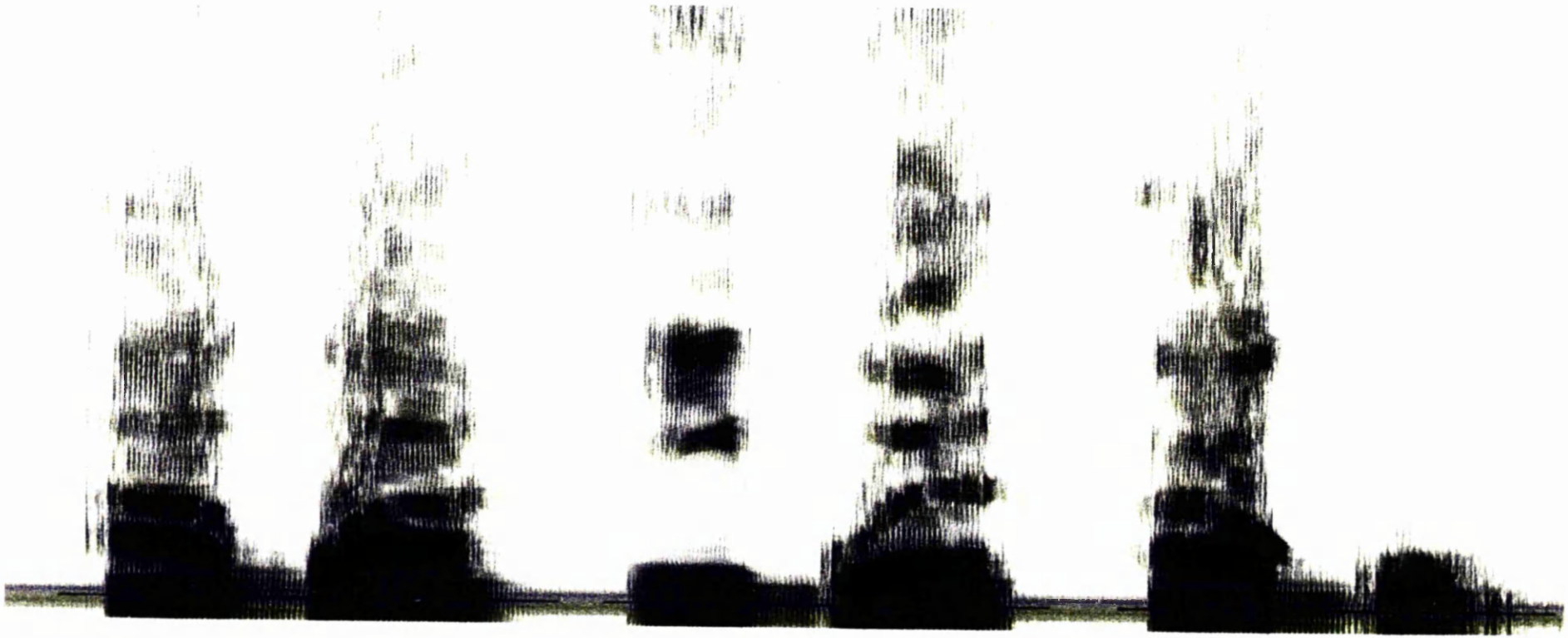
Spec. 16c. [ágwɔ́]



Spec. 17a. [ɑ́kwɑ́]

Spec. 17b. [ɪ́kwē]

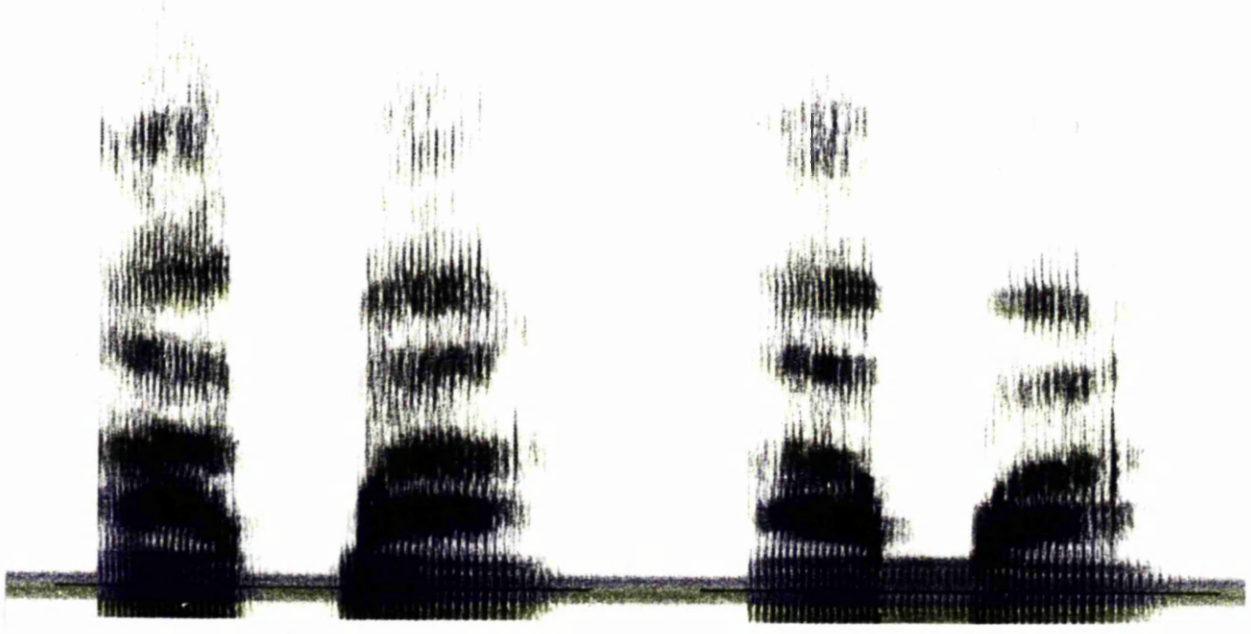
Spec. 17c. [ɷ́kwɷ́]



Spec. 18a. [ágwá]

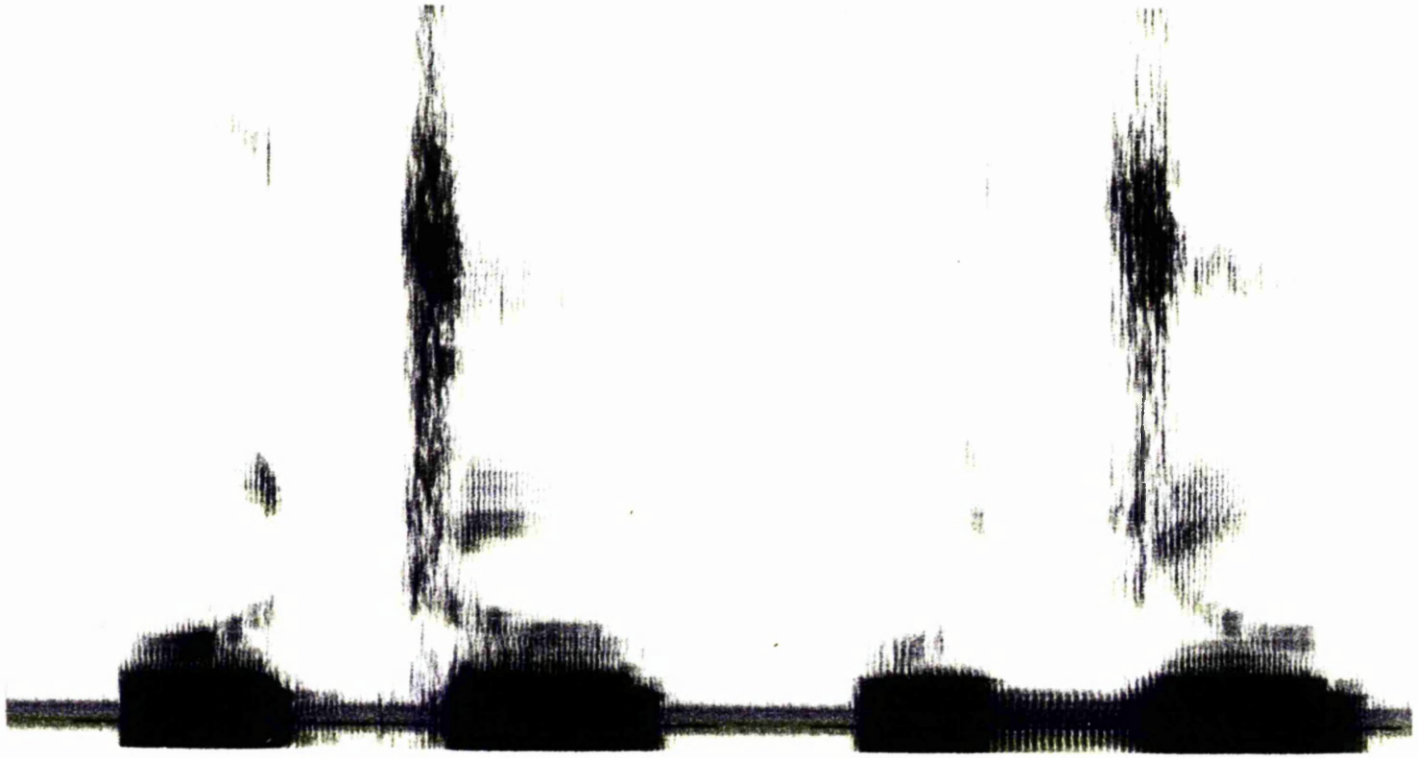
Spec. 18b. [ígwē]

Spec. 18c. [ágwɔ̀]



Spec. 19. [ùkpù]

Spec. 20. [ùgbù]

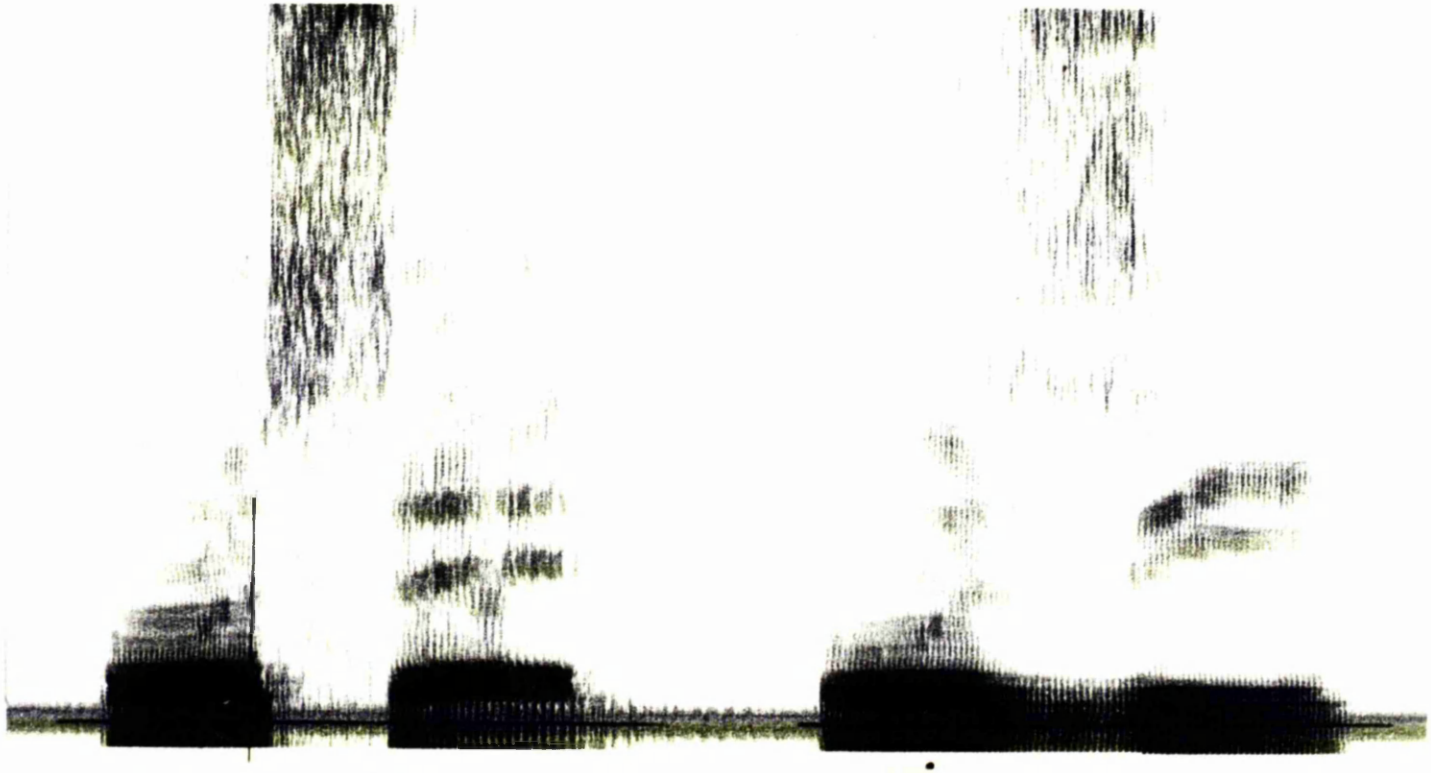


Spec. 21. [útʃú]

Spec. 22. [ùdʒú]

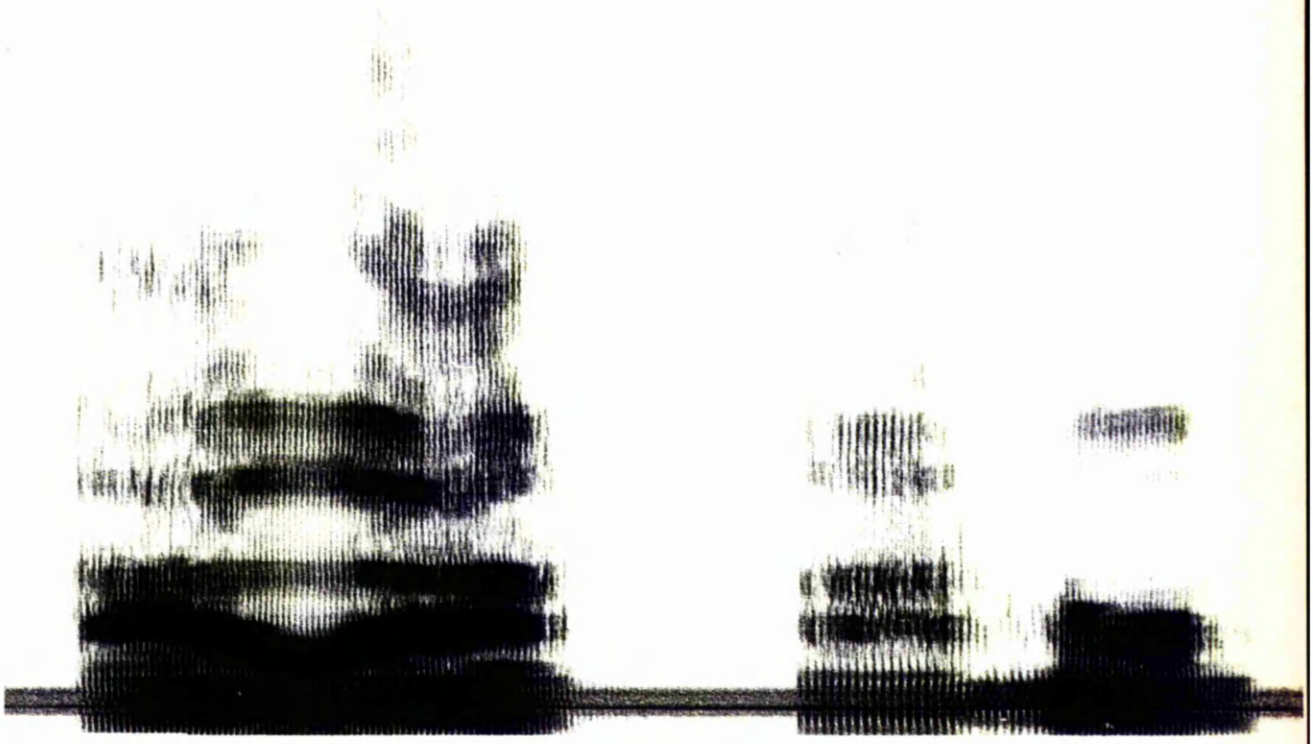
Spec. 23. [ífé]

Spec. 24. [ívù]



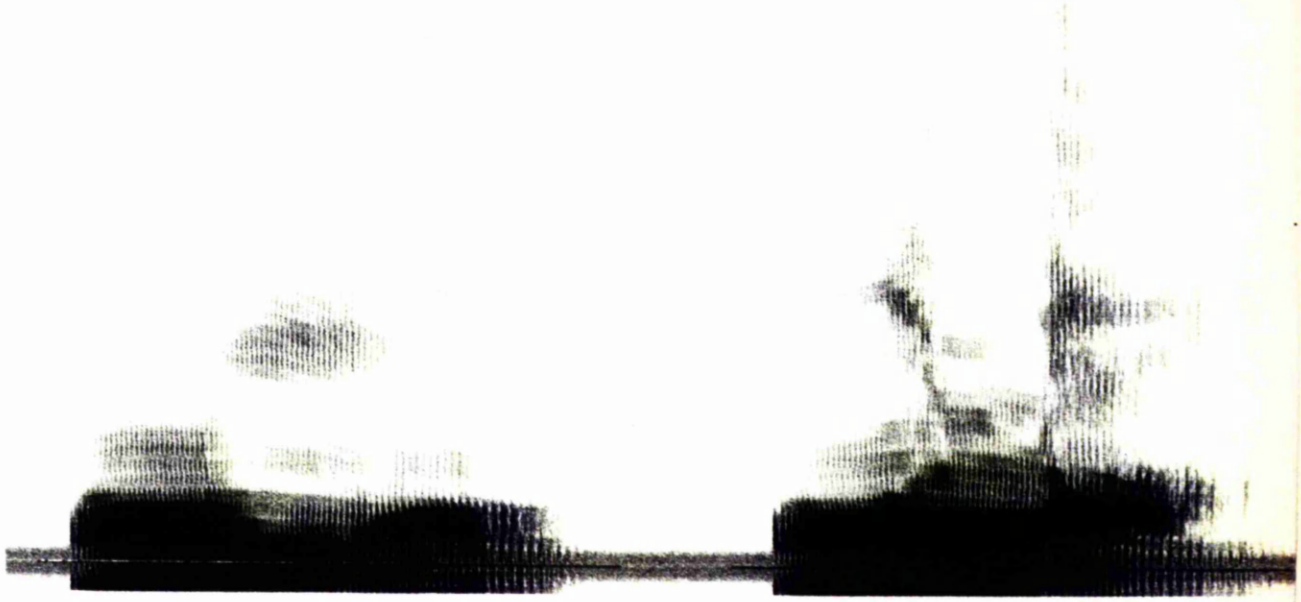
Spec. 25. [ósè]

Spec. 26. [ózí]



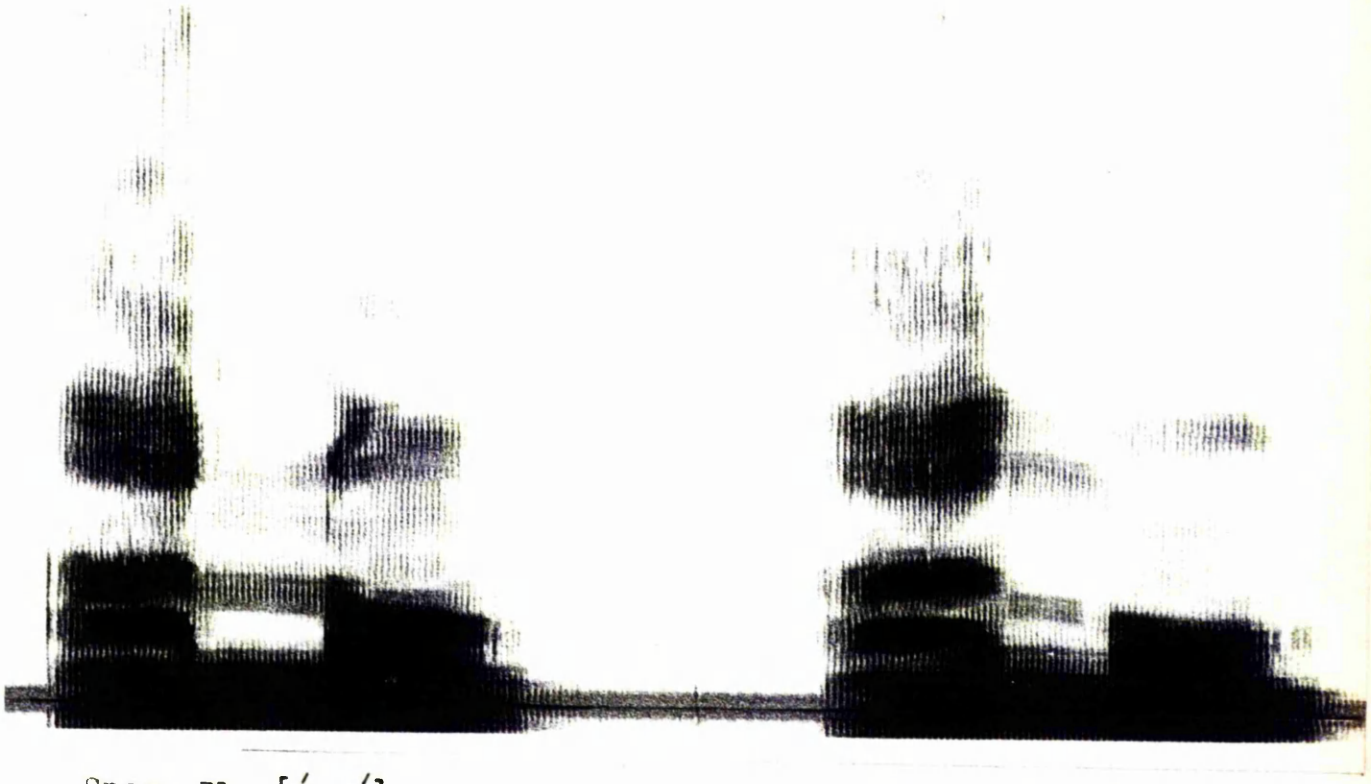
Spec. 27. [ɑ́ɣɑ́]

Spec. 28. [ɑ̀hɷ́]



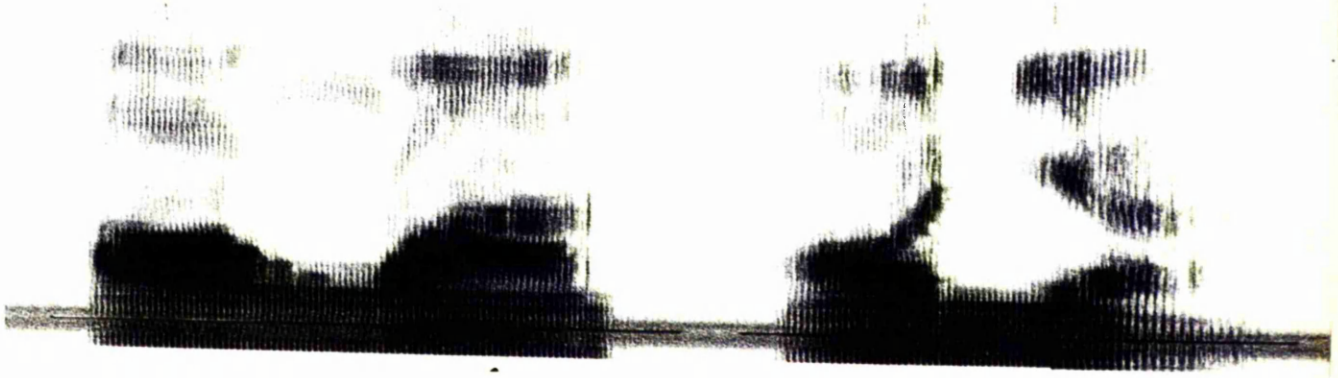
Spec. 29. [ɷ́mɷ̀]

Spec. 30. [ɑ́nɷ́]



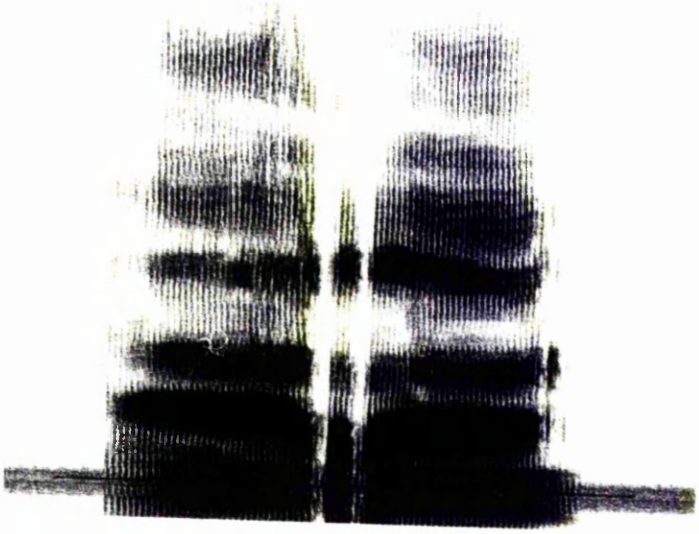
Spec. 31 [ɔ́ŋwá]

Spec. 32. [áŋɔ̄]

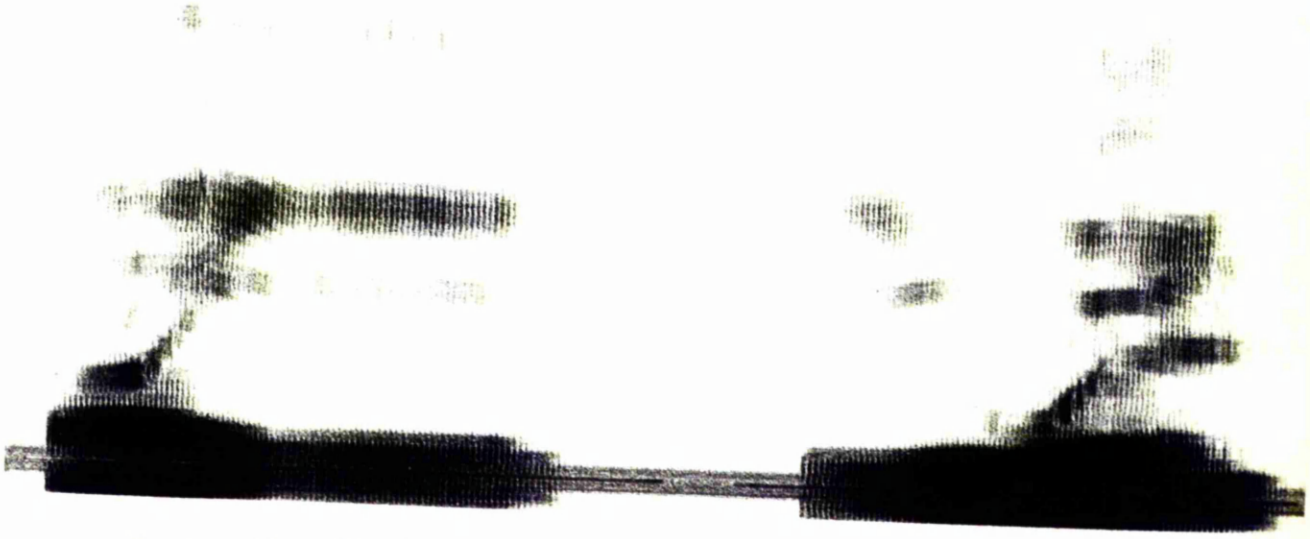


Spec. 33. [ɔ́ŋù]

Spec. 34. [ɷ́mɷ̀]



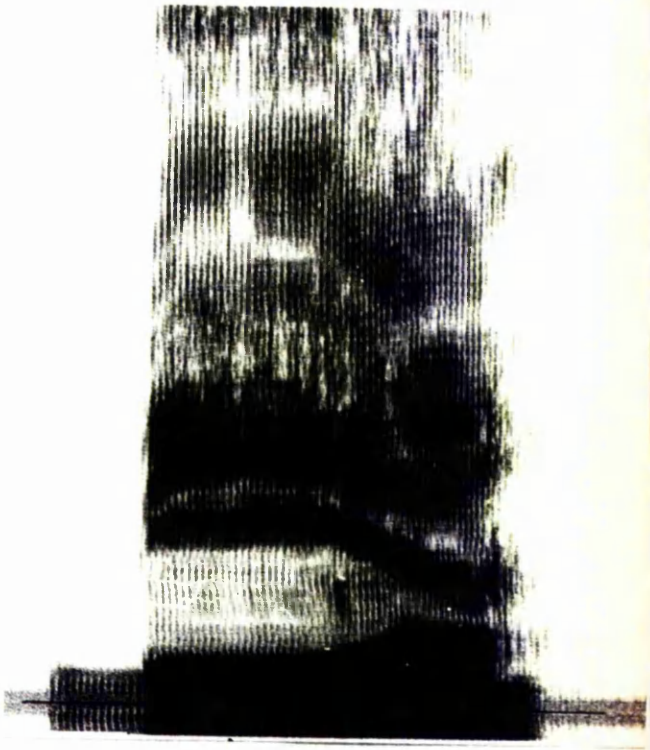
Spec. 35. [ɑ́rɑ́]



Spec. 36. [óyī]

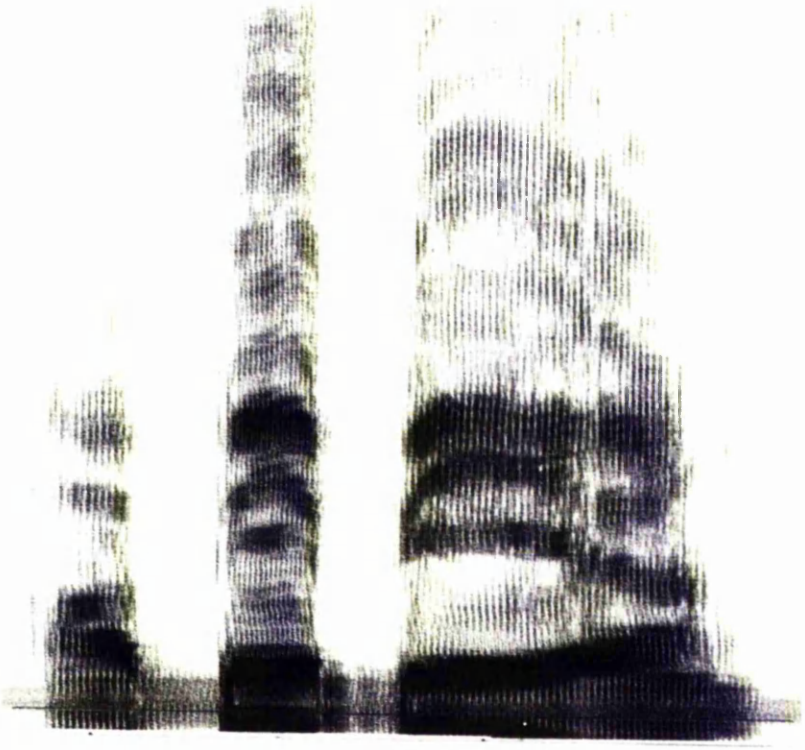
Spec. 37. [íwé]

Spec. 1. [brɑ́]



Spec. 2. [bɹɑ́]

Spec. 3. [ɑ́brɑ̀]



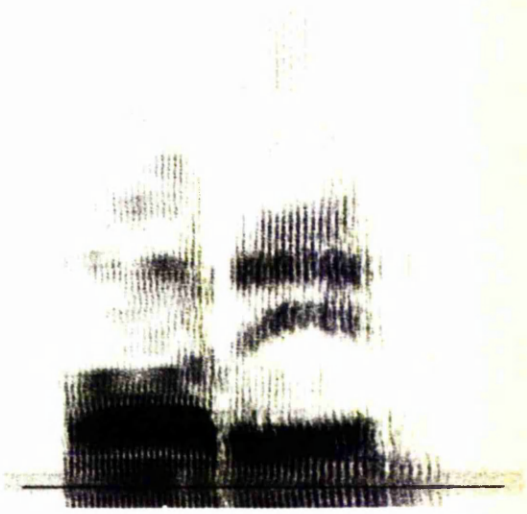
Spec. 4. [ɔbɪ́bɪ̀ɑ́]

Spec. 5. [ɑ́fɪ́fɪɑ́]

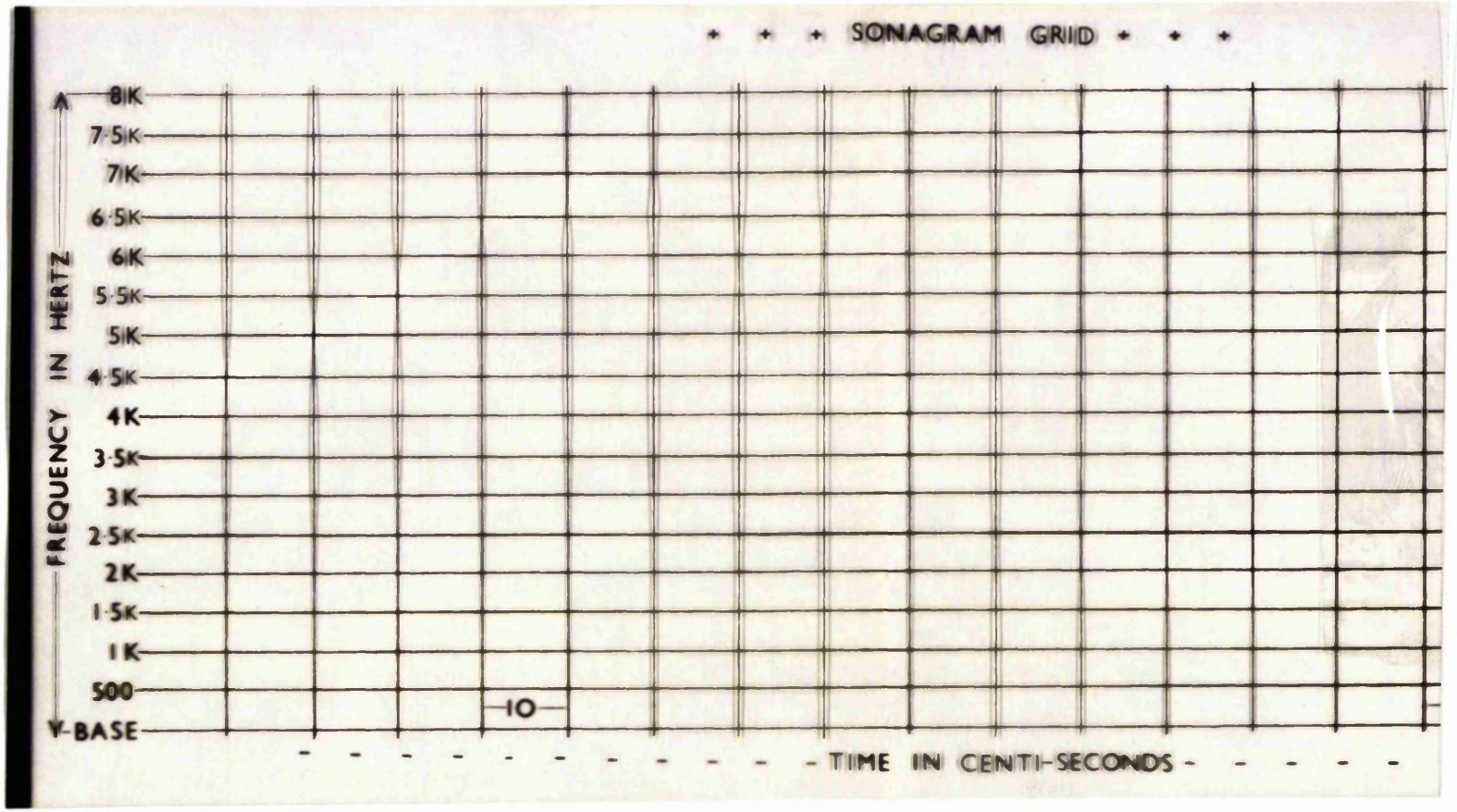
Spec. 6. [fɪ́fɪ̀ɑ́]

Spec. 7. [fio]

Spec. 8. [ʤhɪʤí]



Spec. 9. [ọ́rɪ̀ə]


SONAGRAM GRID
8IK
7·5IK
7IK
6·5IK
6IK
5·5IK
5IK
4·5IK
4K
3·5K
3K
2·5K
2K
1·5K
1K
500
Y-BASE
FREQUENCY IN HERTZ
10
TIME IN CENTI-SECONDS

Mr. S.U. Obi

The Palatogram Figure