

# THE PHONOLOGY OF YUANGA, A LANGUAGE OF NEW CALEDONIA

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## 1. INTRODUCTION

### 1.1 DEMOGRAPHY

The Yuanga language is spoken in the northern region of the island of New Caledonia, which is a French Overseas Territory situated 1,500 kilometres to the east of the coast of Australia.

According to the more recent statistics (published in 1976) Yuanga is spoken by approximately 2,000 people. The Gomen dialect of Yuanga is spoken by the 800 people who live on the western coastal plain of the island in the vicinity of the village of Kaala-Gomen, and it is this dialect that is described here.<sup>1</sup> Two other major dialects of Yuanga can be phonologically distinguished from the Gomen dialect by the absence of the interdental fricative and the retroflexed stops. Nonetheless, all three dialects are mutually intelligible and are recognised by local people, and other linguists, as belonging together in contradistinction to other neighbouring languages. One dialect (population 550) is spoken in the valley of the river Diahot in the environs of the Catholic Mission Station at Bondé, 30 kilometres due north of Gomen. A community which originated from the Bondé area moved eastwards at some point in the past and is now living at St Paul on the north-east coast of the island, near the village of Pouébo. The other important dialect (population 420) is spoken in the region

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<sup>1</sup>The data for this study were gathered over a period of five months in 1982 and 1983 in the village of Paita, which is located three miles to the east of the small town of Kaala-Gomen.

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I would also like to express my appreciation to the chief of the Gomen region, the chiefs of Paita and Baganda, and the Council of Elders and the people of Paita for their gracious welcome and spontaneous generosity throughout the length of our stay with them. We are particularly indebted to the Teinweiawe family for the loan of their house, and also to Pastor Pidjot Teinweiawe, Chief Bealo Teity, Deacon Caina Teity and Mr Mangoulou Teinweiawe for their infinite patience and great devotion to the task of revealing to us the intricacies of their language.

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known as Paimboas, in the central mountain chain 15 kilometres to the east of the Gomen-Bondé axis. (See Schooling 1982:13) and Rivierre (1981) for maps of the region.)

The language takes its name from a river which crosses the plain near Gomen. In this region in which the name originated, *Yuanga* is pronounced [θuaŋa]. It is also known locally as *phwa jua* 'the language (lit. mouth) of θua'.

## 1.2 LINGUISTIC CLASSIFICATION AND HISTORY OF RESEARCH

According to the classificatory work undertaken by Haudricourt (1951, 1971) and Rivierre (1972), *Yuanga* belongs to the Austronesian family of languages, as do all the languages of New Caledonia. As far as internal classification is concerned, Haudricourt (1971) has classified *Yuanga* with the languages of the extreme north of New Caledonia.

In the course of his surveys Haudricourt (1968, 1971) noted some idiosyncratic features of the Gomen dialect of *Yuanga*, namely the presence of four degrees of aperture in the system of vowels and two orders of apical consonants in the consonantal system. Since that time Coyaud (1975) and Michailovsky (1982) of the Centre National de Recherches Scientifiques of Paris have conducted further research on the dialect of *Yuanga* spoken at Bondé and Paimboas, but no other work has been undertaken on the Gomen dialect, apart from the reference in Leenhardt (1946) whose monumental work still remains the point of departure for all linguistic research in New Caledonia.

The early Catholic missionaries also undertook basic linguistic work and in 1893 a catechism was published in the Bondé dialect. Local people report that the Paris Missionary Society printed some portions of the New Testament in the Gomen dialect in the 1930s but at the present time there are no copies in current use. At about the same time Protestant pastors also prepared a liturgy in the same dialect, which is still sometimes used.

## 1.3 THEORETICAL FRAMEWORK OF PRESENTATION

The purpose of this paper is to describe the phonology of the Gomen dialect of the *Yuanga* language. In sections 2–4 a model of linguistic analysis variously known as the 'Structure-Function' or the 'Syntagmatic Model' is used to analyse and describe the data.

This model was first conceived of by J.T. Bendor-Samuel, following training at the University of London and fieldwork conducted in South America, as a practical descriptive methodology for trainee linguists, and it was developed and refined over many years of teaching at the British School of the Summer Institute of Linguistics. In its fully developed form, the model clearly belongs to the structuralist tradition and has particularly clear affinities with the tagmemic approach developed by K.L. Pike (1967) and E.V. Pike (1976). It has been exemplified by numerous descriptions of natural languages, such as those by Callow (1962), Meier, Meier and Bendor-Samuel (1975), Naden (1973), Thomas (1978) and Nicole (1979). The model itself has been presented in some detail by Naden (1971) and more recently by Nicole (1981).

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It is the hope of all of us who were involved in this work that this phonological study will not be an end in itself but merely one step towards a more practical goal, namely the preparation of a practical orthography for the *Yuanga* language.

The syntagmatic approach to linguistics recognises three distinct levels of linguistic reality, each of which is viewed as an essentially autonomous hierarchy of ranks. The three levels are the phonological, the syntactic and the semantic, with the phonological hierarchy being the level which is of interest in this presentation. The lowest rank of the phonological hierarchy is that of the phoneme, which is used in the classical sense of the term, and as such it forms the focal point upon which the entire description of the phonology of a language hinges.

Within the perspective of this model the number of distinct ranks within the hierarchy is not universal but is language specific. In the analysis of Yuanga, reference is made to the following ranks which are listed in ascending order: phoneme, syllable, phonological word, phonological phrase and intonation group.

The second major characteristic of the model is that each unit used in the analysis of a language is defined in terms of its *structure* and its *function*. The structure of a unit, which pertains to any given rank of the hierarchy, is defined in terms of units which belong to the next lower rank, and its function is defined in terms of its role or position in the next higher rank of the hierarchy. Thus for example, the structure of the unit called a syllable is described in terms of phonemes, units of the next lower rank, while its function is described in terms of its place in the next higher rank, that of the phonological word in the case of Yuanga. The structure of the phoneme cannot, by definition, be described in terms of smaller units since it already belongs at the lowest rank of the hierarchy, and so it is described instead in terms of its phonetic realisation in different contexts. Units of any rank are grouped into *types* on the basis of similarity of structure and into *classes* on the basis of similarity of function.

In this study the phoneme rank is dealt with in considerable detail, whereas the higher level ranks are presented in much less detail, and in some cases the hypotheses propounded are subject to subsequent verification.

In section 6 the same data is reappraised from the perspective of the model of Prosodic Analysis and then, very briefly, from the more recent perspective of Autosegmental Phonology.

## 2. A PHONEMIC ANALYSIS OF YUANGA

### 2.1 DEFINITION OF A PHONEME

In the context of the Syntagmatic Model being used for this analysis, the phoneme is the smallest contrastive unit in the phonological system of a language. Since it constitutes the lowest level of the hierarchy, it is not composed of lower level units, but it can be described in terms of the acoustic and articulatory parameters which define its phonetic manifestation as it occurs in different positions in a syllable or phonological word.

There are two primary classes of phoneme, namely consonants and vowels. This distinction is based not only on phonetic features but also on functional differences. All phonemes function as components of syllables which are the units comprising the next higher level in the phonological hierarchy. In general, however, a consonant functions as the margin of the syllable while a vowel functions as its nucleus.

## 2.2 THE CONSONANTAL PHONEMES

The consonantal system of Yuanga can be analysed in terms of three types of articulation and three zones of articulation. The three types of those of closure, nasality and aspiration, while the three zones are labial, apical or central, and dorsal. These three zones can in turn be subdivided into eight more precise points of articulation. All of the above information is summarised graphically in Table 1, while the phonetic realisation of each phoneme is described in section 2.2.1.

TABLE 1: THE CONSONANT PHONEMES

	LABIAL		APICAL			DORSAL
	labial	labio-velar	interdental	postdental	palatalised	
STOPS						
unaspirated	<i>p</i>	<i>pw</i>	<i>t</i>	<i>tr</i>	<i>ty</i>	<i>k</i>
ORAL						
aspirated	<i>ph</i>	<i>phw</i>	<i>th</i>	<i>thr</i>	<i>thy</i>	<i>kh</i>
NASAL	<i>mp</i>	<i>mpw</i>	<i>nt</i>	<i>ntr</i>	<i>nty</i>	<i>nk</i>
CONTINUANTS						
unaspirated	<i>f</i>	<i>w</i>	<i>j</i>	<i>l</i>	<i>y</i>	<i>x</i>
ORAL						
aspirated	<i>fh</i>	<i>wh</i>		<i>(lh)</i>	<i>yh</i>	<i>h</i>
unaspirated	<i>m</i>	<i>mw</i>		<i>n</i>	<i>ny</i>	<i>ng</i>
NASAL						
aspirated	<i>mh</i>	<i>mhw</i>		<i>nh</i> <i>nhy</i>		

In addition to the phonemes displayed in Table 1, the speakers of Yuanga also use the phonemes /s/ and /r/. However these phonemes occur only in words borrowed from European languages, for example:

- /siro/      soft drink (from French *sirop*)
- /kirikèt/    cricket

It is to be noted that in Yuanga, as in most Oceanic languages, the voiced-voiceless correlation is not relevant. Consequently, these terms are not used in Table 1 nor in the technical descriptions of the phonemes, except in those cases where voicing is a non-phonemic characteristic of certain variants. A general statement can be made to the effect that all oral stops are voiceless except in intervocalic position, where voiced variants usually occur. The oral continuants are generally voiced, especially in intervocalic position, but there is a tendency towards free variation in word-initial position. All the nasals, both stops and continuants are voiced.

The postdental stops are produced with a retroflex articulation and the symbol /j/ is realised phonetically as [θ]. It is probable that /lh/ does not occur as an independent phoneme in the speech of the majority of present-day speakers of Yuanga (as explained in section 4.4.2).

Haudricourt (1971:364) makes a distinction between retroflex interdental nasals (both aspirated and unaspirated) for the Gomen dialect of Yuanga. In the course of this present

study, however, no evidence was found for this contrast. The apical nasals which were noted normally had an interdental realisation, although they can also optionally have a dental realisation.

The Gomen dialect is unique among the dialects of Yuanga in that consonants only appear in pre-nuclear position in the syllable, functioning as syllable onset, and never in post-nuclear position, functioning as syllable coda.

### 2.2.1 TECHNICAL DESCRIPTION OF THE CONSONANTS

In this section the phonetic realisation of each of the consonant phonemes is described. Examples of each of the contrasts are presented in section 3, while intervocalic variants are discussed and exemplified in section 4.3. Difficulties experienced in the choice of terms, such as aspiration, are explained in section 4.4.

All the phonemes in Yuanga are produced with egressive lung air. All the consonants are interpreted as being phonologically voiceless (as stated in section 2.2 above).

#### STOPS

##### Labial order

- /p/ is an unaspirated bilabial stop [p].  
It may have a voiced realisation [b] in intervocalic position.
- /ph/ is an aspirated bilabial stop [p<sup>h</sup>].
- /pw/ is an unaspirated labio-velar stop [p<sup>w</sup>].  
It may have a voiced realisation [b<sup>w</sup>] in intervocalic position.
- /mp/ is a prenasalised bilabial stop [m<sup>b</sup>].
- /mpw/ is a prenasalised labio-velar stop [m<sup>b</sup>w].

##### Apical order

- /t/ is an unaspirated interdental stop [t].  
It may have a voiced realisation [d] in intervocalic position.
- /th/ is an aspirated interdental stop [t<sup>h</sup>].
- /tɾ/ is an unaspirated retroflexed stop [ɽ].  
It may have a voiced realisation [ɽ] or a flapped realisation [ɾ] in intervocalic position.
- /thr/ is an aspirated retroflexed stop [ɽ<sup>h</sup>].
- /ty/ is an unaspirated apico-alveolar palatalised stop [tʲ].  
It may have a voiced realisation [dʲ] in intervocalic position.
- /thy/ is an aspirated apico-alveolar palatalised stop [tʲ<sup>h</sup>].
- /nt/ is a prenasalised interdental stop [n<sup>d</sup>].
- /nɾ/ is a prenasalised retroflexed stop [n<sup>ɽ</sup>].
- /nty/ is a prenasalised apico-alveolar palatalised stop [n<sup>dʲ</sup>].

## Dorsal order

- /k/ is an unaspirated velar stop [k].  
In intervocalic position it may be realised interchangeably as a stop or as a voiced [ɣ] or voiceless [x] velar fricative.
- /kh/ is an aspirated velar stop [k<sup>h</sup>].
- /nk/ is a prenasalised velar stop [ŋg].

## CONTINUANTS

## Labial order

- /f/ is an unaspirated labio-dental fricative.  
Its phonetic realisation is voiced [v].
- /fh/ is an aspirated labio-dental fricative.  
Its phonetic realisation can be voiced [v<sup>h</sup>] or voiceless [f<sup>h</sup>].
- /w/ is an unaspirated labio-velar oral approximant [w].
- /wh/ is an aspirated labio-velar oral approximant [w<sup>h</sup>].
- /m/ is an unaspirated bilabial nasal continuant [m].
- /mh/ is an aspirated bilabial nasal continuant [m<sup>h</sup>].
- /mw/ is an unaspirated labio-velar nasal continuant [m<sup>w</sup>].
- /mhw/ is an aspirated labio-velar nasal continuant [m<sup>w<sup>h</sup></sup>].

## Apical order

- /j/ is an unaspirated interdental fricative [θ].  
It may have a voiced realisation [ð] in intervocalic position.
- /l/ is an unaspirated apico-alveolar lateral continuant. Its phonetic realisation is normally voiced [l].
- (lh) is an aspirated lateral but probably is not an integral part of the phonological system of Yuanga. (See section 4.4.2 for a discussion of this symbol.)
- /n/ is an unaspirated interdental nasal continuant [n].
- /nh/ is an aspirated interdental nasal continuant [n<sup>h</sup>].
- /y/ is an unaspirated palatal approximant [j].
- /yh/ is an aspirated palatal approximant [j<sup>h</sup>].
- /ny/ is an unaspirated nasal continuant with a palatalised apico-alveolar articulation [ɲ].
- /nhy/ is an aspirated nasal continuant with a palatalised apico-alveolar articulation [ɲ<sup>h</sup>].

Dorsal order

- /x/ is an unaspirated velar fricative [x].  
It may have a voiced realisation [ɣ] in intervocalic position.
- /h/ is a laryngeal fricative [h].  
Its realisation is always voiceless but in intervocalic position it is usually deleted.
- /ŋ/ is an unaspirated velar nasal continuant [ŋ].

2.3 THE VOCALIC PHONEMES

In the Gomen dialect there are twelve contrastive vowel qualities, of which seven are oral and five are nasal. They are distinguished by four degrees of aperture for the oral vowels and three degrees of aperture for the nasals. The distinction between the second and third degrees of aperture is not contrastive when the vowels are nasalised. The lips are spread for the front vowels and rounded for the back vowels, with this distinction being irrelevant for the vowel formed by the maximum degree of aperture. The vocalic system is schematically presented in Table 2, and the phonetic description of the phonemes follows.

The circumflex is used in both phonemic and phonetic notation to denote the strong, contrastive type of nasalisation, while the tilde is used to mark non-contrastive nasalisation in phonetic script.

TABLE 2: THE VOWEL PHONEMES

	FRONT SPREAD		BACK ROUND
Degree of Aperture	ORALS	NASALS	
Closed	<i>i</i>	<i>î</i>	<i>û</i>
Half-closed	<i>e</i>	<i>ê</i>	<i>ô</i>
Half-open	<i>è</i>		
Open			
		<i>a</i>	

Vowel length is also contrastive, and in principle all vowels can be either short or long (see section 4.5.3).

2.3.1 TECHNICAL DESCRIPTION OF THE VOWELS

(A complete set of examples of all the phonemes will be found in section 3.)

Oral vowels

- /i/ is a front spread vowel with minimum degree of aperture [i].

/e/ is a front spread vowel with a half-closed degree of aperture [e].  
Following all palatalised stops and (in principle) the palatalised oral continuants, the realisation of /e/ is more closed and slightly backed [ɪ].

Examples:

/tyi/	[tʲi]	pawpaw tree
/tye/	[tʲɪ]	wood
/-ntyɛ/	[ <sup>n</sup> dʲɪ]	third person singular possessive

/ɛ/ is a front spread vowel with a half-open degree of aperture [ɛ].  
Following the palatalised stops and the oral palatalised continuants the realisation of /ɛ/ is more closed and is very similar to the normal pronunciation of /e/.

Following another vowel the realisation of /ɛ/ is much more closed and resembles the realisation of /e/. It is probable that there is neutralisation of the /e/ – /ɛ/ contrast in this context. Thus far no examples have been found to disprove this hypothesis.

Examples:

/tyɛ̃(nʉ)/	[tʲɛ̃(nũ)]	(my) food
/ntyɛ̃nA/	[ <sup>n</sup> dʲɛ̃nã]	there/that's right
/yɛ̃pwa/	[jɛ̃b <sup>w</sup> a]	when
/kaɛ̃/	[kaɛ̃]	pumpkin

The capital letters in the above examples (and likewise in any other examples) represent archiphonemes (see section 4.2.4).

/a/ is a central vowel with maximum degree of aperture [a].

/u/ is a back rounded vowel with minimum degree of aperture [u].

/o/ is a back rounded vowel with a half-closed degree of aperture [o].  
Following the labio-velar stops the realisation of /o/ is more markedly rounded and resembles the realisation of the pure [o] vowel.  
Following other consonants /o/ has a realisation which is less rounded and more centralised and resembles [ɔ̞].

Examples:

/mpo/	[ <sup>m</sup> bɔ̞]	a wall
/mpwo/	[ <sup>m</sup> b <sup>w</sup> o]	rotten

/ɔ̞/ is a back rounded vowel with a half-open degree of aperture [ɔ̞].  
Following labio-velar stops and labio-velar nasal continuants, the realisation of /ɔ̞/ is more sharply rounded and even more closed than the pure vowel [ɔ̞].  
Following other consonants the pronunciation is more relaxed open and centralised than the pure [ɔ̞].  
Following another vowel the realisation of /ɔ̞/ is much more closed and resembles [o] or even [ɔ̞]. It is probable that there is neutralisation of the contrast /o/ – /ɔ̞/ in this context.

Examples:

/mpɔ̞/	[ <sup>m</sup> bɔ̞]	stick/switch
/mpwɔ̞/	[ <sup>m</sup> b <sup>w</sup> ɔ̞]	fruit-bat, flying fox



/mO/	[mḡ]	left (direction)
/mwO/	[m <sup>w</sup> ḡ]	pot
/mhO/	[m <sup>h</sup> ḡ]	we three (inclusive)
/mhwO/	[m <sup>hw</sup> ḡ]	wrinkle
/kaO/	[kaᵛ]	flood

### Nasal vowels

- /i/ is a front spread nasal vowel with a minimum degree of aperture [î].
- /e/ is a front spread nasal vowel with a half-open degree of aperture [ê].
- /a/ is a central nasal vowel with a maximum degree of aperture [â].
- /u/ is a back rounded nasal vowel with a minimum degree of aperture [û].
- /o/ is a back rounded nasal vowel with a half-open degree of aperture [ô].

## 2.4 SUMMARY

Using this phonemic model of analysis and description, the phonological system of the Gomen dialect of Yuanga is analysed as having 39 consonant phonemes, of which 37 are native to the language and two are due to borrowing from other sources. In addition, it has 12 basic vowel phonemes and a total inventory of 24, since all the vowels can be either short or long.

## 3. EVIDENCE FOR THE PROPOSED ANALYSIS

A phoneme is by definition a unit of surface contrast. It is, therefore, identified and defined in terms of the patterns of contrast which exist between it and other phonemic units in a given language. Consequently, an analysis of a phonological system into phonemes is supported by data which illustrate a contrast between the members of the set of phonemes which have been posited.

The following data, therefore, are presented to support the analysis set out in section 2. It is presented in phonemic form unless otherwise marked by square brackets.

The glosses which are enclosed in parentheses are to be interpreted as 'a kind or species of ...'. Additional information in parentheses indicates a specification or clarification of the meaning given.

### 3.1 CONSONANTAL OPPOSITIONS

#### 3.1.1 LABIAL ORDER

Stops: /p, ph, pw, phw, mp, mpw/

<i>pa</i>	pebble	<i>pi</i>	fish egg
<i>pha</i>	lung	<i>phi</i>	excrement
<i>pwa</i>	rain	<i>pwid</i>	fish net
<i>phwa</i>	hole	<i>phwid</i>	oldest (child)

<i>mpa</i>	instrument	<i>mpi</i>	we two (exclusive) (idiomatic form)
<i>mpwa</i>	on	<i>mpwi</i>	blind

Continuants: /m, mh, mw, mhw, f, fh, w, wh/

<i>mA</i>	and	<i>mI</i>	ripe, red
<i>mhA</i>	(liana)	<i>mhI</i>	we two (inclusive)
<i>mwA</i>	house	<i>tyimwI</i>	to hold
		<i>timI</i>	to paint
<i>mhwA</i>	we (inclusive)	<i>mhwI</i>	shy
<i>fa</i>	gift	<i>finI</i>	vertical post (house construction)
<i>fha</i>	to speak	<i>fhi</i>	to pass wind
<i>wa</i>	to sing	<i>wi</i>	where?
<i>wha</i>	big	<i>whili</i>	to drag

### 3.1.2 APICAL ORDER

Stops: /t, th, tr, thr, ty, thy, nt, ntr, nty/

<i>ta</i>	table	<i>ti</i>	who?
<i>tra</i>	grammatical word (e.g. <i>hòmpwò tra kò</i> 'trousers')	<i>tri</i>	tea
<i>thra</i>	bald, pandanus	<i>thri</i>	fete for the big chief
<i>taa</i>	to dig	<i>thi</i>	to comb
<i>thaa</i>	red pepper	<i>nti</i>	(tree)
<i>thraa</i>	bad	<i>nte</i>	fork
<i>nta</i>	what?	<i>ntree</i>	wind
<i>ntra</i>	ashes	<i>Intye</i>	him, her
<i>ntya</i>	garbage	<i>tye</i>	wood, tree
<i>tya</i>	mark of indirect object	<i>tyi</i>	pawpaw tree
<i>tyatya</i>	daddy	<i>tyEmpi</i>	our (two exclusive) food
<i>tyAmpwo</i>	to wake up	<i>thyipwe</i>	to sneeze
<i>thyamwA</i>	banana	<i>thyèpwe</i>	square banana
<i>thyapwi</i>	lack of food		

Continuants: /n, nh, ny, nhy, j, l, y, yh/

<i>nA</i>	from (direction)	<i>nI</i>	to (direction)
<i>nU</i>	I	<i>nhI</i>	(hard stone)
<i>nhU</i>	to crumble		
<i>nyA ngA</i>	fete for ...	<i>nyIntyi</i>	(ant)
<i>nyAnyA</i>	mummy	<i>nyO</i>	fruit-bat's nest
<i>nhyAle</i>	to crush in hand	<i>nhyAtu</i>	good soil
<i>nhyA</i>	grammatical word (direct object)		

<i>yAnke</i>	to pick up
<i>yala</i>	to rinse dishes
<i>yaja</i>	name
<i>ya mwA</i>	to roof a house
<i>yhamwA</i>	I do not know
<i>ja</i>	plate

<i>yòò</i>	ironwood tree
<i>yhòò</i>	older brother
<i>kòyò</i>	to lose
<i>èjò</i>	he has the itch (illness)
<i>èlò</i>	yes
<i>la</i>	they, their

### 3.1.3 DORSAL ORDER

Stops: /k, kh, nk/

<i>ka</i>	year
<i>èka</i>	interrogative word
<i>(è)kha</i>	(he) presses
<i>kinka</i>	to laugh
<i>kikha</i>	to burn fields
<i>kai</i>	with (person)
<i>khai</i>	to pull

<i>ki</i>	pain
<i>khi</i>	to break, hurt
<i>nki</i>	to cry
<i>jAnki</i>	brain

Continuants: /ng, x, h, Ø]

<i>ngA</i>	grammatical word (e.g. <i>nyA ngA ajo</i> fete for the chief)
<i>thingA</i>	tail
<i>xa</i>	time word (past)
<i>kixa</i>	nothing
<i>ha</i>	or
<i>a</i>	to go
<i>hai</i>	no
<i>ai</i>	heart

<i>ngAngI</i>	to put teeth on edge
<i>maxi</i>	to close eyes (i.e. to pray)
<i>hi</i>	hand, branch
<i>i</i>	where? (person)

## 3.2 VOCALIC OPPOSITIONS

### 3.2.1 ORAL VOWELS

<i>pi</i>	fish egg
<i>pe</i>	ray (fish)
<i>pè</i>	thigh
<i>pa</i>	pebble
<i>pu</i>	smoke
<i>po</i>	in order to
<i>pò</i>	fern
<i>nki</i>	to cry
<i>nke</i>	dirty
<i>nkè</i>	grandmother

<i>ku</i>	place
<i>ko</i>	chicken
<i>kò</i>	the bush
<i>ka</i>	year
<i>mpè</i>	banyan tree
<i>mpa</i>	instrument

## 3.2.2 NASAL VOWELS

<i>wi</i>	where?	<i>ki</i>	pain
<i>wî</i>	strong	<i>kî</i>	oyster
<i>trè</i>	day	<i>ke</i>	basket
<i>trê</i>	to run	<i>kê</i>	father
<i>la</i>	they	<i>ka</i>	year
<i>lâ</i>	those there	<i>kâ</i>	to shout
<i>pu</i>	smoke	<i>ku</i>	place
<i>pû</i>	green	<i>kû</i>	hard ground
<i>trò</i>	night	<i>kò</i>	the bush
<i>trô</i>	mat	<i>kô</i>	dried fruit

## 3.2.3 VOCALIC LENGTH

As noted previously there is a contrast between long and short vowels. The following data provide evidence for this contrast.

## Oral vowels

<i>pi</i>	fish eggs	<i>tyi</i>	pawpaw tree
<i>pîi</i>	to break (bread)	<i>tyîi</i>	skin
<i>we</i>	water	<i>nke</i>	dirty
<i>wêe</i>	juice	<i>nkeê</i>	melody
<i>pwè</i>	to be born	<i>wè</i>	personal name
<i>pwèè</i>	entrance	<i>wèè</i>	root
<i>mpa</i>	instrument	<i>ta</i>	table
<i>mpaa</i>	black	<i>taa</i>	to dig
<i>mpu</i>	green fruit	<i>nU</i>	I
<i>mpuu</i>	shoulder	<i>nUU</i>	torch
<i>po</i>	to fill	<i>to</i>	time marker (future)
<i>poo</i>	to bind, link	<i>too</i>	to crawl
<i>jò</i>	(illness)	<i>ntrò</i>	cloud
<i>jòò</i>	to swim	<i>ntròò</i>	leaf
<i>kò</i>	the bush		
<i>kòò</i>	upright, leg		

## Nasal vowels

Thus far in the course of data collection very few unambiguous examples of lexemes with long vowels have been noted. The following is a list of the data which are available at this stage of research.

<i>kî</i>	oyster	<i>ta</i>	table
<i>kîi</i>	to snivel	<i>tââ</i>	to squirt water
<i>wê</i>	owl	<i>khô</i>	cord, rope
<i>wêê</i>	hat	<i>khôô ke</i>	basket handle

#### 4. PROBLEMS OF INTERPRETATION AND OTHER THEORETICAL ISSUES

##### 4.1 PROBLEMS OF INTERPRETATION

Certain segments and sequences of segments, even though they can be accurately described from a phonetic point of view, are nonetheless ambiguous when considered from a phonological point of view because the same data could, in theory, be interpreted in a number of different ways. In addition, different theoreticians approach the same data differently using different criteria to guide their choice of interpretation. In this section a number of theoretical issues raised by the Yuanga data are discussed and the reasons for the interpretations adopted are presented.

##### 4.1.1 COMPLEX CONSONANTS

There are five types of complex consonant which are open to alternative interpretations, namely the palatalised, labio-velar, retroflexed and prenasalised consonants. The first four can be interpreted as single complex consonants /C/, or as sequences of two (or even three in the case of aspiration combined with another feature such as labialisation or retroflexion) consonants /CC/ or /CCC/. In addition, the first three can also be interpreted as being sequences of one (or two) consonants followed by one (or two) vowels /CV/, /CVV/ or /CCV/. For example, an aspirated consonant can be interpreted as a consonant followed by /h/ or as a consonant followed by a voiceless vowel homorganic with the next vowel. Likewise a labialised or palatalised consonant can be interpreted as a consonant followed by /w/ or /y/ or as a consonant followed by /u/ or /i/, and a retroflexed consonant can be interpreted as a sequence of consonant plus /r/.

The preferred interpretation is that of a single complex consonant /C/, although, for reasons of facility of typographical reproduction, the phonemes are represented by digraphs and trigraphs, namely: /ph/, /phw/, /tr/, /ty/ etc.

This unitary interpretation is based largely on the canonical structure of the syllable in Yuanga. On the basis of all the unambiguous data available, the only syllable pattern which occurs in the Gomen dialect and which contains a consonant is the /CV/ pattern. Consequently, any interpretation of the complex consonants which involves a /CC/ pattern would violate this pattern and is, therefore, to be rejected.

Likewise, any interpretation which involves a /CV/ or /CVV/ sequence is also to be rejected, because in certain words this would result in a /CVV/ sequence. Even though sequences of two consecutive vowels occur in unambiguous data, sequences of three vowels do not, and so any interpretation which creates such an unattested sequence is to be avoided. The interpretation of the complex consonants as single segments /C/ avoids all these difficulties and accounts for all the data, but at the cost of multiplying the number of consonant phonemes.

The prenasalised stops are also interpreted as single segments /C/ for exactly the same reasons, since the choice of either /VC/ or /CC/ is ruled out. Another possibility is that the nasal phone be interpreted as a separate phonemic segment which belongs to a different syllable than the following stop; that is to say that it would be interpreted as a syllabic nasal. This solution avoids the difficulties mentioned above but it involves positing a new syllable type to cover the syllabic nasal. There is no justification for such a procedure, especially as the interpretation of the prenasalised stops as a single segment accounts for all the data without the need to propose additional syllable types.

Even though the phonetic realisation of the prenasalised stops is voiced, the phonemic notation uses the symbols for the voiceless stops, namely: /mp/, /nt/ and /nk/. This is in an effort to formalise the true generalisation about Yuanga that the phonemic system does not use voicing as a feature to distinguish between phonemes. The comparable distinction in the case of the stops is between voiceless stops and prenasalised stops rather than between voiceless and voiced stops, hence the above choice of notation avoiding the use of additional symbols, namely those for the non-pertinent voiced stops.

#### 4.1.2 THE SEMIVOWELS AND [h]

The semivowels [w] and [y], and [h] also raise some questions of interpretation. As the name 'semivowel' suggests, [w] and [y] can just as easily be interpreted as vowels as they can be as consonants, depending on their function in a given language. In Yuanga it is clear that the semivowels and [h] function as consonants in that they occur only in the pre-nuclear position in the syllable. Such an interpretation does not entail the creation of any new syllable types not otherwise attested, whereas the alternative solution (treating them as vowels) would create a new /VVV/ syllable pattern which is not otherwise attested.

#### 4.1.3 VOWEL SEQUENCES

Certain [VV] sequences are ambiguous because when one of the two close vowels [i] or [u] occurs in either of the two positions it could feasibly be interpreted as a semivowel, functioning as a consonant. Thus, three interpretations of such sequences are possible, namely /VV/, /CV/ or /VC/, with the consonant being either /w/ or /y/.

The /VC/ solution can be immediately rejected since a primary characteristic of the Gomen dialect is the fact that it has no closed syllables.

The /CV/ solution likewise is not suitable since there is contrast between close vowels occurring at the beginning of [VV] sequences and their equivalent semivowels, and also between consonant plus close vowel and palatalised and labialised stops. For example:

[tia]	to push	contrasts with	[tʰa]	indirect object
		and with	[tʰia]	to dance
[ <sup>m</sup> bua]	to call out	contrasts with	[ <sup>m</sup> b <sup>w</sup> a]	head
[ui]	to blow	contrasts with	[wi]	where?
[io]	soon	contrasts with	[jo]	ironwood

It is clear, then, that for Yuanga the vocalic segments in the left-hand column should not be interpreted as a sequence of consonant and vowel but rather as a sequence of two vowels.

This choice has the confirming advantage of harmonising with other unambiguous sequences of vowels, such as /aè/, /aò/, /òè/ and /èa/, which also occur in the Gomen dialect.

The geminate vowels are also ambiguous in that they can be interpreted as single complex segments /V<sup>v</sup>/ or as sequences of two identical segments /VV/. The latter solution is favoured on the grounds of economy, since it does not require the introduction of any new vowel phonemes.

## 4.2 NEUTRALISATION AND BIUNIQUENESS

A phoneme is a contrastive unit defined in terms of its patterns of opposition to other phonemes in a language. Consequently, when the regular patterns of contrast break down for some reason, these have to be carefully noted. Neutralisation is the term used to describe those situations where patterns of contrast which are attested in a given language break down, or are neutralised, in a particular phonological context. Neutralisation affects a number of different phonemes in Yuanga as described below.

### 4.2.1 THE LABIAL CONSONANTS

There is neutralisation of the opposition between the labial consonants and the labio-velar consonants in the environment preceding the high close back vowel /u/, in favour of the labial consonants. For example:

/pò/	fem	is in contrast with	/pwò/	turtle
/mpo/	wall	is in contrast with	/mpwo/	rotten
/mpò/	stick	is in contrast with	/mpwò/	fruit-bat
/mO/	left	is in contrast with	/mwO/	pot

The words in the left column below occur in Yuanga but the ones on the right do not:

/pu/	smoke	*/pwu/
/phu/	fly away	*/phwu/
/mpu/	green fruit	*/mpwu/
/mU/	behind	*/mwU/

### 4.2.2 THE DORSAL CONSONANTS

In word-initial position /k/ is in contrast with /x/. In intervocalic position, however, there can be neutralisation of this contrast with /k/ being realised as [x] or [ɣ] and /x/ also being realised as [x] or [ɣ]. The presence of the feature of voicing in an intervocalic position is a natural phenomenon and (as shown later) is a regular occurrence in Yuanga. The difficulty which arises in this case is that, instead of the intervocalic reflex of /k/ being [g], as might be expected by analogy with the other stops (cf. section 4.3), it is in fact a fricative. The result of this neutralisation is that the reflex of phoneme /k/ may be considered to be identical with the reflex of phoneme /x/ in the same environment, and this violates the principle of biuniqueness which is fundamental of structuralist theory. To put it in Bloch's terms (1941), the above coincidence of the reflexes of two different phonemes in the same environment is an example of complete overlapping, which, according to Bloch, is not acceptable in a valid phonological description.

Before blindly sacrificing symmetry and congruity on the altar of biuniqueness, however, it is necessary to understand the practical considerations which led Bloch to repudiate complete overlapping. His argument is that when a hitherto unknown language is being studied, if phoneme /A/ and phoneme /B/ can have the same reflex [C] in the same environment, then, if the linguist finds an occurrence of reflex [C] how can he know if it is an occurrence of /A/ or an occurrence of /B/? The answer is that he cannot know; and so, for reasons of accuracy and consistency, Bloch insisted on the prohibition of an analysis which allows complete overlapping.

In the case of Yuanga however, the above difficulties do not arise and the analyst can always know when [x] or [ɣ] are reflexes of /k/ and when they are reflexes of /x/. This is because the medial reflexes are free variants which depend mainly on the style of speech. Thus in fast speech the distinction between /k/ and /x/ tends to be blurred in intervocalic positions, but in slow deliberate speech the difference between them is quite clear. There is, therefore, no difficulty in consistently distinguishing between the two different phonemes. For example, in each of the following words or phrases the intervocalic /k/ may be pronounced as [x] or [ɣ] in fast speech, but it is always realised as [k] in slow speech:

/hê-kòlò/	family	(lit. contents of home)
/kòò kai/	second (child)	(lit. standing behind)
/mwO-kAmpu/	church	(lit. house sacred)
/mpwò-kAmpu/	Sunday	(lit. time sacred)
/mpa-kunI/	finally	(lit. thing to finish)
/nU kOmpwè/	I say	

As a general rule then, the contrast between /k/ and /x/ is neutralised in intervocalic position in favour of /x/. This fact harmonises with data from neighbouring languages and dialects; for example, Haudricourt (1963:6) cites data indicating that such an intervocalic neutralisation occurs between all stops and their homorganic fricatives in the neighbouring language of Kumak, and according to my observations the same is true of the dialect of Yuanga spoken at Bondé.

At the same time, however, it must be noted that the contrast between /k/ and /x/ is maintained in slow speech in those situations when the segment in question occurs at the beginning of a word or morpheme, even though it occurs intervocalically in terms of the linear flow of speech. In such cases, as in the examples given above, it is possible to reconstruct whether the underlying phoneme is /k/ or /x/.

In conclusion, one further point can be made with regard to the problem of /k/ and /x/. At the present point in time, even though the distinction between /k/ and /x/ is becoming blurred in certain contexts, the native speaker of Yuanga nonetheless still maintains a distinction between the two phonemes and is able to consistently produce the distinctive realisation of each of them in a deliberate style of speech. I have argued that this fact is sufficient justification for maintaining an analysis that on the surface violates the principle of biuniqueness. However, it is reasonable to suppose that after a period of several generations the knowledge of this distinction may be lost. In that case, there would be no way of accurately assigning a particular example of the phone to its 'correct' phoneme, and so at that time a different analysis would be necessary to account for the phonological system of the language as it would be after the period of change. In other words, languages change and, consequently, different analyses are necessary at different stages in a language's history. During the in-between stages when change is in process, the language itself may be a bit



inconsistent and 'fuzzy round the edges' as Vachek (1964) proposes and so, as Vachek also implies, linguists should not be apologetic if their analyses reflect such linguistic realities. The above analysis is a case in point and lends credence to Vachek's proposals.

#### 4.2.3 THE ASPIRATED CONSONANTS

In spite of all that was stated in section 4.2.2, it is possible to find in the Gomen dialect of Yuanga the phone [k] in word-medial position, as is evidenced by the following examples:

[kika]	burn the fields
[akə]	three (people)
[p <sup>w</sup> əkə]	three (animals)
[haikā <sup>m</sup> bu]	very cold

However, this medial velar phone has been interpreted as the medial allophone of /kh/ rather than as a reflex of /k/ for the following combination of reasons.

In the case of /kikha/, all native speakers consulted insisted that the medial phone should be realised as a strong aspirated consonant, that is, as /kh/.

Haudricourt (1971:384) and Rivierre (1972) indicate that /-khə/ 'three', with an aspirated velar stop, is to be found in many languages of New Caledonia.

Finally, Michailovsky (1982:3) reports that in the dialect of Yuanga spoken at Bondé, the free form /khampu/ 'cold', with an aspirated velar stop, is used even though this word does not currently occur in the Gomen dialect.

This interpretation – that the aspirated velar stop is realised phonetically as an unaspirated stop in medial position – is further borne out by the only other example available of an aspirated stop in medial position:

/thumEnO/	to move (walking)	is realised as	[ <sup>h</sup> thumēnō]
/pèthumEnO/	to walk about	is realised as	[petumēnō]

while

/katUmpi/	quickly	is realised as	[kadū <sup>m</sup> bi].
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These cases where the unaspirated voiceless phone occurs as a reflex of two different phonemes (the aspirated and unaspirated stop) is another example of overlap, but in this case it is only partial overlap, as the identical reflexes occur in different environments. Since the overlap is only partial, it is always possible to unambiguously identify the phoneme which the phone is representing, and so the analysis presented above is acceptable within the theoretical framework proposed by Bloch (1941).

No examples of aspirated nasals in medial position have yet been found, which means that in practice there is neutralisation of the opposition between aspirated and unaspirated nasals in this position. Haudricourt (1968:233) and Rivierre (1972:312) have proposed that the aspirated consonants in New Caledonian languages are derived from reduplicated syllables in an earlier form of the ancestral language(s). If this is true, it is not surprising that there are not a large number of examples of aspirated consonants generally, and it is even less surprising that there are hardly any examples of medial aspirated consonants. Further data collection may produce more examples, in which case the above hypotheses would need to

be double-checked against the new data. (See also section 4.4.1 for further comments on the term 'aspiration').

#### 4.2.4 THE VOWELS

The opposition between oral and nasal vowels is neutralised in two different environments, namely in the environment preceding prenasalised stops and also in that following nasal continuants. In these cases the neutralised segment has a phonetic realisation that is halfway between the normal realisation of the oral and nasal vowels. That is to say, it carries a very light nasalisation which can be quite noticeable if the syllable happens to be stressed, but its realisation is, nonetheless, still quite distinct from that of a normal nasal vowel.

It is in cases like these that the concept of the archiphoneme can be very valuable. The Syntagmatic Model still defines an archiphoneme in the broad sense espoused by the early members of the Prague School (Vachek 1966:60) and, consequently, Nicole (1981:65) states that an archiphoneme is an abstract unit which is the sum of the characteristics of two or more distinct phonemes. This definition leads to the rather unnecessary position that an archiphoneme should be posited in every case of neutralisation and, not surprisingly, this methodological redundancy has been rejected by most other linguists, including later members of the Prague School.

Pike (1967:301), however, also still uses the term, but with a more restricted definition. He only invokes the concept in cases (such as the one under discussion) where the phone which occurs in the neutralising environment has a realisation which is phonetically halfway between the normal realisation of the respective phonemes in their contrastive environments.

Neutralisation which is manifested by a phonetically intermediate form poses a particular problem for analysts. This is because it is not possible to assign the phone which occurs in the neutralising environment to one phoneme or the other without making an arbitrary choice which masks the phonetic reality. In such a case, the archiphoneme as defined by Pike comes into its own, for by using this convention to represent the neutralised phonemes it is possible to state with formal clarity that the neutralisation so marked is one which is not in favour of one phoneme or the other, but is manifested by a phonetically intermediate form.

Thus, for Yuanga, the presence of one of the five vowel archiphonemes /I, E, A, U, O/ indicates that the phonetic realisation of that segment involves a light degree of nasalisation, which sets it apart from the normal realisation of both oral and nasal vowels when they occur in non-neutralising environments.

The situation in Yuanga is reminiscent of the case of nasalisation in French described by Schane in his paper, 'The phoneme revisited' (1971). From the French data Schane (p.505) drew the principle that, if on the surface a feature is contrastive in some environments but not in others, then that feature is lost where there is no contrast.

If this principle were applied to the Yuanga data it could be argued that the phonemically nasalised vowels are the residual result of a process which took place in the following manner:

- (1) nasalisation of vowels preceding nasals: VN >  $\tilde{V}N$
- (2) loss of nasals in syllable-final position:  $\tilde{V}N\$$  >  $\tilde{V}\$$

The first step is a simple case of assimilation and the second also has plausibility, in that the nasalisation of the vowel makes the final nasal redundant. However, in contexts where a nasalised consonant is retained (i.e. in syllable-initial position), the nasal contrast is carried by the consonant and is non-contrastive in the vowel. In such cases, according to Schane's principle, the vowel would tend to lose the non-contrastive feature and become denasalised. This would result, at least in an intermediate stage of the process, in the lightly nasalised vowel which currently occurs in Yuanga.

The application of this principle to Yuanga is complicated by the fact that it is necessary to assume that there never was any vocalic nasalisation contrast following nasal continuants or preceding nasalised stops (or that it has been lost), since contrastive nasalised vowels do not currently occur in those positions. This is not an entirely unreasonable hypothesis, but it is still speculative and there is no evidence currently available to either support or refute it.

It should also be noted that Schane approaches the data in his article from a diachronic perspective, which makes it only marginally relevant to the present paper, which is purely synchronic in nature. In any case, this whole question of nasalisation is taken up again in section 6, where some more satisfactory proposals will be presented.

#### 4.3 CONSONANTAL VARIANTS

In section 2 it was noted that most of the unaspirated consonants have voiced variants which occur in intervocalic position. This is, of course, a very natural phonological phenomenon and its manifestation in Yuanga is exemplified below.

/p/

/hopo/	eat	is realised as	[hobo]
/tyopa/	horse	is realised as	[tʰoba]
/upi/	buy	is realised as	[ubi]

/pw/

/ntyipawa/	number of	is realised as	[n <sup>d</sup> ɰib <sup>w</sup> a]
/thyapwi/	lack of	is realised as	[tʰ <sup>h</sup> ab <sup>w</sup> i]

/ɰ/

/pota/	do	is realised as	[poda]
/ponɰta/	how many?	is realised as	[ponɰda]

/ɰr/

/pètròli/	see again	is realised as	[pɛd <sup>ɰ</sup> li]
/ntròtrò/	yesterday	is realised as	[n <sup>d</sup> ɰd <sup>ɰ</sup> ]

(The flap [ɰ] is another intervocalic variant of /ɰr/, but according to some speakers this is a 'deformation' characteristic of the young people.)

/ty/

/utya/	arrive	is realised as	[ud <sup>ɰ</sup> a]
/ityo/	you (singular)	is realised as	[id <sup>ɰ</sup> ɔ]

/j/

/ajɔ/	chief	is realised as	[aɔ̃]
/yaja/	name	is realised as	[jaɔ̃]

/x/

/ôxè/	again	is realised as	[ôɣè]
/kixa/	nothing	is realised as	[kiya]

/h/

As might be expected /h/ is not voiced intervocally but is instead lost entirely:

/ntyahò/	river	is realised as	[ <sup>n</sup> dʒaɔ]
/nAA hinU/	give to me	is realised as	[nãã inũ]

All of the above examples are variants which are dependent on the style of speech, the voiced variants occurring in normal speech and the voiceless form occurring in slow deliberate speech.

In section 4.2.2 above it was noted that /k/ is an exception to this generalisation in that its medial variant is a fricative rather than a voiced stop. Nonetheless, the natural tendency to voicing still comes into play as the variant fricative is often voiced rather than voiceless.

The intervocalic variant of the aspirated stops is the unaspirated version of the same consonant (as noted in section 4.2.3).

#### 4.4 PROBLEMS OF NOTATION AND DESCRIPTION OF THE CONSONANTS

##### 4.4.1 THE TERM 'ASPIRATION'

The terms 'aspirated' and 'unaspirated' have been used in this analysis in order to describe a set of distinctions which are very pervasive and significant for the phonological system of Yuanga. The reasons for using this particular pair of terms are two-fold: firstly, because on the phonetic level the segments in question are regularly aspirated, and secondly, in order to maintain a certain congruity and comparability with descriptions of other languages of New Caledonia by other researchers, who have consistently used these terms (e.g. Haudricourt 1963, 1971).

It should be noted, however, that in comparing the pronunciation of different speakers and even different pronunciations by the same speaker it was found that the noticeable expiration of air, which is the classical sign of aspiration, did not always appear to be present when so-called aspirated consonants were produced. At the same time, it was clear that all such consonants were produced with a greater degree of force and effort than their so-called unaspirated counterparts, which suggests that terms such as 'fortis' and 'lenis' may be more appropriate for describing this set of distinctions.

The use of the terms 'fortis' and 'lenis' has recently been brought under scrutiny by Jaeger (1983). She is not entirely in favour of these terms, since she considers that the variation in so-called 'force of articulation' is not of primary importance in distinguishing between sounds of this type. She proposes instead that consonants which have traditionally been distinguished by the terms 'fortis' and 'lenis' can be more accurately described in terms of a combination of three phonetic features, namely duration, variation in voicing, and

variation in the type of closure. On the basis of the evidence that she adduces from Zapotec (Mexico) and Jawoñ (Australia), Jaeger proposes, firstly, that fortis consonants are longer than their lenis counterparts; that they tend to be consistent in the type of voicing used, with a tendency to be voiceless and aspirated; and thirdly, that there is no variation in the type of closure used, so that stops are always stops and affricates always affricates etc.

It is noteworthy that, to a large extent, the Yuanga data fit this pattern, with the aspirated consonants fitting Jaeger's description of fortis consonants, and the unaspirated ones fitting her description of lenis consonants. Very little can be said about the question of duration since there is hardly any clearcut evidence currently available. Suffice it to say that syllables with aspirated or fortis consonants have always been subjectively perceived as being longer than syllables with unaspirated consonants (cf. section 4.5.3). The very limited number of spectrograms that are available support this perception, but they do not show that the fortis consonants themselves are longer in duration than the lenis ones. It can be stated with confidence, however, that the aspirated consonants always have the same type of voicing, whether initial or medial (cf. section 4.2.3), that they are almost invariably aspirated and that the stops, at least, are voiceless. In addition, the type of closure is always the same, regardless of the position of the consonant in the word. The only exception to this is /fh/ which can be voiced, although it is usually voiceless. The unaspirated consonants, on the other hand, act just like Jaeger's lenis consonants. For example, there is variation in voicing in that voiceless stops are voiced intervocally (cf. section 4.3), and variation in type of closure in that /k/ is produced with a fricative articulation in medial position (cf. section 4.2.2).

A further piece of evidence which suggests that New Caledonian languages may have the same features as those described by Jaeger is related to the historical source of the consonants in question. In Jaeger's study (1983:187) the fortis consonants are reputedly derived from consonant clusters, while Haudricourt (1968) has proposed that the New Caledonian aspirated (or fortis) consonants are derived from reduplicated syllables. Both cases lend credence to the proposal that duration may be a crucial difference between the two types of consonant.

The significance of Jaeger's proposals, if they are held to be correct, lies in the fact that they support the view that terms such as 'aspirated' and 'unaspirated' may not be totally accurate descriptions of the primary phonetic features of the consonantal system of Yuanga. Clearly, more research and analysis needs to be done on this topic in order to unambiguously define the phonetic realisation of the so-called aspirated and unaspirated consonants in Yuanga. In addition, it would be of considerable value to compare and contrast all the occurrences of aspiration in New Caledonian languages to see if there are certain features which always occur, and then to compare these with similar features in Australian languages, such as that studied by Jaeger.

#### 4.4.2 THE ORAL CONTINUANTS

The pair of phonemes /f/ and /fh/ are rather unusual but are nonetheless characteristic at least of the Gomen dialect of Yuanga. There is some free variation in the pronunciation of /fh/. Middle-aged people pronounce it as a voiceless labio-dental fricative, but younger people tend to pronounce it with a slight degree of voicing. In either case, there is a pronounced aspiration or 'scraping' in the throat which gives the sound its distinctive colouring. In an intervocalic position the pronunciation is slightly voiced by all speakers, in

line with the generalisation noted above regarding the voicing of medial variants. However, even intervocalically the 'aspiration' is still present which distinguishes it from the pronunciation of /f/, which is always pronounced as a voiced labio-dental fricative but without any 'aspiration' or scrape. (The symbol /f/ was chosen to represent this phoneme rather than the symbol /v/ in order to underscore the fact that within the phonological system of Yuanga the primary distinction is between voiceless aspirated segments and voiceless unaspirated segments, and that the voicing correlation is not relevant.)

In Table 1 the symbol /h is marked in parentheses in order to indicate that it is probably not a phoneme of Yuanga as it is currently spoken, even though by symmetry it fits neatly into the system. In the speech of one particular person at Paita a distinction is made between /l/ and /lh/, but this distinction is not recognised – either at the level of production or at the level of perception – by a total of ten other people with whom this question was investigated. It is fairly certain then, that this phoneme should not be counted as part of the phoneme inventory for Yuanga. Even if the aspirated form of /l/ were heard in the speech of a larger number of people, it would still not be necessary to posit a new phoneme, since /l/ always occurs in medial positions while the aspirated form, when it occurs, always occurs in word-initial position.

The same speaker mentioned above also recognises a distinction between the interdental fricative /j/ and its voiced counterpart, but again this distinction is not recognised by any other person with whom it was checked. The fact of the matter would appear to be that the voiced version of the fricative only appears in intervocalic positions, which is entirely in keeping with the general trend of medial voicing in Yuanga. It is, therefore, merely a contextually conditioned variant of /j/.

The examples of variants noted in this section are of interest in that they are probable examples of interference from another indigenous language of New Caledonia. Such cases of outside influence on a phonological system are not easy to recognise by a non-native analyst, but it is important to seek them out if an analysis of a given language is to be truly accurate. In this case the outside language is probably Drehu, which is spoken on the island of Lifou. This language was the first to have an orthography, and in the 1930s pastors from there came to Paita, prepared an alphabet and began to teach children of that era to read. In that orthography a distinction is made between /l/ and \*/lh/ and between /j/ and its voiced counterpart. According to Sam (1982), Drehu has both /l/ and /lh/ as distinct phonemes, as well as both voiced and voiceless interdental fricatives. It is reasonable to suppose, therefore, that the pastors' knowledge of their own language influenced their orthography decisions for Yuanga. Suffice it to say that the person cited above, who makes the idiosyncratic distinctions described there, learned to read in the pastors' school of that era and went on to become fluent in Drehu himself. It is possible also, that the difference in the pronunciation of /fh/ by the older and younger generations dates from the same period, for a voiceless labio-dental is quite common in Drehu and would have been the nearest equivalent to the /fh/ of Yuanga, whereas /v/ in Drehu is a recent and relatively rare borrowed phoneme.

#### 4.4.3 THE PALATALISED CONSONANTS

The phonetic realisation of these phonemes (with the exception of /y/ and /yh/) is not that of a consonant with a single point of articulation but that of a complex consonant with the primary closure between or behind the teeth and the secondary closure at the palate. The phoneme symbols have been chosen expressly in order to try to formally express this fact.

## 4.4.4 THE LABIALISED VELAR CONSONANTS

The phonemes /kw/ and /nkw/ also occur in the Yuanga language, although they have not been included in the main phoneme inventory. They are of a rather peripheral nature in that they only occur in a limited number of proper names, as follows:

/kwamanta/	topographical name
/nkwatintyi/	} names of clans
/nkwamahatai/	
/nkwapama/	
/we nkwa/	lit. river of Gwa (otherwise known as Ouegoa a village in the Bondé dialect area).

The word /kwau/ 'dog' also occurs in both the Gomen and Bondé dialects, but it is possible that this is a relatively recent borrowing of a word of Polynesian origin, namely *kuau* 'the young of an animal'.

The evidence cited above suggests that these phonemes were once an integral part of the phonological system of Yuanga, but for some reason they have disappeared from common usage even though they have remained fossilised in some proper names, and even though they still occur in other languages including Pwapwâ, the language spoken in the region immediately to the south of Gomen.

Haudricourt (1951) has traced the evolution of the old labio-velars in the languages of New Caledonia, but the reason why they were not retained in Yuanga is much less obvious than the fact of their actual absence.

Simons (1982) and Schooling (1981) have documented evidence which suggests that language change in Oceania may have been greatly affected generally by a system of word taboo, and in particular by a prohibition on the utterance of personal names. Naturally enough the prohibition was especially strong in the case of chiefs' names, and one can only assume that it would have been even stronger in the case of the names of gods or important ancestors. There is abundant evidence which indicates that this system of name taboo was practised throughout New Caledonia and that it is still part of the social system at the present time, although in a relatively weak form. Coyaud (1975) collected a number of traditional stories in the Bondé dialect region, and from these it appears that the leading ancestor of the Yuanga people was a personage by the name of *nGwa* or *Goa* (cf. the place name *Ouegoa* cited above). It is reasonable to suppose, therefore, that at an earlier stage in the history of the language there was a prohibition against uttering any word which sounded anything like the name *nGwa* and, as a result, all such words disappeared from the language apart from the few proper names mentioned above.

According to one speaker of the Gomen dialect, the phoneme \*/hw/ could also be included in the phonological system of Yuanga, since he recognises a difference between all the following words:

/wa/	song
/wha/	big
*/hwa/	fig tree
/hoa/	morning

This issue has not yet been satisfactorily resolved, but the evidence collected thus far suggests that the distinction between /wh/ and /hw/ is an idiosyncratic variation which is not

recognised by other members of the community. For this reason, /hw/ has not been included in the main inventory of phonemes.

#### 4.5 FEATURES OF THE VOWELS

##### 4.5.1 DEGREE OF APERTURE

The vowels /e/, /ɛ/, /o/ and /ɔ/ have a tendency to be pronounced with a degree of articulation which is closer than the symbolisation might suggest. Since the functional load of the /e/ – /ɛ/ and /o/ – /ɔ/ oppositions is fairly low, the difference in pronunciation between these two pairs of phonemes is often only very slight, with the consequence that, in isolation, the pronunciation of /ɛ/ and /ɔ/ can easily be confused with that of /e/ and /o/ respectively.

##### 4.5.2 THE NASAL VOWELS

Only five nasal vowels have been distinguished for the Gomen dialect of Yuanga, even though Michailovsky (1982) considers that there are seven distinct nasal vowels in the Bondé dialect.

In the Gomen dialect the four phones [ê], [ɛ̃], [ô] and [ɔ̃] can be distinguished phonetically, but phonologically it is a case of contextual conditioning, with the closer phones being produced following stops and the more open phones being produced following continuants. For example:

/trê/	to run	may be realised as	[trê]
/kê/	father	may be realised as	[kê]
/thôni/	to close	may be realised as	[thôni]

but:

/hê/	contents	is always realised as	[hê]
/hô/	new	is always realised as	[hô]
/wô/	boat	is always realised as	[wô]

Since there is no opposition between the members of the two pairs of phones, there is a tendency towards free variation between them, especially, of course, if there is a switch between fast and slow styles of speech. In general, the more open variants appear to be the more frequent.

##### 4.5.3 VOCALIC LENGTH

In principle all the vowels can be either short or long. This vocalic lengthening has a clear contrastive function in monosyllabic words (as evidenced by the data presented in section 3). However, the function of vocalic length in polysyllabic words is much less clear, especially as no unambiguous minimal pairs have yet been isolated.

One of the reasons for this lack of clarity may be that this is another example of a feature of the language which is in the process of change. The evidence for this is that there is a considerable amount of idiosyncratic variation in both the realisation and the perception of length among native speakers of Yuanga. This suggests that the feature of length may be in



the process of losing its contrastive function, at least for the Gomen dialect. For example, at Paita some speakers of Yuanga pronounce the word /pa/ 'pebble' with a short vowel, while others pronounce it with a long vowel. Some people make a distinction between /pwòpa/ 'four' (inanimate) with a short final vowel, and /pwò paa/ 'little pebble' with a long final vowel, and some make a distinction between /pa/ 'pebble' with a short vowel and /paa/ 'war' with a long vowel.

A further factor which adds to the difficulty of obtaining a clear-cut analysis, but which in itself may be the reason why vocalic length is losing its distinctive function, is that word stress appears to be primarily marked on a phonetic level by a lengthening of the vowel of the accented syllable. For the vast majority of lexical items, stress predictably falls on the penultimate syllable and therefore would not be marked in a phonemic transcription. In addition, the vowels following the so-called aspirated consonants tend to be phonetically long due to the force with which these consonants are pronounced.

It can be seen from this brief résumé of the data that the whole question of vocalic length in Yuanga is fraught with difficulty and uncertainty, and a more complete and definitive analysis will only be possible after more field research has been undertaken.

Three degrees of vocalic length have been noted for a few lexical items in Yuanga by Haudricourt (1968:223) and Michailovsky (1982:10), and also for the neighbouring language of Caaqac by Hollyman (1962:49). It has not yet been satisfactorily demonstrated that this distinction is still recognised by the present-day speakers of the Gomen dialect. Even if this distinction were found to be still pertinent, it would not be necessary to posit a new phonemic feature to account for the second degree of length, since all the examples noted by Haudricourt and Michailovsky involve the two close vowels /i/ and /u/. In such a situation it would be feasible on a phonological level to interpret the second vowel as a semivowel functioning as a consonant in the pre-nuclear position of a second syllable. Thus the example [viii] 'louse' could be interpreted as a two syllable word /tyi.yi/.

## 5. THE HIGHER LEVEL UNITS

### 5.1 THE SYLLABLE

The syllable is the distributional unit which constitutes the next higher rank of the phonological hierarchy above the rank of the phoneme. In terms of its structure, it is composed of phonemes which function as nucleus and periphery of the syllable. Vocalic phonemes (V) function as the obligatory nucleus of the syllable and consonant phonemes (C) function as the optional pre-nuclear margin of the syllable. The syllable functions as a component of the phonological word.

#### 5.1.1 UNAMBIGUOUS SYLLABLE TYPES

In the Gomen dialect of Yuanga, there are two types of syllable which are unambiguous. They are distinguished on the basis of their different structures.

Type 1 : V

The first type consists of a vocalic nucleus without any consonantal support. For example:

/a/	to go, sun	/ê/	sugarcane
/u/	with (instrument)	/ô/	yes

This type of syllable may be divided into at least two classes on the basis of a difference in function:

Class 1 is composed of the phoneme /a/. This class of syllable may function in any position in the phonological word.

Class 2 is composed of the phonemes /i, e, u, o/. This class of syllable may not function as the stressed nucleus of the phonological word if it is immediately preceded by another vowel in the same word (see also section 5.2.2).

At this stage of research it is not possible to assign the phonemes /e/ and /o/ to one class or the other with absolute certainty, although it is probable that they belong in Class 1.

### Type 2 : CV

The second type of syllable consists of a vocalic nucleus supported by a consonant in the pre-nuclear position. For example:

/pu/	smoke	/jinè/	rat
/mu/	behind	/kala/	run away
/nò/	fish		

The syllable type CVC occurs in other dialects of Yuanga but not in the Gomen dialect.

In principle all the short vowels, whether oral or nasal, can function in a syllable of Type 1. The exceptions are /û/, for which no unambiguous data have yet been found, and the oral vowels /o/ and /e/. It is possible that there is neutralisation of the contrast between /e/ and /e/, and /o/ and /ô/ in this type of syllable in favour of the more open vowels (cf. section 2.3.1).

No unambiguous examples of long vowels standing alone without consonantal support have yet been found which suggests that long vowels are not the same type of unit as short vowels. This supports our hypothesis that long vowels should not be interpreted as a single complex unit but rather as a sequence of two units (see section 4.1.3).

All consonants and all vowels can occur in syllables of Type 2, with a distributional gap such that no aspirated nasal consonants have been found in word-medial position.

### 5.1.2 AMBIGUOUS SYLLABLE PATTERNS

It was established in section 4.1.3 that all vowel sequences, whether geminate vowels or heterogenous vowels, are to be interpreted as sequences of two vocalic phonemes. As a result of this segmental interpretation, there are three ambiguous syllable patterns: CVVV, CVV and VV, of which the last two can be combined into a single formula: (C)VV. These patterns can be interpreted either as additional syllable types or as sequences of syllables of Types 1 and 2.

The best hypothesis for the (C)VV sequence is that it should be interpreted as a sequence of two syllables: (C)V.V. This interpretation has the advantage of economy in that it does not entail the addition of any new syllable type, whereas the alternative interpretation – CVV as a single syllable – would mean that this latter pattern would have to be incorporated into the system as a distinct syllable type.

Further evidence supporting the preferred interpretation was obtained by measuring the length of the ambiguous CVV pattern on a sound spectrograph. It was found that the VV sequence was exactly twice as long as a single vowel, which clearly supports the view that a VV sequence should be interpreted as a sequence of two units rather than as one single complex unit. It can also be noted that a long vowel is also the same length as a sequence of two non-homorganic vowels which also lends credence to the hypothesis subscribed to above that long vowels should be interpreted as VV sequences.

In the case of the CVVV patterns all the examples have a close vowel in either the first or the second vowel position. Such vowels can be interpreted as semivowels and therefore as single consonants, or as part of complex consonant phonemes. Such an interpretation again commends itself by virtue of economy, in that it avoids the necessity of positing any new syllable structures.

The following are some examples of ambiguous syllable patterns followed by their proposed phonological interpretation:

CVVV:	[kuau]	dog	interpreted as	/kwau/	(CV.V)
	[t̪eiu]	to remain	interpreted as	/treju/	(CV.CV)
CVV:	[ <sup>m</sup> bua]	to call out	interpreted as	/mpua/	(CV.V)
	[ <sup>m</sup> b <sup>w</sup> a]	head	interpreted as	/mpwa/	(CV)
	[ha <sup>m</sup> b <sup>w</sup> œ]	to guard	interpreted as	/hambwòè/	(CV.CV.V)
	[kaɛ]	pumpkin	interpreted as	/kaè/	(CV.V)
	[haibo]	much	interpreted as	/haipo/	(CV.V.CV)
	[haxai]	big	interpreted as	/haxai/	(CV.CV.V)

## 5.2 THE PHONOLOGICAL WORD

The phonological word is the distributional unit which constitutes the next higher rank of the phonological hierarchy above the rank of the syllable. In terms of its structure, it is composed of syllables which function as the stress-bearing nucleus and as the non-stress-bearing periphery of the phonological word. The phonological word is the domain for the placement of word stress and it functions as a component of the phonological phrase.

### 5.2.1 THE STRUCTURE OF THE PHONOLOGICAL WORD

The phonological word is composed of an obligatory nucleus which comprises a stress-bearing syllable, an optional pre-nuclear margin which may be composed of between one and three syllables, and an optional post-nuclear margin or coda which consists of a single syllable. If a pre-nuclear margin occurs, then a post-nuclear margin must also occur. The syllables which occur in the word margins are, by definition, unstressed.

In addition to the presence of one stressed syllable, a phonological word can be identified by the fact that it is the smallest phonological unit which can stand alone as a complete meaningful utterance, and also by the related fact that its borders are marked by points in the flow of speech where pauses may occur.

Syllables of Type 1, Class 1 and Type 2 may occur in any position in the phonological word except that no more than two syllable nuclei may occur in succession without an

intervening consonant. The only example of a five-syllable word which has been noted thus far is composed entirely of syllables of Type 2.

### 5.2.2 THE PHONOLOGICAL WORD AS THE DOMAIN FOR STRESS PLACEMENT

Word stress in Yuanga falls on the penultimate syllable of the phonological word. Since its placement is predictable it does not have a distinctive or phonemic function, but it does have a demarcative function in that its presence marks off one phonological word from another.

From a phonetic point of view word stress is characterised by extra expiratory force which results in a lengthening of the vocalic nucleus of the stressed syllable. It should be noted that aspirated consonants are produced with a similar kind of pulmonary force and have the same lengthening effect on the following vowel. Consequently, the presence of an aspirated consonant in an unstressed syllable can camouflage the word stress, as the two syllables bear a very similar degree of phonetic force. For example, in the word /pèthumènò/ 'to walk about' the second and third syllables both appear to be phonetically stressed, but the second syllable has an aspirated consonant and it is the third one (i.e. the penultimate one) which bears the word stress.

A number of methods are used in Yuanga for augmenting the lexicon by creating new words. Affixation is one of these methods, but it is also quite common to find compound words which are the result of conjoining what were formerly two phonological words into one unit. In such cases, the compound words retain the same number of stressed syllables as their component words, and are consequently marked by at least two word stresses, as is exemplified by the words listed below. In these, as in the other examples in this section, the stressed syllable is the one following the apostrophe:

/mpwò'kAmpu/	Sunday	(lit. occasion sacred)
/mwO'kAmpu/	church	(lit. house sacred)
/mwOntra'laè/	village	(lit. house of whiteskin)

There is one class of interrogative words which do not follow the usual pattern of stress placement but, for a reason which has yet to be elucidated, have the stress appearing on the ante-penultimate syllable:

/anIta/	how many? (animate)
/pwònIta/	how many? (inanimate)
/ènIta/	when?
/wènIta/	how long?

In those cases where there is a sequence of two contiguous vocalic nuclei, that is to say either a sequence of two syllables of Type 1 (V.V) or a sequence of a syllable of Type 2 followed by a syllable of Type 1 (CV.V), the stress only falls on the first of the two syllables, as indicated in the following examples:

/ui/	to blow	'V.V
/mpua/	to call out	'CV.V
/mwOntra'laè/	village	'CV.CV:'CV.V
/ha'xai/	big	'CV:'CV.V

In the preceding examples, the stress falls in the expected position, on the penultimate syllable. However, in other words this restriction on the stress placement causes the stress to fall on a syllable other than the penultimate. For example:

/haipo/	much	'CV.V.CV
/aiyu/	to inhabit	'V.V.CV

There is, nonetheless, an exception to this restriction in that the open vowel /a/ can carry stress even if it is in second position in a sequence of two vowels, and so in the following examples the stress appears in the usual place:

/è'amwA/	where? (specific)	V.'V.CV
/ju'angA/	Yuanga	CV.'V.CV

It is on the basis of such data that Syllable Type 1 was divided into two classes in section 5.1.1.

### 5.2.3 EXAMPLES OF PHONOLOGICAL WORD TYPES

Phonological words in Yuanga can be divided into six types on the basis of their different structures.

#### Type 1: One Syllable

/i/	where?	V
/mA/	sick	CV
/mpwa/	head	CV

#### Type 2: Two Syllables

/èa/	from where?	V.V
/ajo/	chief	V.CV
/jala/	question	CV.CV
/tòè/	to throw	CV.V

#### Type 3: Three Syllables

/aiyu/	to inhabit	V.V.CV
/è'amwA/	from where?	V.V.CV
/E'ntòà/	seed	V.CV.V
/a'tyòmU/	teacher	V.CV.CV
/ju'angA/	Yuanga	CV.V.CV
/hA'nkanA/	now	CV.CV.CV
/pè'haje/	different	CV.CV.CV
/ja'xòè/	to try	CV.CV.V

#### Type 4: Four Syllables

/atya'mAnti/	wise man	V.CV.CV.CV
/wai'mAnI/	to tie yam leaves together	CV.V.CV.CV

no example available		CV.CV.V.CV
/trètrE'mpwau/	round	CV.CV.CV.V
/pèha'jenI/	difference	CV.CV.CV.CV

## Type 5: Five Syllables

/pènAmpu'lunI/	collection of traditional gifts	CV.CV.CV.CV.CV
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## Type 6: Compound words

/'mwO'kAmpu/	church	'CV.'CV.CV
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## 5.2.4 THE PHONOLOGICAL WORD AND THE GRAMMATICAL WORD

The term 'word' is used in two distinct ways in this model of analysis. It is used to label a rank on the level of the syntactic hierarchy (see section 1.3) as well as on the level of the phonological hierarchy, as has been discussed in the preceding paragraphs. It is important, therefore, to distinguish between these two uses of the same term.

In the majority of cases a phonological word in Yuanga is identical with its correlative grammatical word. This is not always the case, however, since some grammatical units such as prepositions and pronouns, which may be analysed as words on the syntactic level, do not bear word stress and in that unstressed form cannot stand alone as autonomous phonological words.

In such cases, then, a string of segments which may be analysed as two or three grammatical words may only constitute a single phonological word, as the following examples of Type 3 phonological words illustrate:

/kòdò 'kai nU/	upright behind me (i.e. the second child)
/nU 'kOmbwè/	I say

On the basis of data collected thus far, it appears that a single grammatical morpheme may be composed of a phonological word which is a maximum of three syllables in length. Any phonological words which are more than three syllables in length can be correlated with more than one morpheme.

## 5.3 THE PHONOLOGICAL PHRASE

The phonological phrase is composed of phonological words and constitutes the next higher rank in the hierarchy above the level of its constituents. The distinctive characteristics of the phonological phrase are the demarcative accent and minimal intonation patterns. The phonological phrase functions as a constituent of the intonation group which is the next higher rank in the hierarchy.

## 5.3.1 THE DEMARCATIVE ACCENT

In each phrase there is one phonological word, which is normally the one with a verbal function at the grammatical level of the language and which is marked off from the other constituents of the phrase by a noticeably higher pitch. If the word in question is several syllables in length, the peak of the phrase accent coincides with the stressed syllable of the word.

Pitch can be used to differentiate between two different utterances when it occurs as part of an intonation contour, but otherwise pitch has no contrastive, phonemic function in the phonology of Yuanga.

## 5.3.2 INTONATION PATTERNS

Thus far only the verb basic intonation patterns for indicative and imperative statements and for interrogatives have been analysed and described. Doubtless there are other patterns which still remain to be discovered and defined.

The indicative statements and the interrogative phrases which are marked by an interrogative word have an intonation contour which rises at the point of the demarcative accent, and then falls towards the end of the phrase.


Imperatives have an intonation contour very similar to that of the indicative statements. The main difference is that the rising part of the contour begins nearer the beginning of the phrase and rises more sharply and higher before falling towards the end of the phrase.

The interrogatives which are not marked by an interrogative word have a rising contour at the very end of the phrase as well as at the point of the demarcative accent.

The following phrases exemplify the intonation patterns enumerated above. The demarcative accent is indicated by a single slash preceding the syllable in question, and the pitch contour is graphically represented above the string of segments.


Intonation contour for marked interrogatives and indicative statements

*tyo / a wi?*



You go where?  
(Where are you going?)

*nU / a e khumwA*



I (am) going to Koumac.


Imperative intonation contour

*A / ntaml trAmpwa ènE*



Come in (and) sit down here.

Intonation contour for unmarked interrogatives



*tyo tomA A / ntamwA mOnO?* (Are) you going to come back tomorrow?

The above examples are, as stated, examples of phrases. However, it should be noted that they are also examples of minimal intonation groups. In general, intonation is considered to be a feature of the intonation group which is the next higher level in the hierarchy above the phonological phrase. However, since the research thus far has not included an exhaustive analysis of the features of the highest ranks of the phonological hierarchy, the basic intonation features which have been noted thus far are included at the phrase rank, in order to make the analysis as complete as possible at this stage.

## 6. AN ALTERNATIVE ANALYSIS

### 6.1 THE PROSODIC APPROACH TO PHONOLOGICAL ANALYSIS

A classical phonemic approach to phonology can produce a very reasonable analysis of a language such as Yuanga, as has been demonstrated in the preceding sections. It accounts for the phonic data accurately enough and produces a symmetrical systematisation of the phonology of the language which is satisfying and, to a large extent, satisfactory. In particular, the formal presentation reveals certain generalities of the language such as the dichotomy between stops and continuants and between oral and nasal segments, as well as the pervasive presence of aspiration.

In terms of economy, however, a segmental phonemic analysis is not at all satisfactory in that it leads inevitably to the positing of at least 37 consonant phonemes and 12 vowel phonemes. Not surprisingly, some other generalisations, such as the fact that only labial consonants are labialised and only apical consonants are retroflexed or palatalised, also get lost among the sheer mass of symbols.

The prosodic approach to phonology, however, which was first propounded by J. R. Firth (1948) of the London School and further expounded by Robins (1957) and Lyons (1962), offers a different theoretical model which is particularly appropriate for a language such as Yuanga.

As Lyons (1962:129) has pointed out, the prosodic approach to phonology is characterised by the fact that it is two-dimensional. The first of the two dimensions is that of the phonematic units, which are segmental in nature and are ordered in a sequential fashion. The phonematic units represent the way in which the flow of speech can be divided vertically, producing what has been likened to beads on a string (Bendor-Samuel 1960:348). They are not to be equated with classical phonemes but rather as the paradigmatic units of the consonant and vowel systems of a given language. As such, they function as fillers for the consonant and vowel slots within the framework of the syllable of the language. Conventionally, the alphabetic letters *p*, *t*, *k*, etc. are used to represent the consonants and *a*, *e*, *i*, etc., to represent the vowels.

The second dimension is that of the prosodies, which are features of a different type, not unlike Harris's (1944) simultaneous long components. Phonically, they occur parallel to, but not specifically in a one to one relationship with, the phonematic units. The prosodies



reflect the wave-like nature of language (cf. Pike 9176:45), in that they represent features which are manifested horizontally in the flow of speech and which may, as a consequence, have an effect on more than one of the segmental phonematic units. As the phonematic units indicate the paradigmatic phonological relationships, so the prosodies indicate the syntagmatic relationships. By means of this dichotomy it is possible to divide and describe the phonetic material in terms of two systems which are different in nature but complementary in explanatory power. For further exposition of the Prosodic Approach, reference can be made to Palmer (1970) which combines a lucid summary of the theory with an anthology of important articles on the subject.

When this method of analysis was applied to the Yuanga data it was possible to reduce the phoneme inventory to six consonants and seven vowels at the cost of proposing five prosodies and without sacrificing any of the symmetry or uniformity of the system.

## 6.2 THE BASIS FOR AND RESULTS OF A PROSODIC ANALYSIS OF YUANGA

In the course of the analysis of the Yuanga data, pieces of evidence came to light which indicate that certain features of the sound system, such as nasalisation and labialisation, affect more than one segment at a time. The features involved are precisely those which, according to Robins (1957:4), often lend themselves to a prosodic analysis.

As noted in section 2, the palatalised consonants have an effect on the following front vowels which causes them to have a more closed realisation than those in non-palatalised syllables. In actual fact, this is true of the back vowels as well, for in the early stages of data collection the word /tyo/ 'you' was often transcribed as [tɪu].

In a similar way the labialised consonants also have an effect on the following vowel, in that the rounding and closeness of the back vowels in particular is emphasised in a labialised environment. The nasalised consonants affect their neighbouring vowels by giving them a slight nasal colouration and by cancelling the opposition between nasal and oral vowels. A tentative hypothesis that the vowels following aspirated consonants tend to be slightly breathy, more intense and marginally longer than their unaspirated counterparts was confirmed by a sound spectrograph analysis.

All this evidence taken together indicates that many of the phonetic features of Yuanga are not purely segmental in nature. Rather, they are characterised by the fact that they co-occur, not just with single segments, but with a whole string of segments. Consequently, an analysis in terms of prosodies can more effectively describe such features and more adequately reveal the true nature of the phonological system of the language.

Using this system, then, Yuanga is considered to have just seven segmental vocalic phonematic units – *i*, *e*, *è*, *a*, *u*, *o*, and *ò* – and six consonantal phonematic units (all of which have a voiceless phonetic realisation) which can be schematised as follows:

	LABIAL	APICAL	DORSAL
Stops:	<i>p</i>	<i>t</i>	<i>k</i>
Continuants:	<i>f</i>	<i>j</i>	<i>x</i>

In addition to the above phonematic units there are five prosodies which, in combination with the above segmental units and with each other, produce the same number of possible contrasts as the preceding phonemic analysis.

The prosodies and their respective abbreviations are as follows:

Aspiration	(A)
Labialisation	(L)
Retroflexion	(R)
Palatalisation	(P)
Nasalisation	(N)

Apart from two particular cases which will be discussed later, the prosodies of Yuanga described in this section are all examples of what Robins (1957:4) calls 'syllable prosodies', which means to say that the syllable is the domain of the prosody. To put it in other words, the sequence of phonematic units which form a syllable also comprise the maximum linear extent of the effect of any given prosody. Since this is so, it can be stated at the outset that all the prosodies can occur with any of the vocalic phonematic units which form the obligatory nucleus of syllables. The only exception is that the back close vocalic segment *u* does not occur in the same syllable as the labialisation prosody. In addition, there are restrictions on the number of vocalic contrasts which can occur in close proximity to a nasalisation prosody but these are noted in detail in section 6.3. All the prosodies can occur with either Syllable Type 1, consisting of a single vocalic segment, V, or Syllable Type 2, consisting of vocalic segment plus a preceding consonantal segment, CV.

There are, however, a variety of restrictions on the co-occurrence of the prosodies and the consonantal phonematic units. It should be noted, nonetheless, that these restrictions are not entirely arbitrary but in most cases merely eliminate unnatural phonetic combinations.

Thus it is that the retroflexion prosody and the palatalisation prosody only occur with the apical stop *t* and, apart from the fossilised forms noted in section 4, the labialisation prosody only occurs with the labial stop *p*. The aspiration and nasalisation prosodies have a broader distribution, in that aspiration occurs with all the consonantal segments except *j* and *x*, and nasalisation occurs with all the stops.

These latter two prosodies are also unique in that they can co-occur in combination with any of the other prosodies or with each other, and they can also occur together in a three-fold combination with labialisation or palatalisation. A listing of the possible combinations and the syllable types in which they can occur is given below using the formal abbreviations.

Possible combinations	Syllable types
A and L	1 and 2
A and R	2 only
A and P	1 and 2
N and L	1 and 2
N and R	1 and 2
N and P	1 and 2
A and N	1 and 2
A and N and L	2 only
A and N and P	2 only

The application of the first four prosodies to the data is very straightforward as is evidenced by the following examples. The prosodic notation is given in the right hand column.

[p <sup>w</sup> e]	fishing line	is written	L <i>pe</i>
[t <sup>h</sup> i]	to comb	is written	A <i>tī</i>
[t <sup>h</sup> e]	tree	is written	P <i>te</i>
[t e]	night	is written	R <i>te</i>

The nasalisation prosody, however, is considerably more complex and is discussed next. (More examples of all the prosodies are given in section 6.4.)

### 6.3 THE NASALISATION PROSODY

#### 6.3.1 THE PROBLEM

The difficulty with the nasalisation prosody lies in the fact that there are, in effect, three types of nasalisation in Yuanga. Firstly, there is the type of nasalisation commonly known as prenasalisation which operates in combination with a following consonantal segment. In Yuanga it also has an effect on the immediately preceding vocalic segment (if any) in the same word, in that it provokes a neutralisation of the contrast between the two sets of vowels of an intermediate degree of aperture (*e*, *ɛ* and *o*, *ɔ*).

Secondly, there are the nasal consonants *m*, *n*, etc., which in Yuanga have the same neutralising effect as noted above but, in this case, on the following vowel (i.e. the one in the same syllable) rather than on the preceding one.

Thirdly, vocalic units can be nasalised providing a possibility of contrast between oral vocalic segments and nasal vocalic segments. The presence of this type of nasalisation causes the same vocalic neutralisation as mentioned above, but since such nasal/oral contrast only occurs following oral consonants, it clearly cannot be analysed as the same type of nasalisation as in the previous two categories. Normally this type of nasalisation only affects the vocalic phone in question; however there is some evidence that it can affect the preceding phone as well, especially if it is a semivowel. For example /wī/ 'strong' can be optionally pronounced as [(m)wī̃], and likewise for /wê/ 'owl' and /wêê/ 'hat'.

Although sharing certain similarities, these three types of nasalisation are nonetheless different and are not reducible to a single feature or process. This means that they have to be accounted for in three different ways with an independent analysis for each one.

#### 6.3.2 POSSIBLE SOLUTIONS

Within the confines of the prosodic approach, there are two possible solutions for each type of nasalisation: to interpret the nasalisation as a segmental feature, which would entail positing additional phonematic units; or to interpret it as a prosody.

In the case of prenasalisation, a segmental interpretation would result in three additional phonematic units such as *mb*, *nd* and *nG*, or *mp*, *nt* and *nk*. If a prosodic approach is taken,

the fact that the nasalisation affects two contiguous segments which are in different syllables needs to be accounted for and handled in a satisfactory manner.

In the second case the segmental approach would involve the positing of three nasal phonematic units, *m*, *n* and *ng*. The difficulty with applying the prosodic approach in this case is that the prosody is phonetically manifested in three different ways, with labial, apical and velar points of articulation respectively. These different points of articulation would have to be clearly indicated in some way within the limits of the prosodic formalism.

The third category – the nasalised vowels – also lends itself to a prosodic analysis. However, if a prosodic approach were chosen for more than two of the categories of nasalisation, then a way would have to be found to distinguish them so that each occurrence of a given prosody could be properly identified.

If a segmental approach were chosen for the third category (the nasalised vowels), there are two possible options. The most straightforward one would be to follow the example of the phonemic analysis and posit five additional nasal vocalic phonematic units. An alternative approach would be to interpret the nasalised vowel as an oral vowel followed by a nasal consonant on the phonological level which is realised phonetically as a nasalised vowel. On a diachronic level this is a very reasonable hypothesis, for it is known that other dialects of Yuanga, as well as other related languages, have nasal consonants in syllable-final position, even though there are no data immediately to hand which would indicate that this was also once true of the Gomen dialect. However, on a synchronic level it is a much less attractive proposition, for the necessary corollary of creating a closed syllable type, CVN or CVC, far from encapsulating a true generalisation about the dialect, in effect masks a unique fact about the dialect, namely, that it does not have any closed syllables.

### 6.3.3 THE PREFERRED SOLUTION

It would be possible to use a combination of segmental and prosodic solutions to account for the three types of nasalisation but the preferred solution is to treat them all as prosodies. This is clearly the most consistent solution for an analysis based on the Prosodic Model, and it is also the most economical, as it does not require the introduction of any new phonematic units or syllable types. All it requires is the splitting of the nasalisation prosody into three parts, which has the effect of adding two more syllable prosodies to the inventory for Yuanga. Since each of the three prosodies is different, it is necessary to distinguish them, but this can be done by the simple expedient of assigning a different number, N<sup>1</sup>, N<sup>2</sup> and N<sup>3</sup>, to each of them.

Prosody N<sup>1</sup> therefore, refers to the prenasalisation prosody. In this case the nasalisation affects the stop consonants, producing on the phonetic level a strong nasal effect and a concomitant voicing of the stop. As mentioned above, it also causes the preceding vowel (if any) in the same word to be lightly nasalised and the usual contrast between the vowels of an intermediate degree of aperture (*e*, *è* and *o*, *ò*) to be neutralised. The fact that this prosody affects segments in two different syllables can be adequately taken into account by introducing the concept of focus (discussed in some detail in section 6.3.4). The notation for this prosody is as follows:

[<sup>m</sup>ba] instrument is written  $\begin{matrix} N^1 \\ pa \end{matrix}$

Prosody N<sup>2</sup> is the notation for the analysis of the features which were treated as nasal consonants in the phonemic analysis and which are phonetically realised as nasal continuants. In this case the prosody does not act upon or in combination with another consonant, as was the case with N<sup>1</sup>, but it is phonetically manifested as a single nasal consonant in its own right. The prosody also affects the following vowel in exactly the same way as the preceding vowel is affected by prosody N<sup>1</sup>. In the case of N<sup>2</sup> the point of articulation also has to be stipulated. This can be done by using one of the existing phonematic units, with the choice between the appropriate stop and the approximate continuant being somewhat arbitrary. However, in order to minimise any possible confusion between N<sup>1</sup> and N<sup>2</sup>, the symbols for the continuant phonematic units were chosen to fulfill this function. Thus the notation for prosody N<sup>2</sup> is as follows:

[ma] and is written  $\overset{N^2}{fa}$

The third category of nasalisation which affects vocalic segments is labelled N<sup>3</sup>. A word with a nasalised vowel would consequently be transcribed as follows:

[kê] father is written  $\overset{N^3}{ke}$

As noted above, this prosody produces on the phonetic level a strong nasalisation of the vowel and the nasalisation of any preceding semivowel. It also has the same neutralising effect on the intermediate aperture vowels as the other two prosodies.

It should also be noted, in conclusion, that these three nasal prosodies cannot co-occur in the same syllable.

#### 6.3.4 THE CONCEPT OF FOCUS

In his article on Sanskrit, W.S. Allen (1951) develops the concepts of focus and of linear extension as applied to prosodic features. His difficulty in Sanskrit was that the feature of retroflexion, which is typical of certain so-called retroflex consonants in Indic languages, seemed to have an effect on other segments which were sometimes separated from the retroflex consonant by several intervening segments. At that time none of the current explanations for this phenomenon were at all satisfactory and so Allen invoked the two-dimensional notions of the London School and proposed, in the first instance, that retroflexion should be abstracted from the linear sequence of phones and treated as a prosody.

He then went on to propose that any given prosody will have a focal point which will normally coincide with the occurrence of the consonants which, in Sanskrit, are particularly marked by their retroflex articulation. From this focal point the effects of the prosody can spread in either direction along the linear dimension until its influence is halted by the occurrence of what Allen (1951:943) calls a "palatographically interfering articulation". This is a segment which is produced with an articulation which is specifically not retroflex. Any segments in between these two articulations will, to a lesser or greater extent, be affected by the prosody, and they will also have, by definition, a non-interfering articulation. Thus in the Sanskrit example labial consonants, vowels and semivowels can occur within the domain of the retroflex prosody, while a dental consonant would mark the limit of the linear extension of the prosody. For example, in the following word there are two retroflex

prosodies, whose extent is marked by the underlining, which are separated by an interfering dental nasal. The geminate nasal at the end of the word has a retroflexed articulation.

Sanskrit:  $\overset{R}{\text{parinirvinna-}}$

The same principles can also be applied to the Yuanga data. For the majority of the prosodies, the limit of their linear extension conveniently coincides with the contiguous syllable boundaries and so Robin's (1957) category of syllable prosody remains appropriate, even though the effective cause of the limitations on the extent of the prosody is almost certainly due to the presence of an interfering segment which happens to occur at a syllable boundary, rather than any quality inherent in the juncture between syllables itself. An additional advantage of not being tied too closely to Robins's category of syllable prosodies is that it leaves the door open to the possibility of perceiving that in some cases a single prosody may affect a whole word or a polysyllabic component of a word, as in the following example:

[ $^n d \text{ɔ} \text{ɔ}$ ] yesterday is written  $\overset{N^1}{Rt\grave{o}.t\grave{o}}$

In this case, following Lyons's (1962) notation, the position of the retroflexion symbol (R) indicates that both of the syllables in the word are marked by retroflexion in an identical manner, whereas only the first syllable is marked by the nasalisation prosody. This possibility is mentioned to indicate where further research is necessary, but it will not be developed further here.

It is clear, however, that Allen's concept of focus is particularly pertinent to the understanding of the prenasalisation prosody ( $N^1$ ) which spreads in both directions from the focal point but does not end at a syllable boundary in either direction. Whereas in our notation syllable boundaries can conveniently be used to mark the extent of prosodies  $N^2$  and  $N^3$ , in the case of  $N^1$  a system such as Allen used needs to be appended, as is illustrated in the following example:

[ $k\grave{u}nd\text{ɔ}$ ] to drink is written  $\overset{N^1}{ku.t\grave{o}}$

In this example the letter of the prosody symbol is vertically aligned with the focal point of the prosody and the horizontal line marks its linear extension, since  $k$  is a non-nasal consonant and  $\text{ɔ}$  is an oral vowel. From the data collected thus far it has become clear that only oral vowels occur after prenasalised stops. One piece of evidence for this is that such contrasts as / $nke$ / 'dirty' and / $nk\grave{e}$ / 'grandmother' occur, where the neutralisation always associated with nasalisation elsewhere does not occur. This makes it possible to state with some confidence that the vowel following an  $N^1$  prosody always acts as an interfering segment.

In addition to dealing very neatly with the problem raised by the  $N^1$  prosody, Allen's concept of focus and linear extension also accounts for another phenomenon which occurs in Yuanga but which has been skated over up until now. It has been noted elsewhere that sequences of two vowels are possible in Yuanga and that they have been interpreted as sequences of two syllables. It is clear however, that prosodies which are inherent in a preceding consonant carry over to some extent onto the second vowel of the sequence. Having understood Allen's extension of the Prosodic Model this phenomenon is entirely in keeping with prosodic features of language, for it is to be expected that a prosody will affect

any segment which is not separated from the focal point of the prosody by an interfering segment. This is the case with the two vowel sequences in the following example:

[t<sup>h</sup>aa] red pepper is written  $\frac{A}{ta.a}$

In this particular example the second vowel is phonetically marked by a slight degree of breathiness. The notation using the solid line indicates that there is only one prosodic focal point. This means that the second syllable is affected by the prosody to a lesser extent than the first syllable and, as a consequence, the phonetic manifestation of the prosody is not the same in both syllables. If the phonetic manifestation were identical in both syllables, it would be due to the presence of two prosodic foci as in the following hypothetical example:

\*[t<sup>h</sup>aha] would be written  $\frac{A A}{*ta.a}$

The Yuanga data is significantly different from Allen's in one respect, in that two or three prosodies can co-occur with the same focal point or they can overlap so that one particular segment may fall within the domain of two different prosodies. This fact, however, still does not create any major theoretical difficulty. It implies that some segments are susceptible to being affected by more than one prosody. Using Allen's terminology, it is possible to state that they are non-interfering segments with regard to more than one prosody and, as a consequence, overlap is to be expected if two or more prosodies are operative in close proximity. (Examples of co-occurring and overlapping prosodies are given in section 6.4.)

## 6.4 EXAMPLES OF YUANGA DATA USING PROSODIC NOTATION

In the examples given in this section the following notational conventions are used:

- (1) The letter code of the prosodies is vertically aligned with the phonematic unit which marks the focal point of the prosody in the segmental dimension.
- (2) The linear extension of the prosodies normally coincides with the syllable boundaries which are marked by a full stop. The linear extension is marked by a solid line in those cases where it does not coincide with syllable boundaries.

In order to facilitate comparison of the two analyses, the phonemic transcription is given in the left-hand column. The phonetic realisation of the examples is not reiterated here as it can be easily derived from the descriptions of the phonemes given in section 2.

### 6.4.1 EXAMPLES OF SINGLE PROSODIES

Aspiration:

<i>pha</i>	lung	$\frac{A}{pa}$
<i>kha</i>	to press	$\frac{A}{ka}$
<i>fha</i>	to speak	$\frac{A}{fa}$
<i>ha</i>	or	$\frac{A}{a}$

## Labialisation:

<i>pwa</i>	rain	$\overset{L}{pa}$
<i>kapwa</i>	not	$\overset{L}{ka.pa}$
<i>waa</i>	to open mouth	$\underline{\overset{L}{a.a}}$
<i>wòjò</i>	crowbar	$\overset{L}{\grave{o}.j\grave{o}}$

## Retroflexion:

<i>tri</i>	tea	$\overset{R}{ti}$
<i>atru</i>	two (animate)	$\overset{R}{a.tu}$
<i>la</i>	they	$\overset{R}{a}$
<i>tròli</i>	to find	$\overset{R}{\overset{R}{t\grave{o}.i}}$

## Palatalisation:

<i>tyi</i>	pawpaw tree	$\overset{P}{ti}$
<i>tyatya</i>	father	$\overset{P}{\overset{P}{ta.ta}}$ (or: $\overset{P}{Pta.ta}$ )
<i>yaji</i>	to cover	$\overset{P}{a.ji}$
<i>kòyò</i>	to lose	$\overset{P}{k\grave{o}.\grave{o}}$

## Nasalisation:

<i>nta</i>	what?	$\underline{\overset{N^1}{ta}}$
<i>kInka</i>	to laugh	$\underline{\overset{N^1}{ki.ka}}$
<i>ml</i>	ripe	$\overset{N^2}{fi}$
<i>nAA</i>	to give	$\underline{\overset{N^2}{ja.a}}$
<i>ngAmA</i>	the remainder	$\overset{N^2}{\overset{N^2}{xa.f\grave{a}}}$
<i>ô</i>	yes	$\overset{N^3}{o}$
<i>kâ</i>	to shout	$\overset{N^3}{ka}$



## 6.4.2 EXAMPLES OF CO-OCCURRENT PROSODIES

## Aspiration and labialisation:

<i>phwa</i>	hole	A L <u>pa</u>
<i>phwið</i>	the eldest	A L <u>pi.ð</u>
<i>wha</i>	big	A L a
<i>whili</i>	to drag	A L R <u>i.i</u>

## Aspiration and retroflexion:

<i>thra</i>	bald	A R ta
<i>thrðli</i>	shell	A R R tò.i

## Aspiration and palatalisation:

<i>thyamwA</i>	banana	A L P N <sup>2</sup> ta.fa
<i>thyipwe</i>	to sneeze	A P L ti.pe

## Nasalisation and labialisation:

<i>mpwa</i>	on	L N <sup>1</sup> <u>pa</u>
<i>mpwðpô</i>	tired	L N <sup>1</sup> N <sup>3</sup> <u>pð.po</u>
<i>mwA</i>	house	L N <sup>2</sup> fa
<i>wî</i>	strong	L N <sup>3</sup> i

This notation indicates that the labialisation and the nasalisation prosody co-occur simultaneously and that the vowel is the focal point of the prosodies. If this is correct it goes a long way towards explaining, from a phonetic point of view, why the variant [m̃wî] sometimes occurs (cf. section 6.3.1), as this is a natural result of trying to produce a nasal and a labial sound at the same time.

Nasalisation and retroflexion:

<i>ntra</i>	ashes	R, N <sup>1</sup> <i>ta</i>
<i>ntròtrò</i>	yesterday	T N <sup>1</sup> R <i>tò.tò</i>
<i>lâ</i>	those	R N <sup>3</sup> <i>a</i>

Nasalisation and palatalisation:

<i>ntyá</i>	dirt	P N <sup>1</sup> <i>ta</i>
<i>nyAnyá</i>	mother	P P N <sup>2</sup> N <sup>2</sup> <i>ja.ja</i>

No example is available for P and N<sup>3</sup> combined.

Nasalisation and aspiration:

<i>nhU</i>	to crumble	A N <sup>2</sup> <i>ju</i>
<i>hâ</i>	already	A N <sup>3</sup> <i>a</i>

Nasalisation, aspiration and labialisation:

<i>mhWA</i>	we (inclusive)	A L N <sup>2</sup> <i>fa</i>
<i>mhWAnU</i>	moon	A L N <sup>2</sup> N <sup>2</sup> <i>fa.ju</i>

Nasalisation, aspiration and palatalisation:

<i>nhyAtu</i>	good soil	A P N <sup>2</sup> <i>ja.tu</i>
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6.4.3 EXAMPLES OF OVERLAPPING PROSODIES

Overlapping only occurs with the N<sup>1</sup> prosody.

<i>ènOmpau</i>	very good	N <sup>2</sup> <i>è.jò.pau</i> N <sup>1</sup>
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<i>ènUnta</i>	up there	$\begin{array}{c} N^2 \\ \dot{e}.ju.ta \\ N^1 \end{array}$
<i>mAnku</i>	correct	$\begin{array}{c} N^2 \\ \dot{f}a.ku \\ N^1 \end{array}$

At this point a modification can be made to the general statement set out above in section 6.2 with regard to the occurrence of the nasalisation prosody in particular syllable types. With the division of the nasalisation prosody into three categories, the following more specific statement can be made: prosodies  $N^1$  and  $N^2$  only occur with Syllable Type 2, while prosody  $N^3$  can occur with both syllable types.

#### 6.4.4 SUMMARY

The above examples illustrate how a wide variety of features, and combinations of features, can be represented using the Prosodic Approach. In the case of Yuanga the notation reveals clearly the simple syllable structure which is basic to the language. In addition, it reveals that despite the apparent complexity of the system of consonantal contrasts there are, in fact, only a very small number of phonematic units which actually function in the consonant slot of the syllable. The other phonetic features of Yuanga, such as nasalisation and labialisation, are clearly seen to be non-segmental in nature. Their function is not to fill a slot in the syllable structure but rather to give a particular colouration to the syllable as a whole by operating in parallel with the segmental components of the syllable. The prosodic method of analysis and notation, then, graphically reveals the fundamental difference between these two types of phonological feature in Yuanga.

#### 6.5 WORD, PHRASE AND SENTENCE PROSODIES

In section 5 a brief analysis was made of the phonological features of higher level units such as the word, phrase and sentence. Although it is not possible within the limits of this paper to develop this at any length, it should be noted that the prosodic model can also account for features such as stress, phrase accent, tone (if any) and intonation, and would treat them as prosodies of the unit in question. Thus, for example, stress in Yuanga would be analysed as a prosody of the word, for although it does not have any contrastive function in the classical phonemic sense of the word it does have a clear demarcative function, as it is a phonological means of distinguishing one word from another. Using Allen's (1951) conceptualisation again, it could be said that stress is a prosody whose linear extension is bounded by the juncture between words. All the syllables of a word fall within the domain of the stress prosody because, if one syllable is the focal point of the prosody, then by definition all the other syllables in the word will be of a lesser intensity and of a shorter length than the stressed syllable. Thus, in a very real way the stress prosody affects all the syllables of a word, not just the stressed syllable.

In a phonemic analysis stress in Yuanga would, in effect, be relegated to a peripheral position in the analysis because it is not semantically contrastive and is, therefore, 'non-phonemic'. With the prosodic model, however, such a distinction is redundant and stress would take its place on a par with all other prosodies. Such an analysis undoubtedly does greater justice to the true role of stress within the phonological system.

In a similar manner intervocalic voicing could be analysed as another word prosody, phrase accent would be analysed as a prosody of the phonological phrase, and intonation as a prosody of the sentence. As a consequence, it can be seen that the prosodic approach to phonology is capable of taking account of the whole range of phonological features with considerable economy and clarity.

## 6.6 PROSODIC ANALYSIS AND AUTOSEGMENTAL PHONOLOGY

The purpose of section 6 has been primarily to review the phonology of Yuanga from the perspective of Prosodic Analysis and, as a consequence, to bring new light to bear on the exact nature of this particular sound system. It is of interest to note in conclusion, however, that these same data can also be analysed, with very similar results, by using the methodology known as 'Autosegmental Phonology', which has been developed by J.A. Goldsmith (1976).

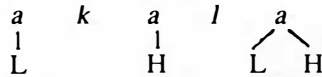
Although of very different parentage, Prosodic Analysis and Autosegmental Phonology have a remarkable amount in common. According to Palmer (1970:ix-xv), the prosodic approach to phonology, as developed by Firth and his colleagues, had three particularly remarkable characteristics. Firstly, it was a radical alternative to the structuralist-type approach to phonology of the day in that it proposed a phonological analysis that was not based primarily on segmentation into phonemes. Secondly, in place of the phoneme, Firth used the word as his base unit and incorporated features of the word into his phonological analysis. At the same time he also emphasised the importance of the syllable, and it is in relation to their function within the syllable that the segmental phonematic units are described and derive their significance. Thirdly, although he did not develop it in any great detail, Firth recognised the interdependence of grammar and phonology and considered that an analysis should attempt to integrate these different aspects of linguistic reality rather than arbitrarily keeping them apart, as was the common practice within American structuralism.

These are, of course, the very same issues which have been taken up and developed, apparently independently, by the Generative school of linguistics. Chomsky himself (1964) rejected the rigid phoneme-based approach to phonology of the structuralists and proposed instead his alternative Transformational Generative approach, which is notable for its close integration of grammar and phonology. Proponents of Natural Generative Phonology have championed the cause of the syllable (Hooper 1972) and the word (Vennemann 1974) as units which are important for, and even basic to, linguistic analysis.

Autosegmental Phonology itself is, of course, one of the most recent developments of phonological theory from within the Generative tradition. Goldsmith's innovation arose out of the fact that the Generative model cannot neatly and conveniently represent essentially non-segmental phonological features such as tone. His solution (Goldsmith 1976:i) is to posit "parallel tiers of segments (or 'autosegments')" which can be used to represent as many different phonological features as are present in the phonic data.

The basic tier of units which occur in all representations is that of the so-called "atomic units" (Goldsmith p.16), although they are usually simply referred to as segments. As with Firth's phonematic units, they are represented by alphabetic letters. In this case, however, in line with traditional generative phonology they represent and symbolise all the appropriate distinctive feature specifications of the segment in question, except for those features represented by another tier of autosegments. Phonological features which cannot adequately

be expressed by single segments, as defined in terms of a matrix of distinctive features, are assigned to another tier and are represented by an abbreviation appropriate to the feature in question. Such a tier is appropriate if a segment needs to be marked with two features which are mutually exclusive in distinctive feature characterisation. An example of this would be a contour tone which may have to be characterised as both '+ high' and '- high' simultaneously. A second tier is also appropriate if there is a feature, such as nasalisation, which occurs simultaneously with or affects more than one segment. Thus in the following example given by Goldsmith (p.23), a word with low tone on the first syllable, high tone on the second syllable and a low-high contour tone on the third would be represented by two tiers of autosegments:



The relationship between the two tiers is overtly marked by lines of association. The role of these lines is important, and Goldsmith developed a formal definition for making the associations which he called 'the well-formedness condition'. In the case of the above example which deals with tone, this condition reads (p.27):

- (1) All vowels are associated with at least one tone;  
All tones are associated with at least one vowel.
- (2) Association lines do not cross.

In addition, it can be noted that complex features can be indicated by having two association lines leading to a single segment as in the case of the contour tone above.

It is not possible within the scope of this paper to give a full autosegmental analysis of Yuanga. The purpose is merely to make passing reference to a current, distinctive development in phonological theory and to underscore the proposal, made elsewhere in this paper, that a single set of data can profitably be viewed from more than one perspective. Nonetheless, by demonstrating how the feature of nasalisation would be handled it is possible to give an indication as to how the other features would be handled as well. The interested reader can easily pursue this issue further on the basis of the examples given.

Autosegmental Phonology is a rule-based theory, although the detailed development of the rules for Yuanga will not be dealt with here. The process of analysis involved applying the universal 'well-formedness condition' and then the non-universal rules which need to be developed for each specific language. These latter rules define how and when the extra lines of association are drawn in those cases where more than one line leads to a single segment or autosegment. Once such rules have been applied to the Yuanga data, the result is as indicated in the following examples. For ease of reference the phonemic, prosodic and autosegmental representations will all be given together.

Prenasalisation:

Phonemic: /kUntò/ to drink

Prosodic:  $\overline{N^1}$   
ku.tò

Autosegmental:

In this notation O indicates 'oral' and N indicates 'nasal'. The upper case *D* represents a segment with all the feature specifications of an /n/ except for nasality. The presence of two association lines leading to the *D* indicates that the segment is complex: in this case it is a prenasalised stop (i.e. part nasal, part oral). The two lines leading to the *u* have similar significance, in that this segment is part oral and part nasal, being neither identical with an oral vowel nor identical with a nasal vowel.

## Nasal consonants:

Phonemic	/nU/	I
	$N^2$	
Prosodic:	<i>ju</i>	
Autosegmental:	$\begin{array}{c} D \quad u \\   \quad / \quad   \\ N \quad O \end{array}$	

## Nasalised vowels:

Phonemic:	/pû/	green
	$N^3$	
Prosodic:	<i>pu</i>	
Autosegmental:	$\begin{array}{c} p \quad u \\   \quad   \\ O \quad N \end{array}$	

It can be seen from these examples that the basic conceptualisation of Prosodic Analysis and Autosegmental Phonology is almost identical, with merely the form of notation being different. Both conceive of a basic string of unitary segments linked in parallel with another set of features which are more fluid in their extension along the linear plane. Clearly there also are some differences, but these largely hinge around whether a particular relationship or feature is explicitly marked in the notation or whether it is implicit in the definition of one of the symbols. For example, in the prosodic analysis the interfering segments are not explicitly marked, although their presence is implied by the absence of any prosodic marking. In the autosegmental analysis all the segments are explicitly marked as to whether they are oral or nasal.

Another significant difference is that the autosegmental analysis only posits a single feature of nasalisation, while three nasalisation prosodies are required with the prosodic approach. This is somewhat counterbalanced by the fact that the autosegmental analysis requires the additional upper case symbols to represent the information which is inherent in the definition of the three prosodies. This means that what is gained by reducing all occurrences of nasalisation to a single feature is counteracted by enlarging the inventory of segmental units.

Finally, in defence of the phonemic analysis, even though the presence of two types of features is not explicitly expressed in the notation, as it is in the other two analyses, nonetheless, in this particular case, the fact that nasalisation affects the contiguous vowel as well as the consonant is indicated by the presence of the archiphoneme.

Needless to say, a lot more work could be done to develop the implications and the relative value of each of the analyses. Suffice it to say at this point that different analyses of the same data are possible; none can be rejected a priori as having no relevance, for each of them, in its own way, gives an accurate account of the sound system of Yuanga and, potentially at least, is capable of doing so for any natural language.

## 7. CONCLUSION

The main purpose of this article has been to present with as much clarity and plenitude as possible a description of the phonological system of one of the dialects of the language of Yuanga. The intrinsic value of such an exercise lies in the fact that this language has not previously been described in such detail, and in the fact that the languages of New Caledonia are almost completely unknown to linguists of the English-speaking world.

In the interests of giving the most complete picture possible, it was deemed appropriate to approach the data from two different perspectives, and this also raises an issue of general interest. The first approach, that of the Syntagmatic Model, concentrates on segmentation. In doing so, it reveals how many individual segments are required to account for the system of phonemic contrasts which are inherent in Yuanga. The approach of Prosodic Analysis or Autosegmental Phonology puts less emphasis on segmentation and demonstrates that the same phonic data can be perceived from another perspective. In this case, both segmental and non-segmental features are perceived as occurring simultaneously and in complementation with each other.

The fact that the same data can be viewed from more than one perspective does not necessarily undermine the theoretical foundations of linguistic analysis in general, nor, even, of one particular model of analysis. The fact of the matter is that all reality can be studied and perceived from different points of view. This universal is illustrated by what are known as 'ambiguous drawings' which, for example, may be seen as a beautiful woman or as an old crone, depending on how the eye interprets the web of interrelationships of the lines in the drawing.

The fact of more than one perspective (provided that it is accurate in its representation of reality) does not imply that one perspective is correct, or true, and that all the rest are illusory. It implies rather that truth may be greater, and more inclusive, than a single isolated viewpoint would have us believe. The inadequacy of a particular perspective, or theoretical model, may lie not in the fact that it presents a false picture of reality but merely in that it presents a partial and incomplete picture of reality. The quest for a complete and, by definition, true picture of linguistic reality, then, does not involve the elimination of all competing models bar one, but rather in the appreciation of the insights which each of the relevant models can bring to bear on the language being studied.

The value of a particular model may, in fact, lie more in its specific aim or practical application. The stated aim of the Syntagmatic Model, as with many phonemic models, is to provide the linguistic foundations for producing a practical orthography of a hitherto unwritten language (Nicole 1981; Pike 1947). In such cases, an analysis which reduces all the phonological contrasts to a set of segments is a very valuable starting point for organising an appropriate but economical alphabet.

The results of a prosodic or autosegmental analysis, on the other hand, do not lend themselves quite so readily to the uni-dimensional requirements of an alphabet-based

orthography, although such analyses may, arguably, be more appropriate than a phonemic analysis if a syllabary were the goal, rather than an alphabet. The strengths of both prosodic and autosegmental analyses lie less in their application to practical problems such as orthography preparation and more in their theoretical insightfulness into the universal nature of language. Both the Prosodic Model and Autosegmental Phonology reveal the fact that speech is not a simple linear collection of discrete utterances but rather a complex interaction of various types of sounds, many of which occur simultaneously rather than sequentially.

A phonemic approach then, provides the valuable service of reducing a complex multi-level system to a single segmental plane suitable for transcription into the uni-dimensional milieu of alphabetic writing; but it does so at the cost of over-simplification. Prosodic analysis and autosegmentalisation preserve and portray the complex web of relationships inherent in a phonological system, such as that of Yuanga, but at the cost of being notationally more cumbersome and, possibly, of less immediate value in other more practical fields.

Viewing linguistic reality from all possible viewpoints is almost certainly a practical impossibility and even using more than one approach in any given study may, generally, be more than the human frame can bear. Nonetheless, it is salutary to realise that such a multi-dimensional view of reality is theoretically possible. Such a realisation can help an analyst choose the approach which is the best suited to his specific goal in undertaking research. In addition and above all, such a realisation helps to keep all discoveries in perspective and to promote the healthy and humbling prerequisite to all scientific research: that no one methodology and no one tradition has a monopoly on truth.

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