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ANINDILYAKWA PHONOLOGY: UMBAKUMBA COMMUNILECT

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I certify that this Special Topic has not been  
submitted for a higher degree to any other  
university or institute.

*Helma J. Leiding*  
.....

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TABLE OF CONTENTS

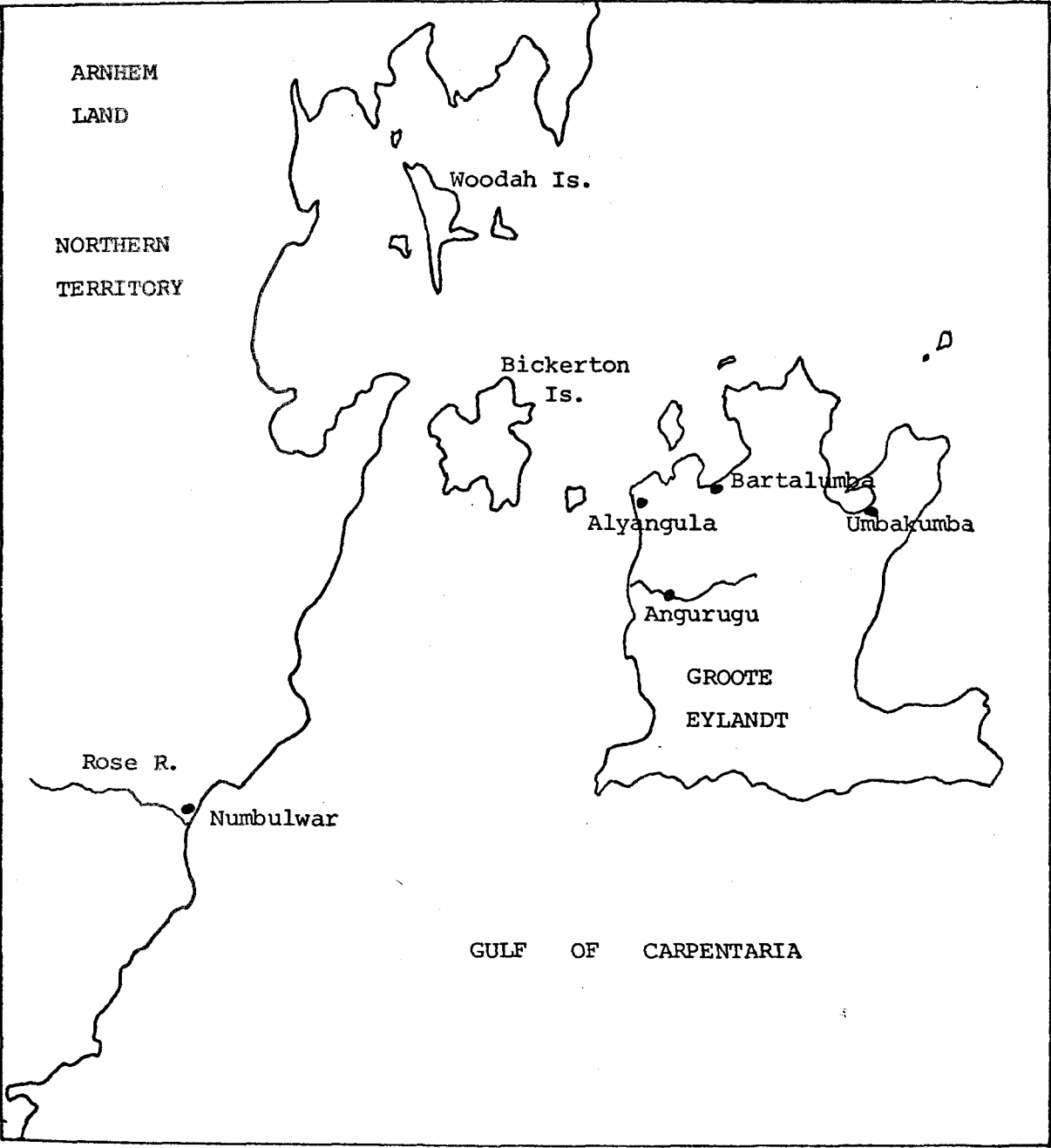
Map

Key to phonetic symbols

0.	INTRODUCTION	1
0.1	The language and its background	1
0.2	Data collection and processing	2
0.3	Aim and contents	3
1.	THE PHONOLOGICAL WORD	7
1.1	Word-final /a/	7
1.2	Assignment of the vowel to root or affix	11
1.3	Morphophonemic rules	14
1.4	Word length and syllable distribution	16
1.5	Word stress	18
2.	THE SYLLABLE	24
2.1	Distribution of syllables in a word	24
2.2	Distribution of consonants and vowels in the syllable	25
2.3	Syllable reduction	29
2.4	The epenthetic vowel	33
2.5	The syllable as a close-knit unit	37
3.	INTERPRETATION	40
3.1	Consonants	40
3.2	Vowels	42

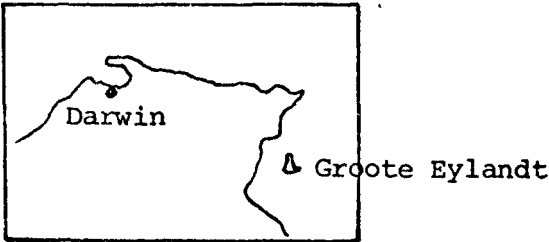


4.	THE CONSONANTS	50
4.1	Consonantal contrasts	51
4.2	Allophonic variation	56
4.3	Phonemic variation	79
5.	THE VOWELS	88
6.	THE LOW VOWEL /a/	113
6.1	The allophones [a] and [æ]	113
6.2	The allophones [a] and [a <sup>ɪ</sup> ]	127
6.3	The allophones [a <sup>ɪ</sup> ] and [æ <sup>ɪ</sup> ]	129
6.4	The allophone [ɒ]	131
6.5	The allophones [a <sup>u</sup> ] and [æ <sup>u</sup> ]	132
6.6	Vowel harmony	134
7.	THE MID VOWEL /e/	137
7.1	Allophonic variation	140
7.2	Vowel harmony	145
7.3	Phonemic variation	146
8.	THE HIGH VOWEL /i/	156
8.1	The allophones [u], [ɔ], [ʊ] and [ə]	163
8.2	The allophones [i], [ɪ] and [u]	171
8.3	The allophones [i], [ɪ], [ʊ] and [ə]	173
8.4	In closed syllables	190
8.5	When the following vowel is a front vowel	191
8.6	Vowel harmony	192
8.7	Phonemic variation	194
9.	CONCLUSION	195
	Reference works	201



GROOTE EYLANDT, NORTHERN TERRITORY

(approx. 800 sq. miles)



KEY TO PHONETIC SYMBOLS

Because of the restriction of certain symbols on the typewriter the following have been chosen. The consonants mainly follow Pike (1947: 5, 7) and the vowels the IPA System (Pike 1947: 232).

Consonants.

Bilabials:	p, m
Dentals:	t̪, n̪, l̪
Alveolars:	t, n, l, and flap ɾ
Retroflexes:	t̠, n̠, l̠, ɽ
Laminals:	tʲ, nʲ, lʲ, j
Velars:	k, ŋ
Glottal:	ʔ
Rounded consonants:	pʷ, mʷ, kʷ, ŋʷ, w

Vowels

		<u>nearest Pike equivalent</u>
Front:	i	i
	ɪ	ɪ
	e	e
	æ	æ
Central	ə	ə
	a	a/ʌ
Back:	u	u
	ʊ	ɯ
	ɔ	o
	ɒ	ɔ

The hyphen preceding a vowel indicates the root or affix begins with a vowel; the hyphen preceding a consonant indicates an initial consonant.

## 0. INTRODUCTION

### 0.1 The language and its background

Anindilyakwa is the name of the language spoken by the Warnindilyakwa Aborigines of Groote Eylandt, Gulf of Carpentaria, Northern Territory. In the classification of Australian Aboriginal languages, Anindilyakwa is placed in the Groote Eylandt Family (Oates 1970: 15) or Andilyaugwan Family (Wurm 1972: 117). The Nunggubuyu Aborigines refer to the language as Yingura/Ingura (Hughes 1971: 312 [yin<sup>ɣ</sup>guʀa]). It is a multiple-classifying language with a richly-developed prefixation, as well as a suffixation, system.

Today, the Warnindilyakwa people live primarily in two communities on Groote Eylandt, viz., Umbakumba (approx. 400) and Angurugu (approx. 700). A few live at Numbulwar, on the mainland to the west, either permanently or temporarily. In 1922, Norman Tindale liberally estimated the population of the Groote Eylandt Archipelago to be a little more than three hundred. Eleven out of the twelve local groups (Turner 1974: 8) are represented at Umbakumba but the three main local groups are Mamarika, Barra and Yantarrnga. The speech of the Umbakumba community differs from that of Angurugu in only a few minor sound shifts. The Umbakumba Aborigines, however, hear the difference between the two communilects as one of voice quality, theirs being the more strident of the two.

Contact with other nations has occurred for at least two or three centuries. The Macassans probably visited Groote Eylandt as traders in trepang and tortoise-shell as early as the eighteenth century. The traders came from Macassar, a port in southern Celebes

which is now part of the Republic of Indonesia (MacKnight 1972: 283) and were probably of the Bugi people of that area (Cole 1971: 7). The Aborigines identify about thirty-five of the nouns recorded to date as Macassan. These words have been incorporated into the noun-classification system and have been adapted to the Anindilyakwa sound system.

Regular contact with Europeans began when Mr. Fred Gray settled at Umbakumba in the late 1930's. He acted as liaison between the Aborigines and the officials at the Port Langdon Flying Base, established in 1938 on the shore of the Umbakumba Lagoon. After World War II, the Australian government asked Mr. Gray to stay and supervise the welfare of the Aborigines. He and Mrs. Marjorie Gray began a school, dispensary, farming and shell craftwork. From 1958-66, the administration of the community was in the hands of the Church Missionary Society (Church of England). Since 1967, Umbakumba has been administered by the Department of Aboriginal Affairs. A local Aboriginal Council now supervises local affairs in the township. (For more detailed information, see Reference Works.)

## 0.2 Data collection and processing

The data used in this paper was collected over a period of 2½ years from May, 1975 to November, 1977, whilst employed as a linguist in the Bilingual Section, Department of Education, Northern Territory Division. Data collection at Umbakumba was commenced using the word list issued by the Australian Institute of Aboriginal Studies, Canberra (approximately 2,200 words). Vocabulary items were added, after checking, from the Anindilyakwa Primers Series by Judith Stokes and Gula Lalara, and from transcribed stories told by

the Umbakumba Aborigines. For the purpose of this analysis a dictionary of 2,400 citation forms of words in phonetic script, six taped stories, and two double-sided 5" tapes of vowels recorded in constant frames, have been used. During the last six months at Umbakumba, a lot of time was spent checking data and in "structured listening", i.e., listening to conversations but focussing on certain sounds.

In 1972, I spent two months at Angurugu with Miss Judith Stokes, linguist, Church Missionary Society, working on the problems in the Anindilyakwa phonology. This data has also been considered.

During my residence at Umbakumba, I taught literacy in the vernacular to nineteen Aboriginal adults, all of whom were literate or semi-literate in English. Twelve of them finished the literacy course, nine of whom could both read and write with a good degree of fluency.

Approximately 220 spectrographs have been processed in the acoustics laboratory of the Macquarie University, using a Voice Print Laboratory Spectrograph.

Data for the spectrographs was recorded by Mrs. Tapinkuta (Katie) Yantarrnga intermittently over a period of six months. Three utterances of each word were recorded each time and controversial words were recorded on several different occasions.

### 0.3 Aim and outline of the contents

The aim of this paper is to present the phonemes of the Umbakumba communilect of Anindilyakwa, with some comparisons made regarding the Angurugu communilect. The phonological word and the syllable have been described in the paper to show how the phonemes function within the larger units. Word stress is only briefly mentioned. As

native reaction (Pike) or native intuition (Chomsky) is considered relevant to linguistic analysis, details of the reactions of the Umbakumba literates have been included throughout the paper.

The characteristics of Anindilyakwa are: long words, fluid vowels, very few minimal pairs for either consonants or vowels, and an extensive morphophonemic system. The distinguishing of six points of articulation for the consonants is typical of the system throughout Australia. Anindilyakwa, however, has a dichotomy between unrounded and rounded consonants which is not typical in Australian languages but is found in some languages of Papua New Guinea (see Lithgow 1977: 4; Pike 1964: 129; Lloyd and Healey 1970: 36; Laycock 1965: 34). The three-vowel system (high versus mid versus low) is also atypical for Australian languages but is found in Papua New Guinea languages (see Staalsen 1966: 69; Bruce 1977: 1 re "typical Sepik vowel system"; Laycock 1965: 32; Pike 1964: 131). Though the Barua vowel phonemes are different from those in Anindilyakwa the allophones of /ə/ and /ʌ/ which parallel /i/ and /a/ are very similar (Lloyd and Healey 1970: 36, 39).

Only a few adverbs and exclamations are monomorphemic. The complex affixation linked with the noun classification system results in numerous morpheme boundaries within each word. The morphophonemic and allophonic changes at the morpheme boundaries have been listed separately in each section for clarity. It was essential to conduct morphological research simultaneously with the phonemic analysis. This fact is highlighted in "Grammatical Prerequisites to Phonemic Analysis" (Brend 1972: 32) in which Pike states: "when phonological and grammatical facts are mutually dependent, the treatment of phonology without reference to grammar is a concealment of part of a most important set of structural facts pertinent to phonology."

Pike (1947: 116 - 7) states that: "Sound systems have a tendency toward phonetic symmetry... It should be emphasized, however, that a language does not have to be symmetrical. Very frequently a sound system is not symmetrical and there are defective series of sounds, or what might be called in this instance 'holes in the pattern'."

The lack of symmetry in Anindilyakwa is seen in the difference in the functional load of the dental series (see Section 4) where dental /ɲ/ is now rare and alveolar /n/ common in prefixes and suffixes. With the loss of /pʷ/ and /mʷ/ preceding /a/, and the development of the alveolar series, the vowel allophones of the high vowel are seen to be unsymmetrical (see Section 8, Chart 9). The lack of symmetry, therefore, is accounted for in terms of language change through interaction with Nunggubuyu, Macassan and English. It would seem possible that Anindilyakwa was originally a language from the northeast. The older Aboriginal men at Angurugu have told Mr. Lance Tremlett (Town Administrator, Church Missionary Society) that their ancestors came from the northeast (personal communication).

The present analysis is an attempt to resolve continuing phonological problems evident in the failure of Aboriginal literates to spell the vowels consistently. The main problem in the early recording of the phonetic data arose because the feature of rounding was not identified correctly in the bilabial consonants, or where rounding was simultaneous, not sequential. Lithgow (1977: 3) faced the same type of problem and says: "a series of labialised velar and/or bilabial consonants is found throughout the Austronesian languages of Milne Bay... The kʷ and gʷ sounds can be heard quite well by Europeans, but we often have difficulty in hearing the labialisation of pʷ, bʷ and mʷ...". Once the rounded consonants were identified as phonemic, the allophones of the high and low vowels were seen to pattern in



accordance with the rounded or unrounded consonants. Previous analyses (Moody 1954; Stokes 1972) divided the high vowel into two phonemes, /i/ and /u/, with phonemic variation. This analysis adds two rounded consonants to the consonant inventory, and reduces the high vowel allophones to one phoneme /i/, with allophonic variation.

The tagmemics model (Pike 1967) is used in this paper in order to make the analysis available to local linguists, literacy workers and non-aboriginal teachers who are either familiar only with the tagmemics model or who have only an elementary knowledge of linguistics. As Aboriginal teachers are also currently being trained in linguistics during teacher-training, it is hoped that the presentation will be understood by some of the local Aboriginal teachers. A larger number of examples than is usually found in a paper of this type has been included for local interest. Some of the morphophonemic and allophonic rules are written in transformational-generative formulae but an explanation is given below each one.

## 1. THE PHONOLOGICAL WORD

The phonological word has been identified by its isolability and a word-final feature /-a/.

### 1.1 Word-final /a/.

The vowel /a/ occurs word-finally in almost every word in the language. It is regarded as the juncture feature at the closure of a word. The basic form of the root can be observed when the word is suffixed. The root-final vowel elides when the word-final /a/ occurs.

/ma <sub>1</sub> lam <sup>w</sup> k <sup>w</sup> iman <sup>v</sup> t <sup>v</sup> a/	'in the canoe'
/ma <sub>1</sub> lam <sup>w</sup> ik <sup>w</sup> a/	'canoe'
/ama <sub>1</sub> ti <sub>1</sub> man <sup>v</sup> t <sup>v</sup> a/	'on the grass'
/ama <sub>1</sub> t <sub>1</sub> a/	'grass'
/a <sub>1</sub> qal <sup>v</sup> i <sub>1</sub> t <sub>1</sub> a/	'home! (emphatic)'
/a <sub>1</sub> qal <sup>v</sup> a/	'home'
/mam <sup>w</sup> i <sub>1</sub> rik <sup>w</sup> i <sub>1</sub> la <sub>1</sub> n <sup>w</sup> i <sub>1</sub> ya/ [mam <sup>w</sup> u <sub>1</sub> ruk <sup>w</sup> u <sub>1</sub> la <sub>1</sub> n <sup>w</sup> i <sub>1</sub> ya] <sup>1</sup>	'along the road'
/mam <sup>w</sup> i <sub>1</sub> rik <sup>w</sup> a/	'road'

The non-final form of a root can also be observed in the first root of a reduplicated compound stem.

/aya <sub>1</sub> r <sub>1</sub> mi <sub>1</sub> ya <sub>1</sub> r <sub>1</sub> ma/	'thin' (Nung)
/ma <sub>1</sub> n <sub>1</sub> ki <sub>1</sub> ma <sub>1</sub> n <sub>1</sub> ka/	'sorcerer's tool'
/al <sup>v</sup> i <sub>1</sub> ka <sub>1</sub> r <sub>1</sub> i <sub>1</sub> pa <sub>1</sub> r <sub>1</sub> ipa <sub>1</sub> ra/	'light and spongy'
/m <sup>w</sup> ik <sup>w</sup> i <sub>1</sub> m <sup>w</sup> ik <sup>w</sup> a [m <sup>w</sup> uk <sup>w</sup> u <sub>1</sub> m <sup>w</sup> uk <sup>w</sup> a]	'deep sea'

All root-final vowels are allophones of the high vowel. The

rounded allophone always follows a labialised consonant. No real evidence has been found for positing a root-final [a] though the vowel /a/ freely varies with /i/ preceding the suffixes /-wiya/ (plural), and /-kiya/ (dual). In Nunggubuyu cognates, a correlation with the root-final vowel in Anandilyakwa can be seen.

<u>Anandilyakwa</u>	<u>Nunggubuyu</u>	
/yimawir̥a/ [yimawur̥i+a]	/yimawuru/	'Red Emperor fish'
/yakařa/ [yakaři+a]	/yakaři/	'fish (sp.)'
/napipa/ [napipi+a]	/napipi/	'mother's brother'
/lipaŋa/ [lipaŋi+a]	/lipaŋi/	'bait'
/ařiřa/ [ařiři+a]	/ařiři/	'wind'
/t̥iŋaya/ [t̥iŋayi+a]	/ŋayi/	'widow'
/yampiřk̥wa/ [yampiřk̥u+a]	/yampiřku/	'parrot fish'
/m̥wik̥im̥wik̥a/ [m̥uk̥um̥uk̥u+a]	/mukumuku/	'deep sea'
/m̥wik̥wa/ [m̥ulk̥u+a]	/mulku/	'stomach'
/miŋawa/ [muŋawu+a]	/miŋawu/	'shell: top'
/t̥vařaŋ̥wa/ [t̥vařaŋ̥u+a]	/t̥vařaŋu/	'horse'
/maŋ̥wimaŋ̥wa/ [maŋ̥umaŋ̥u+a]	/maŋumaŋu/	'illicit love affair'
/aŋ̥wira/ [aŋ̥ur̥i+a]	/ŋura/	'fire'
/amata/ [amaṭi+a]	/mata/	'grass'
/ŋaya/ [ŋayi+a]	/ŋaya/	'I'

Words which do not end with the vowel /a/ fall into three categories, viz.,

(a) Shortened forms of words

Personal Aboriginal names can be shortened and thus end in a vowel other than /a/. English names can end in /i/ but some which are one syllable optionally take the word final /a/.

/t̪ali/ for /t̪alipiyin <sup>ɤ</sup> t̪a/	(personal name)
/pili/	'Billy'
[su:~suwa]	'Sue'

(b) Exclamations

In addition to words ending in a vowel other than /a/, there are two words that have a final consonant. One of the two is a Nunggubuyu cognate.

/yinti/	'oh, I'm wrong'
/kati/	'watch out!'
/ŋ <sup>w</sup> e/	'stop staring at me'
/t̪vit̪/~t̪viwit̪/	'go away!' (Nung)
/ŋaʃ/	'atchoo!'

(c) Glide used when calling out

Aboriginal languages, in general, have a word-final vowel glide used when calling to someone away at a distance. The glide is usually accompanied by a sharp change to high pitch and extreme lengthening of the glide itself.

/t̪il <sup>ɤ</sup> ap <sup>w</sup> int̪ayi/ [t̪il <sup>ɤ</sup> ap <sup>w</sup> ənt̪a <sup>1</sup> ::]	'Dilyapurnta!'
/narat̪ <sup>ɤ</sup> awi/ [narat̪ <sup>ɤ</sup> awu::]	'Naraja!'

Utterance finally, words can end in the root-final high vowel but this is regarded as a stylistic device used mainly in narratives.<sup>2</sup> The following words end the same way as does the suffix for showing continuation or repetition of an action over a long period of time, e.g., /yiřiliken̪a/ 'we went'; /yiřiliken̪iwa/ [yiřəl̪ukenu::wa] 'we kept going on and on'. The suffix /-iwa/ (continuation) has a variant /-iwi/ [u::], e.g., /yiřiliken̪iwi/ [yiřəl̪ukenu::]. The following words probably mean that the actors kept on getting kurrajong, etc.

[mitʷaʃawu:]	for	/mitʷaʃawa/	'kurrajong'
[mamʷuŋtaŋkʷu:]	for	/mamʷiŋtaŋkʷa/	'meat'
[aʃawi:]	for	/aʃawuwa/	'to the inside'

In narratives, the root-final and word-final vowel can be deleted, leaving a word-final consonant. This usually occurs utterance-final or pause-final.

[nəniyam]	for	/naniyama/	'to say' <sup>3</sup>
[ŋalatʷ]	for	/ŋalatʷa/	'she'
[aʃak]	for	/aʃakpa/	'now'
[pi:]	for	/piya/	'and then ...'

Utterance medially, word boundaries coalesce, maintaining the normal stress/rhythm contours.

(i) When the second word begins with a consonant, the root-final high vowel occurs.

[əniɸuŋáwa]	'still alive'
/anipa ŋawa/	

[yínunmálukiyáratʷa]	'the goanna's tracks'
/yinimalika yaʃatʷa/	

[yímanʃákʷuwápiyakína]	'that blue-tongue lizard'
/yimanʃakʷiwapa yakina/	

Occasionally, a root-final vowel is elided preceding a word beginning with a consonant and the nasal is lengthened.

[mem:muŋŋatʷəʃa]	'this (beach) is long'
/mema miŋŋatʷiʃa/	

(ii) When the second word begins with a vowel, the root-final high vowel elides.

[kámpaŋáɭʷmáɴʲtʲa]

'and then at home ...'

/kampa aŋaɭʲimaɴʲtʲa/

[kúɭkátʲa aɾakpeřipeřipawa]

'and then go to the bush ...'

/kilikatʲa aɾakpa eřipeřipawa/

One exception has been noted in a common phrase which closes a narrative discourse. The root-final vowel has been retained and the word-initial vowel elided. This appears to be extremely rare.

[ákʷuŋáwupínmtá]

'and that's all'

/akʷa ŋawa epini-ta/

## 1.2 Assignment of the vowel to root or affix

All words except a few adverbs and exclamations are multi-morphemic. The roots/stems are obligatorily prefixed by one to four prefixes and optionally suffixed by one to three suffixes. The vowel at the boundary of the prefix and root, or prefix and prefix, requires assignment to either the prefix or root. The vowel between the root and suffix is already assigned to the root (see Section 1.1). Suffixes begin with either a vowel or a consonant, e.g. /-awa~-iwa/ [awa~uwa] 'to'; /-ina/ (present tense); /-iyi/ (verbal plural); /-manʲtʲa/ 'on, in'; /-ɭaŋʷiya/ 'through'.

The roots are considered as beginning with the vowels /a/ or /e/, or a consonant. All prefixes end in a vowel. Vowels are regarded as being prefix-final because:

- (a) this means a consistent final vowel whether the morphemic unit

is a word, a root or a prefix.

(b) roots and prefixes (and, therefore, words) can all be said to start with the same phonemic units, viz., /a/, /e/ or a consonant.

apap <sup>w</sup> ina	= a+apap <sup>w</sup> ini+a	'many: A class'
ena	= eni+a	'this: A class'
meti <sup>ř</sup> a	= mi+eti <sup>ř</sup> i+a	'cave: M class'
niyik <sup>w</sup> it <sup>v</sup> iya	= ni+yik <sup>w</sup> it <sup>v</sup> iyi+a	'small: N class'

(c) the prefixes then combine into one formula which has a final obligatory vowel. The combined formula for one or two syllable prefixes is (C) (V) (C) V, in which two vowels cannot co-occur.<sup>4</sup>

/awil <sup>v</sup> apa/	= a+wil <sup>v</sup> api+a	'one: A class'
/tiwil <sup>v</sup> apa/	= ti+wil <sup>v</sup> api+a	'one: D class'
/aniŋapa/	= ani+ŋapi+a	'good: A class nom.'
/niŋ <sup>w</sup> iwil <sup>v</sup> apa/	= niŋi+wil <sup>v</sup> api+a	'one: 1st. sing.'

(d) only one rule then applies at the morpheme boundaries with a consonant-initial root, viz., Rule 2: vowel assimilation (see Section 1.3).

ti+wil <sup>v</sup> apa	> [tuwil <sup>v</sup> apa]	'one: D class'
-------------------------	----------------------------	----------------

Consideration was previously given to positing an overt or underlying high vowel as root-initial, thus making all roots begin with a vowel. This was rejected because, if the prefix ends with a vowel and the root begins with a vowel, one extra rule must apply. If an underlying root-initial high vowel is posited, the morpho-phonemic rule for vowel deletion and the allophonic rule both must apply with the order optional. For example:

Morphophonemic Rule 1: vowel deletion

$\underline{t}i+iwil^{\vee}apa > \underline{t}iwil^{\vee}apa$

Allophonic Rule 3: vowel assimilation

$\underline{t}iwil^{\vee}apa > [\underline{t}uwil^{\vee}apa]$

'one: D class'

An analysis in which only one rule applies seems to me to be simpler and, therefore, preferable to positing an underlying unit which then requires two rules to obtain the phonetic realization.

If a consonant were posited as prefix-final and a vowel as root-initial, only the allophonic rule No.3 would apply, e.g.,  $\underline{t}+Vwil^{\vee}apa > \underline{t}+uwil^{\vee}apa$   $[\underline{t}uwil^{\vee}apa]$  'one: D class'. Class A nouns and adjectives, however, would have V as the prefix and all other classes would have C or CVC. This pattern is less symmetrical and the formula would require all optional units, viz., (C) (V) (C) (V). A consonant alone does not occur as a suffix morpheme. My choice of prefix-final vowel rests on the criteria of symmetry with the root-final vowel, and the pressure of CV as the most common syllable type, expressed in the combined prefix formula (C) (V) (C)V.

Another possibility is to regard the prefix as having a final consonant and the root having an initial consonant, e.g.  $\underline{t}+pina$ . An insertion rule would then be posited to insert a vowel between two consonants not normally in a cluster. This was rejected for a similar reason to the one above: two rules (an insertion rule applied first and then the allophonic rules) would be needed rather than one.



## 1.3 Morphophonemic rules

## Rule 1: vowel deletion

This rule is widely applied at morphophonemic boundaries between prefix and root, root and suffix, and between affixes.

$$[V] + \rightarrow \emptyset \quad / \quad \_ + [V]$$

i.e., the morpheme-final vowel /a/ or /i/ is deleted preceding a morpheme-initial vowel.

a+apata > /apata/	'agile: A class'
a+epina > /epina/	'that: A class'
mi+etiřa > /metiřa/	'cave'
ni+apata > /napata/	'agile: N class'
niři+apařitřena > niřiparřitřena/	'jealous: 1st sing.'
ařalři+iwa > /arřaliwa/ [arřaluwa]	'(to) home'
/ři+arři+yiwaŋkwa > /řarřiyiwaŋkwa/	'old woman'
[řarřiyuwaŋkwa]	
a+pwiķi+alakena > /apwiķwalakena/	'these three'
[apwukwalakena]	
ni+aniřřiŋka > /naniřřiŋka/ [nænəřřiŋka]	'to see'

There are three exceptions to the above rule which are simply irregular. When a CV prefix is affixed to a root-initial /e/, the second vowel elides.

ni+epina > nipina	'that: N class'
mi+epa > mipa	'any?'
ři+eminiŋka > řiminiŋka	'strange: D class'

## Rule 2: vowel assimilation

The following rule is the normal allophonic rule (see Section 8)

for the rounded allophone of the high vowel. It is listed here because it occurs very commonly at the morpheme boundaries and must apply preceding Rule 3.

$$\left[ \begin{array}{c} \text{v} \\ + \text{high} \end{array} \right] + \rightarrow [+round] / \text{ — } + \left[ \begin{array}{c} \text{v} \\ + \text{round} \end{array} \right]$$

i.e., the morpheme-final vowel /i/ is rounded preceding a morpheme-initial rounded consonant (see Section 4, Chart 4).

ti+wil <sub>1</sub> apa > [tuwil <sub>1</sub> apa]	'one: D class'
ṇaṇi+wiṭena > [ṇaṇuwuṭena]	'to climb'
wani+ṇ <sup>w</sup> i+anṭi+ma > [wanuṇ <sup>w</sup> anṭima]	'motherless children'

When the prefix /yi/ (Y noun class marker) precedes a root beginning with /p<sup>w</sup>, m<sup>w</sup>/ Rule 2 optionally applies. When /yi/ precedes a root-initial /k<sup>w</sup>, ṇ<sup>w</sup>/, the assimilation rule is applied. There is also one example, to date, where the variation occurs preceding /ṇ<sup>w</sup>/.

yi+p <sup>w</sup> irata > [y(i/u)p <sup>w</sup> erata]	'kangaroo'
yi+p <sup>w</sup> ik <sup>w</sup> i+ali+akina > [y(i/u)p <sup>w</sup> uk <sup>w</sup> alakina]	'those three there'
yi+m <sup>w</sup> inta > [y(i/u)m <sup>w</sup> anta]	'louse'
yi+ṇ <sup>w</sup> a > [y(i/u)ṇ <sup>w</sup> a]	'crow'

### Rule 3: consonant assimilation

Rule 3 applies within the root or prefix and is the usual allophonic rule for the co-occurrence of a rounded consonant and rounded vowel within a syllable. In the following examples, the assimilation of the consonant causes allomorphs of the root or prefix.

Rules 2 and 3 are ordered and cyclical.

$$\left[ \begin{array}{c} \text{c} \\ + \text{grave} \end{array} \right] \rightarrow [+round] / \text{ — } \left[ \begin{array}{c} \text{v} \\ + \text{round} \\ + \text{high} \end{array} \right]$$

i.e., a labial or velar consonant, /p, m, k, ṇ/ is rounded when it precedes a high, back rounded vowel /u/.

niŋi+wiṭena > /niŋ <sup>w</sup> iwiṭena/	[nuŋ <sup>w</sup> uwuṭena]	'to climb'
niŋi+ŋ <sup>w</sup> an <sup>y</sup> t <sup>y</sup> ina > /niŋ <sup>w</sup> iŋ <sup>w</sup> an <sup>y</sup> t <sup>y</sup> ina/		'to stop'
	[nuŋ <sup>w</sup> uŋ <sup>w</sup> an <sup>y</sup> t <sup>y</sup> ina]	
mi+waṛaka > /m <sup>w</sup> iwaṛaka/	[m <sup>w</sup> uwaṛaka]	'casuarina tree'
maŋiyiwaŋi+iwa > /maŋiyiwaŋ <sup>w</sup> iwa/	[maŋiyuwaŋ <sup>w</sup> uwa]	'to the shark'

#### Rule 4: vowel dissimilation

The sequence /mimV/ has not been recorded to date in word-initial position. In the potential sequence caused by the prefix /mi/ preceding a root-initial /m/, the vowel dissimilates from /i/ to /a/.

$$\begin{bmatrix} \text{v} \\ +\text{high} \end{bmatrix} \rightarrow [+low] \quad / \quad \begin{bmatrix} +\text{nasal} \\ +\text{ant} \\ -\text{cor} \end{bmatrix} \text{ — } \begin{bmatrix} +\text{nasal} \\ +\text{ant} \\ -\text{cor} \end{bmatrix}$$

i.e., the vowel /i/ becomes /a/ between /m/ and /m/.

ni+maŋpala > /ni <sup>w</sup> maŋpala/	'five: N class'
cf.	
mi+maŋpala > /ma <sup>w</sup> maŋpala/	'five: M class'
ti+mi <sup>w</sup> ilaŋaṛa > /ti <sup>w</sup> mi <sup>w</sup> ilaŋaṛa/	'remaining: D class'
cf.	
mi+mi <sup>w</sup> ilaŋaṛa > /ma <sup>w</sup> mi <sup>w</sup> ilaŋaṛa/	'remaining: M class'
ti+mempeṛk <sup>w</sup> a > /ti <sup>w</sup> mempeṛk <sup>w</sup> a/	'ten: D class'
cf.	
mi+mempeṛk <sup>w</sup> a > /ma <sup>w</sup> mempeṛk <sup>w</sup> a/	'ten: M class'

#### 1.4 Word length and syllable distribution

Words vary in length from primarily two syllables to thirteen syllables.

/a.wa/	'liver'
/ma.ma.ṛa/	'paperbark tree'
/a.wi.l <sup>y</sup> a.pa/	'one'

/yi.na.la.ki.na/	'those there'
/yi.ma.ki.ma.ki.na/	'mud wasp'
/a.m <sup>w</sup> iŋ.ta.k <sup>w</sup> i.p <sup>w</sup> i.k <sup>w</sup> a.ya/	'those coming'
/a.m <sup>w</sup> iŋ.k <sup>w</sup> i.ři.m <sup>w</sup> i.ra.ta.ta/	'having holes'
/ŋa.ři.ŋi.na.ki.tař.p <sup>w</sup> i.k <sup>w</sup> i.na/	'to sit with legs crossed'
/ŋa.ři.m <sup>w</sup> iŋ.ta.m <sup>w</sup> iř.k <sup>w</sup> i.li.t <sup>v</sup> a.yi.na/	'to lie down together'
/yi.ři.p <sup>w</sup> i.k <sup>w</sup> i.m <sup>w</sup> iŋ.k <sup>w</sup> i.m <sup>w</sup> iŋ.ka.ta.yi.na/	'we three kept on digging'
/yi.ři.m <sup>w</sup> iŋ.ti.m <sup>w</sup> iŋ.ti.ka.la.li.ke.ni.wa/	'they kept on going'
/yi.ři.p <sup>w</sup> i.k <sup>w</sup> i.m <sup>w</sup> iŋ.k <sup>w</sup> i.m <sup>w</sup> iŋ.ka.ta.yi.ni.pa.pa/	'because we three kept on digging'

Only four words of one syllable have been found to date, all of which are extrasystematic. Three are exclamations: /ŋ<sup>w</sup>e/ 'stop staring at me!'; /t<sup>v</sup>ař/ 'atchoo!'; /t<sup>v</sup>it<sup>v</sup>/ 'go away' (Nunggubuyu cognate); and one is an onomatopoeic word for the call of the crow, viz., /ŋ<sup>w</sup>a/.

Using the dictionary corpus of 2,400 citation forms with from 1 to 10 syllables, the following estimates have been made:

two-syllable words:	3% of the data, about one-third of which are loan words
three-syllable words:	14%
four-six syllable words:	68%
seven-ten syllable words:	15%

Using two short texts, estimates showed that approximately 90% of the words had between two and six syllables. Percentages could vary greatly in texts depending upon when pronouns and demonstratives were of two or three syllables or six or more as in the trials and plurals.

Anindilyakwa speech is often very rapid. From the following spectrographs it can be seen that the three to five syllable words have approximately the same timing; and the six syllable word has the same timing as the eight syllable.

#### Spectrograph

No.1	/ařiřa/	'wind'	800 msecs
2	/alʷaŋpʷina/	'ignorant'	800 msecs
3	/ařakpʷiliřa/	'blunt'	800 msecs
4	/amʷiŋtamʷiŋtiřa/	'careful'	1300 msecs
5	/aminʷtʷiřikʷiřimalʷa/	'smooth'	1200 msecs

#### 1.5 Word stress

A full description of the stress patterns is beyond the scope of this paper. A few comments, however, are necessary because stress has been mentioned in connection with the vowel allophones, syllable reduction, etc.

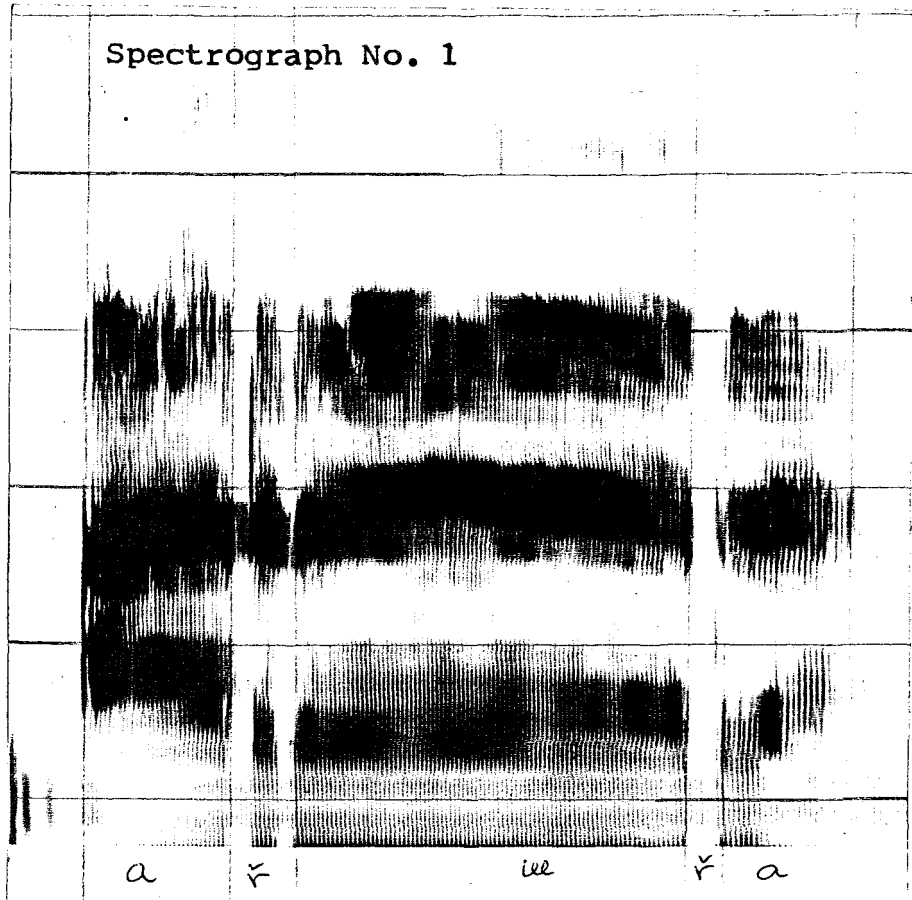
Stress (in the sense of a complex of features such as loudness and length contributing to an impression of stress) is not phonemic. The timing of syllables, mainly in groups of two or three within each rhythm group in a word or utterance, seems to be more important than the feature of stress itself.

The following observations have been made:

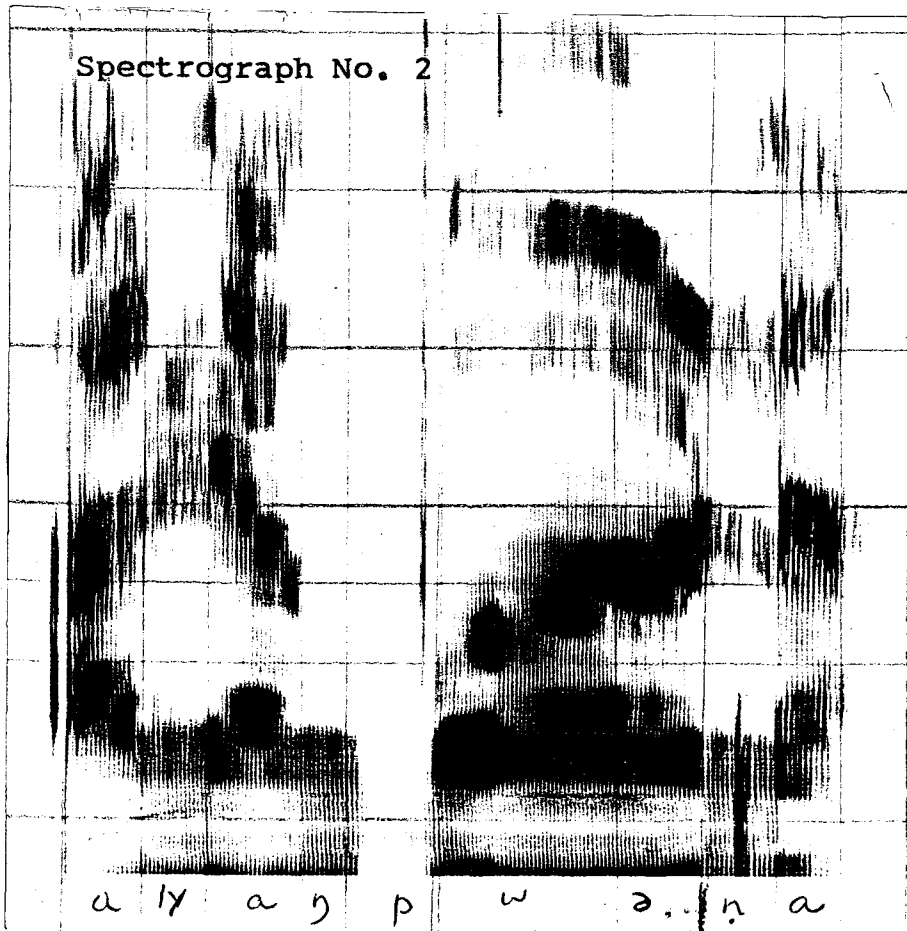
(a) Each word has one primary stress which occurs on the penultimate syllable, except as indicated below. The vowel is always lengthened in a primary-stressed syllable.

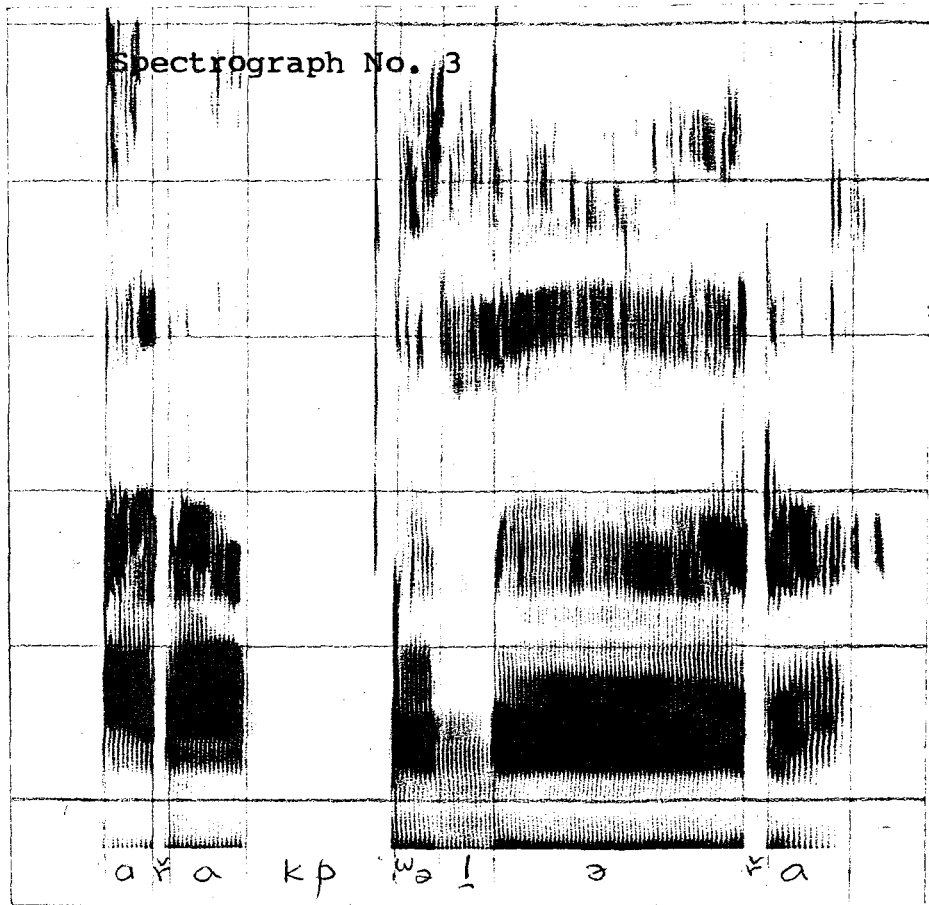
/méma/	'this: M class'
/akʷála/	'some'
/mamaríka/	(clan name)
/aŋʷiŋta/	'ankle'

Spectrograph No. 1

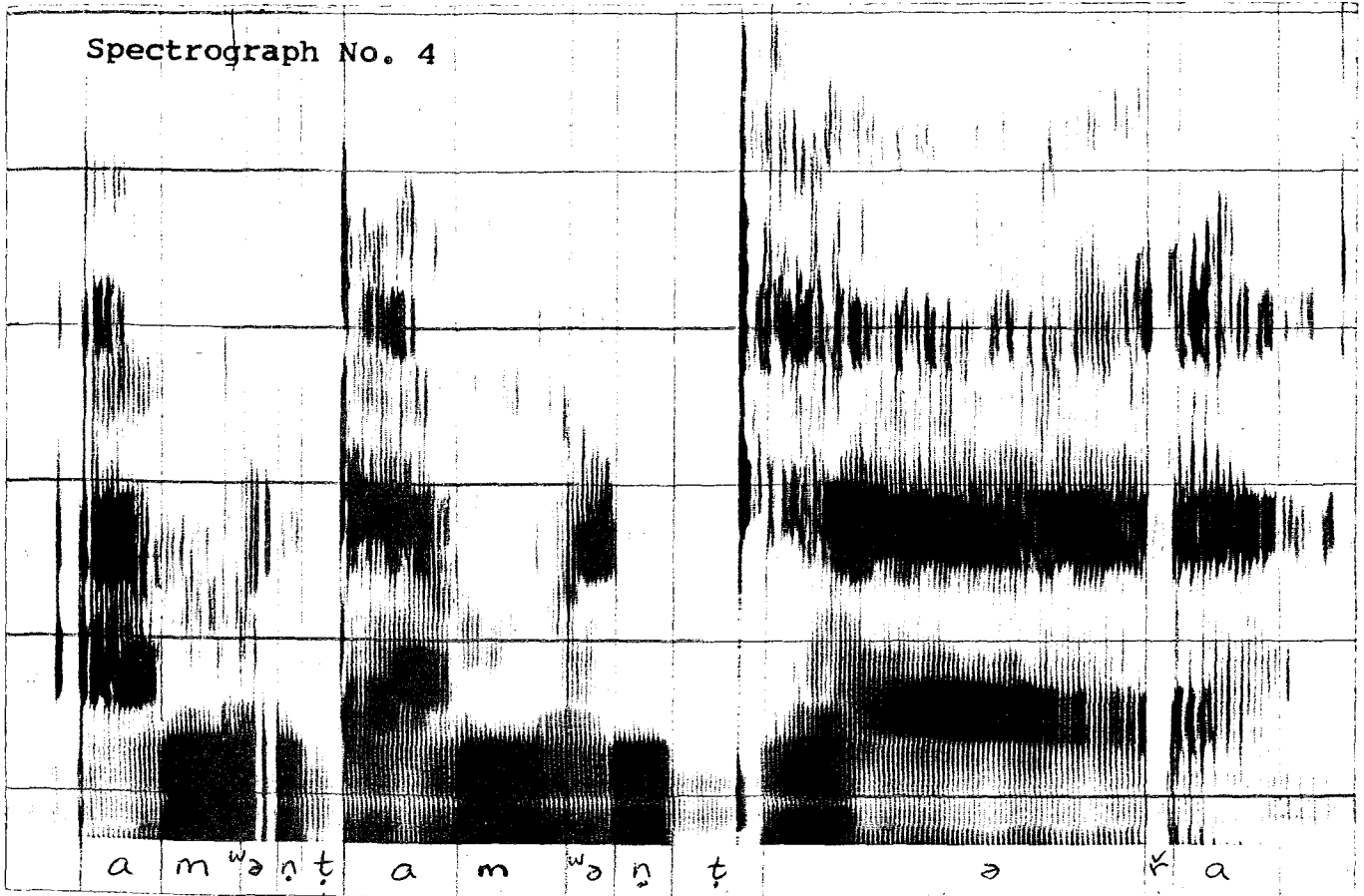


Spectrograph No. 2

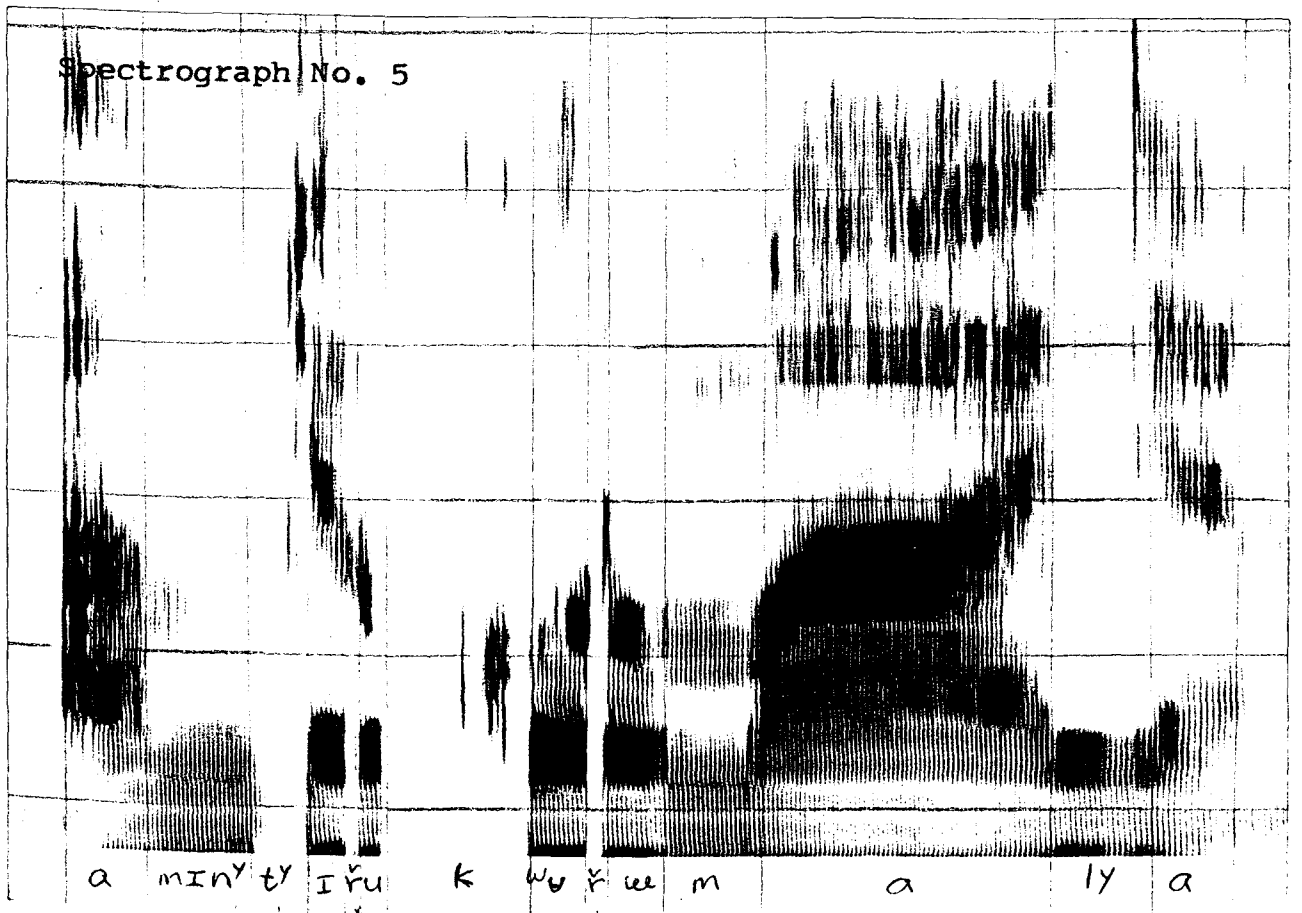




Spectrograph No. 4



Spectrograph No. 5





(b) The stress can optionally change to the antepenultimate syllable if a strong vowel [a, e] occurs in that syllable and a weak vowel, e.g. [u, ə] occurs in the penultimate syllable. It is probable that each vowel has 'strong' and 'weak' allophones but evidence is not conclusive, e.g., [æ] is the weak allophone of both /a/ and /e/; [u, ə] are the weak allophones of /i/. While such a system predominates, reduplication of the root, timing and rhythm, and closed syllables cause exceptions to the basic system. A detailed analysis has not yet been done. In the following examples, the first variant is the most commonly used.

/alika/	[áɭuka~aléka]	'foot'
/emepa/	[ænépa~émepa]	'song'
/m <sup>w</sup> iŋarík <sup>w</sup> a/	[m <sup>w</sup> uŋarúk <sup>w</sup> a~m <sup>w</sup> uŋárúk <sup>w</sup> a]	'fishing line'
/aŋinta/	[áŋənta~aŋénta]	'chin'
/at <sup>y</sup> iwat <sup>y</sup> iwa/	[at <sup>y</sup> úwat <sup>y</sup> úwa~át <sup>y</sup> uwát <sup>y</sup> uwa]	'fern (sp.)'

(c) Where a closed syllable occurs in the ante-penultimate position and an open syllable in the penultimate position, the closed syllable can take the primary stress. Where the closed syllable occurs in a penultimate syllable with a weak vowel, the closed syllable takes the stress.

/aŋpita/	[æŋpəta]	'strong'
/aŋp <sup>w</sup> ir̥ta/	[aŋp <sup>w</sup> úr̥ta]	'waterlily root'
/timpala/	[túmpala~tumpála]	'cloth'

(d) Stress and timing appears to be inherent within each morpheme, dependent upon the number of syllables. To date, this has been noted in the suffixes.

/aṇalʷa/	[aṇálʷa]	'home'
/aṇalʷi-ta/	[aṇálʷətá]	'home (emphatic)'
/alikʷira/	[alukwíra]	'house'
/alikʷirawa/	[alukwírawa]	'to the house'
/mamʷirikʷa/	[mamʷiríkʷa]	'road'
/mamʷirikʷi-laṇʷiya/	[mamʷurukʷulaṇʷíya]	'along the road'

## 2. THE SYLLABLE

Gimson (1962: 53) states that "if, at the linguistic, structural level, a unit consisting of groups of phonemes is found to be useful, then the term 'syllable' may well be applied to such a unit". For the purposes of this paper, this description has been used in order to posit convenient units larger than the phoneme. The syllable boundaries do merge and the divisions are quite arbitrary until further analysis. Where the Aborigines syllabify certain words in alternate ways, they only vary within the suggested syllable types.

The basic syllable patterns can be incorporated into one formula, (C)V(C)(C), where the vowel nucleus is obligatory and the onset may be optionally filled with one consonant and the coda by one or two consonants.

V	a.řa	'forehead'
VC	ak.pa	'buttocks'
VCC	ařŋ.ka	'hip'
CV	wi.ya	'here you are'
CVC	men.pa	'eye'
CVCC	a.łařŋ.ka.wa.ři.ya	'old and tatty'

### 2.1 Distribution of syllables in a word

The syllables, V, VC and VCC, only occur word-initially. The syllable, CV, is the only one to occur in word-final position.

The most frequent syllable used is the CV.

## 2.2 Distribution of consonants and vowels in the syllable

### 2.2.1 Word-initial syllables

In the word initial syllables, V, VC and VCC, the following vowels and consonants occur:

V	a, e
VC, VCC	a
VC	m, ṇ, nʲ, ŋ, ḷ, l̥, ʃ, ṛ, k
VCC	ʃŋ, ṛŋ

In word-initial syllables where a consonant is the onset, not all consonants occur in the indigenous vocabulary. The inventory of initial consonants, however, has been increased by the introduction of loanwords from Macassar, Nunggubuyu and English. The following consonants occur word-initially:

<u>indigenous</u>		<u>only in loanwords</u>
Stops:	ṭ, k	p, t, tʲ, ṭ
Nasals:	m, n, ŋ	
Rounded consonants	pʷ, mʷ, kʷ, ŋʷ, w	
Laterals:	ḷ	l, lʲ, ḷ
Flap:	ʃ	
Approximants:	y	ṛ

The consonants, /ḷ/, /ʃ/ and those in loanwords, are very rare in initial position. The nasals, /ṇ/, /ŋ/ and /nʲ/, do not occur initially.

### 2.2.2 Word-medial syllables

In the CV syllable, all consonants and vowels occur but some

consonant/vowel combinations have not been recorded, viz.,  $\underset{\cdot}{l}a$ ,  $p^we$ ,  $m^we$ ,  $\underset{\cdot}{n}e$ ,  $\underset{\cdot}{n}e$ ,  $te$  and  $\underset{\cdot}{l}e$ .

In the CVC syllable, all consonants but  $\underset{\cdot}{n}$  and  $\underset{\cdot}{t}$  occur as the initial consonant. Chart 1 shows the consonants which can occur in the coda, together with the vowels which may precede them. The vowel  $\underset{\cdot}{e}$  is restricted in its distribution.

Chart 1

Final VC combinations in a CVC

$\begin{array}{c c} & C \\ \hline V & \end{array}$	m	$\underset{\cdot}{n}$	n	$\underset{\cdot}{n}$	$n^y$	$\underset{\cdot}{\eta}$	$\underset{\cdot}{l}$	$\underset{\cdot}{l}^y$	$\underset{\cdot}{\check{r}}$	$\underset{\cdot}{r}$	k
a	am	$a\underset{\cdot}{n}$	an	$a\underset{\cdot}{n}$	$an^y$	$a\underset{\cdot}{\eta}$	$a\underset{\cdot}{l}$	$a\underset{\cdot}{l}^y$	$a\underset{\cdot}{\check{r}}$	$a\underset{\cdot}{r}$	ak
e	em	$e\underset{\cdot}{n}$	en						$e\underset{\cdot}{\check{r}}$		
i	im	$i\underset{\cdot}{n}$	in	$i\underset{\cdot}{n}$	$in^y$	$i\underset{\cdot}{\eta}$	$i\underset{\cdot}{l}$		$i\underset{\cdot}{\check{r}}$	$i\underset{\cdot}{r}$	ik

In a CVCC syllable, the onset consonant has been observed as the stops,  $\underset{\cdot}{p}$ ,  $\underset{\cdot}{t}$ ,  $k$ , the nasals,  $\underset{\cdot}{m}$ ,  $n$ ,  $\underset{\cdot}{\eta}$ , the laterals  $\underset{\cdot}{l}$ ,  $\underset{\cdot}{l}^y$  and the semiconsonants  $\underset{\cdot}{w}$ ,  $y$ . In Chart 2, vowel and final CC patterns can be seen. Only the vowel  $\underset{\cdot}{a}$  occurs with any frequency in a CVCC.

Chart 2

Final VCC combinations in a CVCC

$\begin{array}{c c} & CC \\ \hline V & \end{array}$	$\underset{\cdot}{r}m$	$\underset{\cdot}{r}k$	$\underset{\cdot}{r}\underset{\cdot}{\eta}$	$\underset{\cdot}{r}m$	$\underset{\cdot}{r}\underset{\cdot}{\eta}$
a	$a\underset{\cdot}{r}m$	$a\underset{\cdot}{r}k$	$a\underset{\cdot}{r}\underset{\cdot}{\eta}$	$a\underset{\cdot}{r}m$	$a\underset{\cdot}{r}\underset{\cdot}{\eta}$
e		$e\underset{\cdot}{r}k$			
i					$i\underset{\cdot}{r}\underset{\cdot}{\eta}$

Chart 3 shows the distribution of CC and CCC consonant clusters across syllable boundaries. A syllable-final consonant is a sonorant, except for /k/, and the syllable-initial consonant is most commonly a stop, and less commonly a nasal.

CHART 3

Consonants across syllable boundaries

2nd C 1st C	p	t̚	t	tʲ	k	m	nʲ	ŋ	pʷ	mʷ	kʷ	ŋʷ
k	kp								kpʷ			
m	mp								mpʷ			
n̄	n̄p	n̄t̚	n̄t		n̄k			n̄ŋ			n̄kʷ	
n												
ṅ		ṅt̚	ṅt	ṅtʲ	ṅk							
nʲ				nʲtʲ								
ŋ	ŋp			ŋtʲ	ŋk	ŋm	ŋnʲ		ŋpʷ	ŋmʷ	ŋkʷ	
l̄	l̄p	l̄t̚		l̄tʲ	l̄k	l̄m					l̄kʷ	
l̇											l̇kʷ	
ř	řp				řk	řm		řŋ			řkʷ	řŋʷ
ɾ	ɾp	ɾt̚		ɾtʲ		ɾm			ɾpʷ			
řk	řkp								řkpʷ			
řm	řmp											
řŋ	řŋp				řŋk						řŋkʷ	
ɾm	ɾmp								ɾmpʷ			
ɾŋ					ɾŋk						ɾŋkʷ	

The following examples are ordered as per the vertical columns:

/akpa/	'buttocks'
/ampaka/	'later on'
/menpa/	'eye'
/aṇpilʷiwa/	'sickness'
/mapalpa/	'peanut tree'
/yileřpa/	'palm tree'
/apiyarṇʷiwa/	'four'
/timanṇkařkpa/	'wild plum'
/akʷilařmpitʷina/	'beside'
/ṇařilamařṇpitʷina/	'to sleep well'
/arṇpiliřa/	'jellyfish'
/tilanta/	'rock wallaby'
/timantaṇʷa/	'stingray'
/ṇařapaltata/	'carry on a belt'
/mawirṇtařa/	'woolly butt tree'
/eminta/	'nose'
/aṇta/	'elbow'
/yintʷiřa/	'fish'
/yirařiṇanʷtʷa/	'paperbark tree'
/tiṇiṇtʷapena/	'dolphin'
/diwaltʷa/	'water snake'
/artʷa/	'cooking stick'
/yiwanaṇkitʷa/	'baby wallaby'
/manaṇkimaṇka/	'sorcerer's tool'
/yiřaṇka/	'March fly'
/apalkalʷa/	'wet ground'

/yinikařka/	'hawk'
/ařŋka/	'hip'
/ařŋkayiwaya/	'tamarind tree'
/yiqm <sup>w</sup> iŋmaŋta/	'tortoise'
/yimpalma/	'shell: bivalve'
/ayařmiyařma/	'thin'
/amarmařa/	'a sore'
/aŋkiŋn <sup>v</sup> iŋ <sup>w</sup> iřa/	'complete'
/t <sub>2</sub> imařŋa/	'cricket'
/akp <sup>w</sup> ilk <sup>w</sup> iřariya/	'plains'
/amp <sup>w</sup> ima/	'not sweet'
/al <sup>v</sup> aŋp <sup>w</sup> iŋa/	'ignorant'
/apiyařp <sup>w</sup> iwa/	'four'
/alařkp <sup>w</sup> ilala/	'very thin'
/mařmpařmp <sup>w</sup> iřa/	'black berry'
/yil <sup>v</sup> aŋm <sup>w</sup> iřa/	'cockle shells'
/paŋk <sup>w</sup> it <sup>v</sup> a/	'shark'
/t <sub>2</sub> it <sup>v</sup> iniŋk <sup>w</sup> a/	'echidna'
/alk <sup>w</sup> a/	'crabs for bait'
/małk <sup>w</sup> irarikat <sup>v</sup> a/	'tangled'
/t <sub>2</sub> iŋařk <sup>w</sup> a/	'spikes'
/alařŋk <sup>w</sup> ilařŋk <sup>w</sup> ala/	'attacking'
/ařŋk <sup>w</sup> iwil <sup>v</sup> apa/	'for a long time'
/al <sup>v</sup> ařŋ <sup>w</sup> al <sup>v</sup> il <sup>v</sup> a/	'night'

### 2.3 Syllable reduction

The elision of a CV syllable or the vowel and final consonant of a CVC is a regular feature within the language, occurring in approximately 1% of dictionary entries. The syllable seems to be



sacrificed in order to maintain the stress rhythm contours. In the following data, the Aborigines have accepted both forms of the word as correct in precise speech.<sup>5</sup>

### 2.3.1 Elision of the CV syllable

(i) Where two identical consonants or two consonants with the same manner of articulation occur with an intervening vowel, the first syllable may elide. The vowel is usually the high vowel /i/ but can be /a/ or /e/.

#### between stops

/maka(ṭi)ṭam <sup>w</sup> iṛa/	'string necklace'
/ṭa(ka)ka/	'this: D class'
/ak <sup>w</sup> a(t <sup>v</sup> i)t <sup>v</sup> aṛa/	'cleaned with soap'

#### between nasals

/mamiṛi(n <sup>v</sup> i)n <sup>v</sup> a/	'paper berry'
/wa(na)na/	'this: W class'
/e(ne)na/	'this: A class'
/me(me)ma/	'this: M class'

#### between laterals

/aṇa(ḷi)ḷaṇ <sup>w</sup> a/	'its (sing.)'
/aka(ḷi)ḷeṛṇk <sup>w</sup> iṛa/	'orange sandstone'
/al <sup>v</sup> aṛṇ <sup>w</sup> a(l <sup>v</sup> i)l <sup>v</sup> a/	'night'

#### between /ɣ/

/nik <sup>w</sup> i(ɣi)ɣiṭena/	'to scratch'
/ak <sup>w</sup> iwa(ɣi)ɣa/	'torn'
/yik <sup>w</sup> i(ɣi)ɣiṭaṇ <sup>w</sup> a/	'swordfish'

/a <sub>l</sub> iŋatʷi(ři)řa/	'long'
/ŋařampi(ři)řarina/	'to wait for'
/ṭakatʷa(řa)řa/	'nut (sp.)'
/mamʷike(ře)ře/	'spreading roots'

between approximants

/aŋʷitʷi(ři)ra/	'hollow'
/aři(yi)wa/	'edible root'
/ṭi(yi)wa/	'jellyfish (sp.)'
/wiřili(yi)wa/	'bird (sp.)'
/maŋi(yi)waŋa/	'shark'

(ii) A syllable can elide with a change in stress pattern, with both forms acceptable.

/akʷiṭiṭi(ka)tʷiŋʷa/	'gate, door'
[ákwuṭíṭikatʷúŋʷa~akʷuṭíṭitʷuŋʷa]	
/amʷiŋta(ki)tʷika/	'small things'
[ámʷəŋṭákítʷíka~ámʷəŋtatʷíka]	
/amʷiŋkʷala(ři)wa/	'few and small'
[ámʷuŋkʷálařúwa~ámʷuŋkʷaláwa]	
/a(wi)riŋkʷařkʷa/	'barracuda'
[áwuruŋkʷařkʷa~áruŋkʷařkʷa]	
/a(wi)riŋʷtʷa/	'orange'
[áwuriŋʷtʷa~áriŋʷtʷa]	

(iii) In word-final position, /-ma/ may be optionally added, or /-ma/ and /-mʷiřa/ vary freely. These are usually verb suffixes which vary with no apparent meaning change. Either one seems to be chosen in accordance with the rhythm pattern.

/yikalʷaŋama~yikalʷaŋmʷiʃa/	'fish (sp.)'
/yitʷaʃakama~yitʷaʃakamʷiʃa/	'Olive Ridley turtle'
/makaparama~makaparamʷiʃa/	'shovel-nosed shark'
/manilaʃŋkaŋʷiʃa~manilaʃkaŋʷiʃama/	'wild rosella'

### 2.3.2 Elision of reduplicated root

There are two examples, to date, where the reduplication of the root is optional. (Some Aborigines will only accept the shorter form.)

/t̪imaʃŋimaʃŋa~t̪imaʃŋa/	'cricket'
/alʷaŋmʷilʷaŋmʷiʃa~alʷaŋmʷiʃa/	'shell: Angel wings'

### 2.3.3 Elision of VC within a CVC syllable

When two nasals co-occur in a closed CVC syllable with an intervening high vowel, the vowel and second consonant elide. The resultant alveolar nasal preceding a dental stop assimilates.

/t̪iman̩(in̩)t̪at̪aŋʷa/	'stingray (sp.)'
/al̪aʃŋ(in̩)t̪aʃŋena/	'shell: Triton'
/an̩(in̩)t̪ilʷakʷa/	(language name)

### 2.3.4 Elision of CV to C

There are two examples where the CV sequence is reduced to C with a change of consonantal phoneme from /ʃ/ to /r/.

/aʃitʷiʃa/ [aʃitʷiʃa~artʷiʃa]	'sunny'
/aʃitʷa/ [aʃitʷa~artʷa]	'green tree frog'

### 2.3.5 Baby talk

The unstressed second syllable in a four-syllable word elides

in the "baby talk" form of the language.<sup>6</sup>

[wuwata]	for /wiřiwata/	'dog'
[yikampa]	for /yilikampa/	'pearl oyster'

#### 2.4 The epenthetic vowel

An epenthetic high vowel occurs between two consonants, usually following /ř/ or /r/. The vowel frequently becomes a full vowel when it occurs in a stressed position in a rhythm unit. Most of the epenthetic vowels precede a sonorant but they also occur preceding an obstruent. The problem as to whether the epenthetic vowel is a full vowel or merely transitional is compounded by the occurrence of contrastive pairs.

/amarŋka/	'to laugh'
/amarĩka/	'edible roots (gen.)'
/arŋk <sup>w</sup> itařpa/	(diminisher)
/aruŋk <sup>w</sup> ařik <sup>w</sup> a/	'barracuda'

In almost all cases where the epenthetic vowel is recorded, the vowel is emically a full vowel. Aboriginal literates almost always insert the vowel, even to the point of writing a vowel where an epenthetic has not been recorded. Their preference for a CV, rather than consonantal closure of the previous syllable, is very obvious in their "creative" writing of short stories.

Three criteria have been used to determine the emic status of the vowel and most instances recorded to date have been resolved.

##### (a) Spectrographic evidence

The spectrographs, in many cases, show a formant structure and a duration which indicates the epenthetic vowel is the equivalent of

other vowels in the language.

#### Spectrograph

No.6	/amempeřik <sup>w</sup> a/	[æmempeř(u)k <sup>w</sup> a]	'ten'
7	/at <sub>ɪ</sub> iřip <sup>w</sup> iřa/	[at <sub>ɪ</sub> uř(w)p <sup>w</sup> əřa]	'straight'
8	/al <sup>v</sup> eřiŋaŋ <sub>ɪ</sub> ta/	[al <sup>v</sup> æř(ə)ŋaŋ <sub>ɪ</sub> ta]	'searing hot'

The occurrence of vowels could be ascertained by processing other controversial data, but in a field situation, this is not possible.

#### (b) Root- and prefix-final vowel

Roots and prefixes have been analysed as having a final vowel. Where the epenthetic vowel occurs at the morpheme boundary, this analysis can be implemented to posit a vowel.

/aři-p <sup>w</sup> əta/	[ař(ə)p <sup>w</sup> əta]	'strong'
/alařim <sup>w</sup> iř <sub>ɪ</sub> ta/	[alæř(ə)m <sup>w</sup> əř <sub>ɪ</sub> ta]	'darkness'
/tak <sup>w</sup> eři-k <sup>w</sup> eřa/	[tak <sup>w</sup> eř(ɪ)k <sup>w</sup> eřa]	'bird: shining flycatcher'

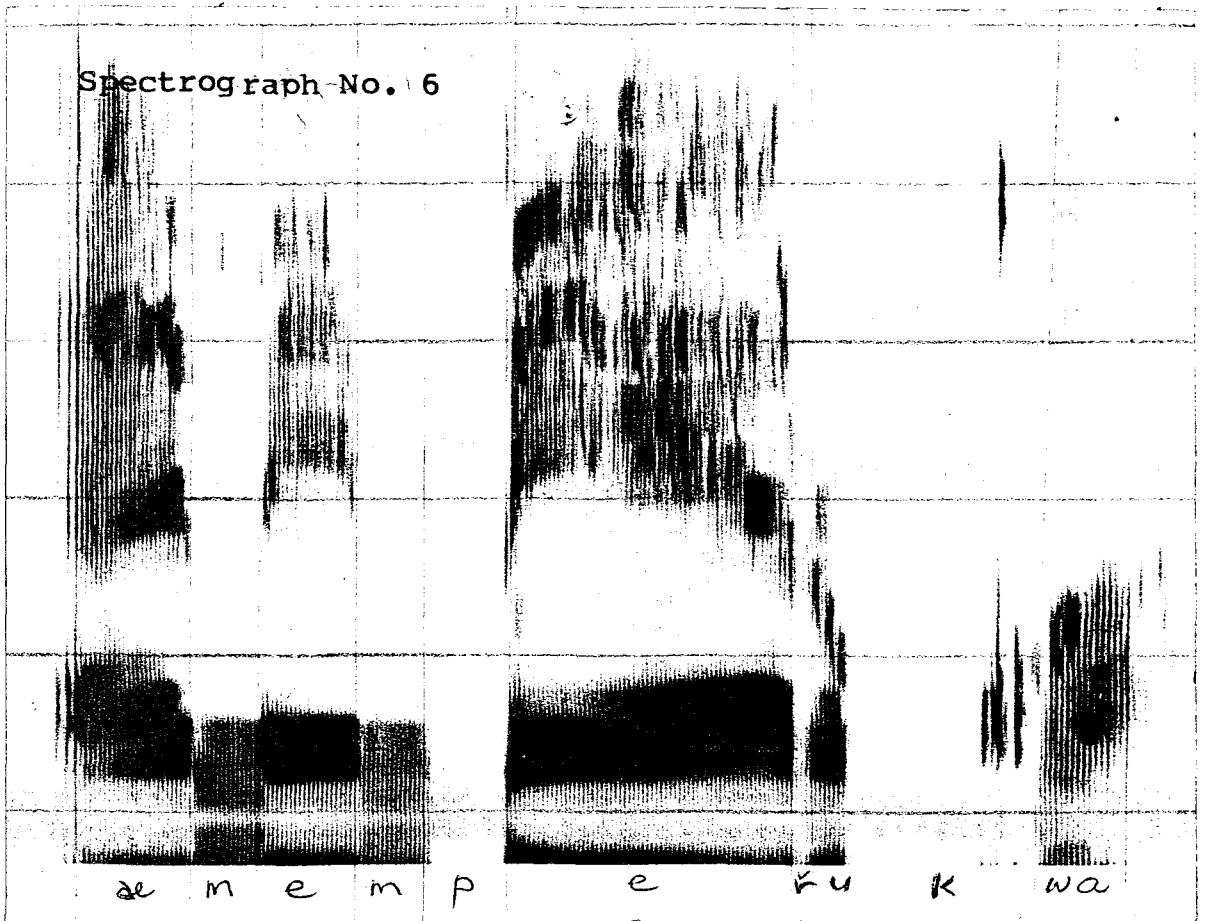
#### (c) Rhythm/timing/stress

The stress/rhythm patterns often indicate that a syllable is necessary to maintain the timing or to separate two stressed syllables (see Section 1.4).

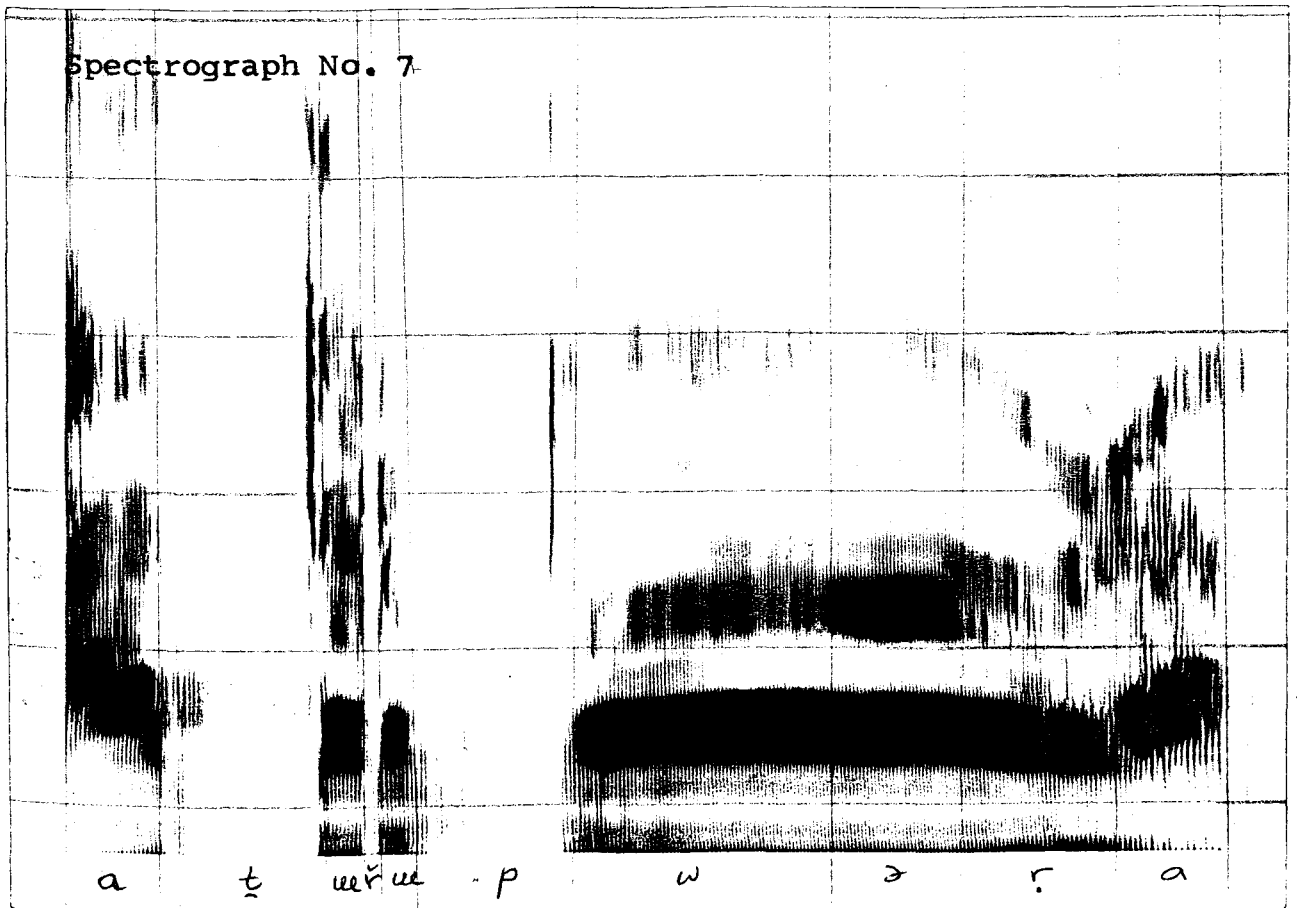
In the examples immediately below, the first of each pair shows a stress/rhythm pattern where all full vowels occur. The second one of the pair shows a corresponding epenthetic vowel analysed as phonemic. The final examples illustrate the analysis where contiguous stressed syllables occur.

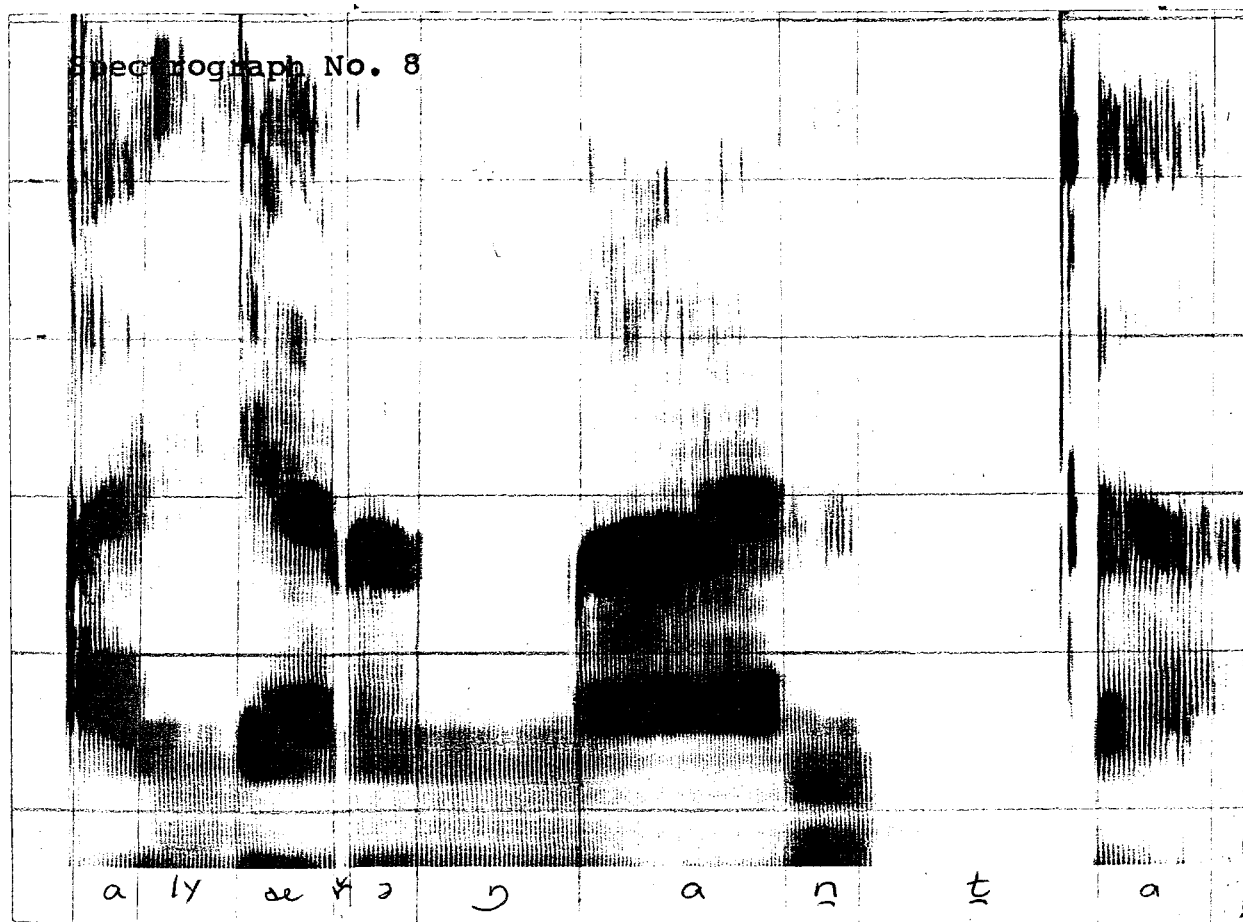
/yilařikiřa/	[yilařikířa]	'fern (sp.)'
/yilařipenta/	[yilař(ə)pénta]	'venomous snake (sp.)'

Spectrograph No. 6



Spectrograph No. 7





/alʋikaɾpilʋiɾa/	[álʋɪkáɾpɪlʋíɾa]	'slippery'
/alʋikaɾipʷita/	[álʋɪkáɾ(ə)pʷəta]	'inedible'
/mamaleɾipiɾa/	[mámaleɾípíɾa]	'barbed spear'
/memiɾikʷiɾa/	[mæmíɾkʷúɾa]	'white yam'
/yikʷiɾitaŋʷa/	[yukʷúɾtáŋʷa]	'swordfish'

There are some words where the insertion or reduction of a vowel co-occurs with changes in the stress patterns. The decision to analyse the optional vowel as emic is somewhat arbitrary, but based on the principle of consistency of analysis for all epenthetic vowels. There are also other words in which the variation has not been perceived in similar CC clusters.

/aɾiŋka/	[áɾŋka]	'hips'
/niŋaɾiŋka/	[nuŋáɾŋka~nuŋaɾéŋka]	'hips: 1st sing.'
/akaɾiŋa/	[akáɾŋa~akaɾúŋa]	'teeth'
/akaɾiŋala/	[akáɾəŋála]	'sting, bite'
/maɾimpa/	[máɾmpa~maɾúmpa]	'teeth: molars'
/yaɾima/	[yáɾma~yaɾúma]	'fish: yellowtail kingfish'
/maɾiŋa/	[máɾŋa~maɾúŋa]	'night'
/meɾiŋʷa/	[méɾŋʷa~meɾúŋʷa]	'ochre: yellow'
/mʷilikʷa/	[mʷúlkwʷa~mʷulúkʷa]	'stomach (internal)'
/anʋaɾiŋʷa/	[anʋáɾŋʷa~anʋaɾúŋʷa]	'quiet, tame'

## 2.5 The syllable as a close-knit unit

Sommerstein (1977: 200) comments: "Very many phonological processes can be expressed with greater generality if the syllable



and its boundaries are allowed to be mentioned in their statement." In Sections 6-8, the vowel allophones are described in terms of the syllable because it is regarded as a closely-knit unit in this language.

Vowel allophones are inherent within each syllable, with variation predictable according to the initial consonant within each syllable. Other vowel allophones may optionally occur when conditioned by the initial consonant or the vowel in the following syllable.

The CV patterns showing the inherent vowel allophones are as follows:

	/i/	/e/	/a/
Bilabial	pi mi	pe me	pa ma
Dental	t <sub>̣</sub> i n <sub>̣</sub> i l <sub>̣</sub> i	t <sub>̣</sub> e~æ - -	t <sub>̣</sub> a~æ n <sub>̣</sub> a~æ l <sub>̣</sub> a~æ
Alveolar	ti ni li ɹi	- ne - ɹe	ta na la ɹa
Retroflex	t <sub>̣</sub> u n <sub>̣</sub> u l <sub>̣</sub> u ɹu	t <sub>̣</sub> e - - -	t <sub>̣</sub> a n <sub>̣</sub> a l <sub>̣</sub> a ɹa
Laminal	t <sub>̣</sub> ɹi n <sub>̣</sub> ɹi l <sub>̣</sub> ɹi yɹi	t <sub>̣</sub> ɹe~æ n <sub>̣</sub> ɹe~æ l <sub>̣</sub> ɹe~æ ye~æ	t <sub>̣</sub> ɹa~æ n <sub>̣</sub> ɹa~æ l <sub>̣</sub> ɹa~æ ya~æ
Velar	ki ŋi	ke ŋe	ka ŋa
Rounded	p <sup>w</sup> u m <sup>w</sup> u k <sup>w</sup> u ŋ <sup>w</sup> u wu	- - k <sup>w</sup> e ŋ <sup>w</sup> e we	p <sup>w</sup> a m <sup>w</sup> a k <sup>w</sup> a ŋ <sup>w</sup> a wa

The consonants (see Section 4: Chart 4) fall into three categories: rounded, palatal (lamino-palatal and possibly velar) and neutral consonants. A vowel is conditioned most strongly by a rounded or a

palatal consonant. If either of these consonants occur in the following syllable, the inherent vowel allophone usually changes, e.g.,  $\underline{t}w+ly\grave{a} > \underline{t}rly\grave{a}$ ;  $wu+ly\grave{a} > wily\grave{a}$ ;  $lyr+wa > lyuwa$ ;  $/ya\sim\grave{a}+k^w\grave{a} > ly(a/a^u)k^w\grave{a}$ ;  $ma+t^y\grave{a} > ma^I t^y\grave{a}$ . An unrounded consonant in the following syllable can optionally cause an unrounded allophone of a vowel, e.g.,  $p^wu+n\grave{a} > p^w\grave{e}n\grave{a}$ ;  $k^wu+ly\grave{a} > k^w(i/u)ly\grave{a}$ .

The vowel allophones (see Sections 6, 7, 8) fall into two categories: front vowels and non-front vowels. Regressive vowel harmony occurs within each category (see Sections 6.6; 7.2; 8.6). A syllable consisting of a neutral consonant and front vowel can condition the low vowel in the preceding syllable, e.g.,  $\eta a+\check{r}i > \eta(a/\grave{a})\check{r}i$  (see Section 6.1.3) or the high vowel, e.g.,  $\underline{t}w+r_i > \underline{t}r_i$  (see Section 8.5).

### 3. INTERPRETATION

The interpretation of vowels and consonants is based on the non-suspect syllable patterns in Section 2.

#### 3.1 Consonants

##### 3.1.1 Rounded consonants

The rounded consonants /p<sup>w</sup>, m<sup>w</sup>, k<sup>w</sup>, ŋ<sup>w</sup>/ occur only as the onset of a syllable in word-initial and word-medial positions. As no CC clusters occur in these positions the rounded consonants have been interpreted as a single complex unit.

/p <sup>w</sup> ɪŋkawa/	'boss'
/apap <sup>w</sup> ɪna/	'many'
/m <sup>w</sup> ap <sup>w</sup> apilʲa/	'boat'
/am <sup>w</sup> ara/	'fishing spear'
/k <sup>w</sup> a/	'come here!'
/k <sup>w</sup> ɪyarɪta/	'cyclone'
/ak <sup>w</sup> alʲa/	'fish (generic)'
/ŋ <sup>w</sup> e/	'stop staring!'
/aŋ <sup>w</sup> ɪnta/	'ankle'

##### 3.1.2 Homorganic nasal plus stop

The homorganic nasals plus stops /mp, mp<sup>w</sup>, n̥t, nt, n̥tʲ, nt̥, ŋk, ŋk<sup>w</sup>,/ are analysed as a sequence of two consonants on the basis of the occurrence of a large number of heterorganic nasals plus stops. The nasal can be seen to contrast in the initial position in the clusters, /n̥p, np, n̥t, ntʲ, nt̥, ŋk, ŋk̥/.

/am <sup>w</sup> iŋk <sup>w</sup> a/	'Sweetlip Emperor fish'
/am <sup>w</sup> iŋpa/	'windbreak'

There are some factors which may suggest that homorganic clusters should be regarded as single complex units. It is felt, however, that these factors are not sufficiently conclusive to warrant the setting up of another series of phonemes.

The major factors are:

(a) The sequences such as /řŋ, lp, lk<sup>w</sup>/ can optionally be separated by a vowel when there is a change in stress pattern, e.g.,

[mařŋa~mař <sup>w</sup> ŋa]	'night'
[a <sup>i</sup> yílpiyílpa~á <sup>i</sup> yílu <sup>w</sup> piyílu <sup>w</sup> pa]	'bush'
[m <sup>w</sup> úl <sup>w</sup> ka~m <sup>w</sup> ulú <sup>w</sup> ka]	'stomach'

The homorganic clusters do not tolerate a change of stress pattern involving the insertion of a vowel. They do function as a much more closely-knit sequence than the above CC clusters.

The same, however, can be said about the heterorganic clusters of nasal plus stop, viz., /ŋp, ŋp, nt<sup>v</sup>, nt<sup>v</sup>, ŋk, ŋk/. No intervening vowels occur in this set either. It certainly does not seem feasible to posit that, because the homorganic and heterorganic clusters are close-knit units, they should all be considered as single units. It would add a possible fifteen more phonemic units.

(b) The high vowel /i/ is conditioned by the homorganic cluster functioning as a unit, i.e., the cluster /ŋk<sup>w</sup>/ is the environmental factor that causes the occurrence of the allophone [u].

/aŋiŋk <sup>w</sup> aya/	[aŋuŋk <sup>w</sup> aya/	'tomorrow'
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This is the strongest evidence for positing the clusters as a unit but it is counteracted by the occurrence of the allophone [æ] for /a/ where the closure of a syllable by [ŋ] is a factor in the conditioning of the allophone [æ], e.g., /alʲiŋaʁkɪraŋkʷiʁa/ [alʲiŋæʁkɪraŋkʷuʁa] 'inflamed'. (See Section 6.1.3.)

Another non-linguistic factor based on native intuition has occurred in adult literacy classes. Some of the men have syllabified words leaving the cluster as a unit, e.g., /amʷiŋkʷa/ as [a.mʷu.ŋkʷa] 'Sweetlip Emperor fish'. They have had no problem in pronouncing the cluster initially in the syllable although they do tend to begin with a syllabic nasal, as in [m:pa] the shortened form of /yimpa/ 'but'. Others, however, are much more likely to omit the homorganic nasal altogether in accordance with the word-final vowel pattern.

### 3.2 Vowels

#### 3.2.1 Vowel clusters

The vowel clusters [ia] and [ua] alternate with [iya] and [uwa], respectively, and are interpreted at VCV. The semiconsonants, /y/ or /w/ are usually realised at the onset of a stressed syllable.

/wiya/	[wia-wiya]	'here you are'
/kayiwa/	[ka <sup>I</sup> yua-ka <sup>I</sup> yuwa]	'dillybag'

The vowel clusters are interpreted as VCV on the following bases:

- (a) Within the morpheme, the nonsuspect pattern for /a/ and /e/ always has an intervening semivowel /y/, e.g. /yayeʁa/ [yæ<sup>I</sup>yéʁa] 'vein'.
- (b) At the morpheme boundaries, the high vowel can be seen to elide preceding /a/. A consonant, therefore, is posited in these sequences

where no elision occurs. (See Section 1.3.)

(c) Each vowel has a syllable peak and, therefore, is the nucleus of a syllable.

The vowel clusters [a<sup>u</sup>u~a<sup>u</sup>wu], [a<sup>i</sup>i~a<sup>i</sup>yi], [a<sup>i</sup>u~a<sup>i</sup>yu] and [a<sup>i</sup>a~a<sup>i</sup>ya] have been interpreted as VCV for reasons given above.

/awirik <sup>u</sup> wa/	[a <sup>u</sup> (w)uruk <sup>u</sup> wa]	'swamp'
/wiřawimin <sup>u</sup> ya/	[wuřa <sup>u</sup> (w)umin <sup>u</sup> ya]	'duck'
/ayikwit <sup>i</sup> ya/	[a <sup>i</sup> (y)ukwut <sup>i</sup> ya]	'small (sing.)'
/aŋkayiwaya/	[aŋka <sup>i</sup> (y)uwa <sup>i</sup> (y)a]	'tamarind'

### 3.2.2 Glides [a<sup>i</sup>:] and [a<sup>u</sup>:]

The glides [a<sup>i</sup>:] and [a<sup>u</sup>:] are interpreted as /ayi/ and /awi/.<sup>7</sup> The allophone [æ<sup>i</sup>:] also occurs in free variation with [a<sup>i</sup>:] in this word-final environment.

Length is the feature that distinguishes the glides [a<sup>i</sup>] analysed as /a/ (see Section 6. ) from [a<sup>i</sup>:] as /ayi/.

#### (i) Word-final glides

/yakayi/	[yaka <sup>i</sup> :]	'ouch!'
/t <sup>y</sup> ayi/	[t <sup>y</sup> æ <sup>i</sup> :]	'scram! (rebuke)' (Nung.)
/yaw <sup>i</sup> /	[ya <sup>u</sup> :]	'yes'

The reasons are:

- (a) Non-suspect word patterns do not end in a consonant.
- (b) Some exclamations have a variant form where the word-final /a/ occurs. These pairs of words then show only a difference in the final vowel.

/yaw <sup>i</sup> ~ yawa/	[ya <sup>u</sup> :~ya <sup>u</sup> wa]	'yes'
/t <sup>y</sup> ayi ~ t <sup>y</sup> aya/	[t <sup>y</sup> æ <sup>i</sup> :~t <sup>y</sup> a <sup>i</sup> ya]	'scram (rebuke)'

(c) The reverse sequence /iya/ also occurs in variation with [a<sup>i</sup>:] without change of meaning.

/tʷayi~tʷiya/ [tʷa<sup>i</sup>:~tʷiya] 'scram!'

The interpretation provides a similar counterpart for other words, e.g.,

/wayi/ [wa<sup>i</sup>:] 'oh! (surprise)'

/wiya/ [wia] 'here you are'

(d) The offglide is heard by some Aborigines who immediately said the word /yakayi/ had three syllables. Others showed the same intuition in writing /yakai/ before seeing it in print. Others, however, have discriminated only two syllables, and usually write /yakay/.

(ii) Word medially, the glides [a<sup>i</sup>:] and [a<sup>u</sup>:] have been interpreted as /ayi/ and /awi/ respectively. The glide is sometimes lengthened.

The vowel /a/ usually varies allophonically between [a] and [a<sup>i</sup>] preceding the laminal /nʷ/. In the following words, no variation occurs and the glide [a<sup>i</sup>:] is interpreted as /ayi/ on the basis of the morphemes involved, and the length of the glide. (See Section 1.3 for morphophonemic rule No.1.)

/ŋayinʷaŋʷa/ [ŋa<sup>i</sup>nʷaŋʷa] 'my'

ŋayi+laŋʷa

/ŋayinʷtʷa/ [ŋa<sup>i</sup>:nʷtʷa] 'I (dative)'

ŋayi+atʷa

/ŋayinʷtʷikʷapa/ [ŋa<sup>i</sup>:nʷtʷukʷopa] 'I, also'

ŋayi+atʷi+kʷapa

The vowel /a/ usually varies between [a] and [a<sup>u</sup>] preceding a labialised consonant. In the following words, no variation occurs,

and the vowel glide is lengthened.

/kawik<sup>w</sup>inata/ [ka<sup>u</sup>:k<sup>w</sup>unata] 'coconut'

/t<sup>y</sup>awik<sup>w</sup>a/ [t<sup>y</sup>a<sup>u</sup>k<sup>w</sup>a] 'chalk'

(Note: The Aboriginal literates first brought these words to my attention by reacting against the spelling of /ŋan<sup>y</sup>aŋ<sup>w</sup>a/ and /kak<sup>w</sup>inata/.)

### 3.2.3 Word-initial [i] and [u]

(i) Word-initially, [i~ʔi] or [u~ʔu] occurs preceding a laminal or labialised consonant, respectively; [yi~ʔi] or [wu] occur preceding other consonants. Even though there is a non-suspect pattern for word-initial /a/ and /e/ these have all been interpreted as /yi/ and /wi/.<sup>7</sup>

/yit<sup>y</sup>ařa/ [ʔit<sup>y</sup>ařa~it<sup>y</sup>ařa~yit<sup>y</sup>ařa] 'seagull'

/yilata/ [ʔilata~yilata] 'shellfish'

/yikařpa/ [yikařpa] 'woomera'

/wip<sup>w</sup>iřa/ [up<sup>w</sup>əřa~ʔup<sup>w</sup>əřa~wup<sup>w</sup>əřa] 'like'

/wiřiwata/ [wuřuwata] 'dog.'

The reasons are:

(a) The variation between [yi] and [i] is predictable and therefore non-phonemic. As there is no contrast, the variants are interpreted as a whole.

(b) When /a/ or /e/ occurs word-initially, the final vowel of the previous word may elide in fast speech in a discourse. When the vowel [i] occurs as word-initial, no instances of vowel elision have been found to date. The combined words comply with the rules for a consonant-initial word. (See Section 1.)



/yiniřiŋka yilʎakʷa/

'she saw honey'

[yɪnəřuŋka yɪlʎakʷa/

(Note: /yilʎakʷa/ in isolation is [ilʎakʷa].)

(c) The word-initial and the word-medial occurrences of [i] and [u] occurring as the phonetic realisation of the syllable are both interpreted in the same way (see Section 3.2.2).

/yilʎařa/ [ilʎařa]

'sailfish'

cf.

/ayiřpiyiřpa/ [a<sup>i</sup>řpiyiřpa]

'continuous'

(ii) In three words, there is variation between [yɪ~ʔə~ø] preceding a homorganic nasal plus stop, the nasal of which is syllabic when it occurs initially. These have been interpreted as /yi/ because no other homorganic clusters occur word-initially.

/yinʎtʎa/ [inʎtʎa~nʎ:tʎa]

'it's my turn!'

/yɪnta/ [yɪnta~n:ta]

'show me!'

/yimpa/ [ʔəmpa~m:pa]

'but'

### 3.2.4 Vowel length

The lengthened high vowels [i:] or [u:] vary with the sequences /iyi/ and /iwi/, respectively.<sup>7</sup> Vowels are always lengthened in the primary-stressed syllables, and, to date, no contrast between short and long vowels has been established. The above sequences differ from the stressed vowel length because two syllable peaks can be heard in some utterances. Long vowels have been interpreted as VCV. All the following examples occur within the morpheme.

/wiyita/	[wí:ta~wíyɪta]	'straight'
/atʷiwira/	[atʷúra~atʷúwura]	'youngest sibling'
/ayiwira/	[ayú:ra~ayúwura]	'water'
/mamatʷiyiŋa/	[mámatʷíŋa~mámatʷiyiŋa]	'sorcery'
/mařpiyiŋta/	[mařpí:ŋta~mařpiyiŋta]	'tree (sp.)'
/aminʷtʷiřkʷiwířimalʷa/		'smooth'
[áminʷtʷiřkʷú:řumálʷa~		
áminʷtʷiřkʷuwúřumálʷa]		

The Macassan word for 'book' is /tʷiwira/ [tʷu:řa~tʷúwura] which correlates with the Gupapwingu (Northeastern Arnhem Land) loanword /tʷu:řa/ [tʷo:řa]. The variant [tʷiřa] has also been heard at Umbakumba and this would conform to the allophonic patterning for a high vowel and phonemicize as /tʷiřa/.

Long vowels [i:] and [u:] are interpreted as VCV, rather than being analysed as contrastive with a short vowel, because:

- (a) There is no contrast between a short and long vowel /a/ and /e/ and the positing of /i:/ would create an unsymmetrical vowel system.
- (b) The sequences /iyi/ and /iwi/ already exist where reduction to a lengthened vowel does not seem to occur.<sup>7</sup> A morpheme boundary occurs between the V and CV, e.g.,

/ayilpiyilpa/	'bush'
/wiřiwířakaŋapa/	[wuřuwúřakaŋapa] 'those: 1st excl. pl.'

There is also a plural suffix /-iyi/ which precedes the tense suffix on verbs. This has been recorded as [i:~iyi]. The long vowel could be simply the non-phonemic lengthened vowel in a stressed penultimate syllable varying with the plural suffix. (Prefixes

are marked obligatorily for plural.) The variant forms have also been recorded in the plural form of one of the verbal adjectives.

/ŋařik <sup>w</sup> il <sup>v</sup> ařiyina/	'to shine'
[ŋařuk <sup>w</sup> il <sup>v</sup> ařiyina~ŋařuk <sup>w</sup> il <sup>v</sup> aři:na]	
/alařŋk <sup>w</sup> iyiqma/	'putrid (plural)'
[alařŋk <sup>w</sup> iyiqma~alařŋk <sup>w</sup> i:qma]	

### 3.2.4 The vowel [ɒ]

The allophone [ɒ] of the phoneme /a/ varies freely with [a] following a rounded consonant, /w/, /k<sup>w</sup>/ and /ŋ<sup>w</sup>/. In the following words [ɒ] occurs but does not vary with [a]. The consonant is simultaneously rounded in some instances. The sequences [mɒ] and [pɒ] are interpreted as /m<sup>w</sup>a/ and /p<sup>w</sup>a/, respectively, in accordance with the other occurrences of [ɒ].

/map <sup>w</sup> ak <sup>w</sup> a/	[mapɒk <sup>w</sup> a]	'legless lizard'
/yanp <sup>w</sup> ak <sup>w</sup> a/	[yanpɒk <sup>w</sup> a]	(place name)
/tamp <sup>w</sup> ak <sup>w</sup> a/	[tampɒk <sup>w</sup> a]	'tobacco'
/m <sup>w</sup> awil <sup>v</sup> a/	[m(ɒ/a)wil <sup>v</sup> a]	'pubic tassel'
/m <sup>w</sup> ampata/	[mɒmpata]	(personal name)
/wiřam <sup>w</sup> ak <sup>w</sup> a/	[wuřampɒk <sup>w</sup> a]	'double barred finch'

(Note: For similar analyses where [mɒ] is analysed as /m<sup>w</sup>a/ see Godfrey and Leeding (1974) or Yallop (1977: 26: /apm<sup>w</sup>ara/ [apmɒra].)

Alternatively, the occurrence of [ɒ] following /m/ or /p/ could be said to extend the environment in which [ɒ] as an allophone of /a/ occurs. This seems implausible because other instances with the sequence [mVw] or [pVw] show that the free variation in this environment is [a]~[a<sup>u</sup>] (see Section 6.5).

The English loanword, 'pawpaw' is pronounced [p<sup>w</sup>(v/a/o)p<sup>w</sup>uwa]  
/p<sup>w</sup>ap<sup>w</sup>iwa/.

In the following example, the vowel [v] occurs with syllable  
reduction to [ŋ<sup>w</sup>V].

/akinipwi-ŋawi-ta/

'that's all (emphatic)'

[akinup<sup>w</sup>uŋ<sup>w</sup>ɔ̃ta]

#### 4. CONSONANTS

##### 4.1 Consonantal contrasts

There are twenty-four contrastive consonants, consisting of eight stops, eight nasals, four laterals, one flap, and three central approximants, as shown on Chart 4.

The consonants divide into two major groups according to whether they are rounded or unrounded. The unrounded consonants contrast at six points of articulation, the rounded at three points of articulation, as shown on Chart No.4. At any one point of articulation, the consonants are distinguished by a maximum of four differences in the manner of articulation.

The rounded consonants function as a set in their conditioning of the vowels, with the rounding being the crucial feature. Lamino-palatals are placed next to velars because these are alike in some cases in conditioning vowels.

The examples in this paper (including repetitions of the same word) have been used as the basis of a consonantal frequency count. There are approximately 3,850 consonants. The consonants listed below are ordered according to a decreasing frequency of occurrence. It should be noted that /ʃ/ is very frequently used, occurring 3% more often than the following consonants. Alveolars (except /n/) and retroflexed consonants (except /ɻ/) are infrequent.

11.22%	ʃ
8.1%-7.9%	y, ŋ, p
6.2%-5%	ṭ, k, m, n, w, kʷ
4.7%-2.7%	tʲ, lʲ, ḷ, ṛ, mʷ
2.1%-.05%	ŋʷ, nʲ, pʷ, ŋ̣, ṇ, ḷ, ṭ, ṭ, ḷ

CHART 4

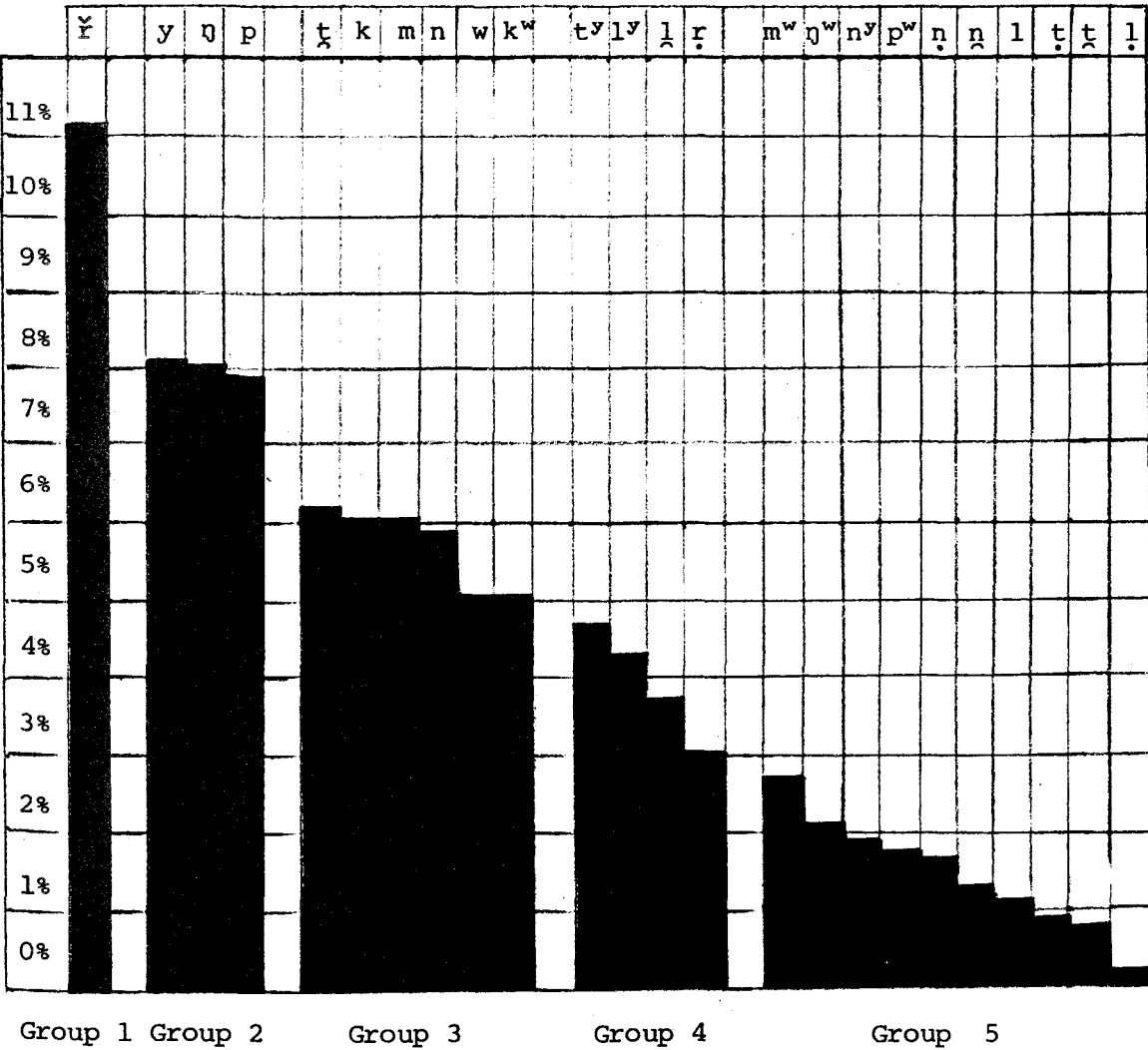
Consonantal phonemes

UNROUNDED							ROUNDED**	
	Bi-labial	Apico-dental	Apico-alveolar	Apico-retro-flex	Lamino-palatal	Dorso-velar	Labio-velar	Labialised Bilabial    Velar
stops	p	t	t	ṭ	tʲ	k		pʷ    kʷ
nasals	m	n	n	ṇ	nʲ	ŋ		mʷ    ŋʷ
laterals		ɭ	l	ɭ̣	lʲ			
flap			ɾ					
*central approximants				ɻ	y		w	

\* i.e., central approximants other than laterals.

\*\* "Rounded" is a convenient cover term for the set, /pʷ, kʷ, mʷ, ŋʷ, w). The terminology used here (including recognition of labio-velar as a point of articulation) is put forward by Ladefoged 1971: Ch.7.

Consonantal Frequency



The consonants are divided into five groups on the above graph. Groups 1, 2 and 3 divide naturally because of a sharp drop in the frequency of occurrence.

The consonantal contrasts are best seen in word-medial position because not all occur initially. Very few minimal pairs exist in the language but contrasts are clearly evidenced in analogous environments. Each rounded consonant is placed next to its unrounded counterpart to show the contrast clearly.

Between a-a

p	/awil <sup>ɣ</sup> apa/	'one'
p <sup>w</sup>	/m <sup>w</sup> ap <sup>w</sup> apil <sup>ɣ</sup> a/	'boat (archaic)'
ṭ	/aŋ <sup>w</sup> ata/	'tears'
t	/ti <sup>ɣ</sup> apata/	'pronged spear'
ṭ	/amata/	'grass'
t <sup>ɣ</sup>	/ya <sup>ɣ</sup> at <sup>ɣ</sup> a/	'goanna'
k	yiraka/	'didjeridu'
k <sup>w</sup>	/yil <sup>ɣ</sup> ak <sup>w</sup> a/	'wild honey'
m	/at <sup>ɣ</sup> ikama/	'a sore'
m <sup>w</sup>	/am <sup>w</sup> a <sup>ɣ</sup> a/	'fishing spear'
ṇ	/yinana/	'fingernail'
n	/yinitena/	'coral'
ṇ	/amakana/	'straight-stemmed'
n <sup>ɣ</sup>	/awankan <sup>ɣ</sup> e <sup>ɣ</sup> a/	'always teasing'
ŋ	/yinaŋa/	'witchetty grub'
ŋ <sup>w</sup>	/aŋ <sup>w</sup> a/	'border along the beach'
ḷ	/ak <sup>w</sup> ala/	'some'
l	/yimaŋala/	'woomera'
ḷ	--	
l <sup>ɣ</sup>	ak <sup>w</sup> al <sup>ɣ</sup> a/	'fish (gen.)'



ʔ	/aʔa/	'forehead'
ṛ	/nara/	'no'
y	/ŋaya/	'I'
w	/awa/	'liver'

Between a-i

p	/awapilʔa/	'warm'
pʷ	/apapʷina/	'many'
ṭ	/aṭaṭipina/	'this side'
t	/ṭiṭitʔa/	'metal'
ṭ	/apaṭitʔena/	'cruel'
tʔ	/atʔiŋʷa/	'sickness'
k	/talʔakilʔa/	'fish: groper'
kʷ	/amakʷilʔa/	'big'
m	/maminʔa/	'firefly'
mʷ	/mamʷila/	'fish grills'
ṇ	/aŋiŋa/	'food'
n	/anitʔa/	'alcoholic liquor'
ṇ	/amanina/	'charcoal'
nʔ	/anʔiʃa/	'mucus'
ŋ	/aŋiŋta/	'chin'
ŋʷ	/aŋʷiŋta/	'ankle'
ḷ	/alika/	'foot'
l	/wiʔapalitʔa/	'owners'
ḷ	/maḷiwiya/	'emu'
lʔ	/yalʔilʔa/	'flying fox'

ř	/ařiřa/	'wind'
ṛ̌	/aṇariya/	'baby'
y	/kalayiřa/	'fish: sea perch'
w	/awitʷa/	'fog'
<u>initially</u>		
p	/pařa/	'N.W. wind' (Mac.)
pʷ	/pʷapʷiwa/	'papaw' (Eng.)
ṭ	/ṭaya/	'green tree snake'
t	/tampa/	'damper' (Eng.)
ṭ̣	/takitaki/	'duck' (Eng.)
tʷ	/tʷařaṇʷa/	'horse'
k	/kapa/	'be quiet!'
kʷ	/kʷa/	'come here!'
m	/mamařa/	'paperbark tree'
mʷ	/mʷawilʷa/	'pubic tassel'
ṇ	-	
n	/nařa/	'no'
nʷ	-	
ṇ̣	-	
ṇ	/ṇawa/	'that's enough'
ṇʷ	/ṇʷa/	(call of the crow)
ḷ	/ḷaka/	'is it ready?'
l	/lipaṇa/	'bait' (Mac.)
ḷ̣	/lama-lama/	'shovelnosed spear' (Nung.)
lʷ	/lʷalʷiṇa/	'knife' (Mac.)

ř	-	
r	/ratʃa/	'rice' (Eng.)
y	/yakařa/	'fish: trevally'
w	/wařanʃtʃa/	'(go) quickly'

(Note: Loanwords from Macassan, English and Nunggubuyu have been used in this list because no indigenous words begin with the phonemes listed.)

#### 4.2 Allophonic variation

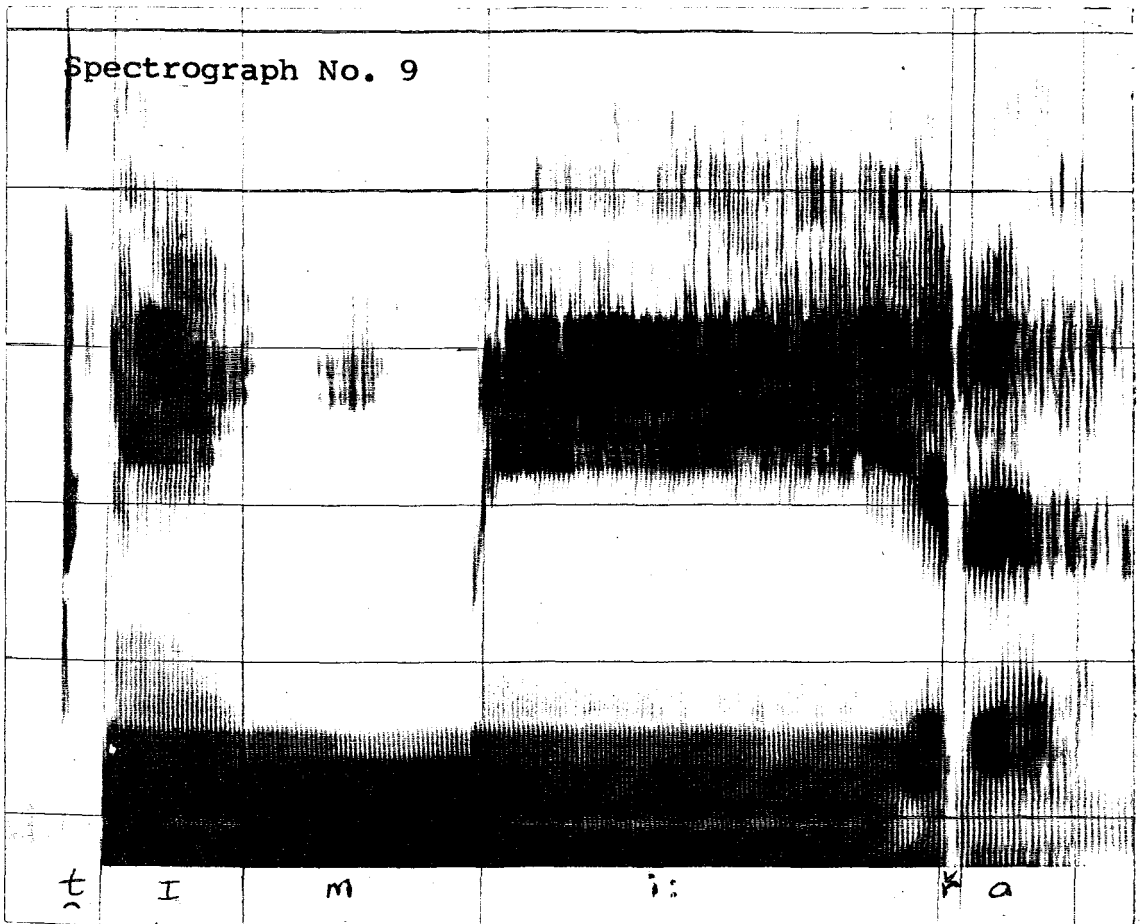
In this section, the phonetic quality of the consonants will be discussed as well as any variation.

##### 4.2.1 Stops

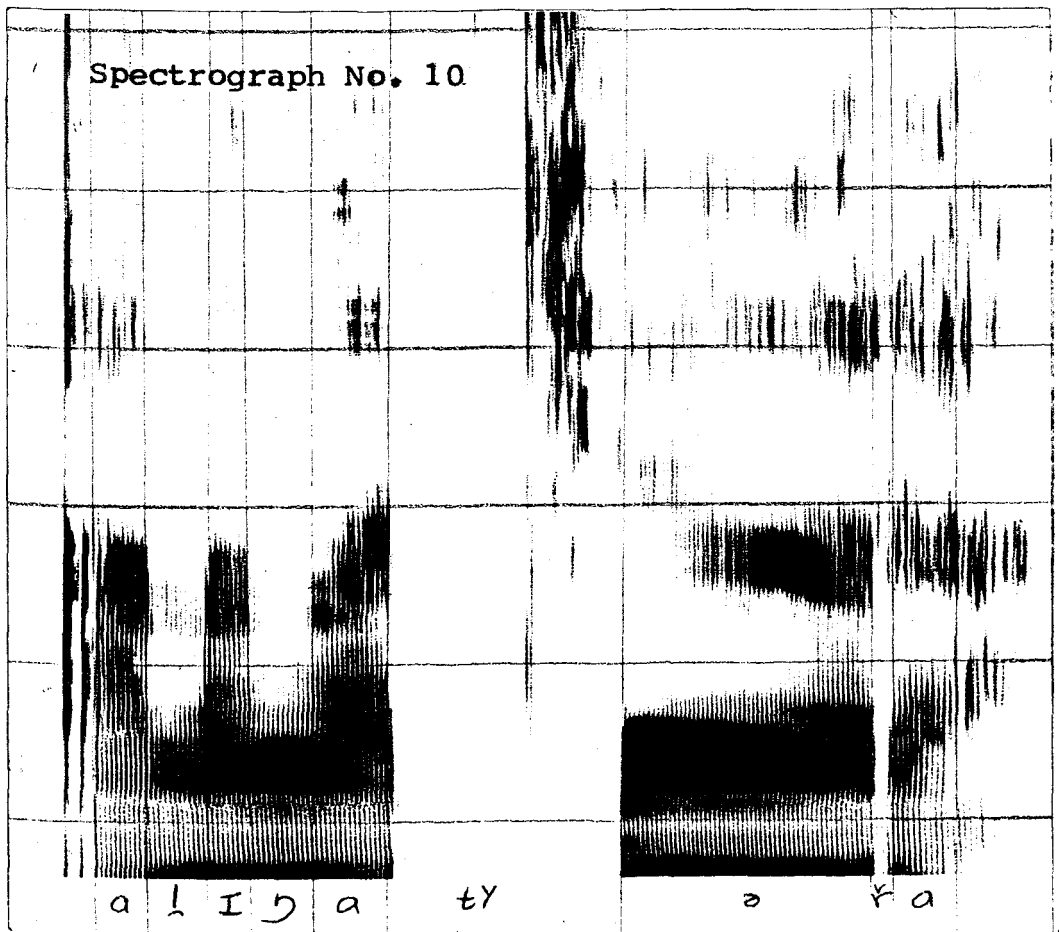
All stops are voiceless and unaspirated. Occasionally, some of the more fluent speakers of English will aspirate a stop in a stressed syllable but this is probably only when the audience is non-aboriginal.

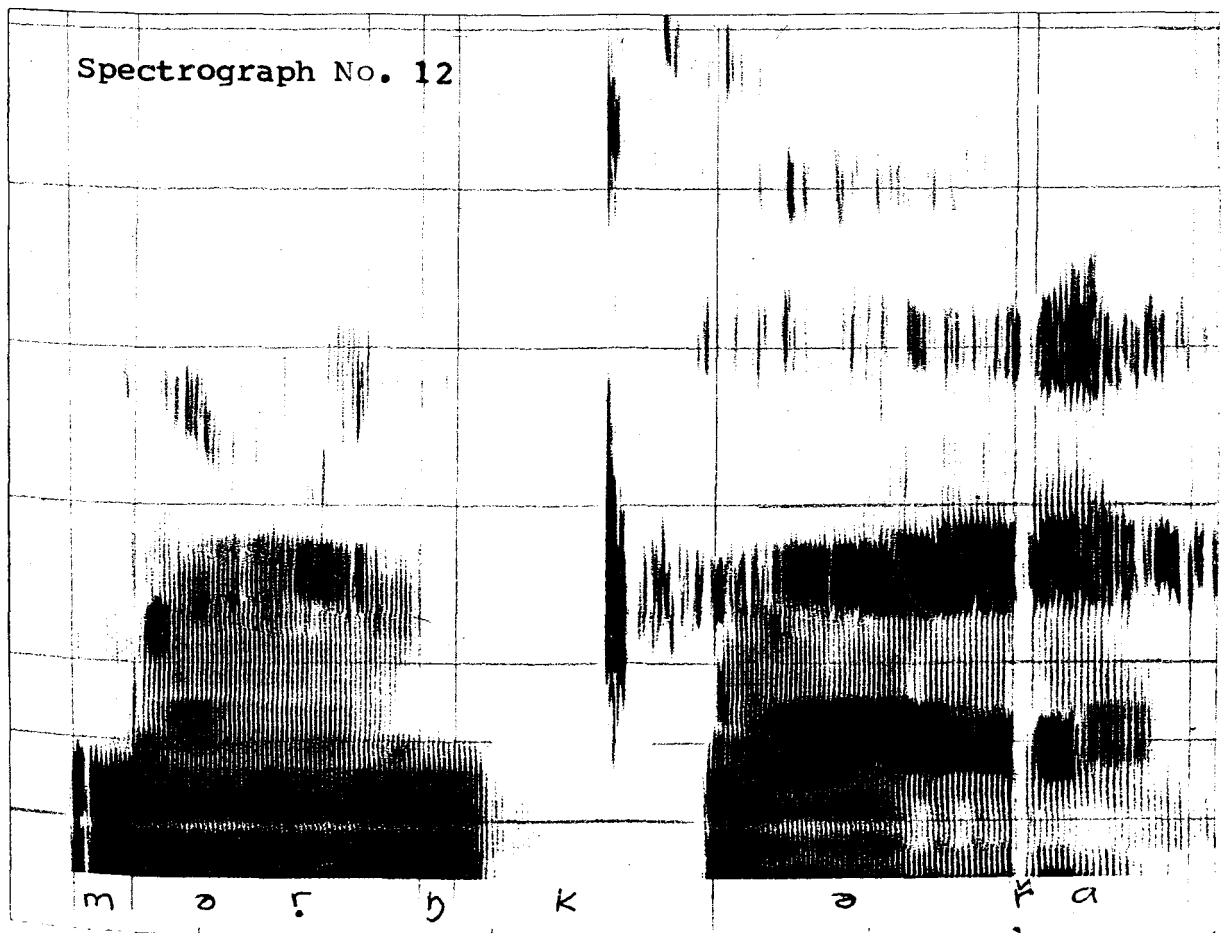
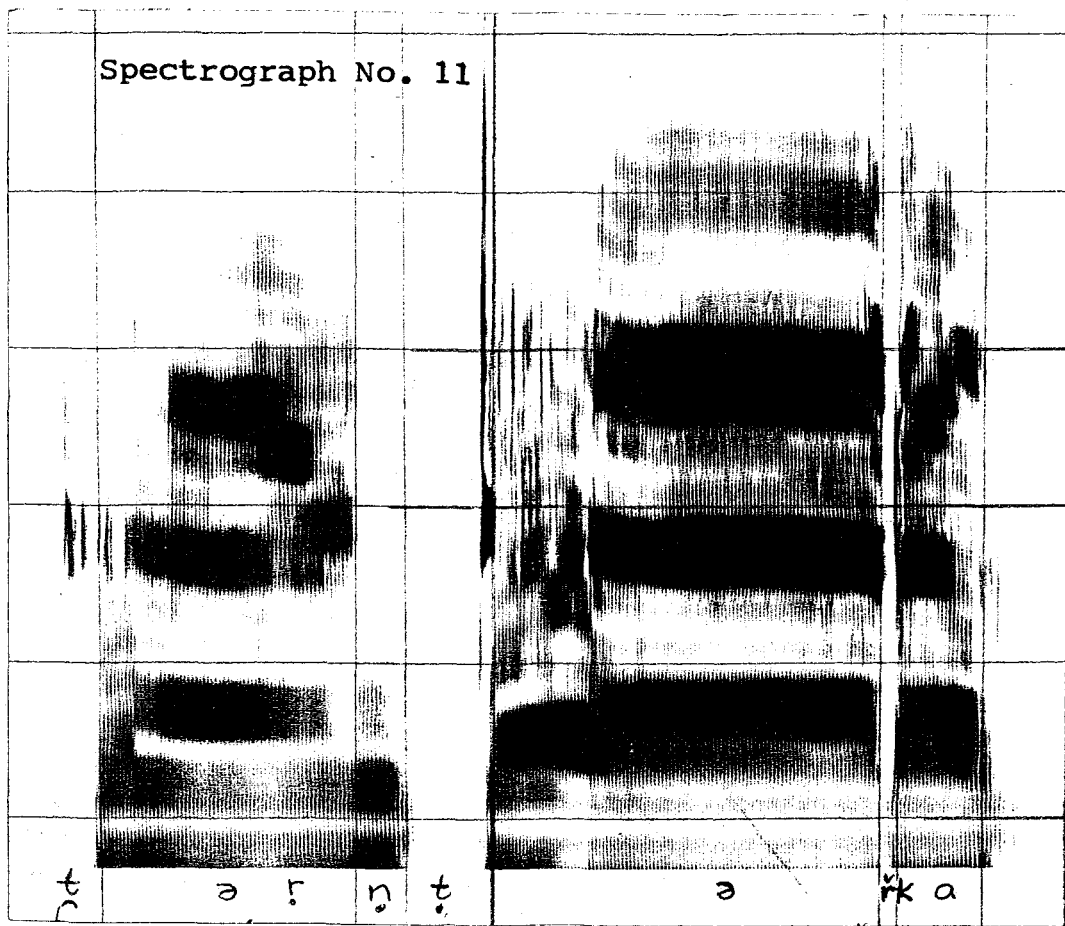
The spectrographs show that some degree of voicing occasionally occurs word medially following a vowel or a nasal. Spectrograph No. 9 /t̪imiřa/ [t̪imiřa] 'Torres Strait pigeon' provides an illustration of the voicelessness of word-initial stops. Word-medially following a vowel or a homorganic nasal, the stops are usually voiceless (see spectrographs Nos. 10 and 11 /aḷiṇatʃiřa/ [aḷiṇatʃəřa] 'long'; /t̪iṇt̪iřka/ [t̪əṇt̪əřka] 'my mother') but can be voiced up to approximately 20% of the closure phase in precise speech (see spectrographs Nos. 12 and 13 /miṛṇkiřa/ [məṛṇkəřa] 'sinker'; /niṇant̪ina/ [niṇant̪əna] 'to be wounded by a spear'). In spectrograph No. 14 /t̪iṇt̪iṇt̪a/ [t̪əṇt̪əṇt̪a] 'tree (sp.)', where [t̪] has been pronounced very rapidly and is phonetically voiced, the glottal pulse continues but the overall energy

Spectrograph No. 9

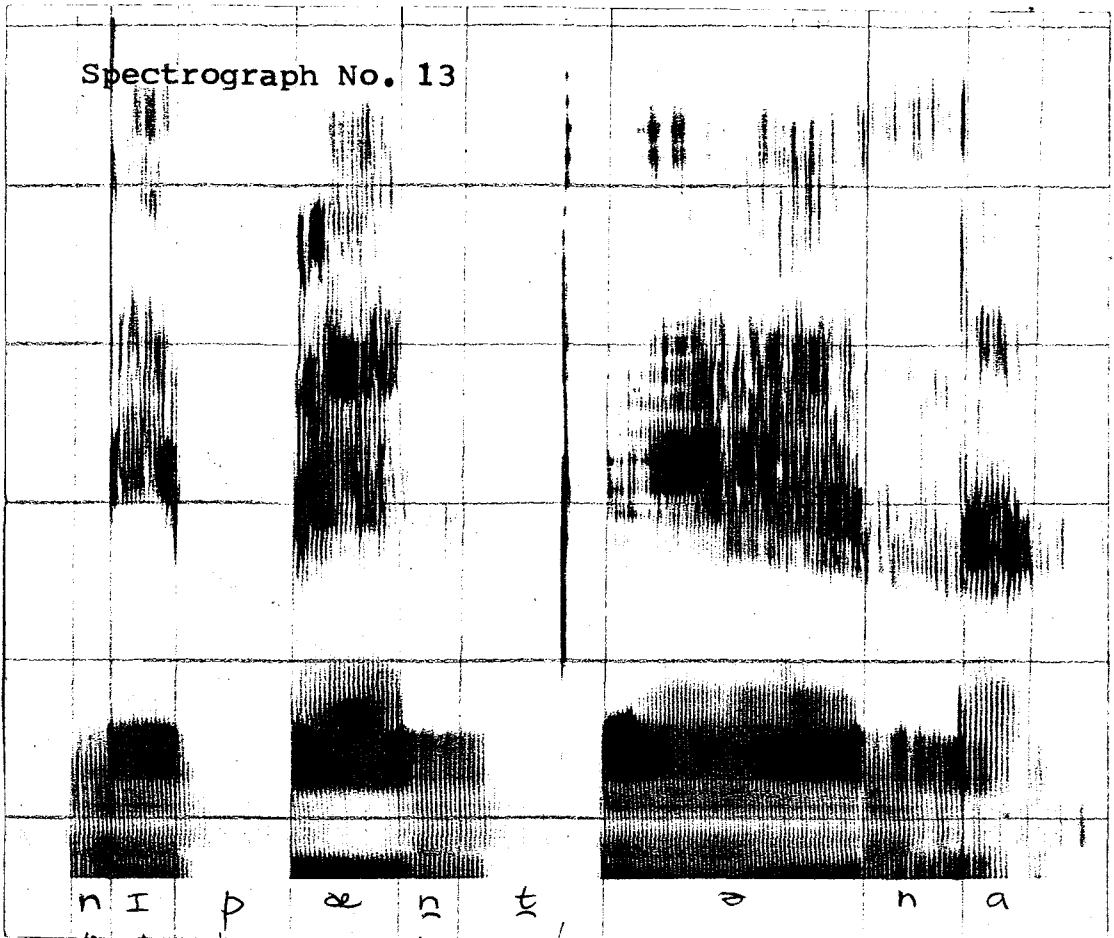


Spectrograph No. 10

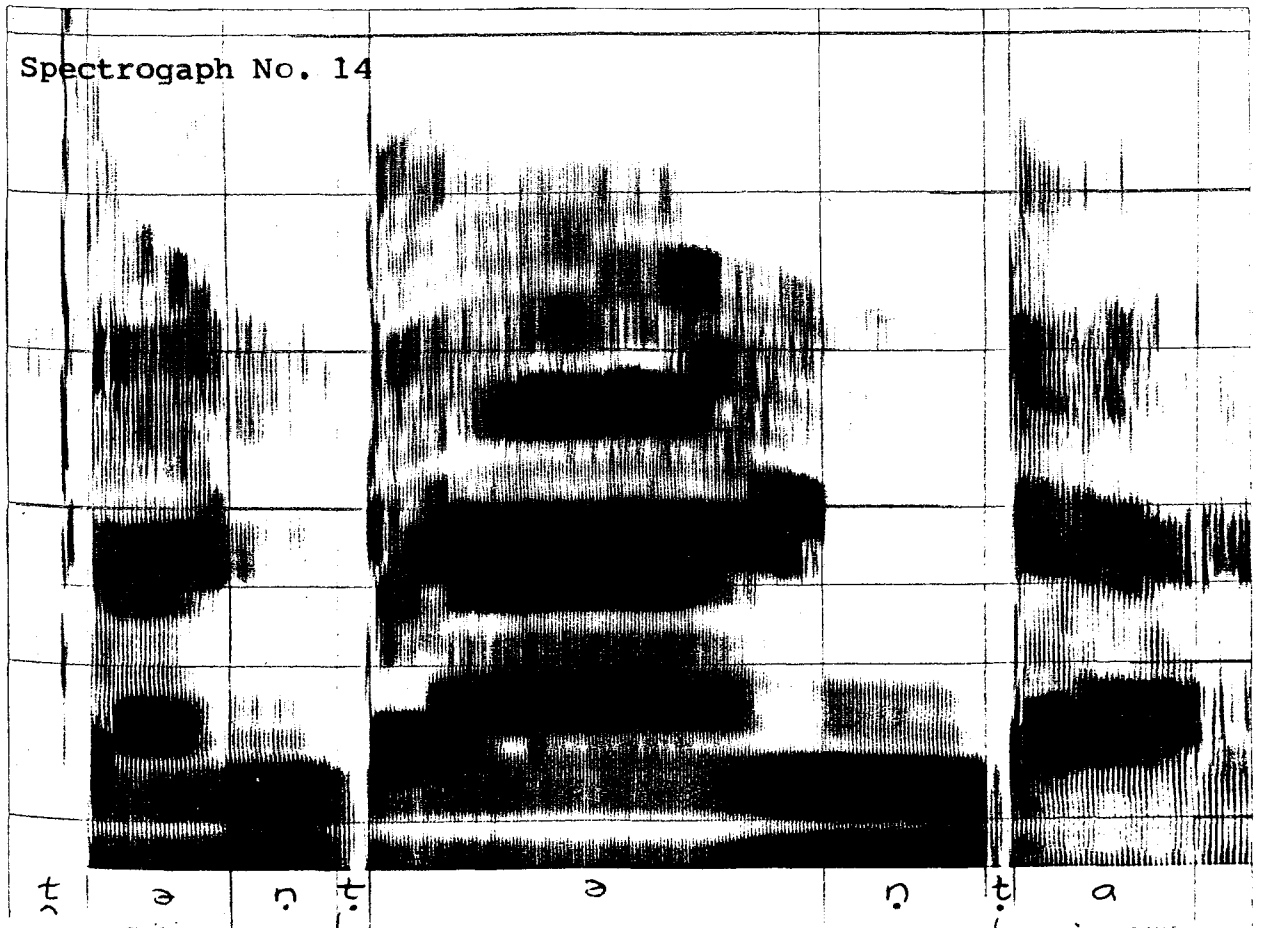




Spectrograph No. 13



Spectrograph No. 14



of emission is very greatly reduced during occlusion.

Stops following a heterorganic nasal are often voiceless but can be voiced up to approximately 40% of the closure phase (see spectrographs Nos. 15 and 16 /k<sup>w</sup>ĩnk<sup>w</sup>ĩna/ [k<sup>w</sup>unk<sup>w</sup>una] 'fish: lowly trevally'; /aŋp<sup>w</sup>ĩr̥ta/ [aŋp<sup>w</sup>ur̥ta] 'waterlily root').

A double stop or a lengthened stop with a delayed release occurs in variation with its single counterpart, usually in the penultimate or anti-penultimate syllable. The double stop only seems to occur in citation forms or where the word is emphatic, as in exclamations. The first stop closes the syllable and is unreleased and lengthened. No contrast has been found to date with the single series of stops, though the patterning of geminate clusters would correlate with the consonant cluster /kp/, the only CC cluster involving two stops. The geminate clusters, [pp], [kk] and [t̪t̪] freely vary with their single counterpart intervocally.

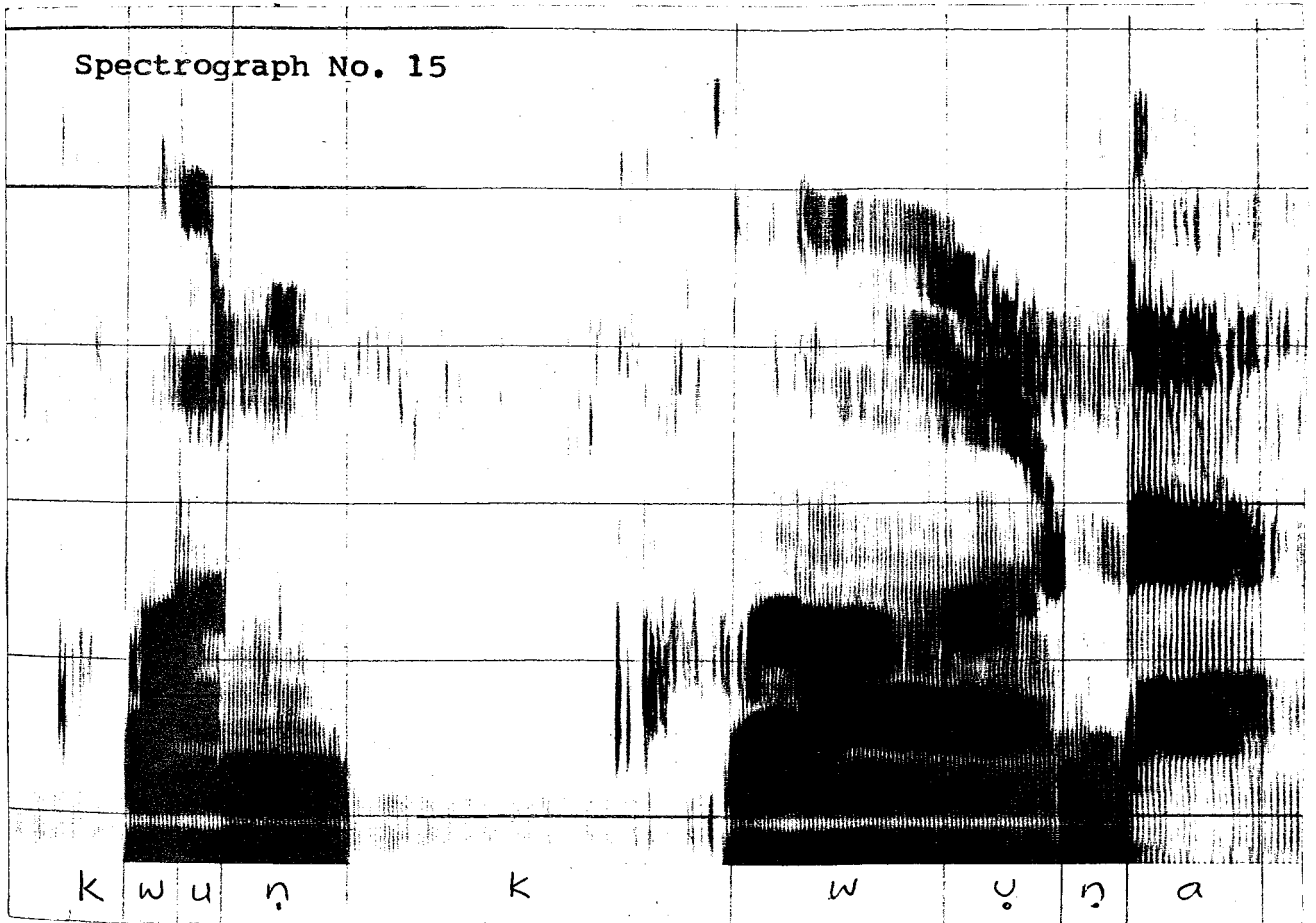
/apa/	[ápa~appa]	'that, over there'
/yinipa/	[yínipa~yíníppa]	'red ochre'
/yakayi/	[yaka <sup>1</sup> ~yakka <sup>1</sup> ]	'ouch!'
/mikiřa/	[mikiřa~míkkiri]	'swamp nut'
/etiřa/	[æt̪eřa~æt̪t̪eřa]	'hole'

The geminate clusters [pp] and [kp] freely vary with /p/ following /ř/. (See Section 4.3.2 for further discussion of [kp~p].)

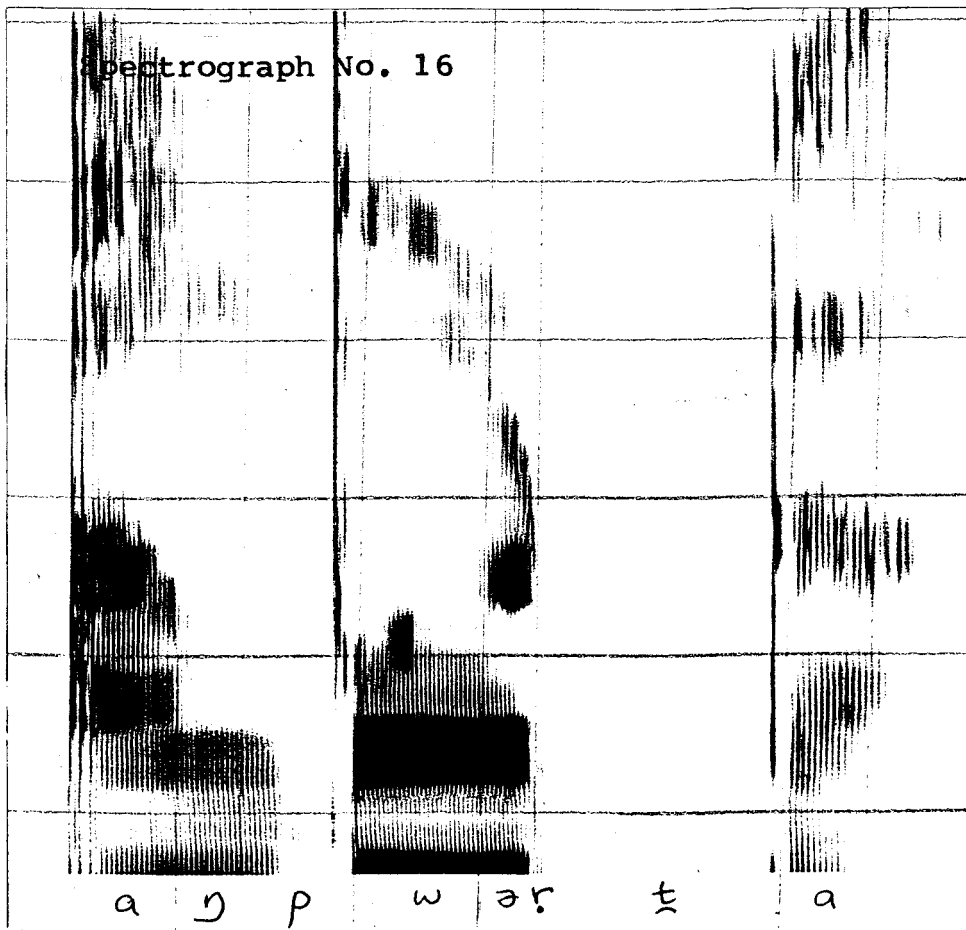
/akilvařpa/	[ækilvařpa~ækilvař(k/p)pa]	'light'
/alvikařparipařa/	[al̪vikařpařpařa~ al̪vikař(k/p)pařpařa]	'inedible'

To date, there is one word, /t̪akat̪vařařa/ [t̪akat̪vt̪vařařa] 'nut (sp.)', where the double stop is usually articulated.

Spectrograph No. 15



Spectrograph No. 16





## 4.2.2 Laterals

The tongue root position for laterals /l̥/ and /lʷ/ is similar to that of the dark /l/ of English, as in 'bottle'. The Aborigines describe the tongue position as the edges of the tongue being against the upper molars.

## 4.2.3 Flap /ɾ/

Flap /ɾ/ is usually articulated with the tongue tip but some speakers vary between an apical and a laminal articulation when /ɾ/ follows a lamino-palatal.

/lʷiɾɪlʷiɾa/

'tasselled'

/yinitʷiɾa/

'rocky outcrop'

Previous spectrographs show that only one interrupt occurs for the flapped /ɾ/ in almost every instance. A flap with two interrupts can occur as shown by spectrograph No.17, /mʷiliɾa/ [mʷəɭuɾa] 'reef'. A trilled [ɾ̃] has only been heard utterance-final in a text where the vowel was elided.

## 4.2.4 Dentals

The tongue tip position for the interdental series is usually in dental position but variation occurs between the dental and interdental articulation. The interdental series, /n̪/, /l̪/ have two variants:

- (i) The alveolar allophone occurs in syllable-final position preceding a stop.

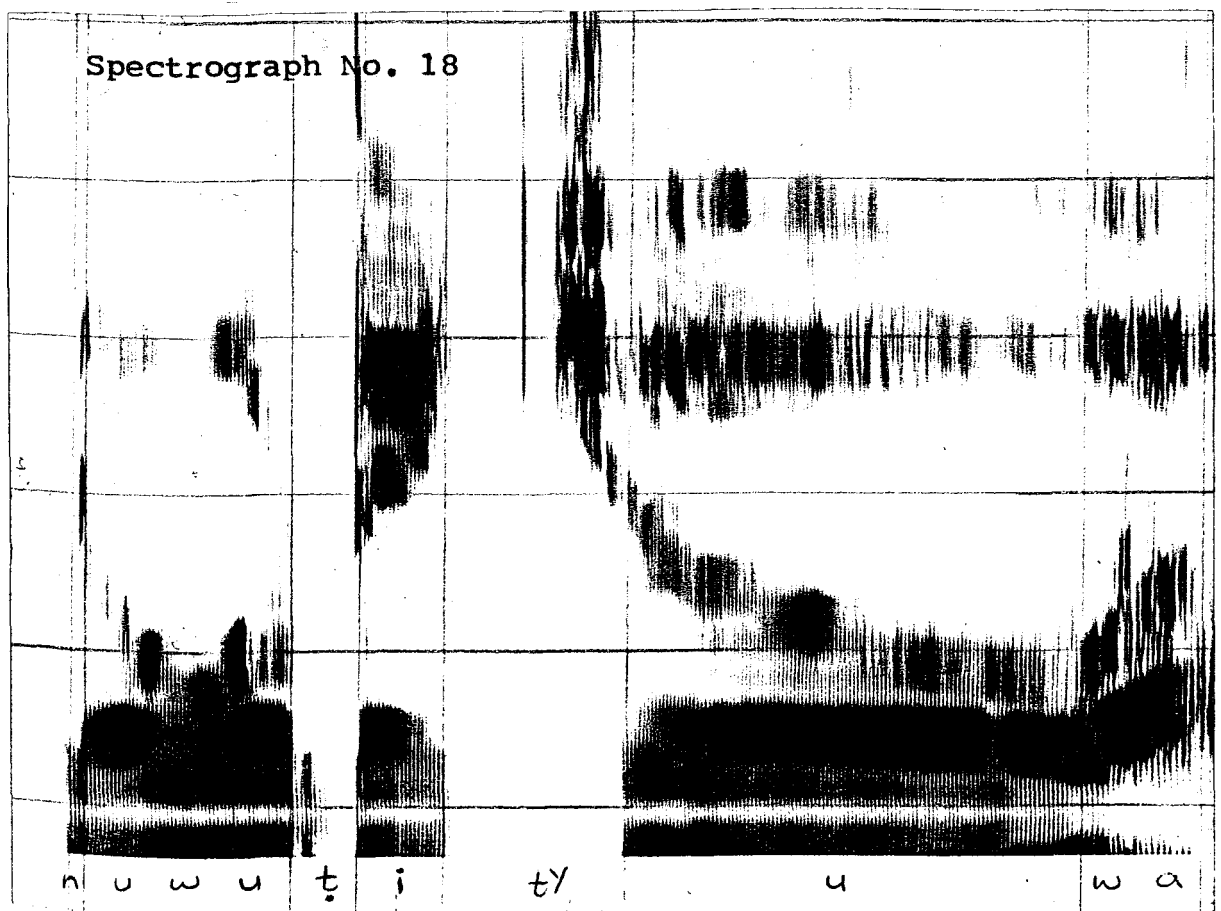
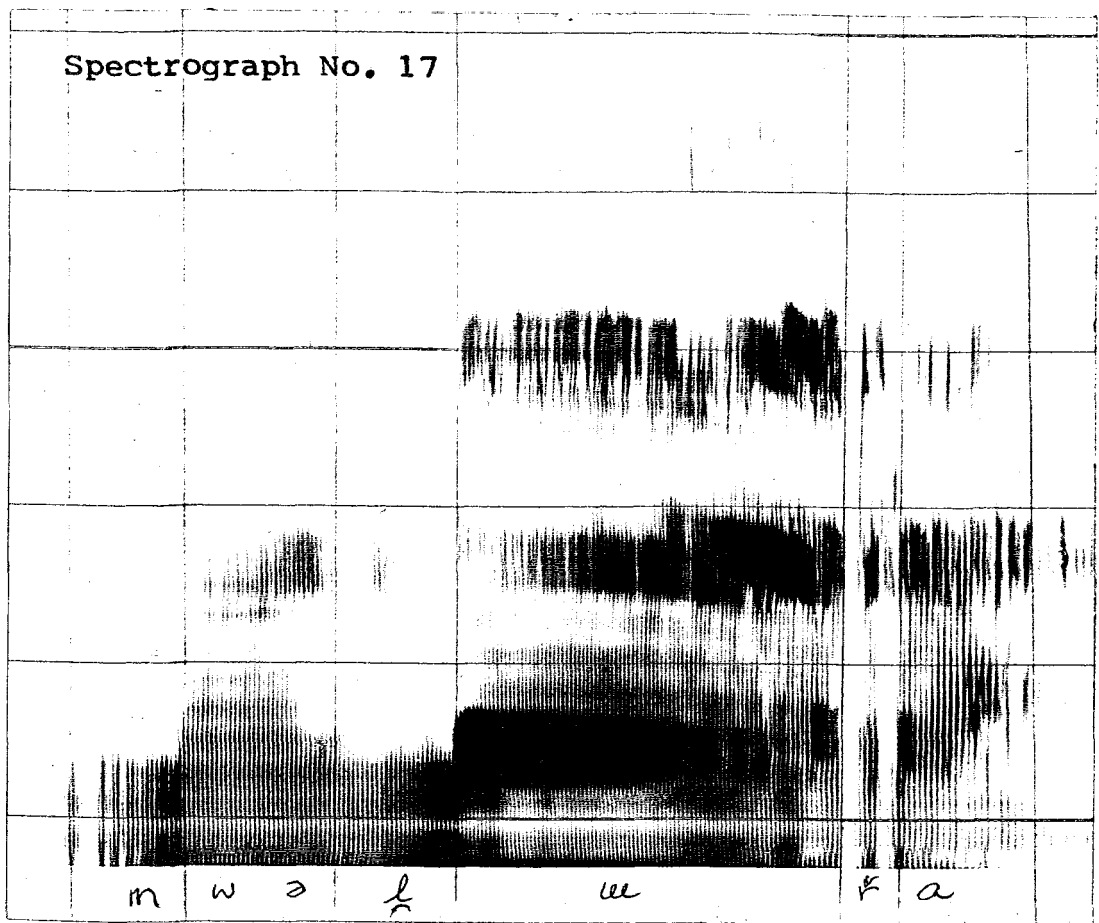
/mʷilk̪wa/ [mʷulk̪wa]

'stomach'

/men̪pa/ [men̪pa]

'eye'

The allophone [t] in syllable final position also occurs in



the loanword, /p<sup>w</sup>itp<sup>w</sup>ila/ [p<sup>w</sup>utp<sup>w</sup>ula] 'ball', used mainly at Angurugu.

The assignment of the alveolar preceding a stop to the alveolar series has been rejected because, apart from /n/, all occurrences of the alveolars are in loanwords.

(ii) The interdental allophone occurs elsewhere, i.e., initially and intervocalically.

/l̥aka/	[l̥aka]	'is it ready?'
/aŋ <sup>w</sup> ala/	[aŋ <sup>w</sup> ala]	'mud crab'

#### 4.2.5 Laminals

The lamino-palatal consonants are articulated with the tongue blade on the alveo-palatal ridge and with the tongue tip usually behind the lower teeth. The tongue tip is occasionally between the teeth.

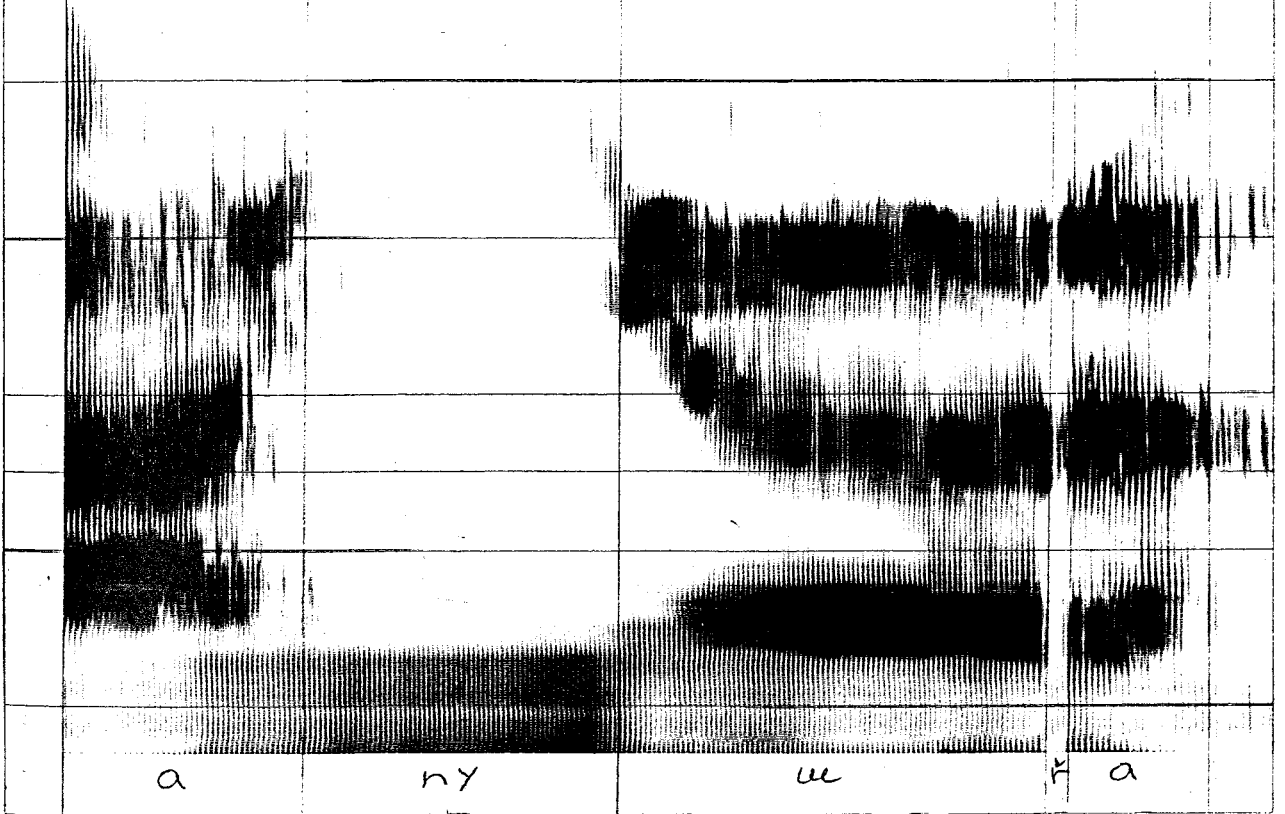
The lamino-palatal consonants usually have an offglide as shown in the following spectrographs. The offglide is sometimes so pronounced that it has been recorded as a transitional [i].

No.18	/tʲ/	/niwiṭitʲiwa/	[nuwuṭitʲuwa]	'to put onto'
No.19	/nʲ/	/anʲiʃa/	[anʲuʃa]	'mucus'
No.20	/lʲ/	/ṭilʲap <sup>w</sup> iŋṭa/	[ṭilʲap <sup>w</sup> əŋṭa]	'frog (gen.)'

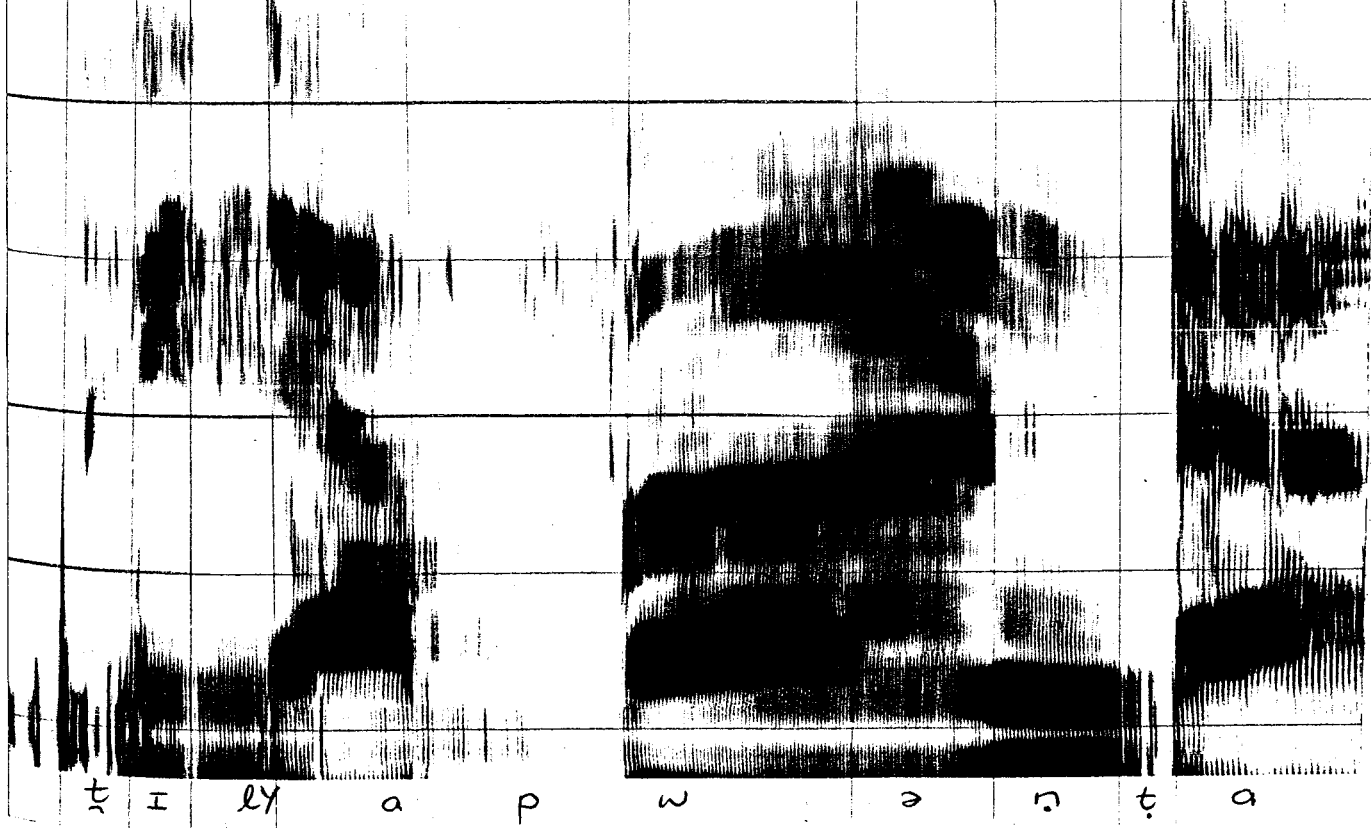
#### 4.2.6 Rounded consonants

The feature of labialization is considered to be a secondary feature in Ladefoged (1971: 59ff.). He suggests that, in cases of double articulators with two equal degrees of stricture, the action of the lips be regarded as secondary articulation. He adds that "these points can be handled by having two additional places of

Spectrograph No. 19



Spectrograph No. 20



articulation and another feature" (1971: 65), as shown on Chart No.4.

The rounding of the labialised consonants, /p<sup>w</sup>, m<sup>w</sup>, k<sup>w</sup>, ŋ<sup>w</sup>/, fits into the two categories noted by Ladefoged (1971: 62): "... it may be necessary to consider two different kinds of lip rounding. It is possible to form a small lip aperture by bringing the lips together vertically, so that the side portions are in contact, but there is a gap in the center". The consonants, [k<sup>w</sup>, ŋ<sup>w</sup>] are usually rounded according to the first kind (lip rounding or protrusion). The consonants, [p<sup>w</sup>, m<sup>w</sup>], are rounded according to the first kind if the initial consonant of the following syllable is also a rounded consonant. Variation between both kinds (lip protrusion and compression) occurs when the following syllable begins with a consonant other than a rounded consonant. (See Section 8 for further details of the interaction of rounded consonants and vowels.) Lip protrusion co-occurs with a following rounded vowel allophone [u, ɔ, ɒ] and lip compression co-occurs with unrounded vowel allophones [ɪ, ə]. (See Sections 6-8.)

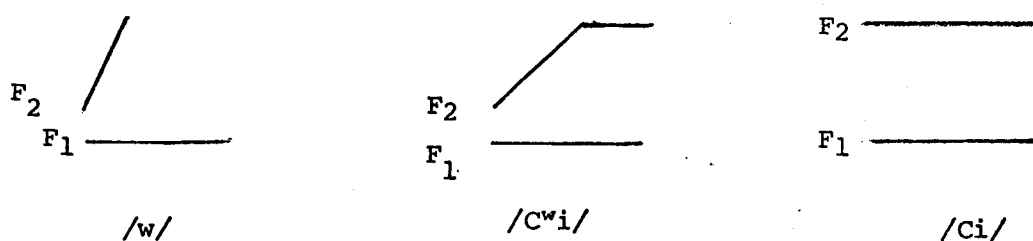
/am <sup>w</sup> iŋk <sup>w</sup> iřa/	[am <sup>w</sup> uŋk <sup>w</sup> (u/ɔ)řa]	'cheek'
/wiřak <sup>w</sup> ak <sup>w</sup> a/	[wuřak <sup>w</sup> ɔk <sup>w</sup> a]	(clan name)
/aŋ <sup>w</sup> iřa/	[aŋ <sup>w</sup> uřa]	'fire'
/m <sup>w</sup> ik <sup>w</sup> im <sup>w</sup> ik <sup>w</sup> a/	[m <sup>w</sup> uk <sup>w</sup> um <sup>w</sup> uk <sup>w</sup> a]	'deep sea'
/am <sup>w</sup> iŋm <sup>w</sup> iřa/	[am <sup>w</sup> uŋm <sup>w</sup> uřa]	'crayfish'
/a <sub>l</sub> ap <sup>w</sup> iřa/	[a <sub>l</sub> ap <sup>w</sup> əřa]	'bark'

Lip rounding, whether protrusion or compression, may be sequential or simultaneous. It always co-occurs with the vowel [u].<sup>8</sup> The difference between sequential and simultaneous rounding was, at first, transcribed phonetically as free variation of [k] and [k<sup>w</sup>] and [ŋ] and [ŋ<sup>w</sup>] preceding [u]. This was incorrect. What was phonetically transcribed as [ku] is [k<sup>w</sup>u] with simultaneous rounding. This discovery reduced

extensive free variation between the phonemes /k/ and /k<sup>w</sup>/, and /ŋ/ and /ŋ<sup>w</sup>/ to a few words (preceding [a]) and led to the positing of extensive allophonic variation for the phonemes /k<sup>w</sup>/ and /ŋ<sup>w</sup>/ viz., free variation between sequential or simultaneous lip rounding. The simultaneous rounding is apparent when actually watching the native speaker. In listening to recorded data, the simultaneous rounding is perceived, not by listening for the sequential offglide, but by the rounded quality of the following vowel. Lip rounding is usually sequential preceding the clear vowels, [a, e, i].

/ak <sup>w</sup> alʔa/	[ak <sup>w</sup> alʔa]	'fish (gen.)'
/m <sup>w</sup> ik <sup>w</sup> ena/	[m <sup>w</sup> uk <sup>w</sup> ena]	'sweat'
/am <sup>w</sup> iŋ <sup>w</sup> inʔa/	[am <sup>w</sup> uŋ <sup>w</sup> inʔa]	'soft'

The spectrographs attest the rounding of the bilabial rounded consonants, /p<sup>w</sup>, m<sup>w</sup>/ as well as /w, k<sup>w</sup>, ŋ<sup>w</sup>/. English-speaking non-aboriginals have great difficulty in recognising the rounding of bilabials (Lithgow 1977: 3 ). In the following spectrographs, it should be noted that the native speaker has deliberately slowed down the articulation of rounded consonants in the penultimate syllable in order to draw my attention to their phonetic quality. The contrastive patterns of the spectrographs depend on the rise in the second formant which correlates with a reduction in lip rounding.



The following spectrographs illustrate the contrasts between the rounded consonants, /p<sup>w</sup>, m<sup>w</sup>, k<sup>w</sup>, ŋ<sup>w</sup>/ and their unrounded counterparts.

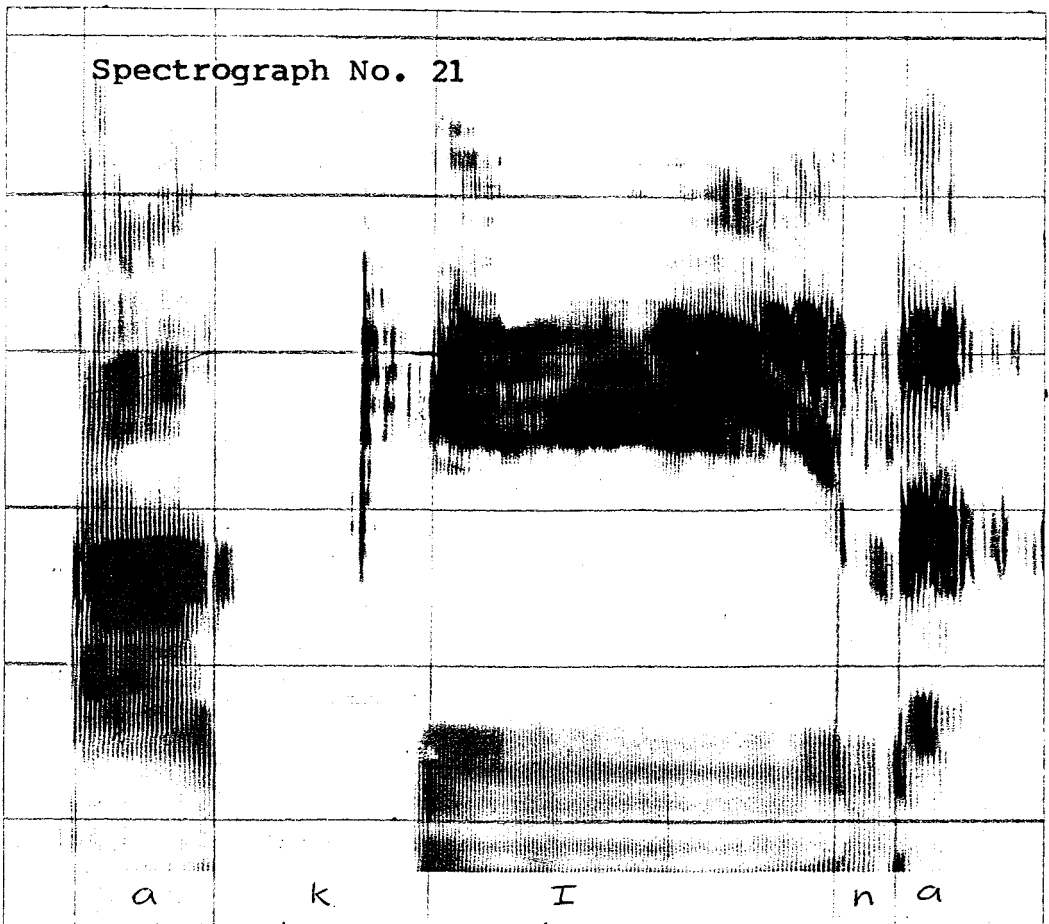
An example of [w] is included to show the similarity between the approximant and the sequential release of the other rounded consonants. The consonants are in initial and medial word positions.

No.

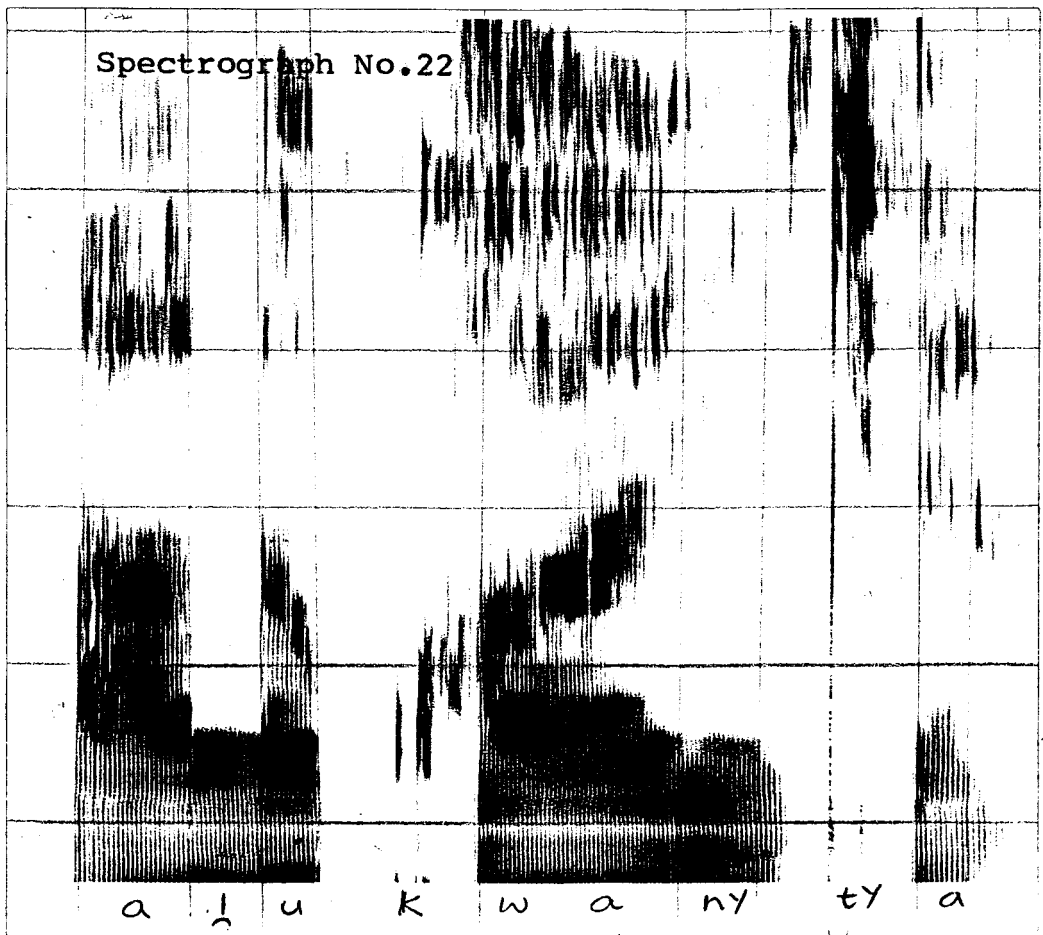
21	/k/	/akina/	[akina]	'that'
22	/k/	/alik <sup>w</sup> an <sup>ɥ</sup> ɬa/	[aluk <sup>w</sup> a <sup>ɥ</sup> n <sup>ɥ</sup> ɬa]	'dance'
23	/k <sup>w</sup> /	/memiřik <sup>w</sup> iřa/	[memiřuk <sup>w</sup> uřa]	'white yam'
24	/k <sup>w</sup> /	/k <sup>w</sup> impam <sup>w</sup> iřa/	[k <sup>w</sup> umpam <sup>w</sup> uřa]	'fish (sp.)'
25	/k <sup>w</sup> /	/k <sup>w</sup> it <sup>ɥ</sup> a/	[k <sup>w</sup> it <sup>ɥ</sup> a]	'hey, look!'
26	/ŋ/	/aŋiŋ <sup>ɬ</sup> a/	[aŋəŋ <sup>ɬ</sup> a]	'chin'
27	/ŋ <sup>w</sup> /	/aŋ <sup>w</sup> iŋ <sup>ɬ</sup> a/	[aŋ <sup>w</sup> uŋ <sup>ɬ</sup> a]	'ankle'
28	/ŋ <sup>w</sup> /	/ap <sup>w</sup> iŋ <sup>w</sup> iřa/	[ap <sup>w</sup> uŋ <sup>w</sup> uřa]	'stupid'
29	/ŋ <sup>w</sup> /	/aŋ <sup>w</sup> in <sup>ɥ</sup> a/	[aŋ <sup>w</sup> in <sup>ɥ</sup> a]	'pus'
30	/p/	/a <sup>ɤ</sup> aŋpiřa/	[a <sup>ɤ</sup> aŋpiřa]	'fish (sp.)'
31	/p/	/ŋařiyak <sup>w</sup> eřipika/	[ŋařiyak <sup>w</sup> eřipika]	'to remember'
32	/p <sup>w</sup> /	/yiniŋp <sup>w</sup> ina/	[yiniŋp <sup>w</sup> əna]	'sea snake'
33	/p <sup>w</sup> /	/aŋkap <sup>w</sup> iřa/	[aŋkap <sup>w</sup> əřa]	'who?'
34	/p <sup>w</sup> /	/yip <sup>w</sup> i <sup>ɤ</sup> a <sup>ɤ</sup> /	[yip <sup>w</sup> u <sup>ɤ</sup> a <sup>ɤ</sup> ]	'kangaroo'
35	/m/	/yiniŋk <sup>w</sup> eřimiřa/	[yiniŋk <sup>w</sup> eřimiřa]	'sea snake'
36	/m <sup>w</sup> /	/t <sup>ɥ</sup> im <sup>w</sup> ik <sup>w</sup> im <sup>w</sup> iřa/	[t <sup>ɥ</sup> um <sup>w</sup> uk <sup>w</sup> um <sup>w</sup> əřa]	'beetle (gen.)'
37	/w/	/t <sup>ɥ</sup> iwe <sup>ɤ</sup> t <sup>ɥ</sup> iřa/	[t <sup>ɥ</sup> uwə <sup>ɤ</sup> t <sup>ɥ</sup> əřa]	'cockatoo'
38	/m <sup>w</sup> /	/am <sup>w</sup> it <sup>ɥ</sup> iřa/	[am <sup>w</sup> it <sup>ɥ</sup> əřa]	'money'
39	/m <sup>w</sup> /	/kiřam <sup>w</sup> iŋ <sup>ɬ</sup> akakina/	[kiřam <sup>w</sup> əŋ <sup>ɬ</sup> akakina/	'those there'

(Note: In the initial syllable of spectrograph No.21, the rounding of /k<sup>w</sup>/ is simultaneous and does not show on the spectrograph.)

Spectrograph No. 21

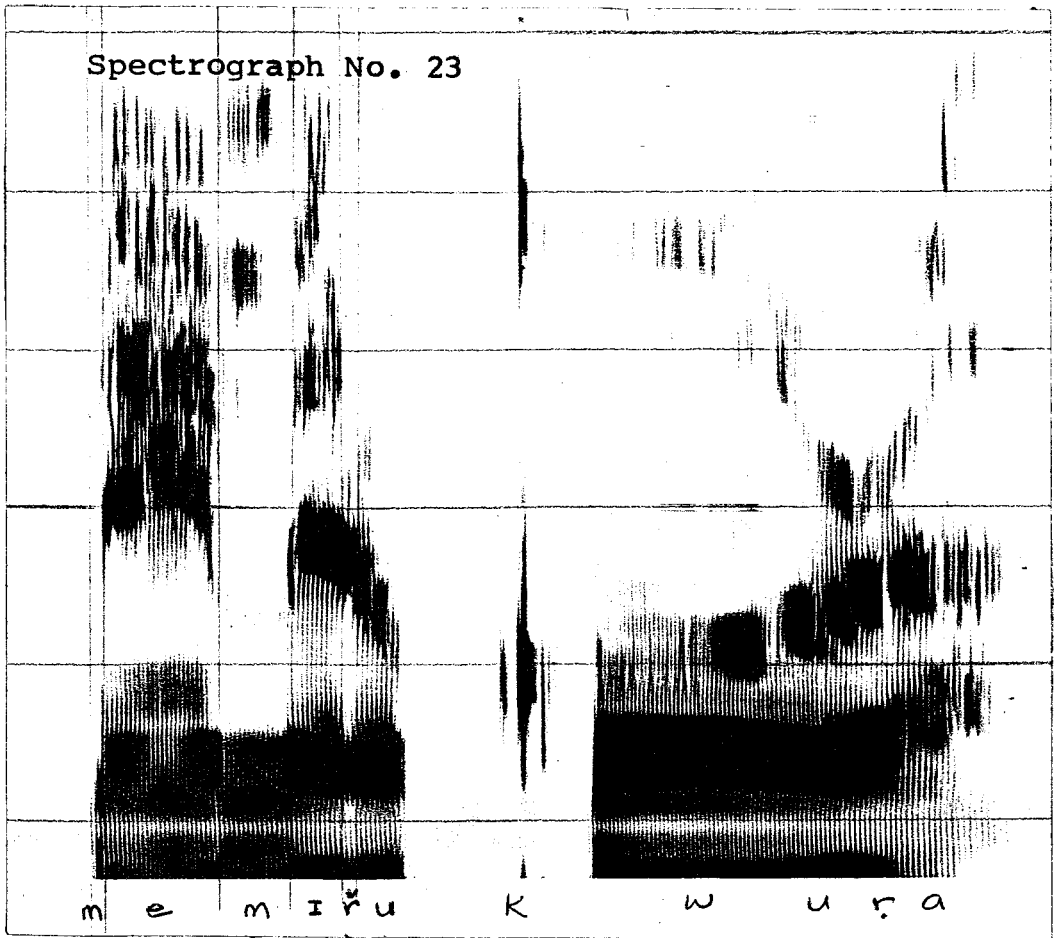


Spectrograph No. 22

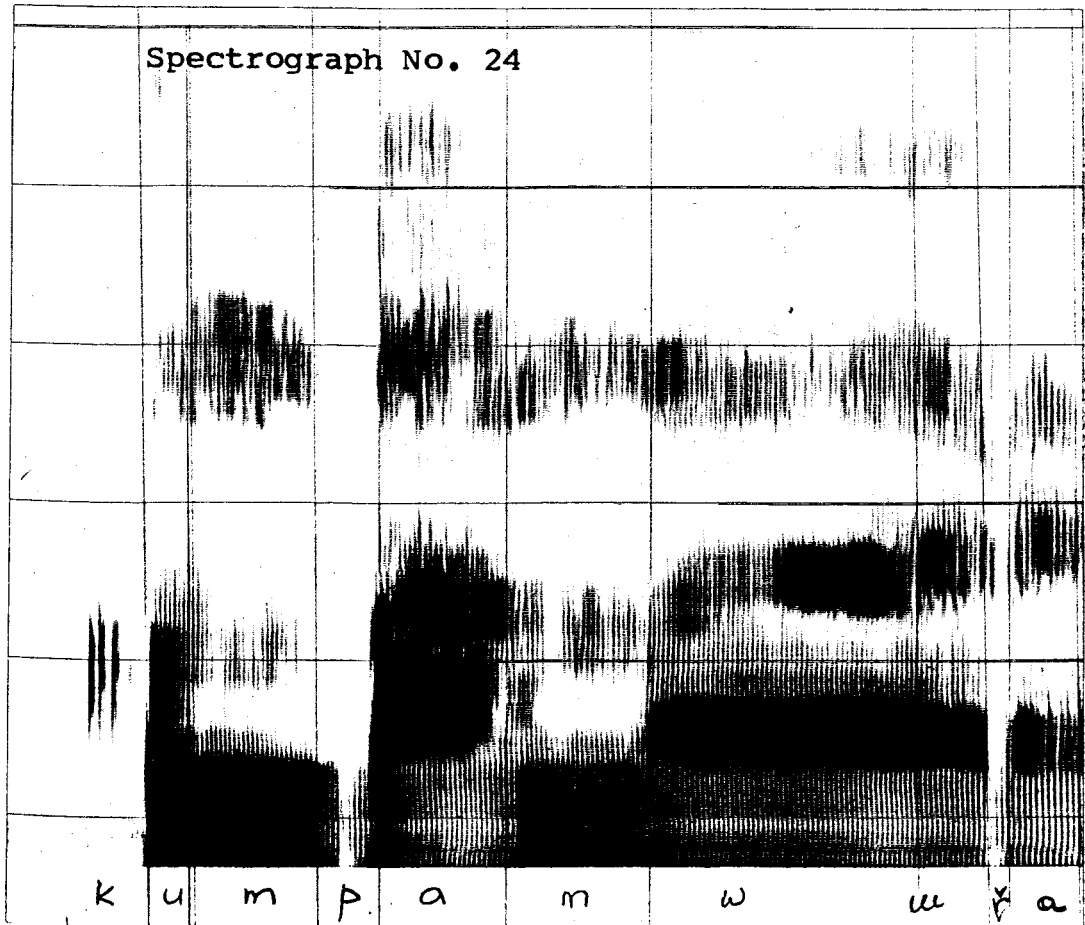




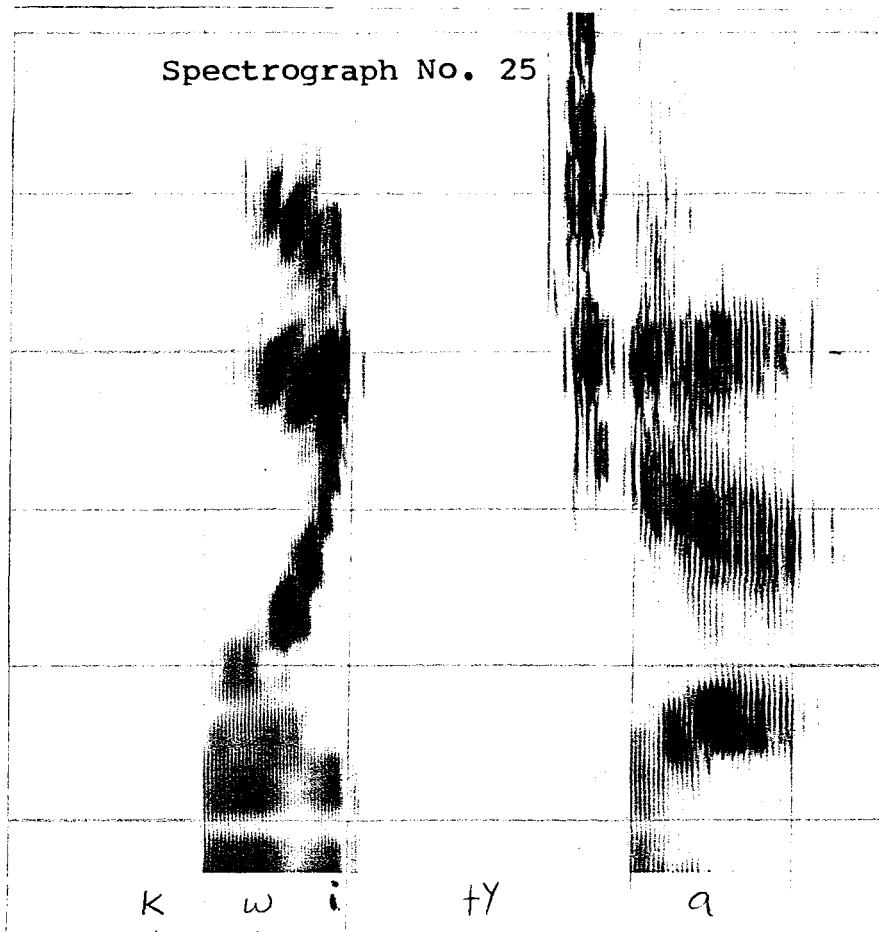
Spectrograph No. 23



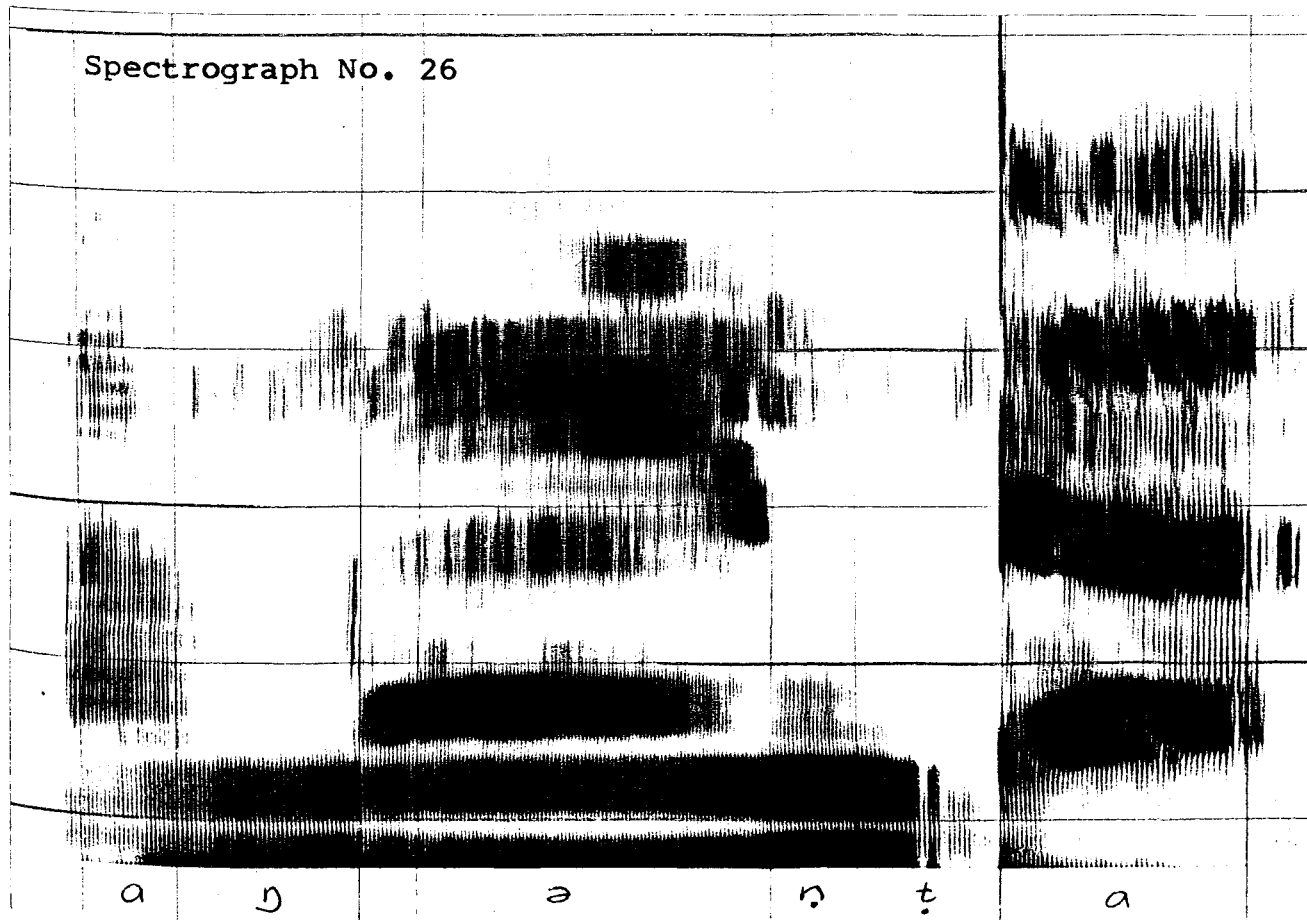
Spectrograph No. 24



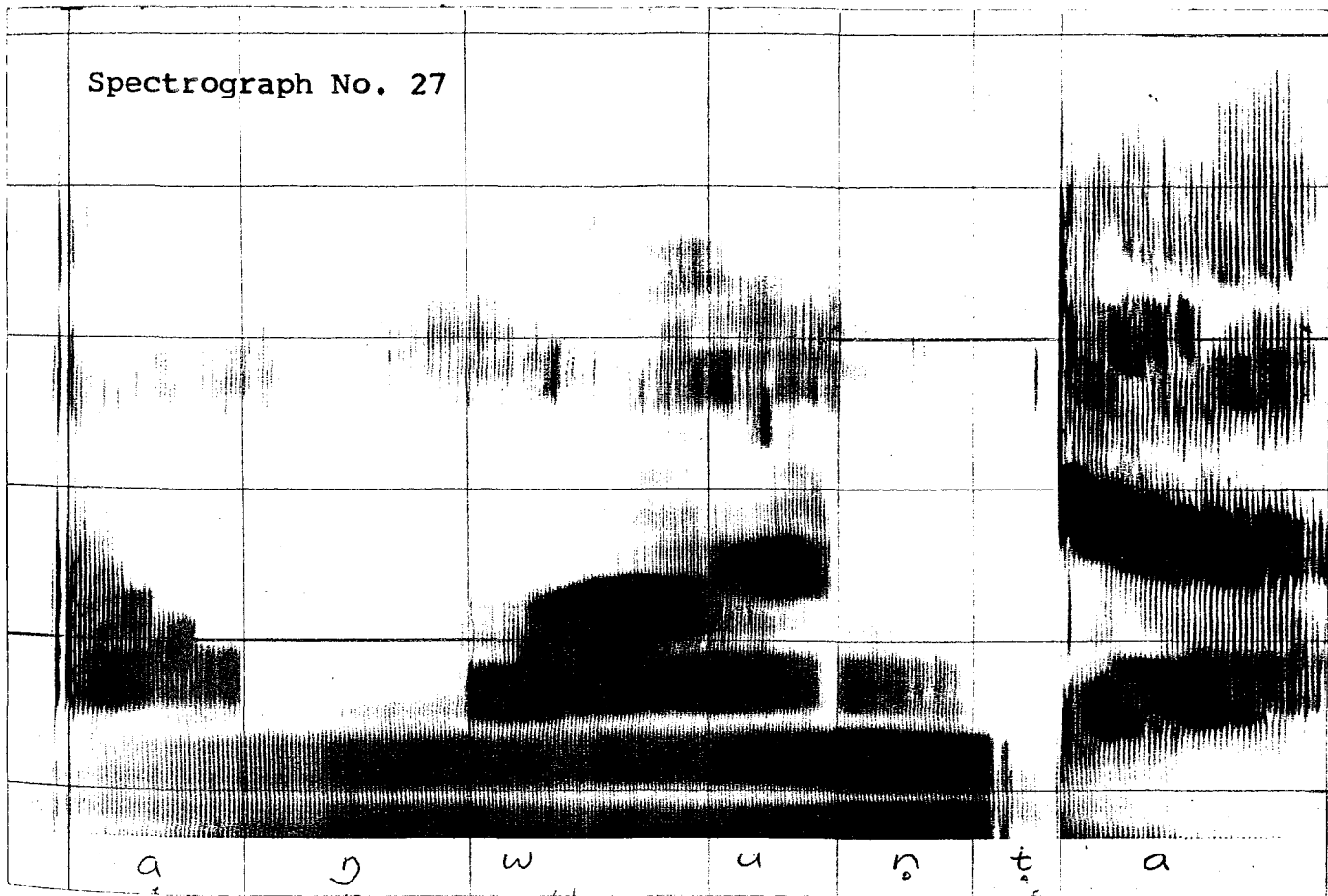
Spectrograph No. 25



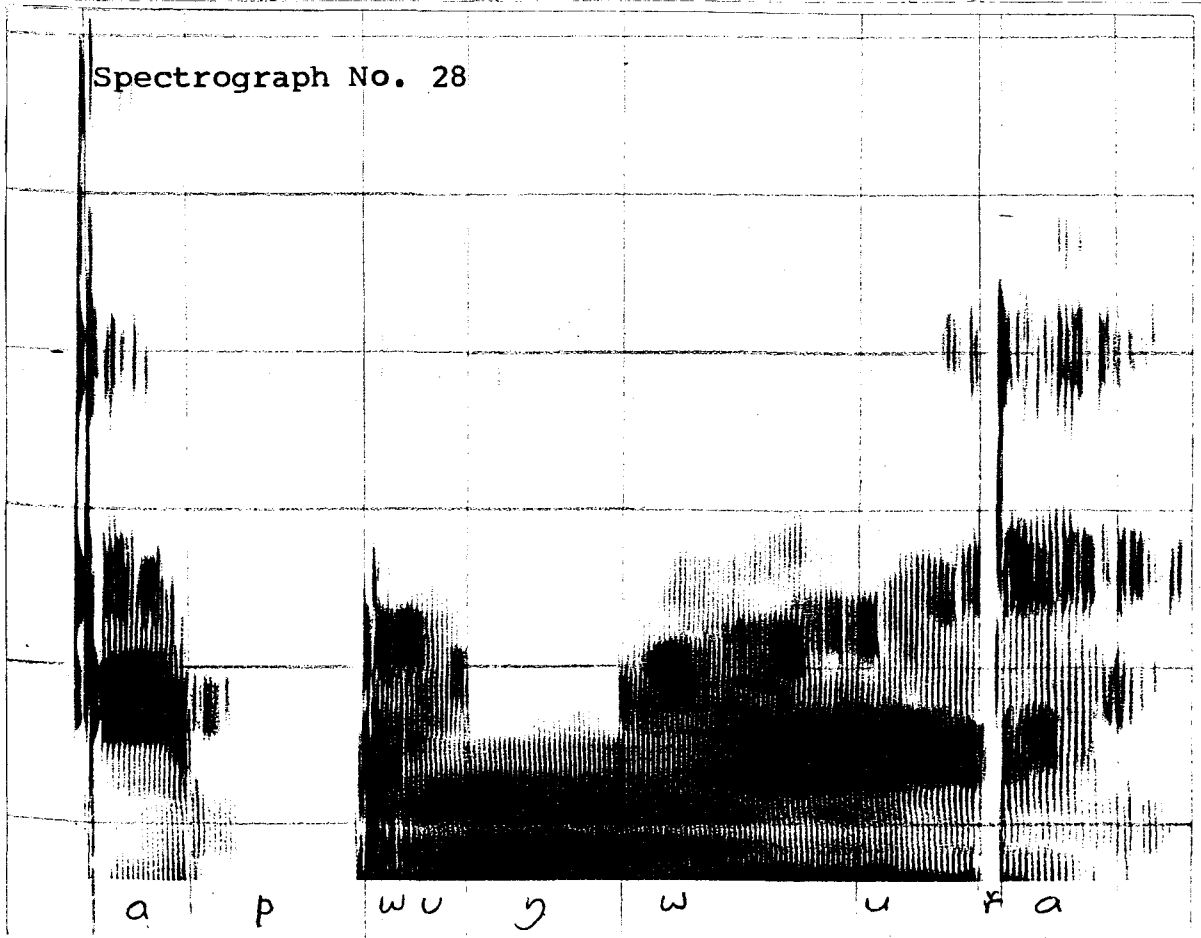
Spectrograph No. 26



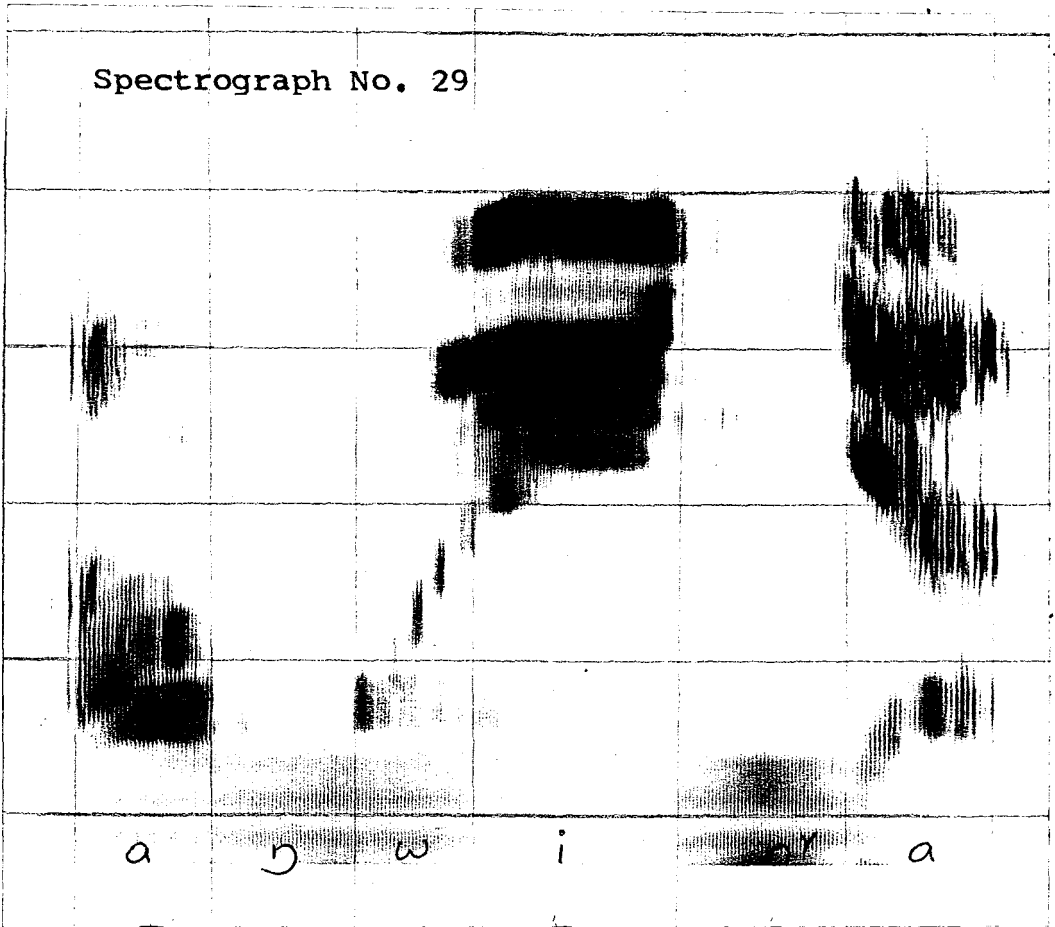
Spectrograph No. 27



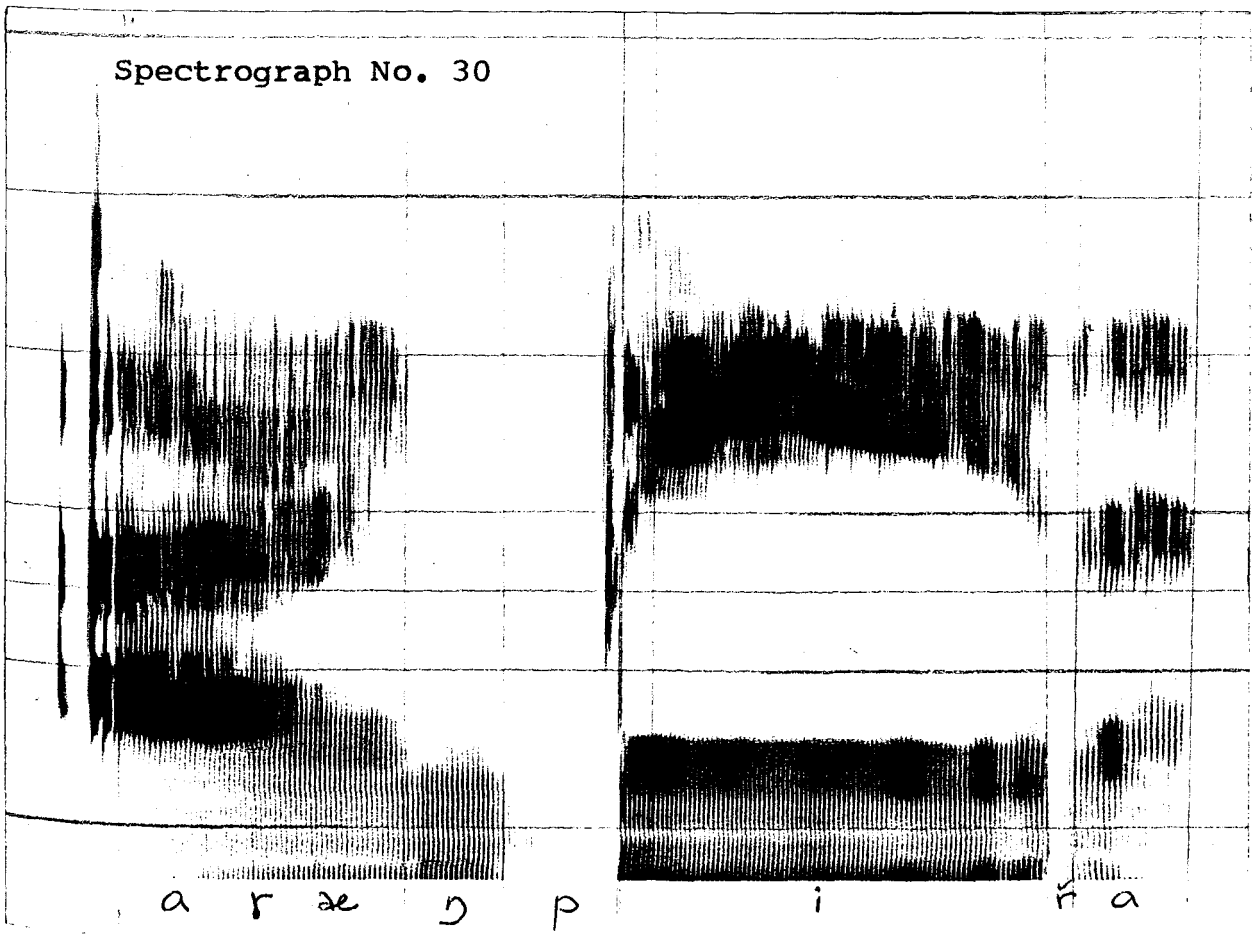
Spectrograph No. 28



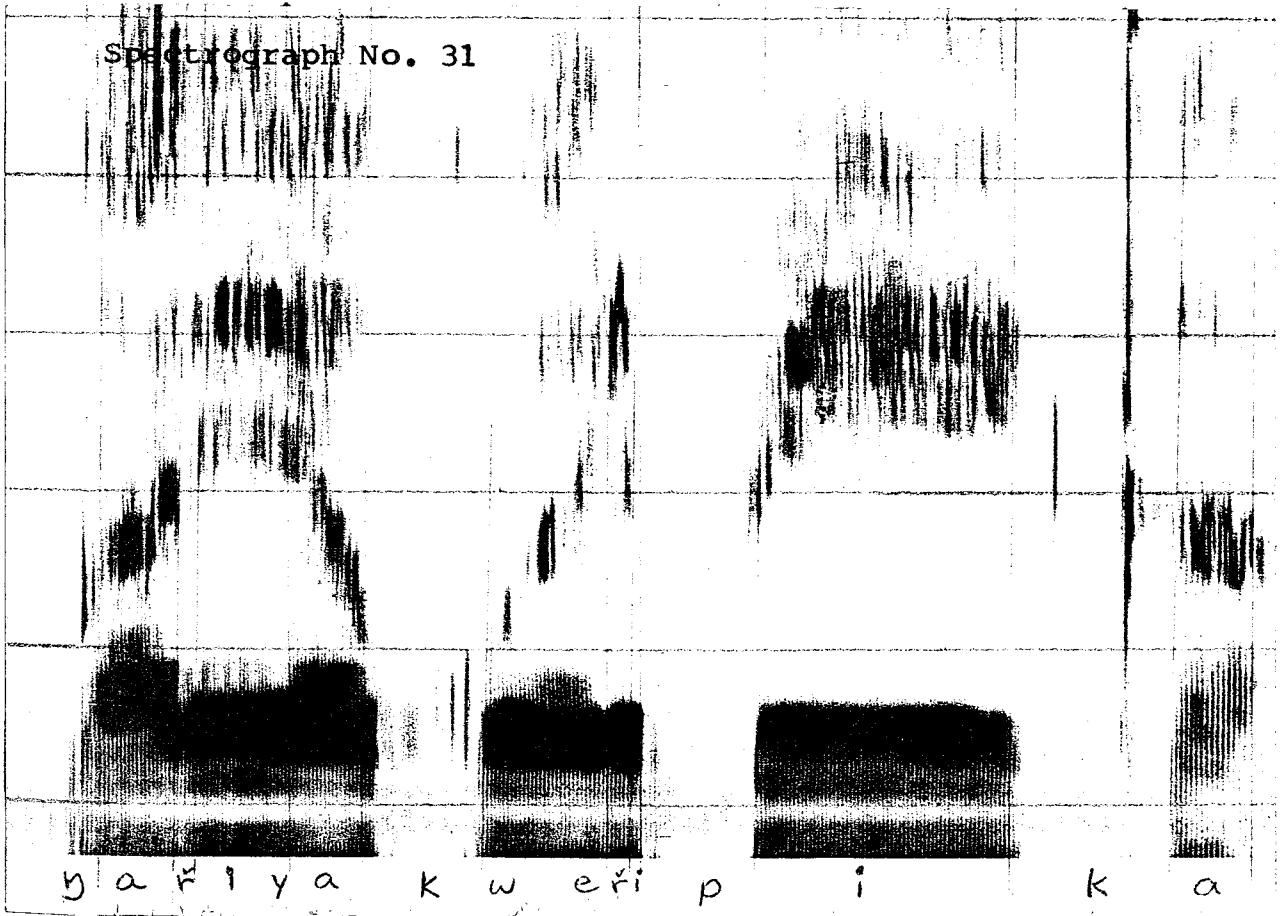
Spectrograph No. 29



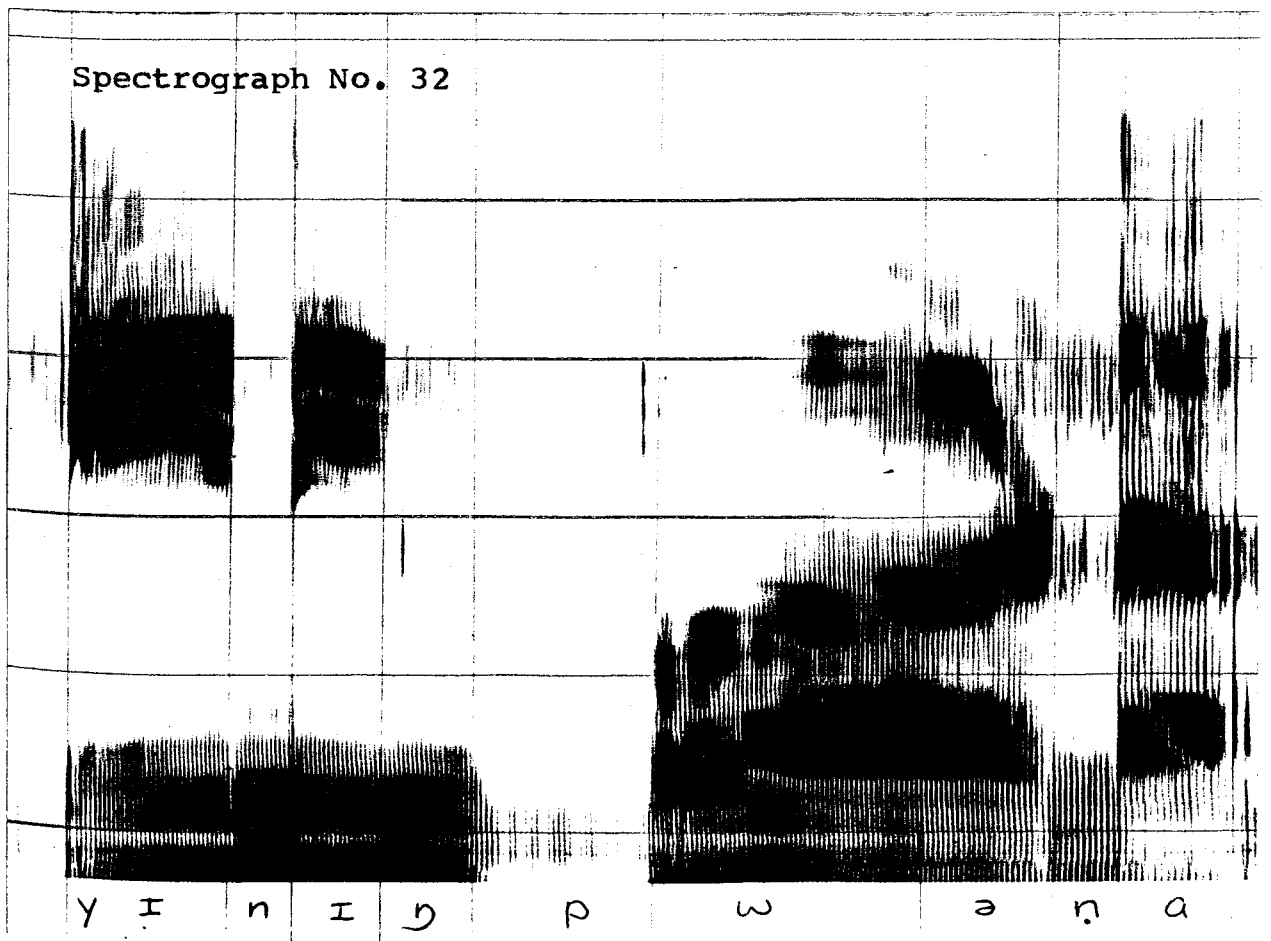
Spectrograph No. 30



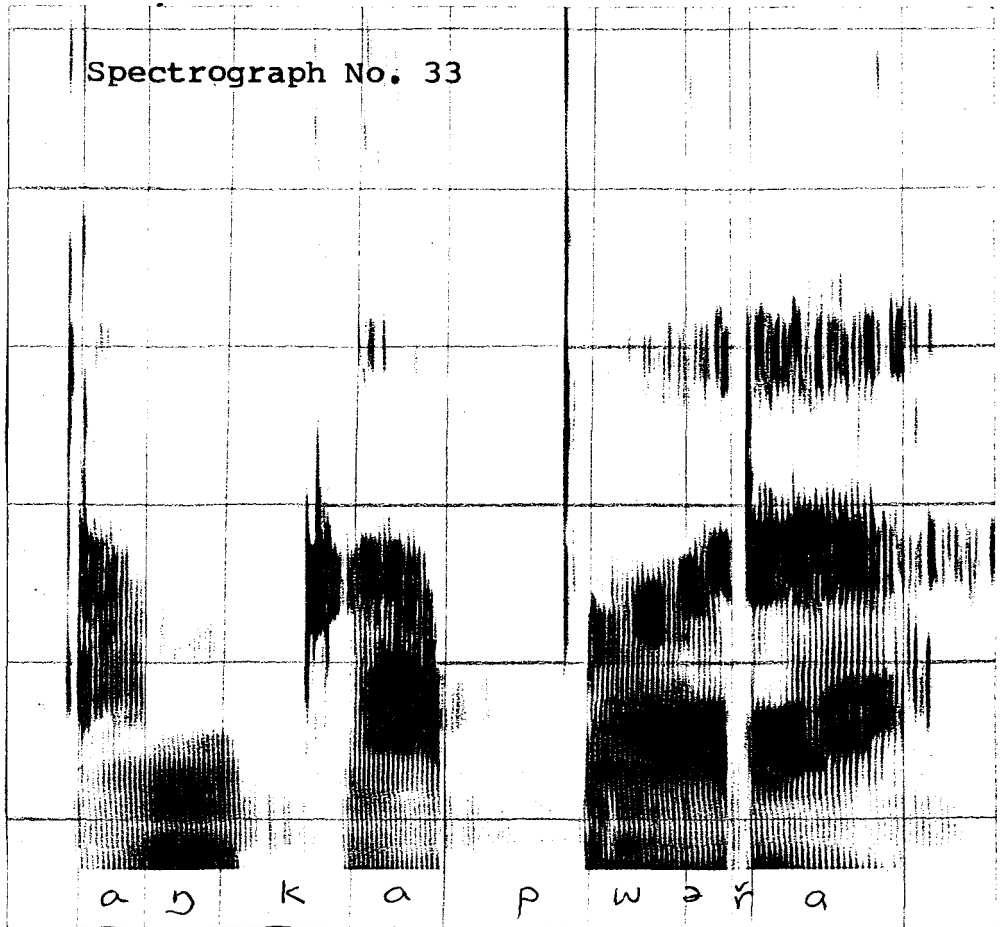
Spectrograph No. 31



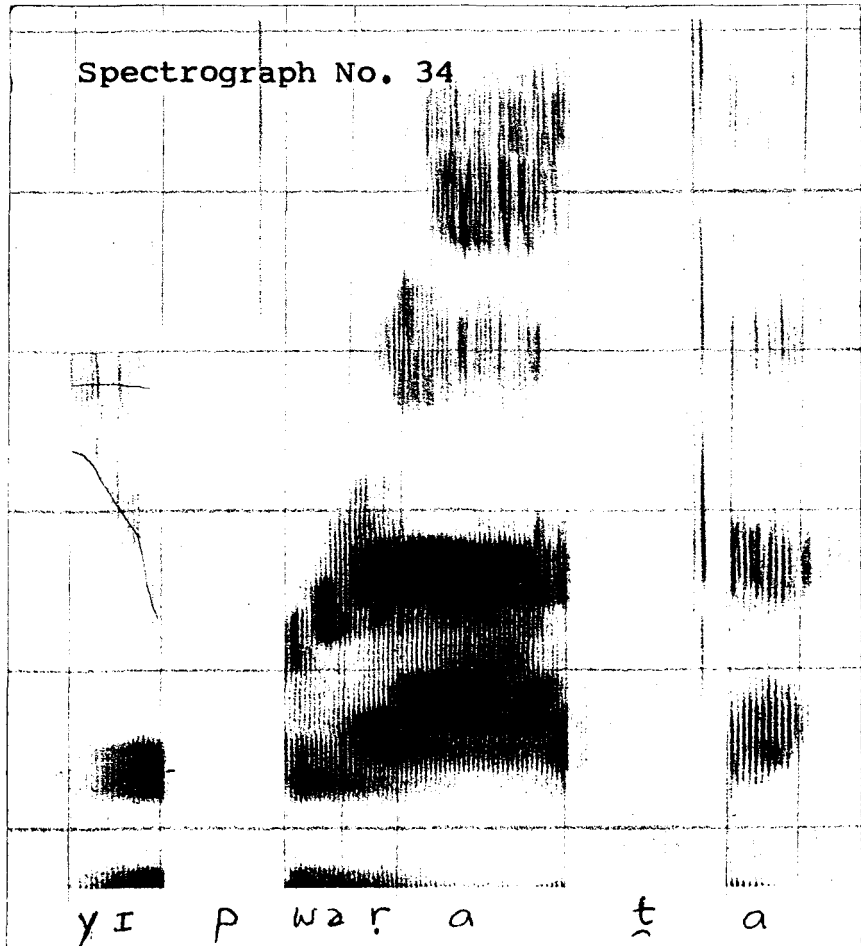
Spectrograph No. 32



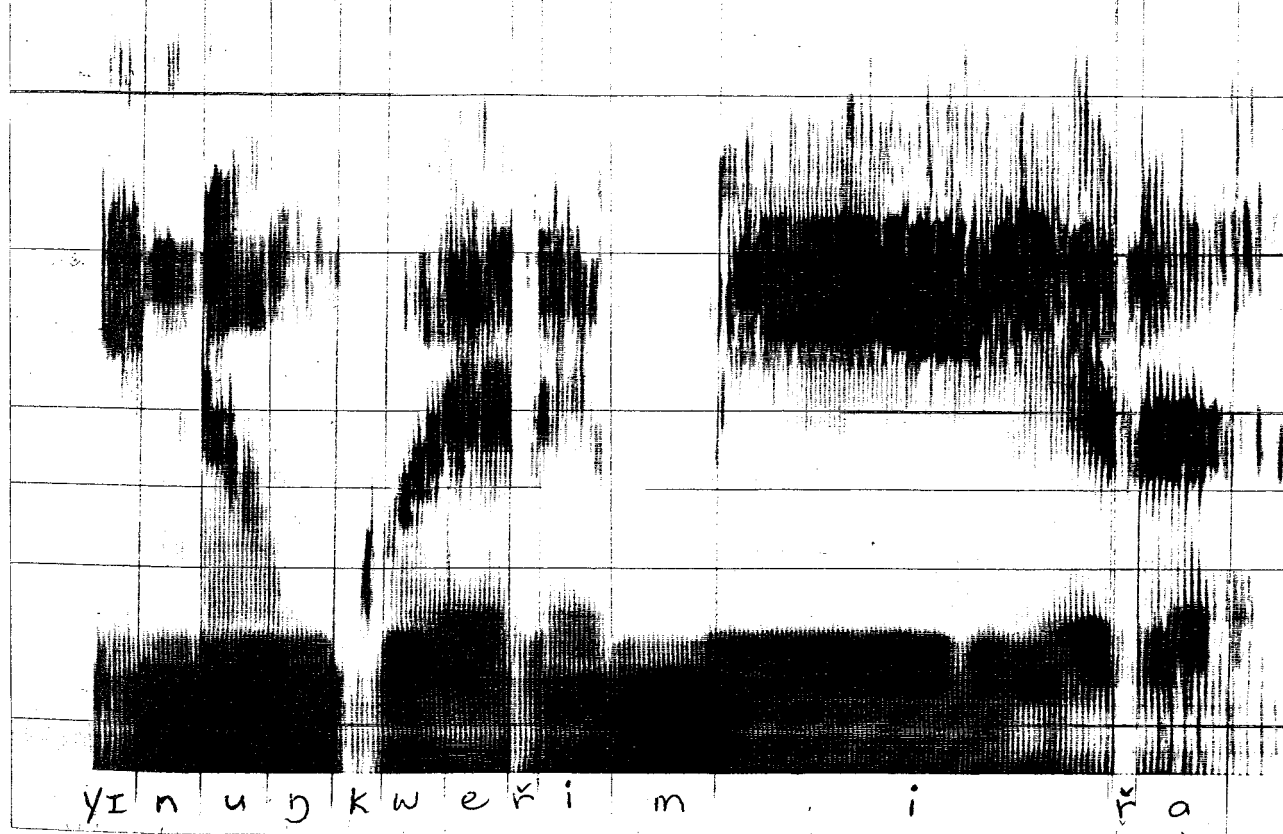
Spectrograph No. 33



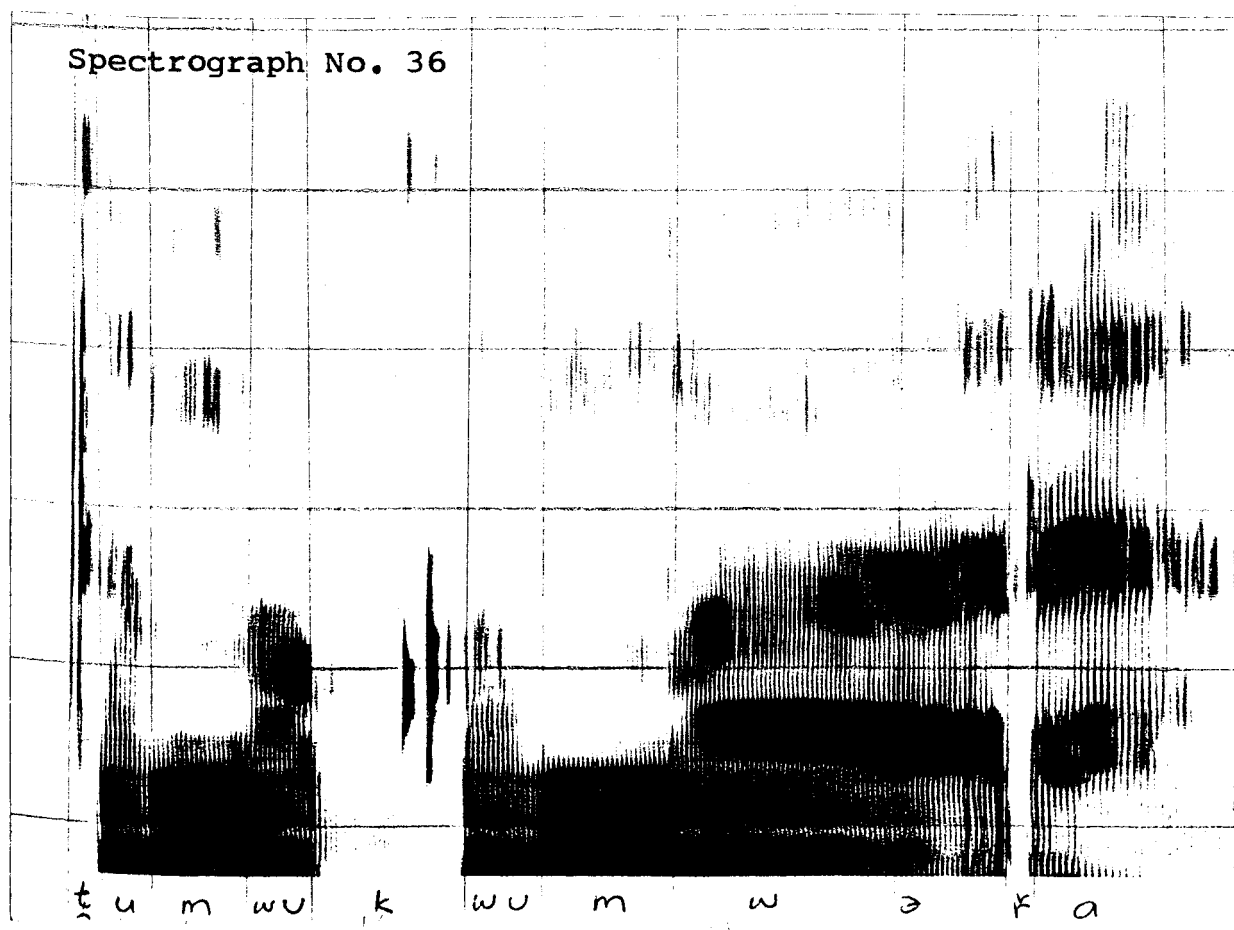
Spectrograph No. 34



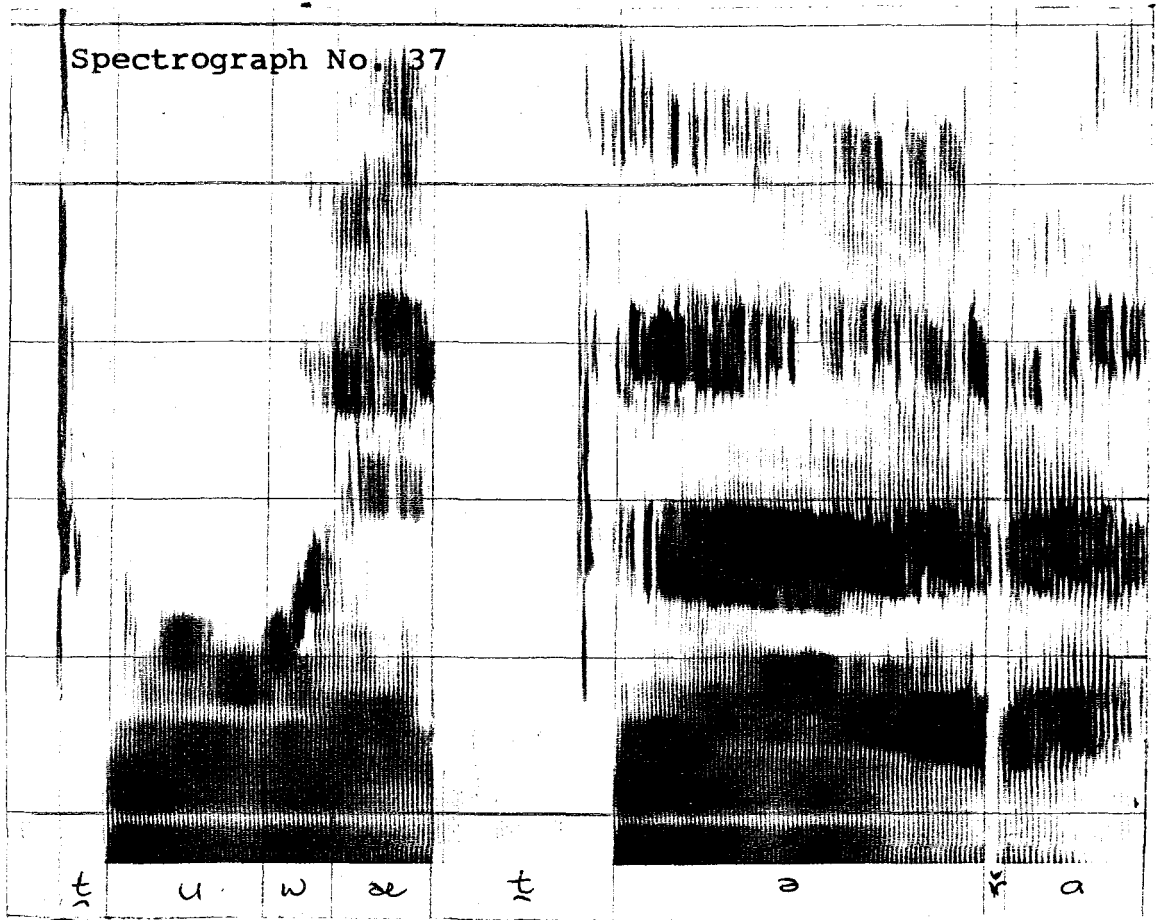
Spectrograph No. 35



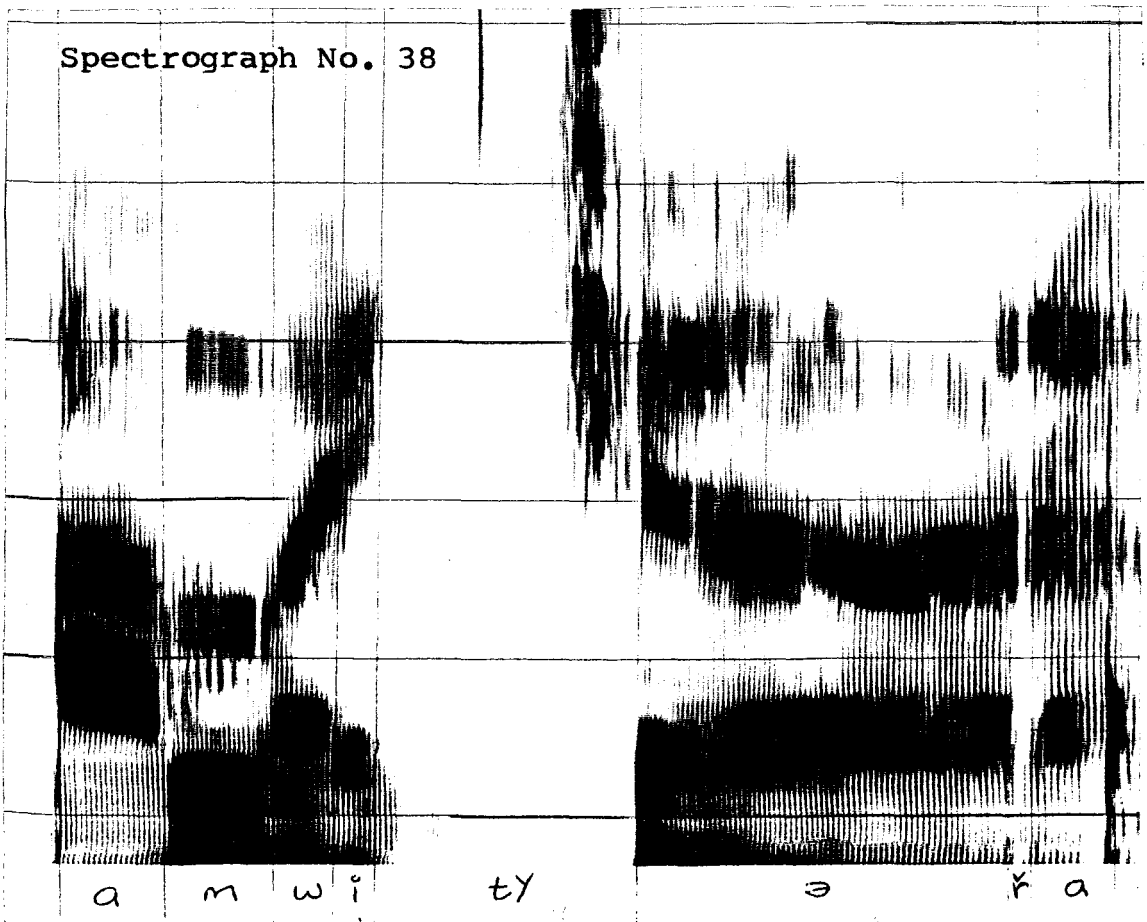
Spectrograph No. 36



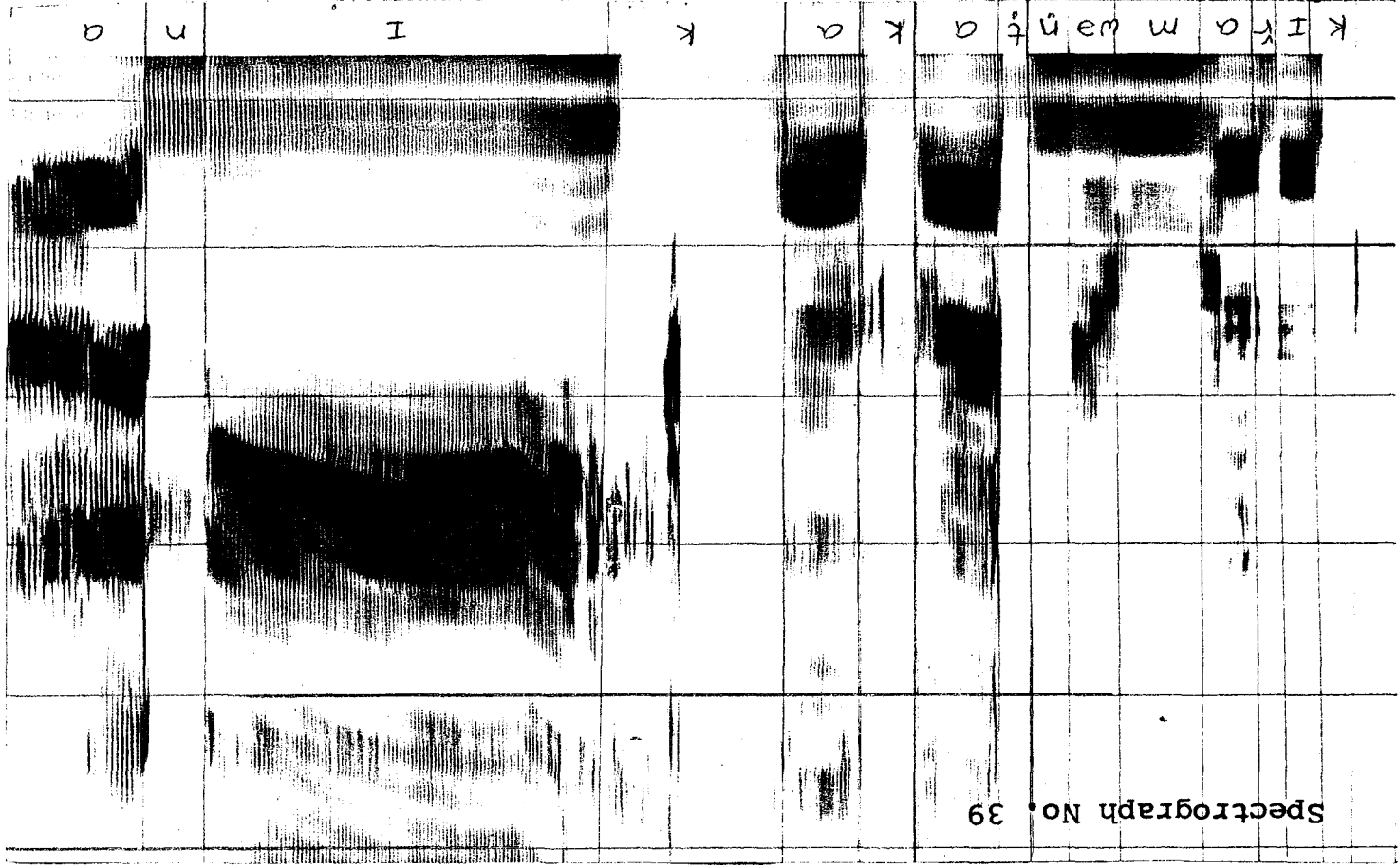
Spectrograph No. 37



Spectrograph No. 38







### 4.3 Phonemic variation

Consonantal variation between phonemes falls into two main groupings:

- (a) between single phonemes
- (b) in consonant clusters

The variation can be regarded as free variation and as being mainly due to factors of assimilation, elision, simplification and metathesis.

Phonemic variation between consonants occurs most commonly when a nasal or a lateral is one of the variants (manner of articulation) or when a laminal or a retroflex is one of the variants (point of articulation). Sonorants vary more than obstruents, and usually with each other. The variation occurs in approximately 5% of the dictionary entries, causing variant phonemic transcriptions.

Regular sounds shifts occur between the two communities but, with so much intermarriage and travel, both forms could probably be found in each community. The older people, however, still attribute specific usage to one or other of the communities.

#### 4.3.1 Variation between single phonemes

In Chart 5, variation has been recorded between phonemes where X has been entered. The contrast between two laminals or two retroflexes could be said to neutralise to /y/ and /ɾ/, respectively.

CHART 5Phonemic variation between consonants

	n <sup>y</sup>	l <sup>y</sup>	t̃	ñ	l̃	t	l	ʃ	ṇ	ḷ	w
t <sup>y</sup>			x								
y	x	x	x		x						
l̃				x				x			
l		x						x		x	
ṭ						x					
ṛ							x	x	x	x	
ŋ <sup>w</sup>											x

## (i) Fall variation (including regular sound shifts)

There are three regular sound shifts between the communilects. (See last paragraph Section 4.3.) The change, however, only occurs in some specific words.

The most common shift is between /l<sup>y</sup>/ at Umbakumba and /l̃/ at Angurugu.

/aḷɪnaṭɪiʃiʃa/	(Umb)	)	
		)	'long'
/aḷɪnaṭɪiʃiʃa/	(Ang)	)	
/aḷɪaʃaṭaṭa/	(Umb)	)	
		)	'dusk'
/aḷɪaʃaṭaṭa/	(Ang)	)	
/ṭiḷɪap̣ẉɪnṭa/	(Umb)	)	
		)	'frog (generic)'
/ṭiḷɪap̣ẉɪnṭa/	(Ang)	)	

There is another sound shift between /n/ at Umbakumba and /ṇ/ at Angurugu. It seems to occur mainly in the pronouns and in one verbal suffix. At Umbakumba, the common form for 'they (dual)' is now /epiniwa/ and not /ap̣ẉɪniwa/ as at Angurugu. This means that homophonous forms occur for 'to that ...' and 'they (dual)'

at Umbakumba whereas Angurugu has retained a phonemic contrast.

/ŋiŋk <sup>w</sup> inat <sup>v</sup> a/	(Umb)	)	
		)	'you (dual)'
/ŋiŋk <sup>w</sup> inat <sup>v</sup> a/	(Ang)	)	
/niŋilikenə/	(Umb)	)	
		)	'to go'
/niŋilikəna/	(Ang)	)	
/panamp <sup>w</sup> ila/	(Umb)	)	
		)	'headband' (Mac.)
/paŋamp <sup>w</sup> ila/	(Ang)	)	

The third regular sound shift is of a minor nature. In English loanwords, Umbakumba uses /ř/ and Angurugu /t/ or /t̥/. The Angurugu pronunciation is closer to that of English.

/miřit <sup>v</sup> ina/	(Umb)	)	
		)	'medicine'
/mitit <sup>v</sup> ina/	(Ang)	)	
/p <sup>w</sup> iřip <sup>w</sup> ila/	(Umb)	)	
		)	'ball'
/p <sup>w</sup> it̥p <sup>w</sup> ila/	(Ang)	)	

The following phonemes vary unsystematically in individual words. Where the word is regarded as belonging to the Angurugu communilect, it is marked (Ang). All known examples are listed.

Laminal ~ laminal/dental/alveolar

/t̥imapi(ɭ <sup>v</sup> /y)an̥taŋ <sup>w</sup> a/	/bird (sp.)'
/maki(ɭ <sup>v</sup> /y)an̥pařka/	'broom'
/ (ɭ <sup>v</sup> /y)al <sup>v</sup> iŋa/	'knife'
/yal <sup>v</sup> a(ɭ <sup>v</sup> /y)a/	'flying fox'
/mal <sup>v</sup> iřmil <sup>v</sup> a~mayiřmil <sup>v</sup> a (Ang)/	'red-collared lorikeet'
/ŋařapiřaŋpa(ɭ <sup>v</sup> /y)ina/	'to trick'
/awi(n <sup>v</sup> /y)empa/	'fighting'
/min <sup>v</sup> an̥awa~miyan̥awa (Ang)/	'stone-headed spear'
/mit̥iyal <sup>v</sup> a~mit <sup>v</sup> iyal <sup>v</sup> a (Ang)/	'beach'

/mamikiya <sub>l</sub> i(y/l)a/	'crab (sp.)'
/t <sub>l</sub> il <sub>l</sub> inə~yil <sub>l</sub> inə (Ang)/	'salt'
/yal <sup>ʋ</sup> ik <sup>w</sup> a~tal <sup>ʋ</sup> ik <sup>w</sup> a (Ang)/	'rain'
/(l <sup>ʋ</sup> /l)ipa(l <sup>ʋ</sup> /l)ipa/	'canoe' (Mac. lepalepa)

retroflex ~ retroflex/alveolar

/wa(r/ṛ)an <sup>ʋ</sup> t <sup>ʋ</sup> a/	'quickly'
/pa(r/l)iw <sup>ɪ</sup> řa/	'plant (sp.)'
/al <sup>ʋ</sup> aṇi(r/ř)iyat <sub>a</sub> /	'sulky'
/k <sup>w</sup> iya(r/ř)ir <sub>a</sub> /	'cyclone'
/ṇařit <sup>ʋ</sup> i(r/ř)apina/	'to fill, pour'
/mana(r/l)ampa/	'coolamon'
/lama~rama~lama/	'shovel-nosed spear' (Nung)
/pi(l/l)aṅkita/	'blanket' (Eng.)
/at <sub>i</sub> tařa~at <sub>i</sub> tařa (Ang)/	'hot'
/((t/t)itila/	'bell'
/((t/t)iya/	'tea' (Eng.)

dental ~ dental/alveolar

/a(l/ṇ)ima/	'mangrove'
/alp <sub>i</sub> l <sup>ʋ</sup> iřa~al <sup>ʋ</sup> ikařpil <sup>ʋ</sup> iřa/	'slippery'
/akpi(l/ř)k <sup>w</sup> iřariya/	'plains'
/mikpi(l/ř)kiya(l/ř)k <sup>w</sup> a/	'receding tide'
/ṇařik <sup>w</sup> inim <sup>w</sup> i(l/ř)k <sup>w</sup> i <sub>l</sub> ina/	'to be lying down'
/tik <sup>w</sup> ililiwawa~tik <sup>w</sup> i <sub>l</sub> ililiwawa/	'frill-necked lizard'

Rounded cons ~ rounded cons.

/aṇ <sup>w</sup> aṇ <sub>a</sub> ~awaṇ <sub>a</sub> /	'sandstone'
---	-------------

The phonemes /k/ and /k<sup>w</sup>/ vary in /yiřim<sup>w</sup>iṇ(k/k<sup>w</sup>)at<sub>i</sub>na/ 'to

dig' and at the morpheme boundary in such words as /ap<sup>w</sup>i(k/k<sup>w</sup>)a<sub>l</sub>akena/ 'those there'. This data needs checking before a definite decision can be made in view of the fact that simultaneous rounding was recorded as [-laŋa] for [-laŋ<sup>w</sup>a] but later corrected.

(ii) Assimilation

In a sequence of three consonants in open syllables across syllable boundaries, the middle consonant can assimilate to either the first or last consonant of the sequence. This variation occurs when the first and last consonants are both stops, or a velar stop and a laminal or alveolar. The variation usually occurs in three contiguous syllables but it can occur with an intervening syllable as well.

/tataka~takaka/	'this: D class'
/ak <sup>w</sup> ipipayika~akikipayika/	'drinkable fluid'
/ak <sup>w</sup> ititit <sup>ɪ</sup> ɪŋ <sup>w</sup> a~ak <sup>w</sup> itit <sup>ɪ</sup> ɪt <sup>ɪ</sup> ɪŋ <sup>w</sup> a/	'gate'
/wiřilik <sup>w</sup> ik <sup>w</sup> il <sup>ɪ</sup> ɪa~wiřilik <sup>w</sup> il <sup>ɪ</sup> ɪl <sup>ɪ</sup> ɪa/	'white ants'
/yakaka~yayaka/	'this: Y class'
/nakaka~nanaka/	'this: N class'
/ak <sup>w</sup> iri(k <sup>w</sup> /p)iripika/	'cannibalistic'

(iii) Elision

The semiconsonant /y/ in the word-initial sequence /ya/ may elide. The variation has only been recorded on adverbs, usually locatives.

/(y)atikina/	'from there'
/(y)ak <sup>w</sup> it <sup>ɪ</sup> ina/	'there'
/(y)aŋk <sup>w</sup> iřaŋ <sup>w</sup> a/	'to here'

/ (y) an <sup>y</sup> t <sup>y</sup> e <sup>ž</sup> i k i n a /	'in the opposite direction'
/ (y) a ŋ m a ŋ m i n <sup>y</sup> t <sup>y</sup> i l a ŋ <sup>w</sup> a /	'purposelessly'

## (iv) Metathesis

When metathesis occurs, it is being regarded as variation in the order of the consonants rather than free variation of the phonemes. It is not common.

/ y i n i y a <sup>ř</sup> l w a <sup>ṇ</sup> a ~ y i n i y a w i <sup>ř</sup> a <sup>ṇ</sup> a /	'native cat'
/ ŋ a <sup>ř</sup> i <sup>ṇ</sup> a p <sup>w</sup> i <sup>ṛ</sup> i w a k a ~ ŋ a <sup>ř</sup> i <sup>ṇ</sup> a p <sup>w</sup> i w i <sup>ṛ</sup> a k a /	'to undress'
/ a w i l i m a <sup>ř</sup> a ~ a w i <sup>ř</sup> a m a l a /	'boomerang'

## (v) Variation by choice of a suffix

Variation occurs in what seems to be a choice between two similar suffixes.

/ a <sup>ṛ</sup> a k p a k i y a ~ a <sup>ṛ</sup> a k p a w i y a /	'a long time ago'
(now + dual) (now + plural)	

In the demonstratives, there is an alternate form for the suffixes for third person plural. It is possible that this variation has a change in meaning but, to date, the forms seem to be used interchangeably. The suffixes, /-enena/ 'this here' and /-akina/ 'that there', vary with /-ayena/ and /-ayina/, respectively. The suffixes, /-ayena/ and /-ayina/, indicate plural reciprocity (plus tense) on the verbs.

/ ṭ i m <sup>w</sup> i <sup>ṇ</sup> t a k a k i n a ~ ṭ i m <sup>w</sup> i <sup>ṇ</sup> t a k a y i n a /	'those women (pl.)'
/ ṭ i m <sup>w</sup> i <sup>ṇ</sup> t a k e n e n a ~ ṭ i m <sup>w</sup> i <sup>ṇ</sup> t a k a y e n a /	'these women (pl.)'

## (vi) Baby talk

The following forms are regarded as "baby talk" but are sometimes used by young adults.

[ayik <sup>w</sup> it <sup>v</sup> il̩a]	for /ayik <sup>w</sup> it <sup>v</sup> iya/	'small (sing.)'
[yit <sup>v</sup> aya]	for /yit <sup>v</sup> aʃa/	'seagull'
[t̩al̩amaŋkat̩ata]	for /t̩aʃamaŋkat̩ata/	'lizard (sp.)'

#### 4.3.2 Variation in consonant clusters

##### (i) Assimilation

One of the commonest types of variation is assimilation of the first consonant (i.e. a nasal) to the point of articulation of the second. Some people at Umbakumba regard the assimilated form as incorrect, whereas the assimilated cluster seems to be the most common form at Angurugu.

/ŋaʃa(ŋ/m)p̩iʃat <sup>v</sup> ina/	'to keep'
/a <sub>ŋ</sub> laŋa(ŋ/m)pa/	'where are those?'
/al <sup>v</sup> i(ŋ/m)p̩il <sup>v</sup> i(ŋ/m)paʃŋa/	'lungs'
/aŋa(ŋ/m)p̩il <sup>v</sup> a/	'armpit'
/a(ŋ/m)p̩il <sup>v</sup> iwa/	'sickness'
/ami(n/m)peʃk <sup>w</sup> a/	'ten'
/k <sup>w</sup> i(ŋ/ŋ)t̩iʃa/	'python'

Preceding /p/, the velar nasal is optionally replaced by a velar stop.

/a(k/ŋ)p̩iʃiŋka/	'dry'
/ami <sub>ŋ</sub> t̩i(k/ŋ)pal <sup>v</sup> a/	'dew'

(ii) In the following example, the whole homorganic cluster varies.

/ŋaʃiyaŋmin <sup>v</sup> t̩a <sub>ŋ</sub> t̩ina~ŋaʃiyaŋmin <sub>ŋ</sub> t̩a <sub>ŋ</sub> t̩ina/	'to be quiet'
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##### (iii) Elision

Variation is caused by the elision of the first consonant of



the cluster. It commonly occurs in a homorganic cluster of nasal plus stop.

/a(m)p <sup>w</sup> iṛimpa/	'sunburn'
/amiya(m)pena/	'what?'
/yik <sup>w</sup> iṛi(ŋ)ṭaṇ <sup>w</sup> a/	'swordfish'
/mami(n <sup>v</sup> )ṭ <sup>v</sup> awit <sup>v</sup> awa/	'bird: Striated pardalote'
/a(ŋ)kap <sup>w</sup> iṛa/	'whose?'

Free variation can occur between [p] and [kp], and [m] and [ŋm]. In other instances, the CC cluster always occurs. The examples could be analysed as the same type of non-phonemic variation as in the geminate stops. They are, however, being analysed as a CC cluster with optional elision of the first consonant for two reasons: (a) the CC cluster is already established as emic; and (b) it is possible that, when the velar and labial are articulated simultaneously, they have not been heard and recorded. Almost all the examples of variation follow a front vowel and all the examples without variation follow /a/.

/a(k)palkal <sup>v</sup> a/	'wet ground'
/ṇaṛi(k)p <sup>w</sup> ik <sup>w</sup> ina/	'to winnow'
/aṛakpi(k)pila/	'pointed'
/aṛipiriṭeṛ(k)pa/	'bush down further'
/al <sup>v</sup> al <sup>v</sup> i(k)pa/	'lips'
/aniṇk <sup>w</sup> al <sup>v</sup> i(ŋ)pa/	'harpoon'
/yi(ŋ)m <sup>w</sup> iṇmaṇṭa/	'tortoise'
/ṇaṛin <sup>v</sup> iṛ(ŋ)ma/	'to sneeze'

A velar nasal is elided preceding the laminal nasal in the following word:

/aṇki(ŋ)n <sup>v</sup> iṇ <sup>w</sup> iṛa/	'unbroken, complete'
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## (iv) Simplification

Retroflexed /r/ preceding one or two consonants in a cluster elides, thus simplifying the cluster. The simplified form is becoming the most common, especially for those under thirty years of age.

/a(r)maṛmaṛa/	'a sore'
/a(r)ṇkawira/	'for always'
/ṇaṛa(r)ṭiṛena/	'to spear'
/ṇaṛim <sup>w</sup> iṇk <sup>w</sup> a(r)ṭena/	'to scavenge'
/yaṛi(r)ṭa/	'swollen glands'

The consonant cluster /ṛṇ/ is simplified to /ṇ/ preceding /k/. The Umbakumba people tend to prefer the more complex form.

/aṛṇka/ (Umb) /anka/ (Ang)	'hip'
/awaṛṇkan <sup>y</sup> eṛa~awankan <sup>y</sup> eṛa/	'always fighting'
/ṭiwaṛṇkak <sup>w</sup> iṛariya~ṭiwaṇkak <sup>w</sup> iṛariya/	'bird: osprey'

In the following examples a consonant cluster is simplified by being reduced to a single consonant which is not a member of the cluster but at or near the same point of articulation.

/al <sup>y</sup> iṇpil <sup>y</sup> iṇpaṛṇa~al <sup>y</sup> ikpil <sup>y</sup> ikpaṛṇa/	'lungs'
/mat <sup>y</sup> ikiṛiṇṭa~mat <sup>y</sup> ikiṛiṭa/	'mosquito net'

## 5. THE VOWELS

There are three phonemic vowels: high /i/, mid /e/, and low /a/ with the basic allophones being [ɪ], [e] and [a] respectively. The allophones of each vowel are described in detail in Sections 6-8.

The values of Formants 1 and 2 for most of the vowel allophones have been plotted on the following graph No.1. The graph shows the vowel targets of one female speaker. The corresponding frequencies for a male speaker would be approximately 20% less on both parameters. Using the figures estimated for a male speaker, the following comparisons can be made with the Australian English targets as shown in Bernard (1967: 40).

### Anindilyakwa

i, ɪ, ɔ, u

ɪ

ə

a

æ

e

### Australian English

as in 'heed, hid, horde, hood'

same tongue height as in 'who'd'  
but further back.

higher and further back than in  
'heard'

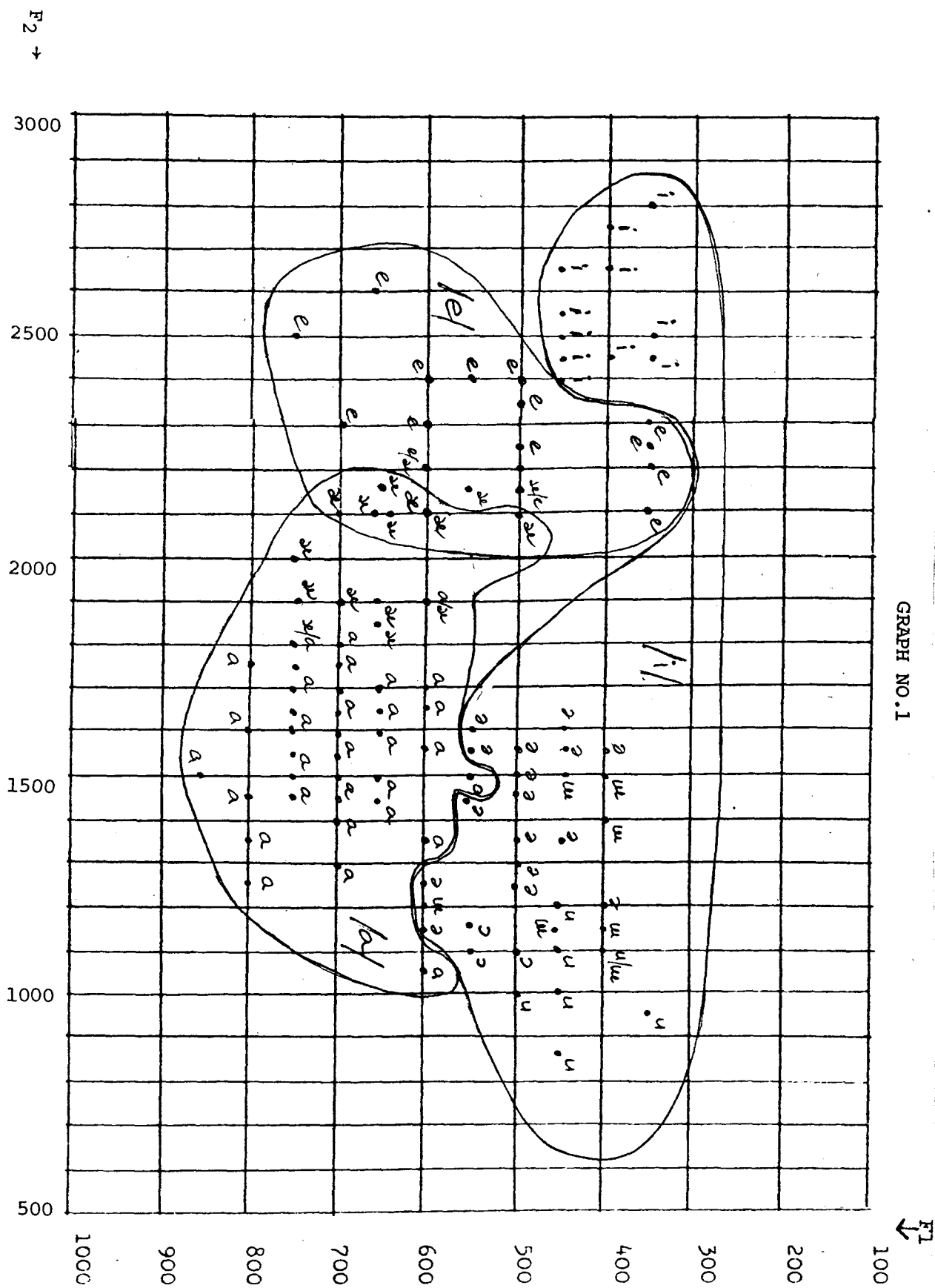
higher and further forward than  
in 'hard'

higher and further back than in  
'had'

higher than in 'head'

On Graph No.1, the circles indicate the phonetic area for each of the three phonemes. The overlapping allophone [æ] of the phonemes /a/ and /e/ is indicated by the overlapping circles. The allophone [æ] between 1800-2000Hz for F<sub>2</sub> is contiguous to laminals. The

GRAPH NO.1



allophone /e/ occurring with a frequency of 350Hz for F<sub>1</sub> occurs in the words /enena/ 'this'; /memema/ 'this'; /eminta/ 'nose'.

The vowel phonemes contrast in the following words:

/i/	/mikiřa/	'swamp nuts'
/e/	/keřa/	'hey, look!'
/a/	/kařa/	'do you agree?'
/i/	/ařipa/	'dry ground'
/e/	/epa/	'any?'
/a/	/ařapa/	'that: A class'
/i/	/řařayikpatřena/	'to strip bark off'
/a/	/nařayikpitřena/	'to throw'

There is a further contrast between the vowel /a/ and the glide [æ<sup>i</sup>] preceding a velar stop or nasal. The contrast occurs in both initial and medial positions. The glide also contrasts with the phoneme /i/. Graph No.2 shows the glide preceding a velar stop and Graph No.3 preceding a velar nasal. As can be seen by the number of entries on the graphs the glide preceding the stop is quite common while that preceding the nasal is rare. The starting point of the glide varies from [æ] which is an allophone of /a/ with an F<sub>2</sub> frequency between 1500-2200Hz. and [æ] as an allophone of /e/ with an F<sub>2</sub> frequency between 2100-2500Hz. The frequency of F<sub>1</sub> parallels both /a/ and /e/ but the average range of 550-700Hz is that of /a/.

The following spectrographs have been included in plotting the graph No.2:

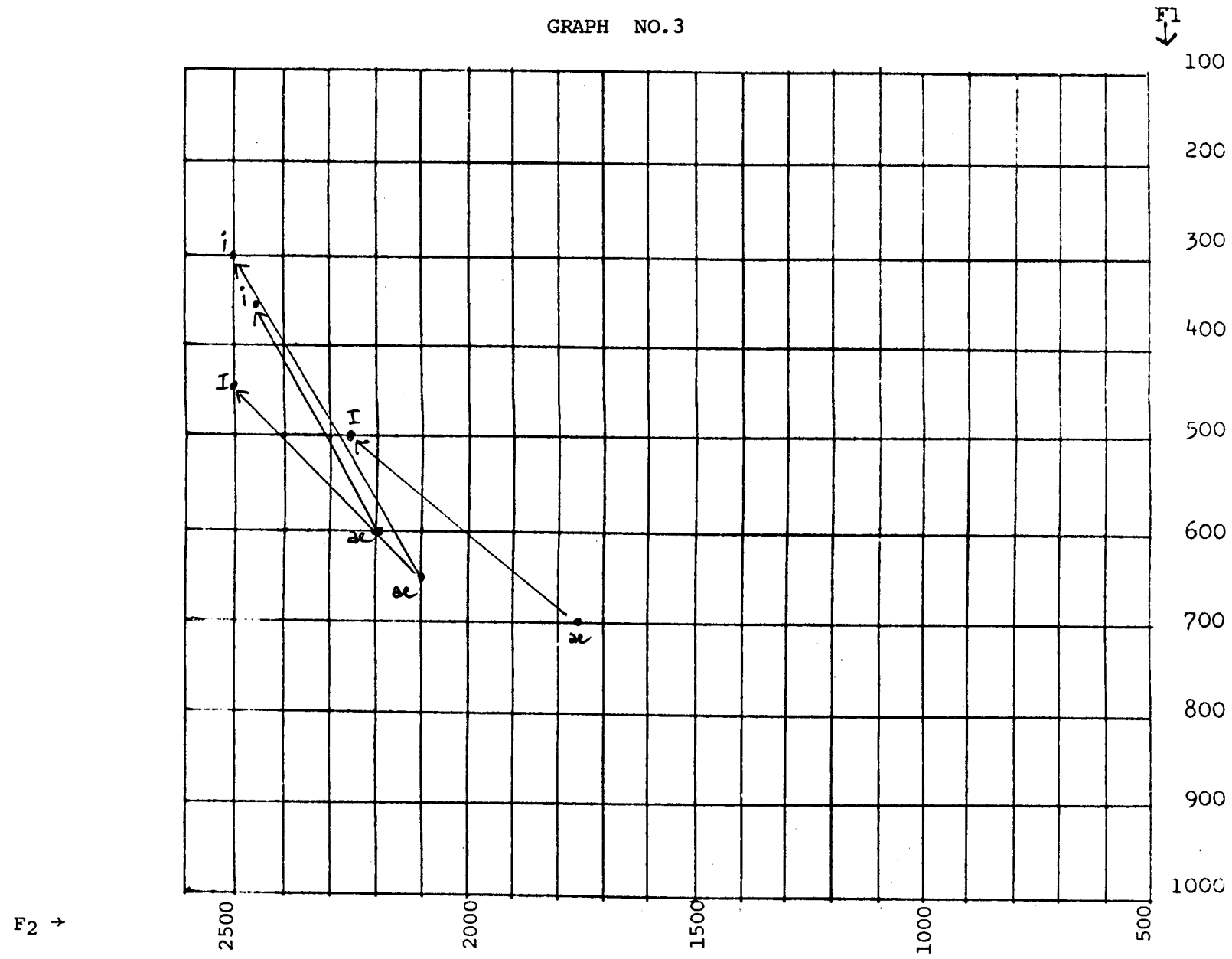
#### Spectrograph

No.40 /ayika/ [æ<sup>i</sup>:ka]

'tree (gen.)'



GRAPH NO. 3



No.41	/ayikp <sup>w</sup> ita/	[æ <sup>I</sup> kp <sup>w</sup> əta]	'right'
42	/ayikpařa/	[æ <sup>I</sup> kpařa]	'headache'
43	/ayikawil <sup>v</sup> ama/	[æ <sup>I</sup> kawil <sup>v</sup> ama]	'left'
44	/ayikil <sup>v</sup> ařa/	[æ <sup>I</sup> kil <sup>v</sup> ařa]	'left'
45	/ayikiřa/	[æ <sup>I</sup> kiřa]	'name'
46	/timayikal <sup>v</sup> a/	[tɪmæ <sup>I</sup> kal <sup>v</sup> a]	'bird: Jabiru'
47	/tipitayikp <sup>w</sup> ita/	[tɪpɪtæ <sup>I</sup> kp <sup>w</sup> əta]	'bird: Oyster Catcher'
48	/arayikpa/	[æ <sup>I</sup> ra <sup>I</sup> kpa]	'inside'
49	/amayikpa/	[æ <sup>I</sup> mæ <sup>I</sup> kpa]	'generous'
50	/alaŋayikpa/	[alæ <sup>I</sup> ŋæ <sup>I</sup> kpa]	'those over there'
51	/yimayikpiřa/	[ɪmæ <sup>I</sup> kpiřa]	'bird: Royal Spoonbill'

In the above examples, the root-initial phoneme is a vowel, with the glide therefore being retained in other morphological forms. See Section 1.3 for the morphophonemic Rule No.1 for vowel deletion.

/t-ayikpařa/	[tæ <sup>I</sup> kpařa]	'headache'
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The following spectrographs have been used to plot Graph No.3:

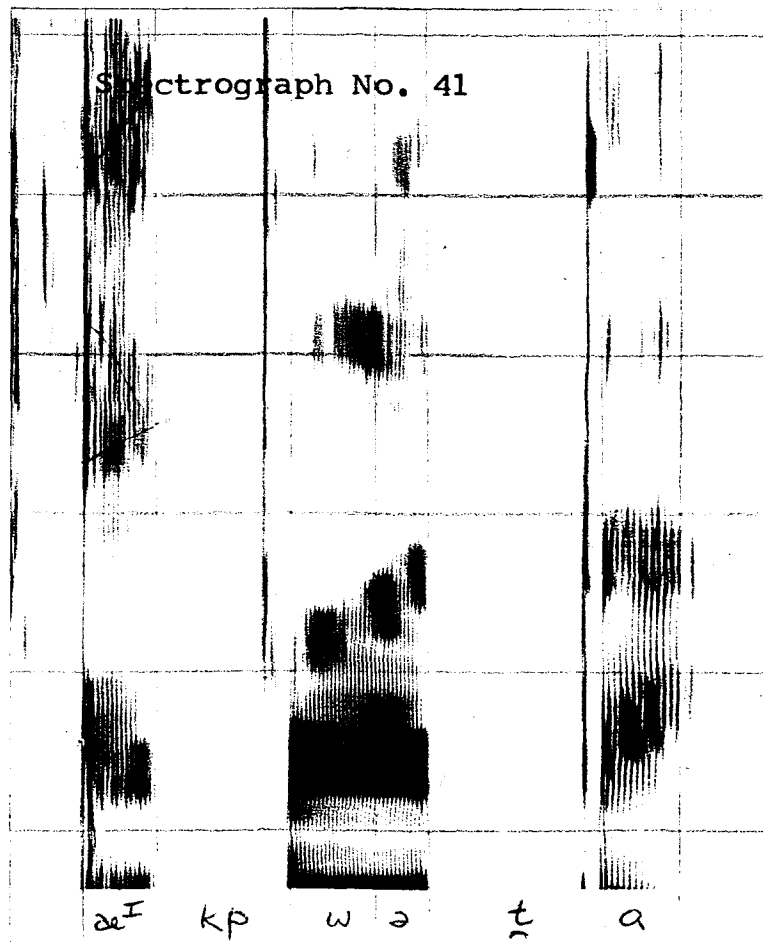
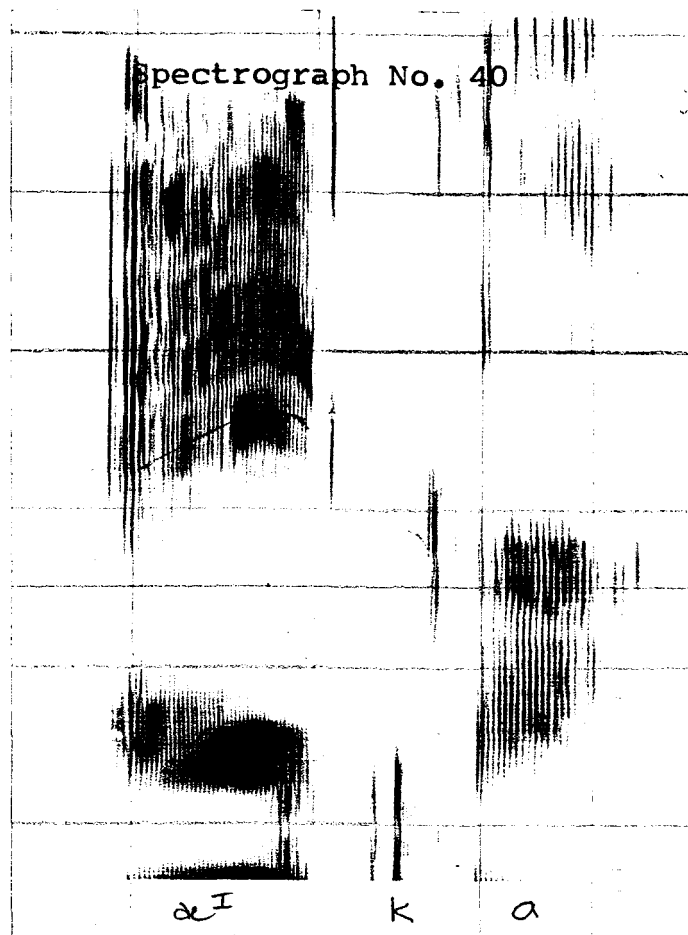
#### Spectrograph

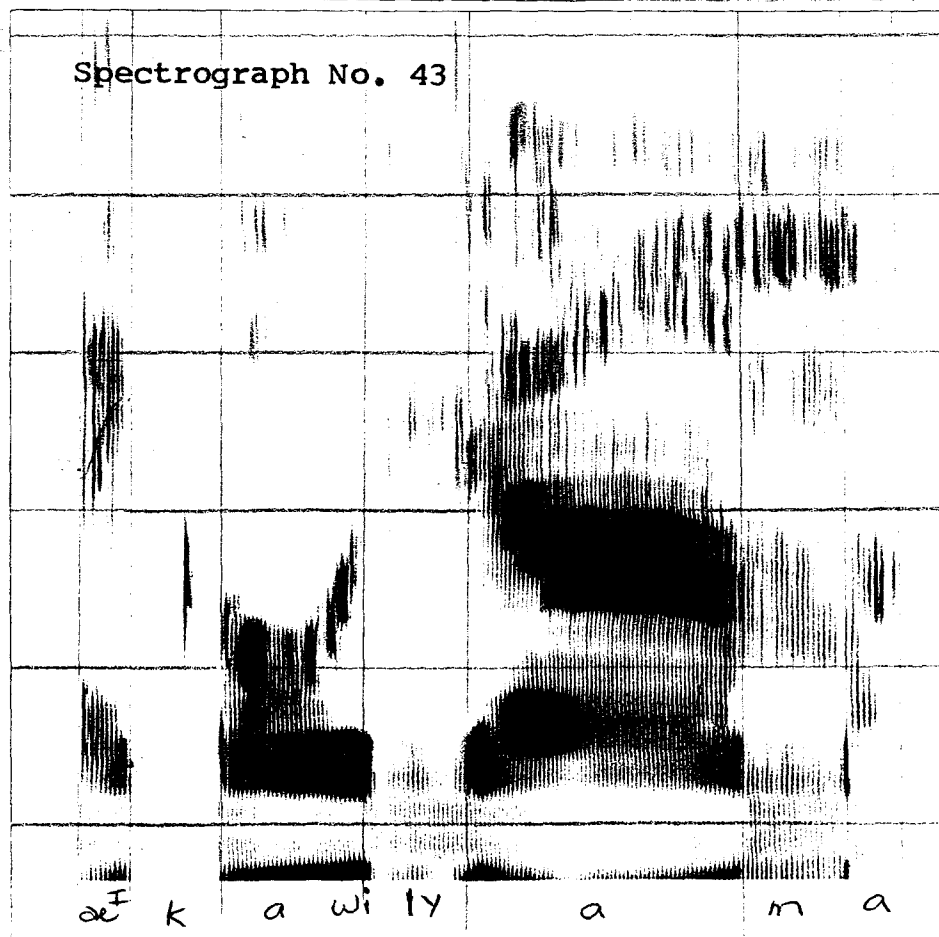
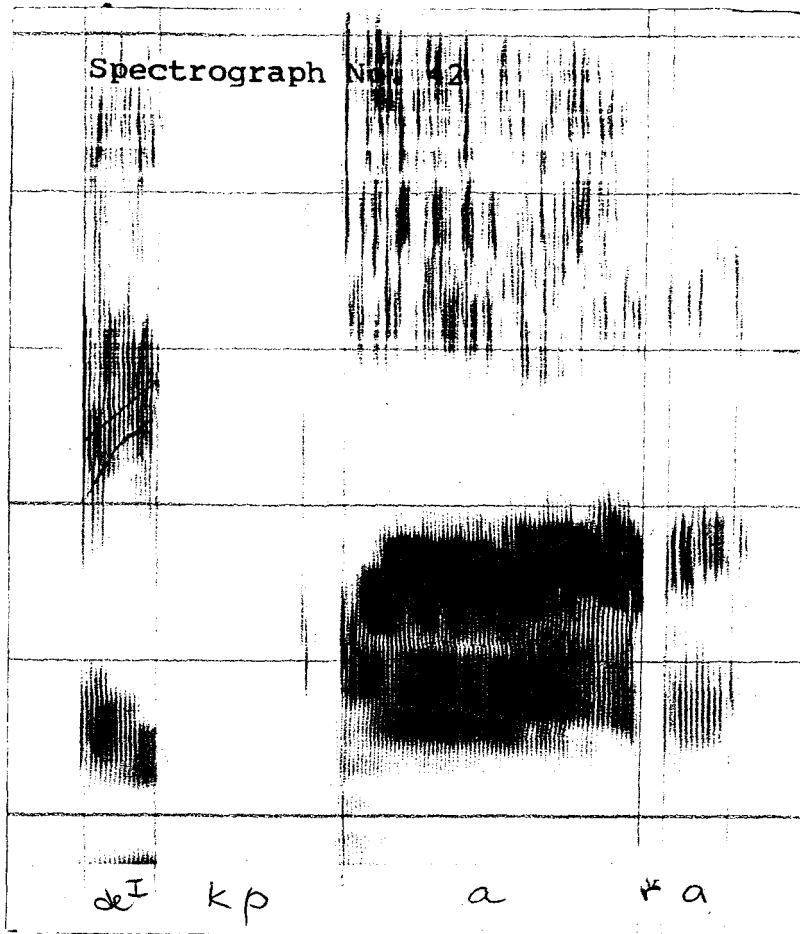
No.52	/ayin <sup>k</sup> wiwa/	[æ <sup>I</sup> ŋk <sup>w</sup> uwa]	'a long way'
53	/ayin <sup>p</sup> wita/	[æ <sup>I</sup> ŋp <sup>w</sup> əta]	'strong'

The vowels /a/, /i/ and [æ<sup>I</sup>] contrast in the following words:

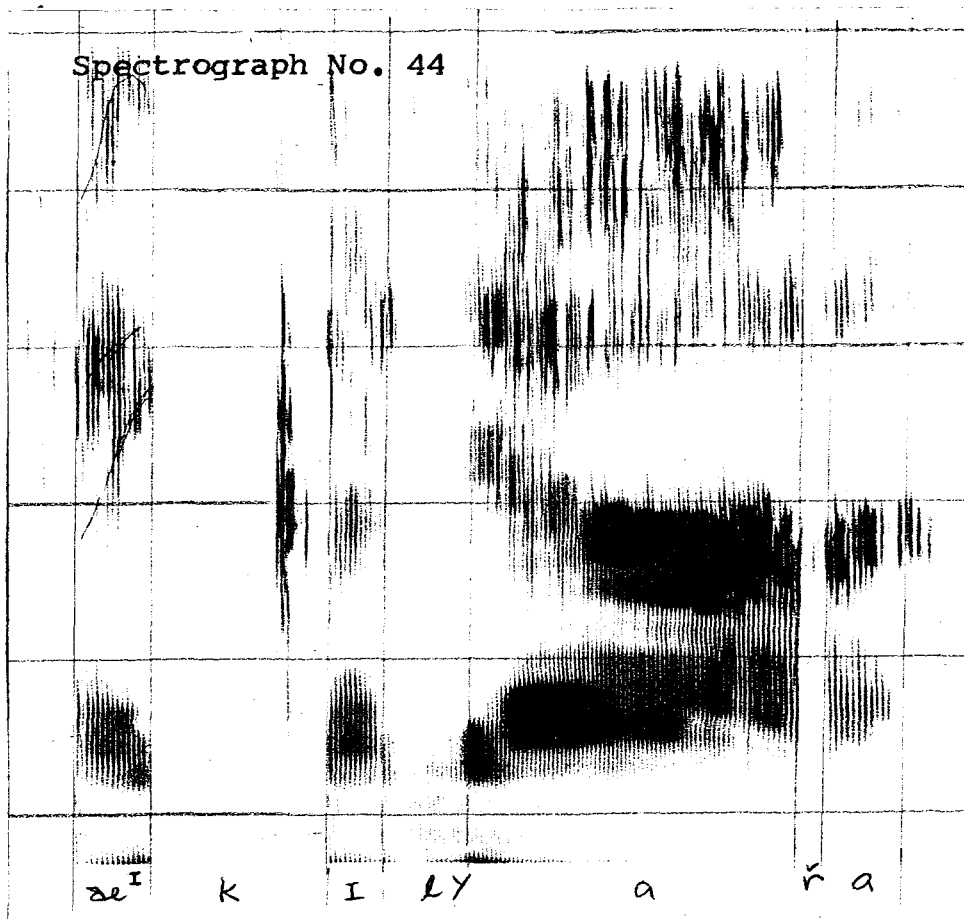
/akpa/	'buttocks'
/yikpa/	'pheasant'
/ayikpařa/	[æ <sup>I</sup> kpařa] 'headache'
/alakpa/	'leg'
/al <sup>v</sup> al <sup>v</sup> ikpa/	'lips'
/alayikpina/	[alæ <sup>I</sup> kpi <sup>n</sup> a] 'these/those (not here)'



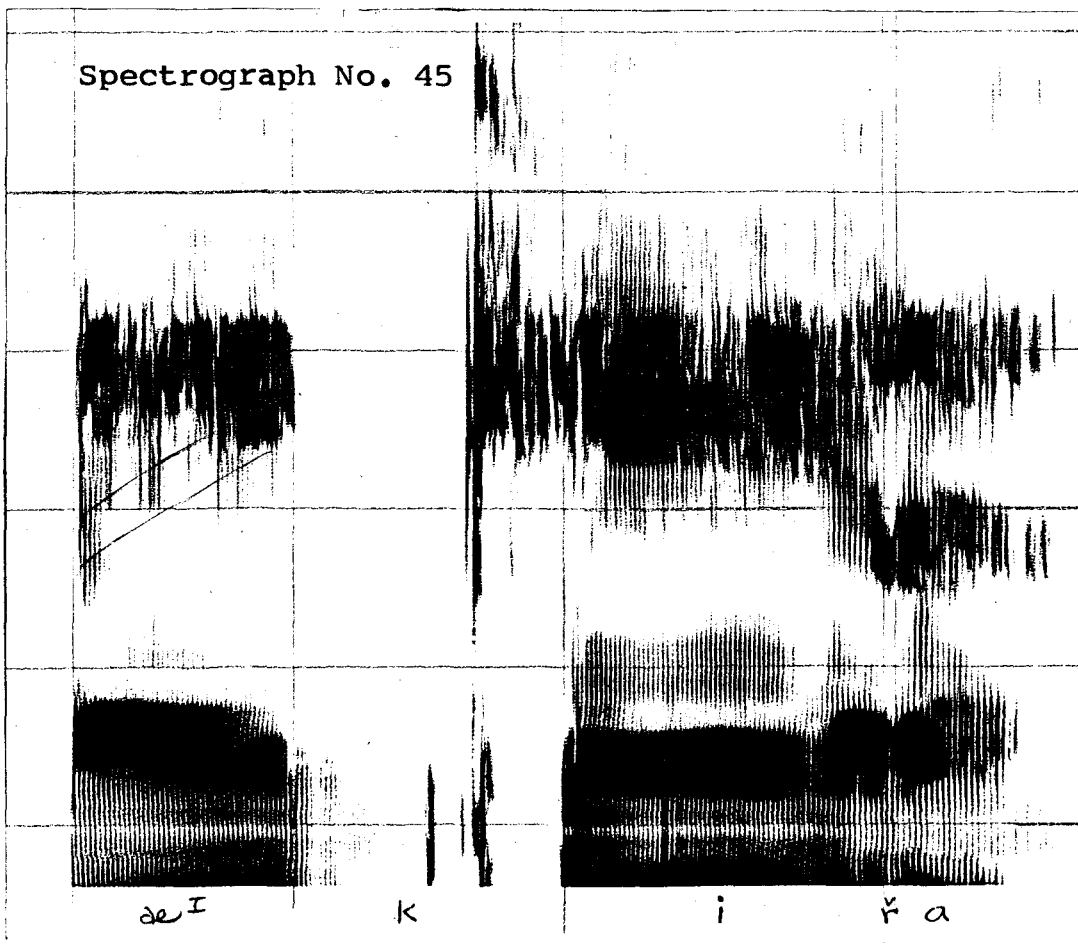




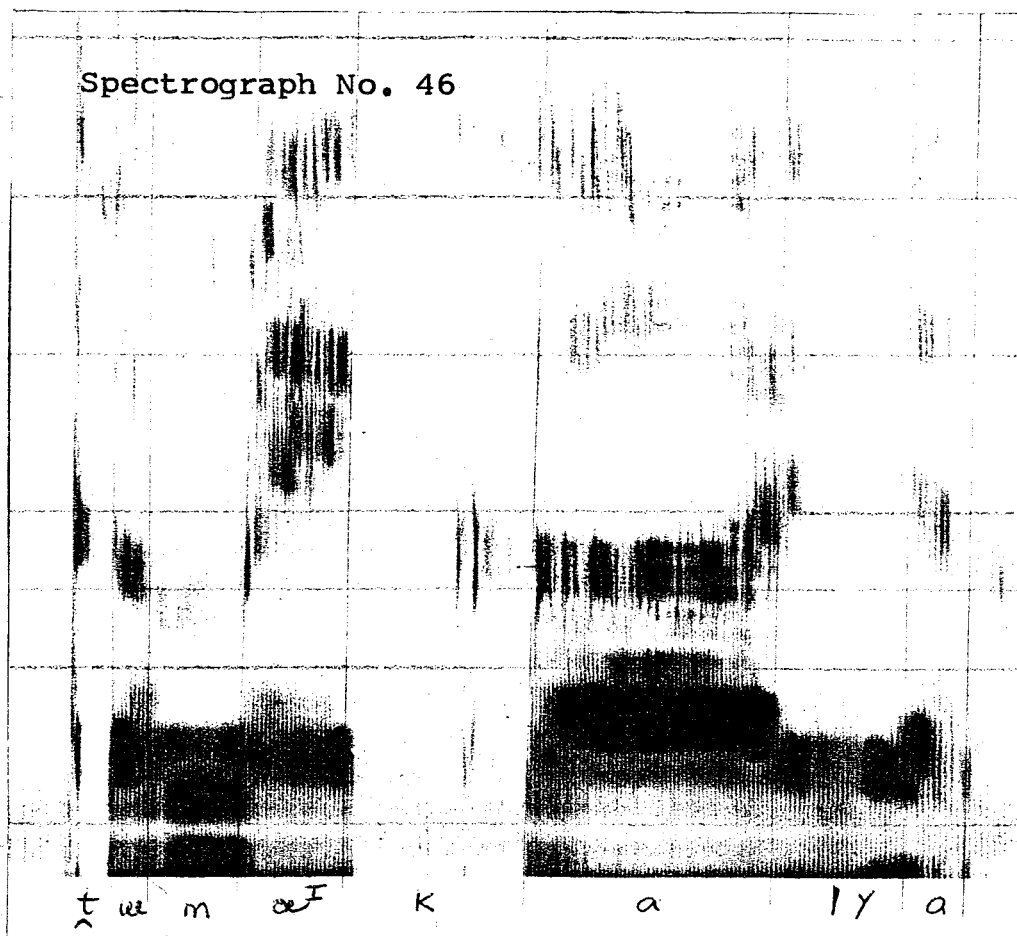
Spectrograph No. 44



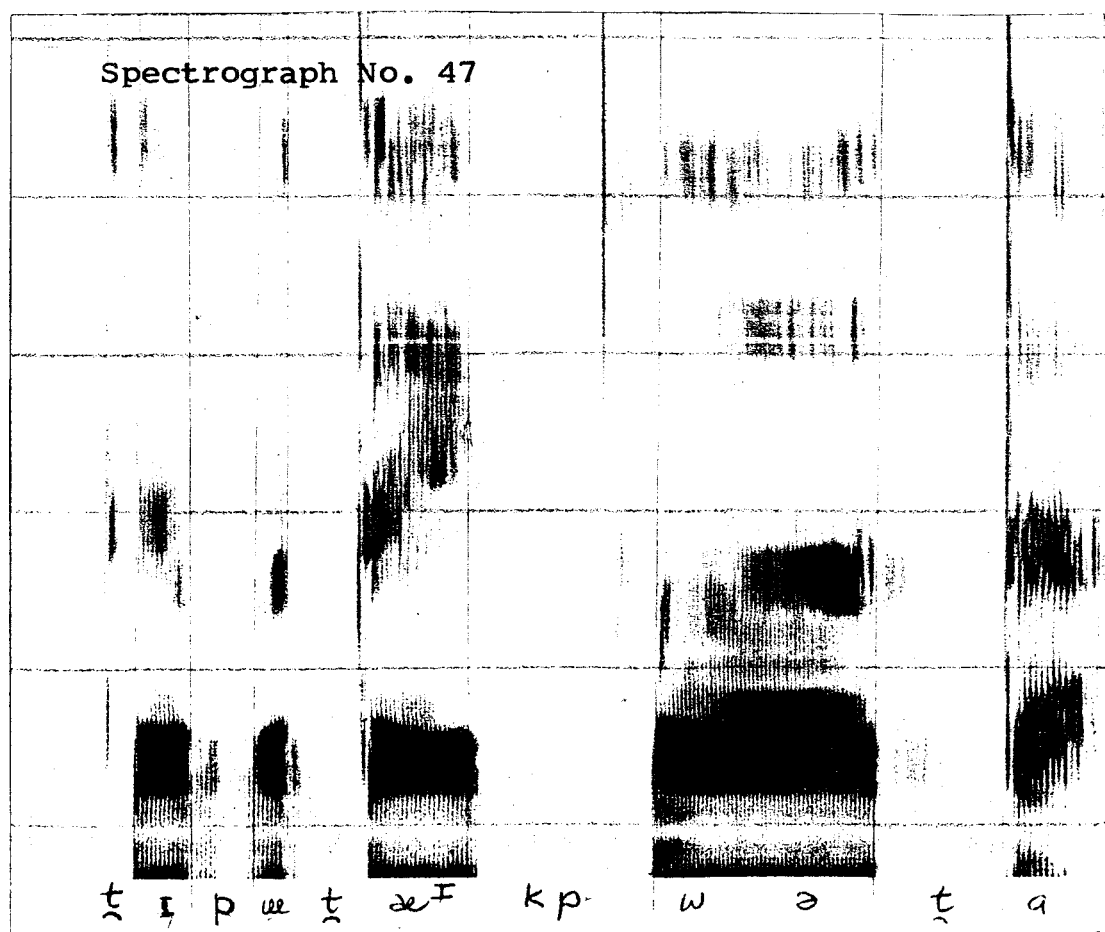
Spectrograph No. 45

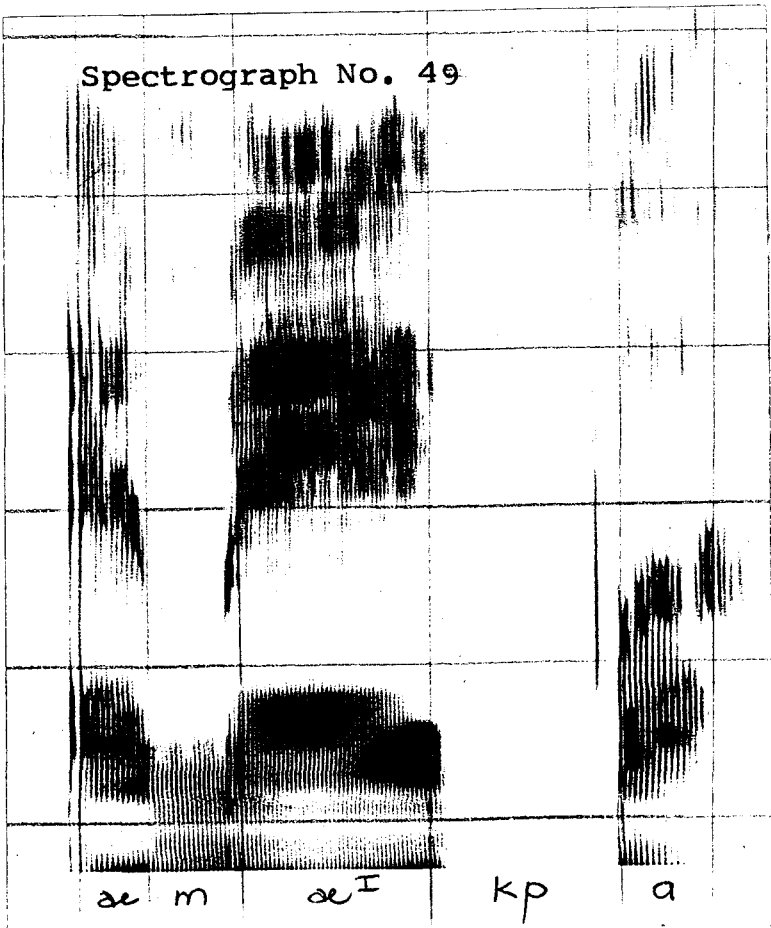
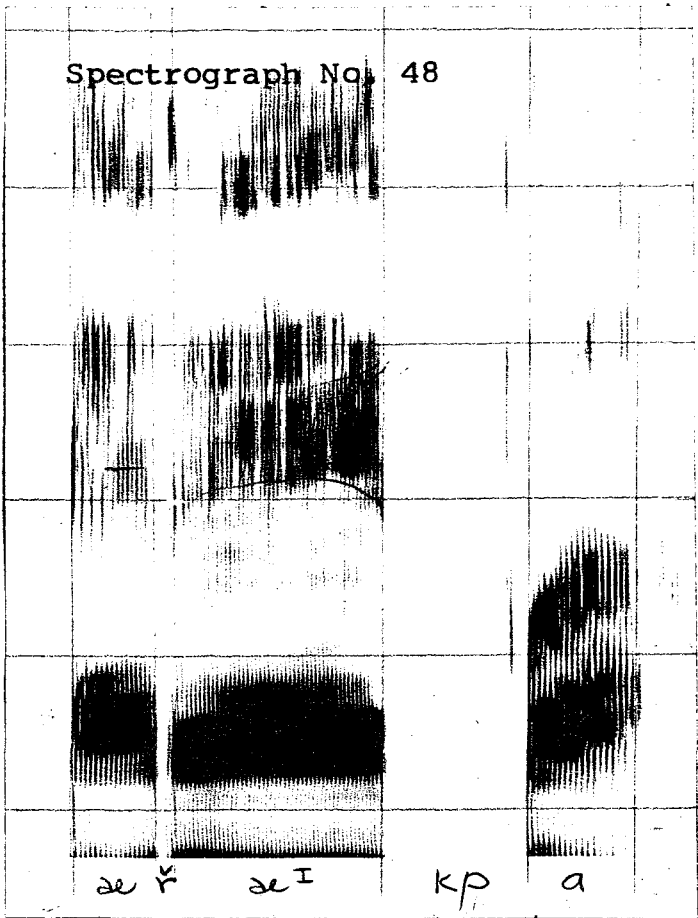


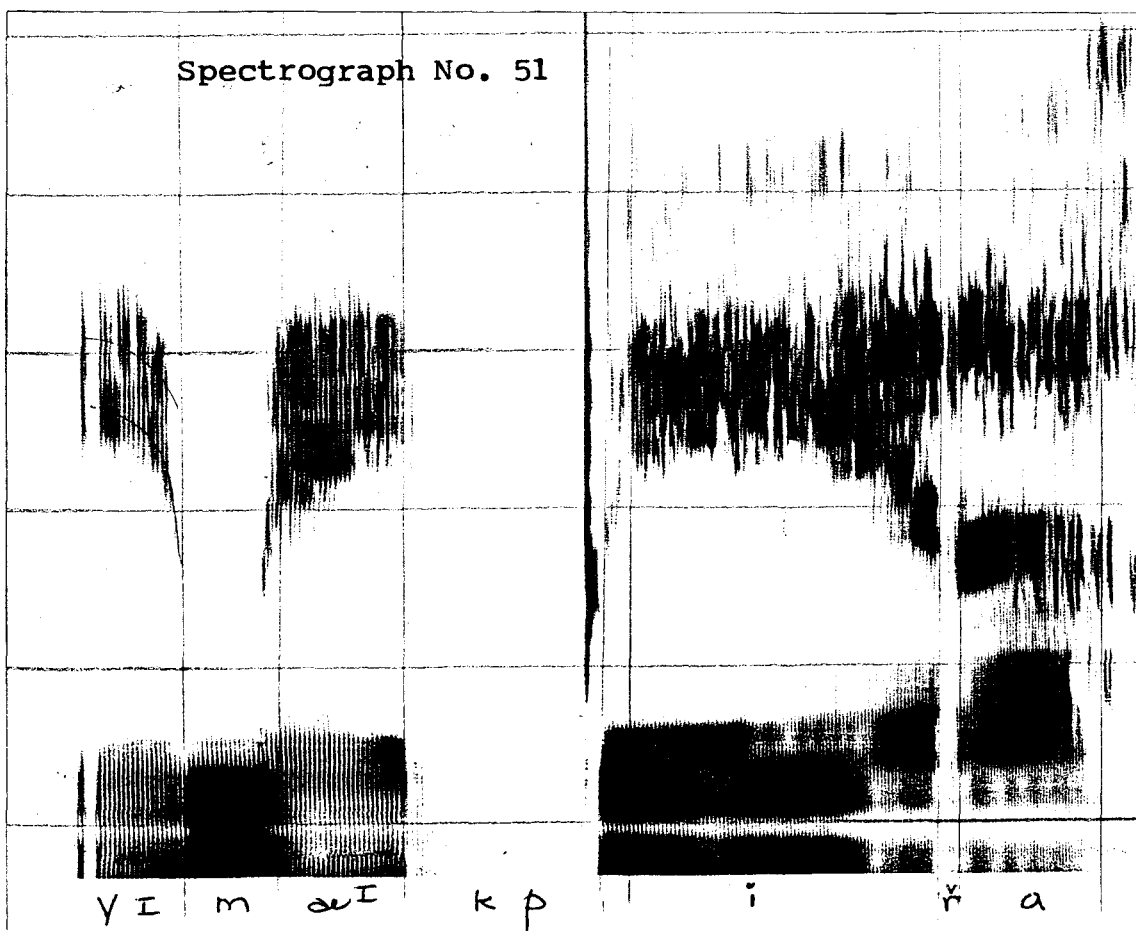
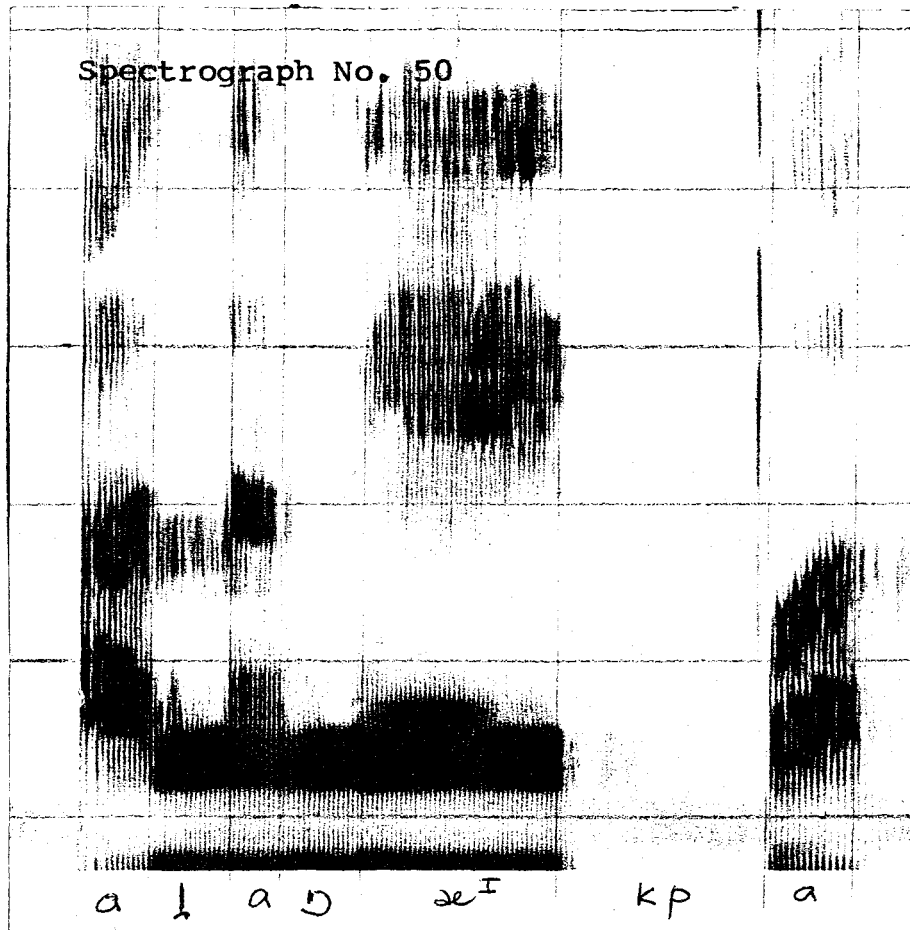
Spectrograph No. 46

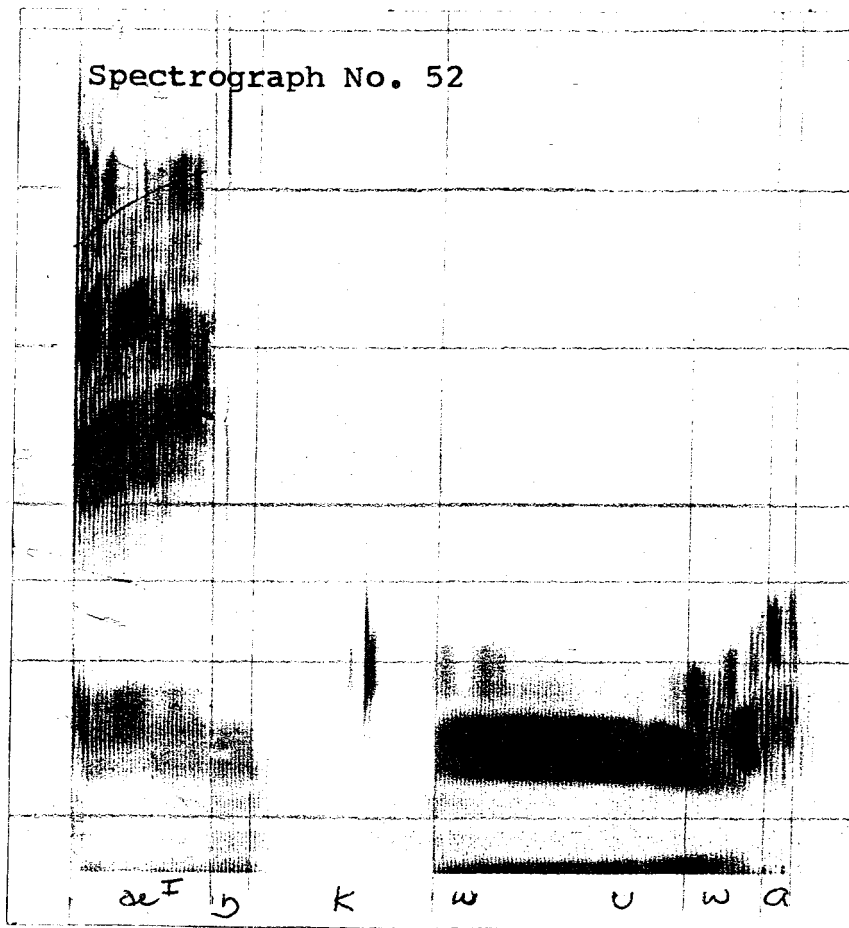


Spectrograph No. 47

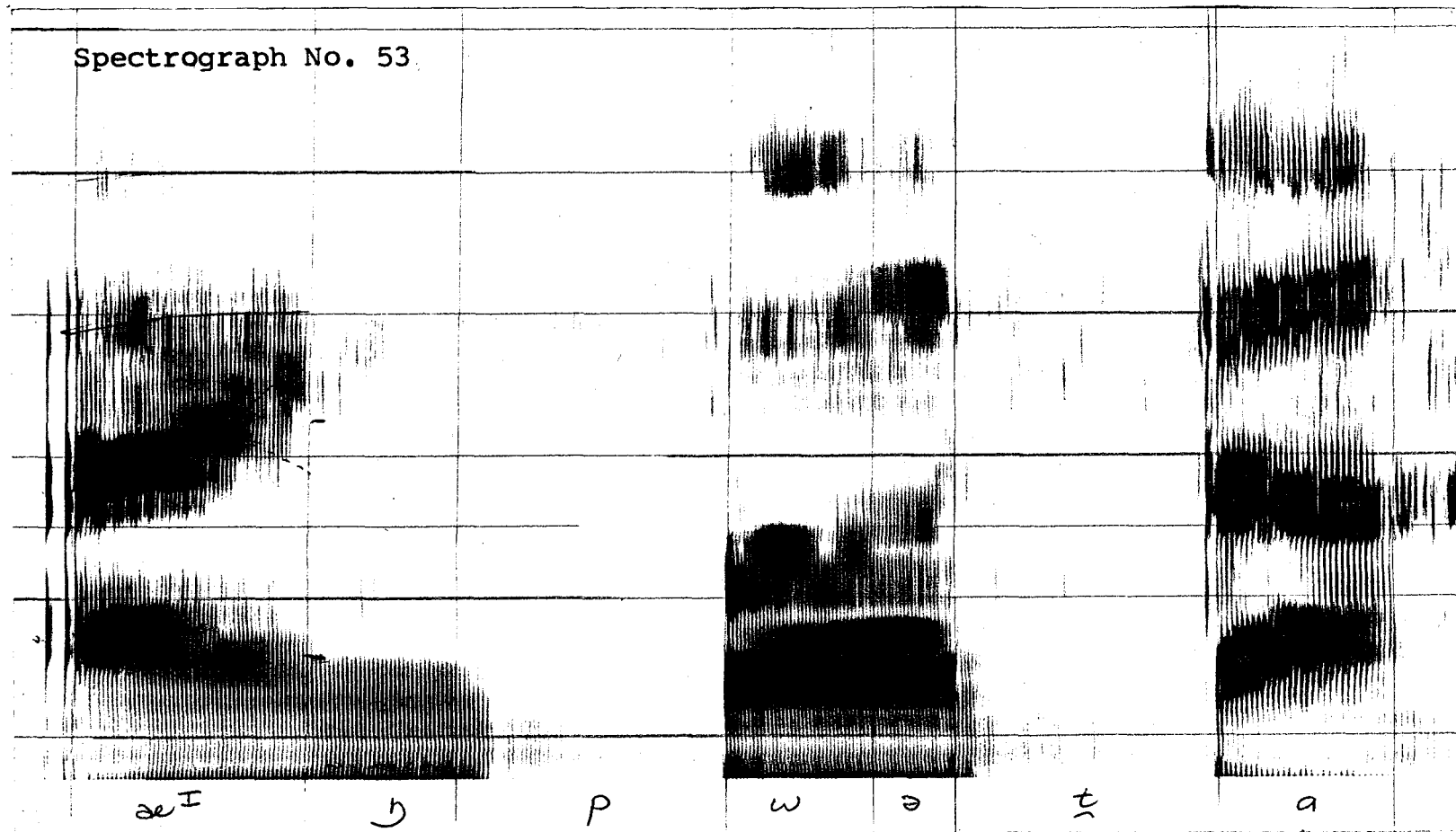








Spectrograph No. 53.





/ampaka/	'later on'
/wiřipikipika/	'pigs'
/ak <sup>w</sup> ipipayika/ [ak <sup>w</sup> upipæ <sup>I</sup> ka]	'fluid'
/niŋakp <sup>w</sup> iřaŋa/	'to find'
/niŋikpiriŋka/	'dry'
/niŋayikp <sup>w</sup> iřaka/ [niŋæ <sup>I</sup> kp <sup>w</sup> əřaka]	'to make'

The glide [æ<sup>I</sup>] cannot be shown to contrast with /e/ because of the limited distribution of the phoneme /e/ (see Section 7). The two vowels could be said to be allophones of the one phoneme, thus extending the environment of the phoneme /e/. The glide, however, is being analysed as the sequence /ayi/ for the following reasons.

(i) The Aborigines who began literacy lessons reacted very strongly against the initial vowel in /eřa/ [e:řa] 'vomit' as being the same as the initial vowel in /ayika/ [æ<sup>I</sup>ka].<sup>9</sup> They insisted the two vowels were different just as much as native English speakers will not accept /h/ and /ŋ/ as the one emic sound even though they occur in mutually exclusive environments. The attitude of the Aborigines led to further investigation as to the emic status of the two sounds.

(ii) There is a marked discrepancy between the occurrence of /ayi/ and /awi/ within the morpheme. There are only four occurrences of /ayi/ recorded to date, over against approximately twenty occurrences of /awi/. The sequence /ayi/ [a<sup>I</sup>i] can optionally reduce to the glide [a<sup>I</sup>] if the stress pattern permits. The analysis of the glide [æ<sup>I</sup>] as /ayi/ increases the number of occurrences in the already-existing pattern.

/ṇařalk <sup>w</sup> iwayit <sup>v</sup> ina/	[ṇařalk <sup>w</sup> uwayit <sup>v</sup> ina~ nuwálk <sup>w</sup> uwart <sup>v</sup> at <sup>v</sup> úŋ <sup>w</sup> a]	'to skin, peel'
/ṇařina <sup>y</sup> inta/	[ṇař <sup>w</sup> na <sup>y</sup> inta]	'to want'
/tak <sup>w</sup> imayipayařka/	[tak <sup>w</sup> um(ayi/a <sup>i</sup> )pa <sup>i</sup> yařka]	'spider'
/mařiwayit <sup>v</sup> a/	[mařuw(ayi/a <sup>i</sup> )t <sup>v</sup> a]	'fern (sp.)'

When the sequence [ayi] occurs across a morpheme boundary, the reduction to a glide does not occur, e.g.:

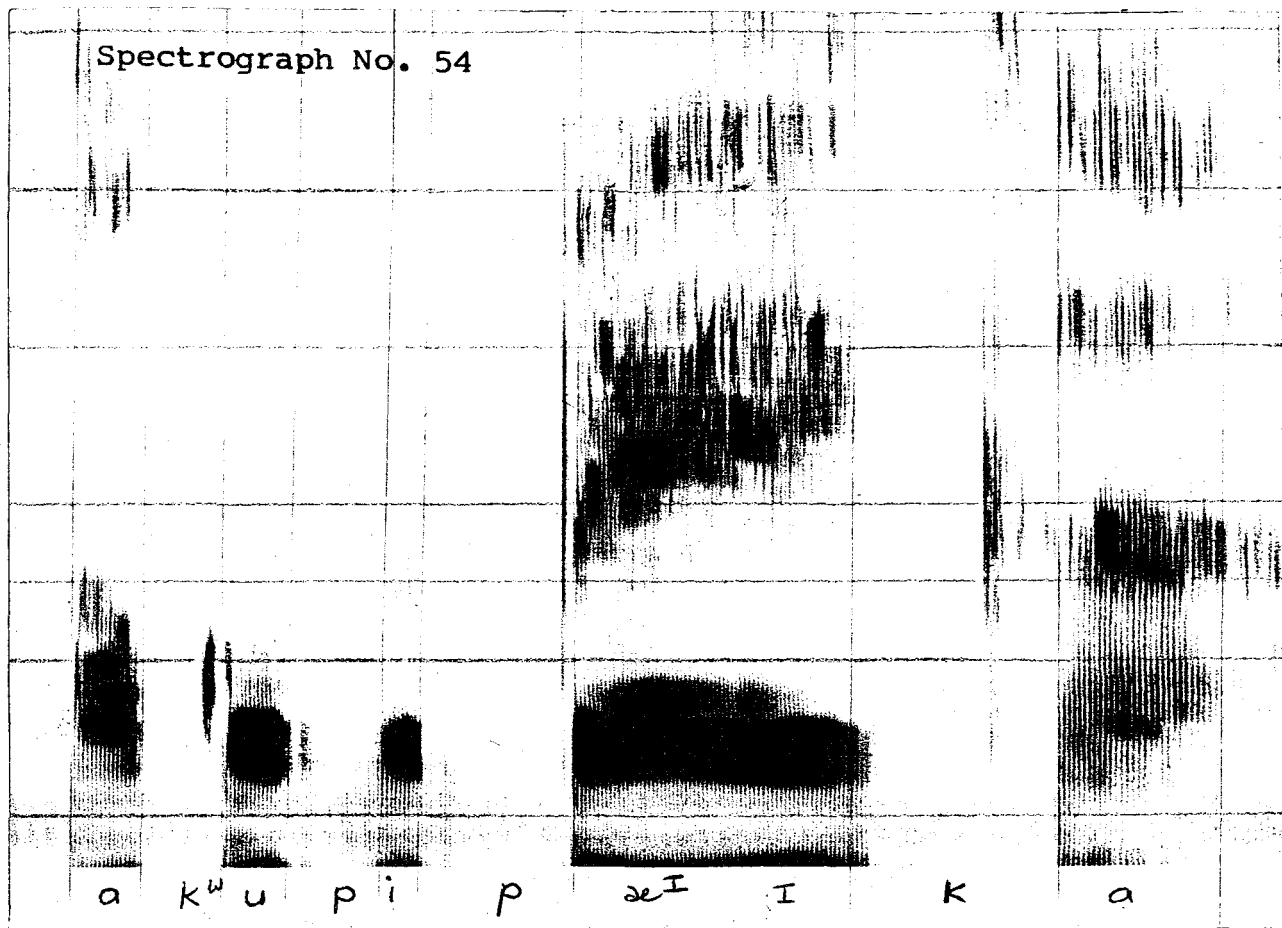
/a+yilpi+yilpa/	'bush'
/ṇařiwil <sup>v</sup> akat <sup>v</sup> a+yina/	'to teach'

(iii) The allophonic glides [a<sup>i</sup>] and [æ<sup>i</sup>] are non-contrastive and short (see Section 6.3). The reduced sequence /ayi/ is usually long but can be shortened in rapidly spoken unstressed syllables. The glide [æ<sup>i</sup>] varies with the non-reduced [æ<sup>i</sup>í] in the following examples.

/ayika/	[æ <sup>i</sup> ka~æ <sup>i</sup> yíka]	'tree (gen.)'
/ařipilayina/	[ařipilæ <sup>i</sup> na~ařipilæ <sup>i</sup> yína]	'aeroplane'
/mayila/	[mæ <sup>i</sup> la~mæ <sup>i</sup> yíla]	'mail'
/ak <sup>w</sup> ipipayika/	[ak <sup>w</sup> upipæ <sup>i</sup> ka~ak <sup>w</sup> upipæ <sup>i</sup> yíka]	'drinkable fluid'

The last example is supported by spectrograph No.54 where the sequence of [æ] plus [i] is two vowels, not a glide.

(iv) The allophone [e~æ] has been perceived in variation with [æ<sup>i</sup>] in a closed syllable but the above spectrographs do not give evidence of this. It is possible that the glide is sometimes so short in duration that the non-native speaker does not react to it as a glide, e.g. [e<sup>i</sup>] is heard as [e] as in American English. If the allophones [æ<sup>i</sup>] and [e] are said to vary allophonically in a closed syllable, the allophone [e] will then overlap between the two emic units, viz., /e/ and /ayi/.



(v) If the glide [æ<sup>I</sup>] is said to be an allophone of /e/, it is difficult to justify the movement of a phonetically-simple allophone towards the more complex glide. The reduction of the sequence /ayi/, however, is not uncommon to language in general.

There is a possibility that, instead of analysing [æ<sup>I</sup>] as /ayi/, the contrastive unit is the consonant, not the vowel. The velar stop and nasal may be palato-velars. There are two basic reasons for this assumption:

(a) The allophone [æ<sup>I</sup>] occurs preceding a lamino-palatal (see Section 6.3). If the velars /k, ŋ/ contrast with palatalised velars /kʲ, ŋʲ/, the allophonic rule would apply to the second set.

A vowel glide occurs in the initial syllable of the following words:

#### Spectrograph

No.55	[æ <sup>I</sup> kɪɪɫʲaʁkpa]	'light'
56	[æ <sup>I</sup> kɪɪɫʲɪŋpeʁeʁa]	'forked stick'
57	[æ <sup>I</sup> kpəɫkʷəʁaka <sup>I</sup> yɪŋa]	'treeless sand dune'

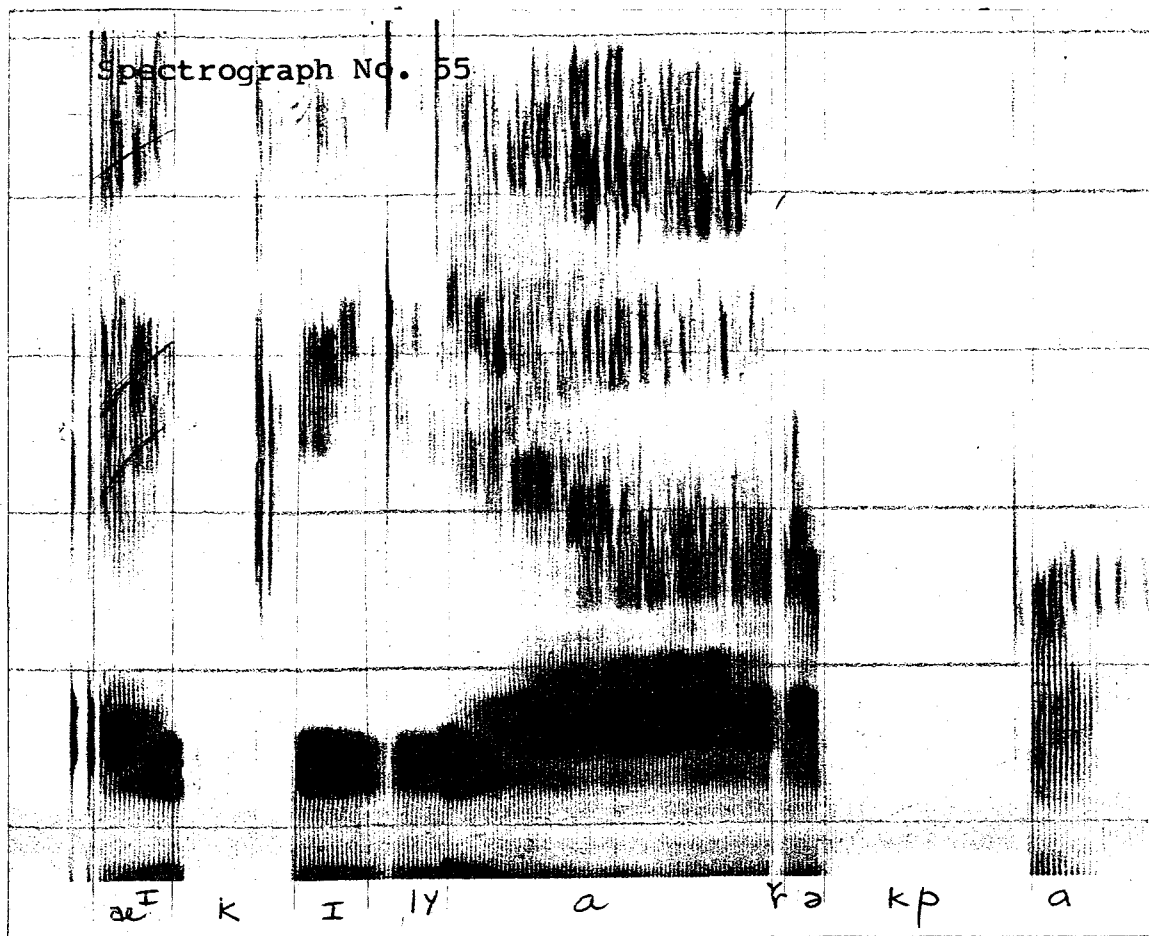
The vowel glide could be analysed as /ayi/, or possibly as a glide [æ<sup>I</sup>] of the phoneme /a/ preceding the syllable /ki/. Such an allophonic rule would, however, be an isolated case rather than part of the total system (see Section 6).

In the following spectrographs of alternate forms of the same word, the glide [æ<sup>I</sup>] occurs preceding /k/ but the allophone [æ] occurs preceding /ŋ/.

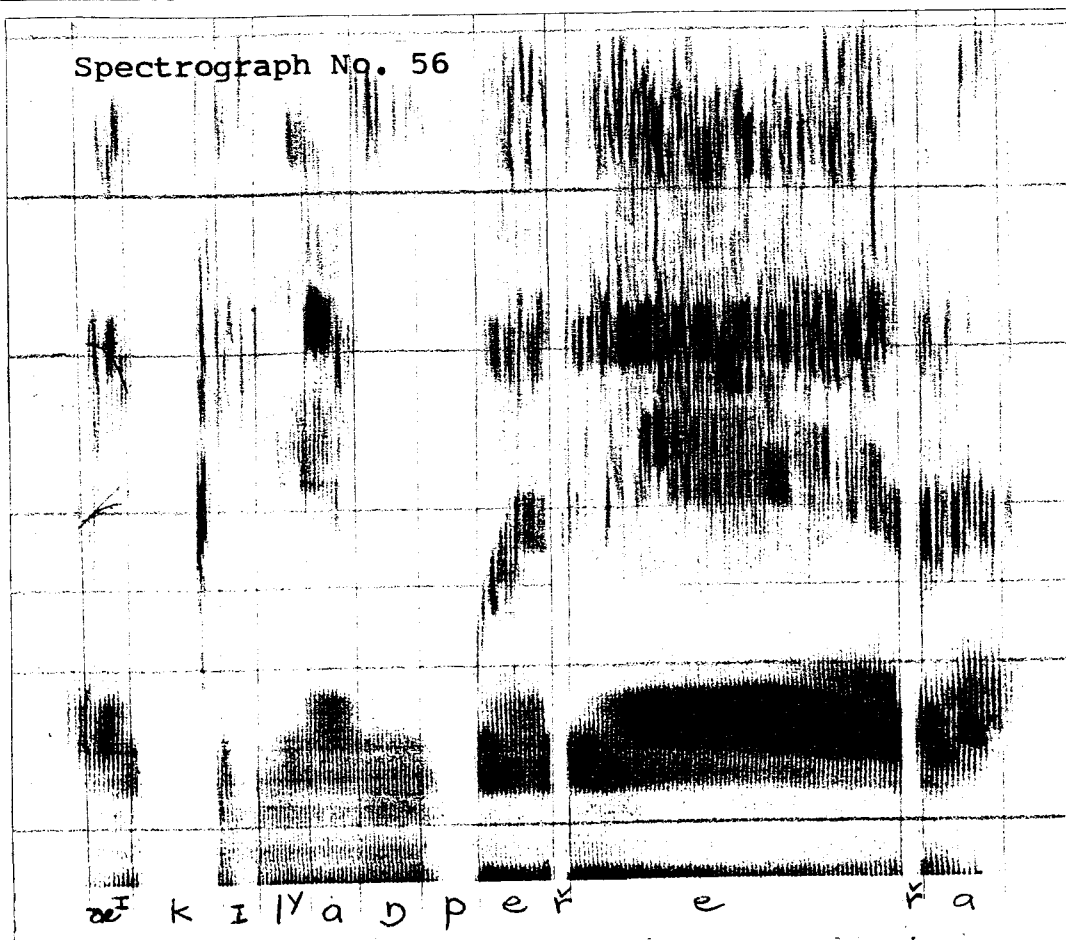
#### Spectrograph

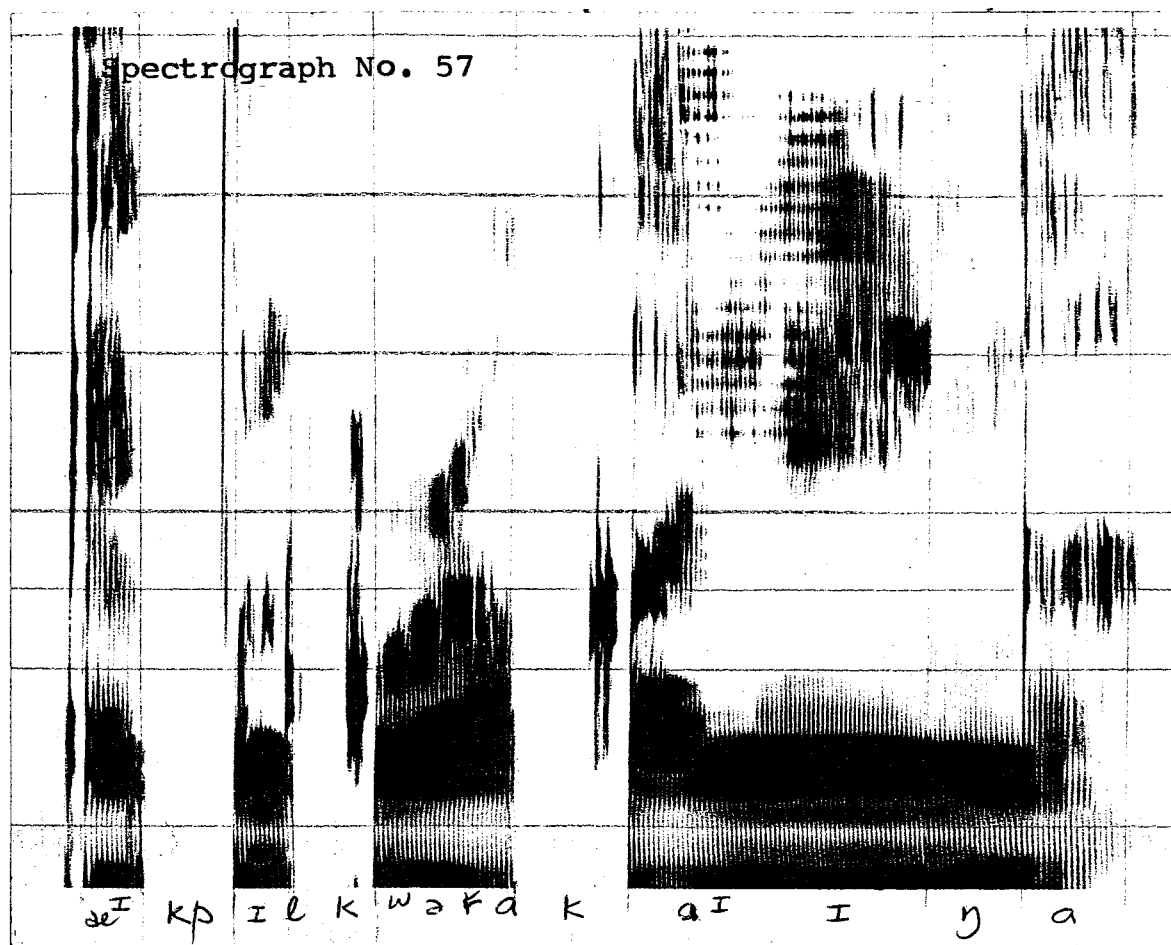
No.58	[æ <sup>I</sup> kpʷəʁəŋka]	'dry'
59	[æŋpʷəʁəŋka]	'dry'

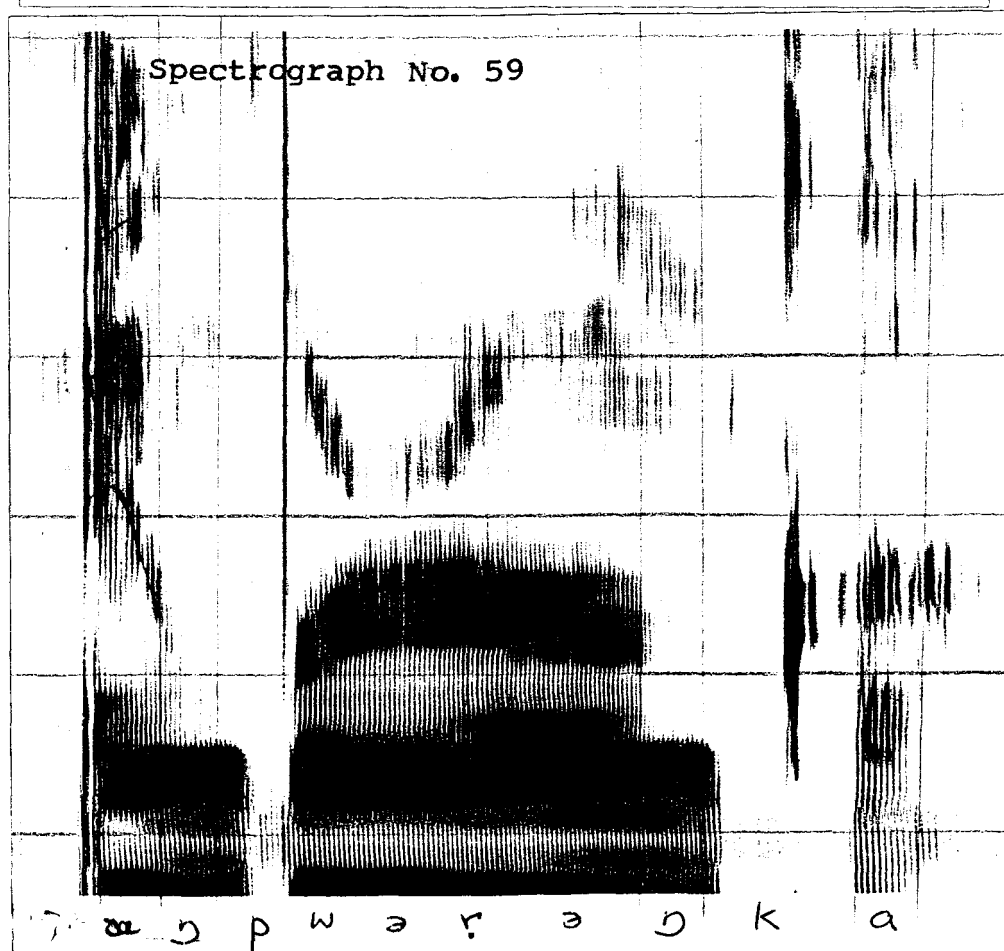
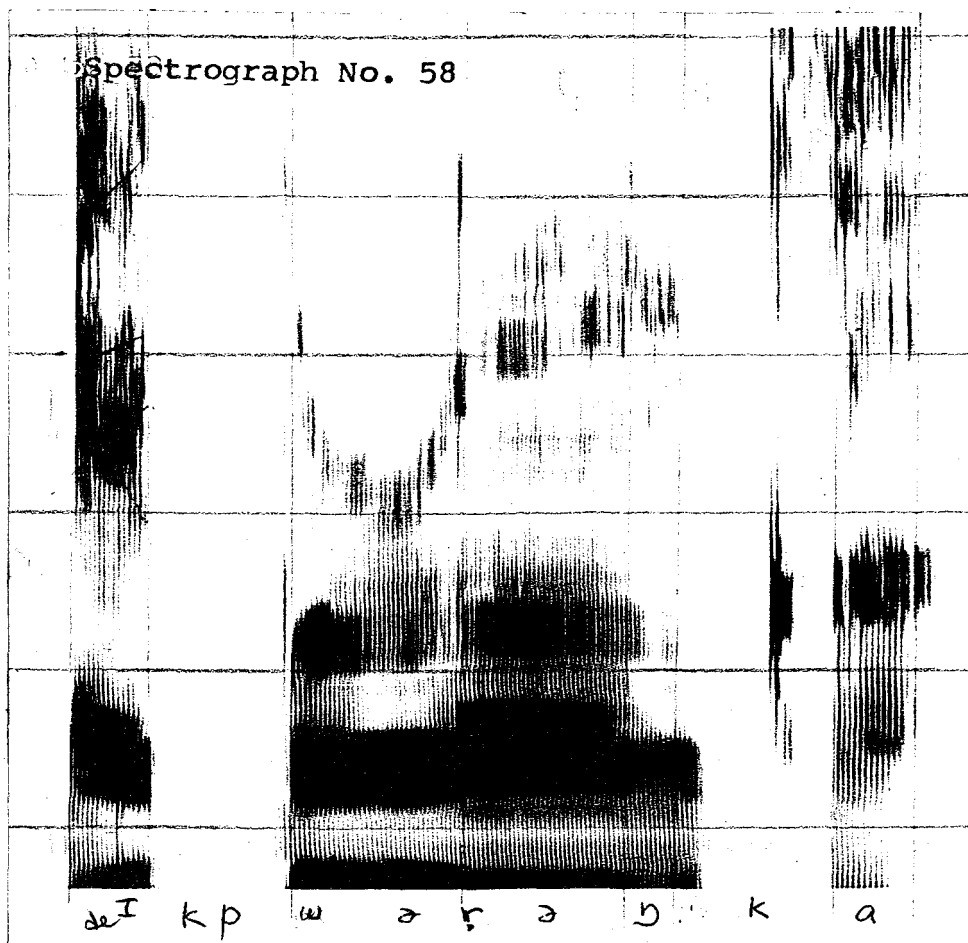
Spectrograph No. 55



Spectrograph No. 56







The vowel glide does not occur in the initial syllable of the following spectrographs. (The nasalization of the vowel can be seen where the nasal formant begins during the articulation of the vowel.)

## Spectrograph

No.60	[æŋkalʲa]	'wet'
61	[æŋpʷələʁa]	'blunt'
62	[æŋma]	'putrid'

It seems to me that there is a strong possibility that palato-velars /kʲ/ and /ŋʲ/ occur and that the allophones [æ<sup>i</sup>] and [æ] of the phoneme /a/ vary freely in this environment. The same palato-velar phonemes occur in Yanyula the southern-most multiple-classifying language in the area (J.F. Kirton: personal communication) and in Garawa (Furby 1972: 29).

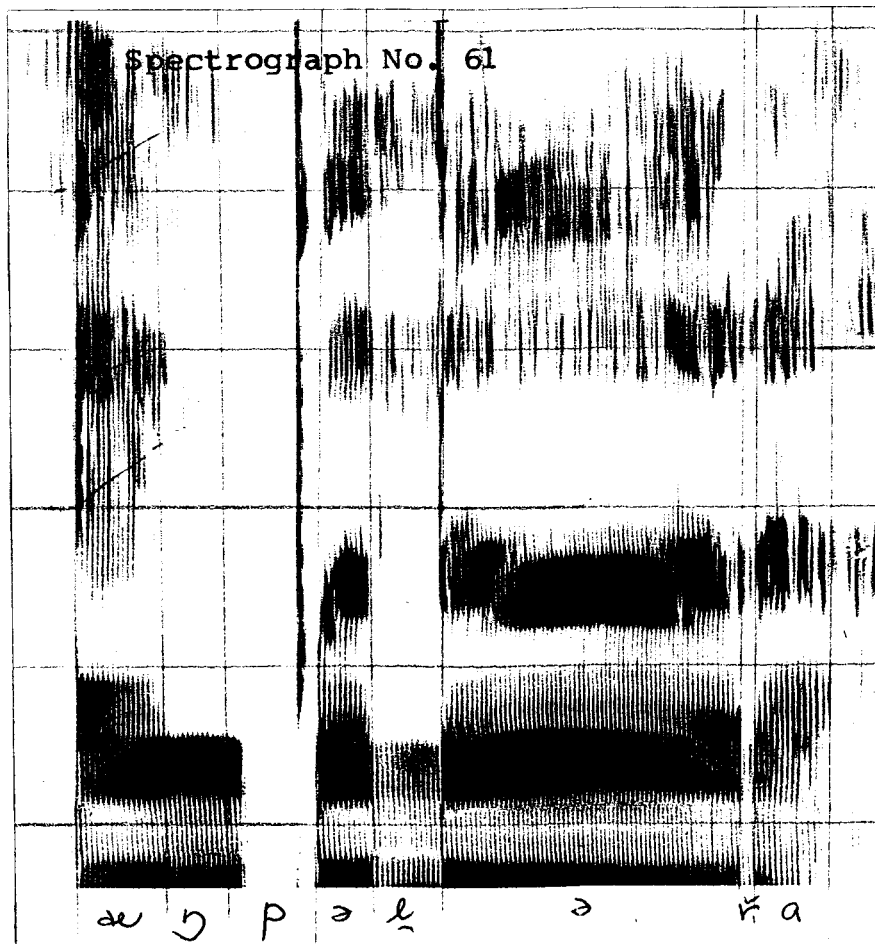
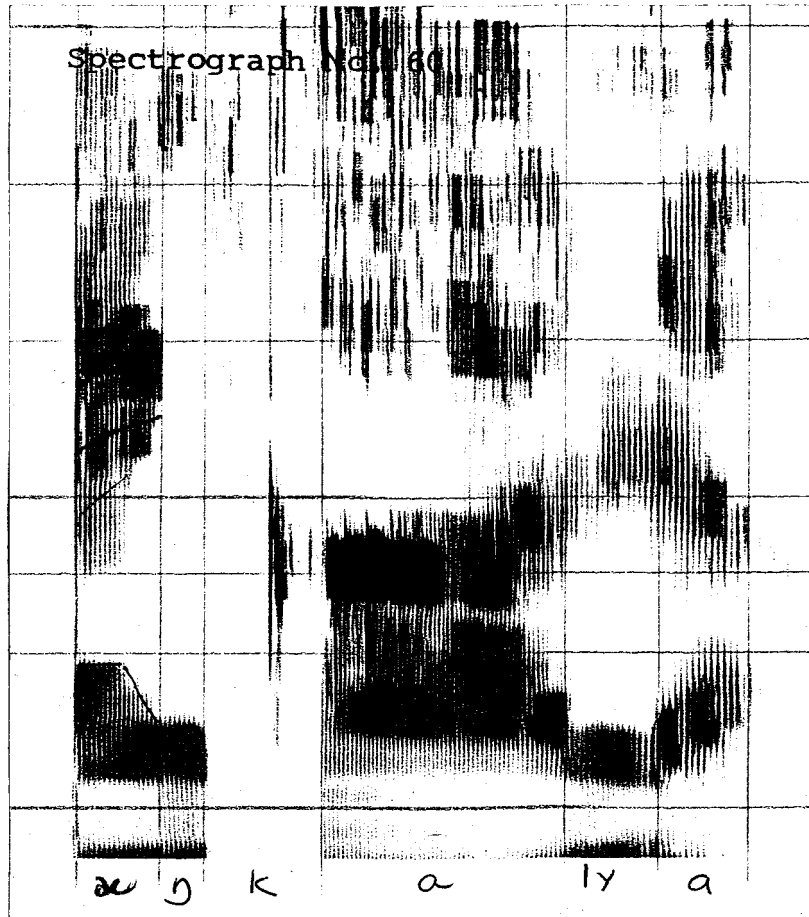
/aŋʲpʷiləʁa/	[æŋʲpʷələʁa]	'blunt'
/akpʷiriŋka/	[æ <sup>i</sup> kpʷərəŋka]	'dry'

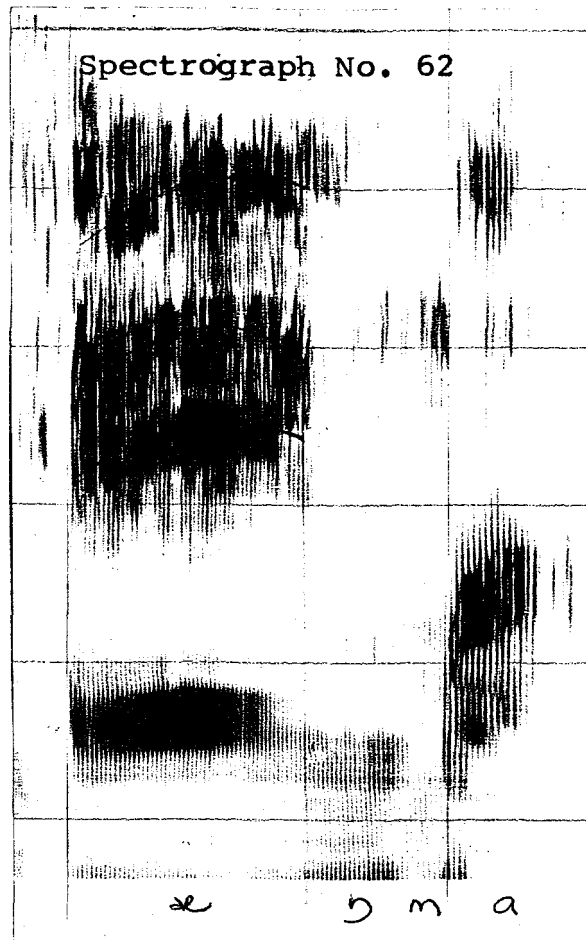
(b) Where the glide [æ<sup>i</sup>] occurs in the A noun class, the high allophone [i] occurs in other noun classes with a CV prefix. The occurrence of [i] as an allophone of the high vowel frequently occurs preceding a lamino-palatal consonant. The allophone [u] that normally occurs between [t̪] and [k, ŋ] (see Section 8: Chart 9) does not occur in these words, e.g.,

/t̪i-ŋʲkalʲa/	[t̪iriŋkalʲa]	'wet'
/t̪i-kʲpʷiriŋka/	[t̪ikpʷərəŋka]	'dry'
/t̪i-ŋʲma/	[t̪iriŋma]	'putrid'
/t̪i-kʲilʲaʁkpa/	[t̪ikilʲaʁkpa]	'light'

In the light of the above hypotheses, all occurrences of







[æ̃æ<sup>I</sup>] preceding a velar stop or nasal need to be checked to ascertain the point of articulation of the velar consonant and homorganic velar nasal/stop cluster.

6. THE LOW VOWEL /a/

The low vowel /a/ has seven allophones, viz., [a], [æ], [a<sup>ɪ</sup>], [æ<sup>ɪ</sup>], [a<sup>u</sup>], [æ<sup>u</sup>] and [ɒ]. The phonetic values are:

- [a] low, central, unrounded vowel which can be open or closed.
- [æ] low, front, unrounded vowel. The articulation [æ<sup>^</sup>] is higher and more central than the English [æ] in 'cat'. This allophone could alternatively be symbolised as [ɛ<sup>^</sup>].
- [ɒ] low, back, unrounded vowel.
- [ɪ] high, front, open, unrounded vowel.
- [u] high, front, open rounded vowel.

The allophone [a] is the most widely distributed and occurs in variation with the other allophones in almost every environment.

Chart 6 shows the distribution of all the allophones of /a/. A rounded vowel or offglide only occurs contiguous to a rounded consonant marked off by the double lines. The laminal series do not function as a set and have been separated on the chart. Rare exceptions, listed in Sections 6.1.3 and 6.1.4, are not entered so that the overall system can be seen more clearly. For restrictions on the distribution of the allophone [æ] in open versus closed syllables see Chart 7, Section 6.1.

## 6.1 The Allophones [a] and [æ]

The allophone [æ] varies with [a] as either free variation or in a mutually exclusive environment. In at least 75% of the data, the variation is in an unstressed or secondary-stressed syllable. The allophone [a] is usually the variant in the primary-stressed penultimate syllable.

CHART 6

Allophones of /a/

C preceding \ following C	C								Rounded
	Labial	Dental	Alv.	Retro.	Laminal			Velar	
					tʲ, nʲ	y	ɭʲ		
labial	a/æ	a/æ	a	a	a/a <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a	a <sup>u</sup>
dental	a/æ	a/æ	a/æ	a	-	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a/æ	a/a <sup>u</sup>
alveolar	a/æ	a/æ	a/æ	a	a/a <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a/æ	a/a <sup>u</sup>
retroflex	a/æ	a	a	a	a/a <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a	a/a <sup>u</sup>
laminal	a/æ	a/æ	a/æ	a/æ	a/æ/æ <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a/æ	a <sup>u</sup> /æ <sup>u</sup>
velar	a/æ	a/æ	a/æ	a	a/a <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a/æ	a/æ	a/a <sup>u</sup>
rounded	a/ɔ	a/æ	a	a/ɔ	a/a <sup>I</sup>	a <sup>I</sup> /æ <sup>I</sup>	a	a/ɔ	a/ɔ

The variation occurs under four conditions. Approximately 85% of the data showing such variation occurs because of the first conditioning environment, i.e., following a laminal or dental. Often two of the following environmental factors co-occur.

(a) in an open or closed syllable where the initial consonant is a laminal or dental. The conditioning by the laminal or dental can be seen in the following examples:

[ampɪɻuma akʷalʷa] 'two fish'

cf.

[y(a/æ)mpɪɻuma y(a/æ)ɾatʷa] 'two goannas'

[aɭakɪna akʷalʷa] 'those two fish'

cf.

[ɬ(a/æ)ɭakɪna ɬ(a/æ)ɬiyara] 'those two girls'

(b) when the following syllable has an initial laminal or dental. This rule could be united with (a), stating the variation occurs contiguous to a laminal or dental, but has been kept separate because restrictions on the specific laminals are easier to state and because this analysis correlates better with the conditioning of the high vowel. (See Section 8.)

(c) when a syllable is closed with a labial, dental, /ɻ/, laminal or velar.

Chart 7 shows the distribution of the allophone [æ] in variation with [a] in open and closed syllables. The x indicates that the variation occurs irrespective of the phonetic quality of the vowel in the following syllable; the asterisk indicates that the variation only occurs when the following vowel is a front vowel.

Variation preceding a labial or a velar most commonly occurs when the syllable is closed. As stated previously, the preceding

laminal can be seen to be the strongest conditioning factor for the allophone [æ].

### CHART 7

#### Distribution of [æ] in open and closed syllables

following C preceding	Labial open cl.	Dental open cl.	Alv. open cl.	Retro. open cl.	Laminal open cl.	Velar open cl.
labial	x	x x	*			* x
dental	x	x	x		x	x x
alveolar	x	x x	x		x x	x
retroflex	x			*	x	x
laminal	x x	x x	x x	x	x	x x
velar	x	x x	x		x	* x
rounded C		x				*

The variation due to syllable closure can be seen in the following examples:

/miyampena/ [miyapena~miyæmpena] 'what?'  
 /aniŋk<sup>w</sup>amiyaŋtaŋ<sup>w</sup>a/ [ænuŋk<sup>w</sup>amiyaŋtaŋ<sup>w</sup>a~  
 ænuŋk<sup>w</sup>amiyæŋtaŋ<sup>w</sup>a] 'shell (sp.)'

The velar nasal closing a syllable is much more likely to cause the variant [æ] to occur than is the labial. The allophone [æ] is sometimes the only variant between two velar nasals. The same root occurs in the following pair of examples but with alternation between /m/ and /p/.

/-aŋampa/ [aŋampa] 'where is ...?': A  
 Class

/ya<sub>l</sub>aŋaŋpa/ [ya<sub>l</sub>æŋaŋpa~ya<sub>l</sub>aŋ(a/æ)mpa] 'where is ...?': 1st  
incl. dual

(d) when the vowel in the following syllable is a front vowel.

The variant [æ] occurs when the vowel in the following syllable is the front vowel [i], [e] or [æ]. It has been observed in sub-minimal pairs or in variant forms of the same word where [a] precedes [k<sup>w</sup>u] and [æ] precedes [ki]. In examples in Section 6.1.4, other consonants precede the high vowel.

/waŋk<sup>w</sup>iřat<sup>ʷ</sup>a/ [waŋk<sup>w</sup>uřat<sup>ʷ</sup>a] 'to run away'  
cf.  
/waŋkiřat<sup>ʷ</sup>a/ [wæŋkiřat<sup>ʷ</sup>a] 'to listen'  
/aŋk<sup>w</sup>il<sup>ʷ</sup>im<sup>w</sup>i<sub>l</sub>a/ [aŋk<sup>w</sup>ul<sup>ʷ</sup>um<sup>w</sup>u<sub>l</sub>a] 'all'  
cf.  
/aŋkil<sup>ʷ</sup>im<sup>w</sup>i<sub>l</sub>a/ [æŋkil<sup>ʷ</sup>um<sup>w</sup>u<sub>l</sub>a] 'not to be opened'  
/napiliwentina~nap<sup>w</sup>iliwentina/ 'to bend with the head  
[næpiluwentina~nap<sup>w</sup>uluwentina] tucked in'

In the following set of words, there is a root where [æ] occurs preceding /Ci/ and [a] preceding /m<sup>w</sup>V/ or /p<sup>w</sup>V/.

/a-ŋam<sup>w</sup>i<sub>l</sub>a/ [aŋam<sup>w</sup>ə<sub>l</sub>a] 'behind the breasts'  
/a-ŋamina/ [(a/æ)ŋamina] 'breast'  
/a-ŋaŋk<sup>w</sup>iwa/ [aŋaŋk<sup>w</sup>uwa] 'front of the chest'  
/a-ŋaŋpil<sup>ʷ</sup>a/ [(a/æ)ŋaŋpil<sup>ʷ</sup>a] 'armpit'

In another pair of words where there is a semantic area similar to the one above, the conditioning of [æ] preceding /ŋi/ seems to be perpetuated when the second part of the stem changes to give a sequence /ŋk<sup>w</sup>i/, thus making an exception to the general rule stated earlier in this section.



/na-ŋaŋilena/	[næŋæŋilena]	'to pant'
/na-ŋaŋk <sup>w</sup> iwaŋina/	[næŋæŋk <sup>w</sup> uwaŋina]	'to breathe or have a heartbeat'

#### 6.1.1 Within a syllable with an initial laminal or dental

When the syllable consists of a laminal or dental and a low vowel, the allophones [a] and [æ] vary freely, except when the initial consonant of the following syllable is a rounded consonant or the laminal /y/.

Where the two contiguous consonants are both laminal or both dental, the allophone [æ] is the most common variant.

##### (i) within the morpheme

##### laminal—labial

/t <sup>ɹ</sup> ampa/	[t <sup>ɹ</sup> (a/æ)mpa]	'tamarind'
/yampiya/	[y(a/æ)mpiya]	'throat' (Nung)
/ayapit <sup>ɹ</sup> apa/	[a <sup>ɹ</sup> y(a/æ)pit <sup>ɹ</sup> apa]	'separate'
/niyaminiya <sup>ɹ</sup> ta/	[niy(a/æ)mɪniya <sup>ɹ</sup> ta]	'do (it) like this'
/t <sup>ɹ</sup> iŋin <sup>ɹ</sup> t <sup>ɹ</sup> apena/	[t <sup>ɹ</sup> iŋin <sup>ɹ</sup> t <sup>ɹ</sup> (a/æ)pena]	'dolphin'
/ŋa <sup>ɹ</sup> iyak <sup>w</sup> it <sup>ɹ</sup> amina/	[ŋa <sup>ɹ</sup> iyak <sup>w</sup> ut <sup>ɹ</sup> (a/æ)mɪna]	'to get jealous'

##### laminal—dental

/ya <sup>ɹ</sup> ta <sup>ɹ</sup> ta/	[y(a/æ)t <sup>ɹ</sup> (a/æ)t <sup>ɹ</sup> a]	'from here'
/ya <sup>ɹ</sup> lak <sup>w</sup> a/	[y(a/æ)l <sup>ɹ</sup> ak <sup>w</sup> a]	'here'
/tak <sup>w</sup> il <sup>ɹ</sup> an <sup>ɹ</sup> ta <sup>ɹ</sup> ta/	[tak <sup>w</sup> il <sup>ɹ</sup> (a/æ)n <sup>ɹ</sup> ta <sup>ɹ</sup> a]	'ceremonial feathers'
/niyaminiya <sup>ɹ</sup> ta/	[niy(a/æ)mɪniy(a/æ)t <sup>ɹ</sup> a]	'do (it) like this'
/ŋa <sup>ɹ</sup> ayan <sup>ɹ</sup> ta <sup>ɹ</sup> pena/	[ŋa <sup>ɹ</sup> a <sup>ɹ</sup> y(a/æ)n <sup>ɹ</sup> ta <sup>ɹ</sup> pena]	'to ask about'
/m <sup>w</sup> inaniya <sup>ɹ</sup> ta/	[mɪnaniy(a/æ)n <sup>ɹ</sup> ta]	'conch shell'
/ayama/	[a <sup>ɹ</sup> y(a/æ)ma]	'hair'
/niyama/	[niy(a/æ)ma]	'to say'

/kampilʷama/	[kampilʷ(a/æ)ma]	'to stay'
/niŋiyakʷitʷamina/	[niŋiyakʷutʷæmina]	'I'm jealous'

laminal—alveolar

/tʷaʃaŋʷa/	[tʷ(a/æ)ʃaŋʷa]	'horse'
/yaʃiŋkʷa/	[y(a/æ)ʃuŋkʷa]	'yesterday'
/yaʃimilʷa/	[y(a/æ)ʃəmɪlʷa]	'coral'
/miyaʃawa/	[miy(a/æ)ʃawa]	'burrawong'
/yiniyaʃiwaŋa/	[yɪniy(a/æ)ʃuwaŋa]	'native cat'
/ayaʃimʷiʃa/	[ay(a/æ)ʃəmʷəʃa]	'upper arm'
/mayala/	[ma <sup>ɪ</sup> y(a/æ)la]	'aware of being deceived'
/anʷaʃiŋʷa/	[anʷaʃuŋʷa]	'quiet'
/ŋaʃipilʷaʃikayina/	[ŋaʃipɪlʷ(a/æ)ʃika <sup>ɪ</sup> yina]	'to lie face down'
/miya <sub>l</sub> kʷa/	[miy(a/æ)lkʷa]	'low tide'
/wilʷaʃa/	[wilʷ(a/æ)ʃa]	'in the centre'
/yitʷaʃa/	[itʷ(a/æ)ʃa]	'seagull'
/yiniyaʃma/	[yɪniy(a/æ)ʃma]	'S.E. wind'

laminal—laminal

/yalʷikʷa/	[y(a/æ)lʷukʷa]	'rain'
/lʷalʷiŋa/	[lʷ(a/æ)lʷiŋa]	'knife'
/ŋaʃilʷalʷiwaŋina/	[ŋaʃilʷ(a/æ)lʷuwaŋina]	'to chew'
/a <sub>l</sub> iŋkʷalʷalʷiʃa/	[a <sub>l</sub> iŋkʷalʷ(a/æ)lʷəʃa]	'plant (sp.)'
/ŋaʃikpilʷatʷaŋʷima/	[ŋaʃikpɪlʷ(a/æ)tʷaŋʷuma]	'to toss about'
/miyatʷa/	[miy(a/æ)tʷa]	'paddle'
/mitʷiyalʷa/	[mitʷiy(a/æ)lʷa]	'beach'
/ŋaŋiŋʷanʷtʷatʷa/	[ŋaŋuŋʷanʷtʷætʷa]	'to stop'

laminal—retroflex

/t̪it̪ariwa/	[t̪it̪(a/æ)ruwa]	'silver crowned friar bird'
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(Note: The [æ] allophone preceding a retroflex is very rare.)

laminal—velar

/tal̪akil̪a/	[tal̪(a/æ)kil̪a]	'fish: groper'
/an̪akp̪wita/	[an̪(a/æ)kp̪w̪eta]	'brave'
/ŋaʃiyaŋpit̪ina/	[ŋaʃiy(a/æ)ŋpit̪ina]	'to call by name'
/ŋaʃiyaŋkil̪awif̪at̪ina/	[ŋaʃiy(a/æ)ŋk̪el̪awuf̪at̪ina]	'to echo'
/ŋaʃil̪aŋmena/	[ŋaʃil̪(a/æ)ŋmena]	'to lead'
/nil̪akil̪ak̪w̪ir̪t̪ina/	[nil̪(a/æ)k̪il̪ak̪w̪ur̪t̪ina]	'to have a lot of spears'
/anit̪iyaŋma/	[ænit̪iyæŋma]	'weak, slow'

dental—dental

/yat̪ata/	[yat̪(a/æ)ta]	'from here'
/yiŋaŋa/	[yiŋ̪(a/æ)ŋa]	'fingernail'
/map̪wil̪ala/	[map̪w̪ul̪(a/æ)la]	'shallow salt water'

dental—alveolar

/yilaʃipenta/	[yil̪(a/æ)ʃ̪epenta]	'snake (sp.).'
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dental—laminal

/at̪al̪ima/	[at̪(a/æ)l̪ɪmma]	'river'
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dental—velar

/mal̪aŋayikpa/	[mal̪(a/æ)ŋæ <sup>1</sup> kpa]	'those two there'
/winaŋaŋman̪t̪ya/	[wunaŋaŋman̪t̪ya] <sup>10</sup>	'two cousins'

## (ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies first and then the rule for allophonic variation is applied to the resultant syllable.

with root-initial vowel

/y-ařimilʲa/	[y(a/æ)řumilʲa]	'coral'
/y-ařatʲa/	[y(a/æ)řatʲa]	'goanna'
/y-ampiřkʷa/	[y(a/æ)mpiřkʷa]	'parrot fish' (Nung.)
/y-alkiřaŋkʷiřa/	[y(a/æ)lkiřaŋkʷuřa]	'fish (sp.)'
/y-alʲilʲa/	[y(a/æ)lʲilʲa]	'flying fox'
/t̚-ařiřapa/	[t̚(a/æ)t̚uřapa]	'few: D class'
(cf. /m-ařiřapa/	[mat̚uřapa]	'few: M class'
/t̚it̚-ařiŋka/	[t̚ut̚(a/æ)řuŋka]	'woman: D class'
/yiniy-ařiŋka/	[yiniyařuŋka]	'old goanna: Y class'

## 6.1.2 When the following syllable begins with a laminal or dental

In a V(C) syllable or a CV(C) syllable where the initial C is any consonant except a laminal or dental, the allophone [æ] varies freely with [a] when the following syllable begins with a laminal or dental. The laminal is usually /lʲ/ or the sequence /nʲtʲ/. (For further discussion, see Section 6.2(ii).)

labial——dental

/amʲiŋalpalpiřa/	[amʲuŋ(a/æ)lp(a/æ)lpiřa]	'plant (sp.)'
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alveolar——dental

/wiřaŋt̚iŋta/	[wuřaŋt̚iŋta]	'mouse'
/ařiřata/	[ařəř(a/æ)t̚a]	'fish (sp.)'

/alʲaʃatata/	[alʲ(a/æ)ʃ(a/æ)tata]	'dusk'
/wiʃaminanta/	[wuʃamin(a/æ)ntiya]	'to look'

alveolar—laminal

/yimʲiʃalʲa/	[yimʲuʃ(a/æ)lʲa]	'green ant'
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retroflex—laminal

/wananʲtʲa/	[wan(a/æ)nʲtʲa]	'quickly'
/aranʲtʲaʃa/	[ar(a/æ)nʲtʲ(a/æ)ʃa]	'dangerous sea creatures'

velar—dental

/aʃayik(a/æ)liwa/	[aʃæ <sup>I</sup> k(a/æ)luwa]	'string-like'
/aŋalpʲiŋalpiʃa/	[aŋ(a/æ)lpʲuŋalpiʃa]	'plant (sp.)'

velar—laminal

/timayikalʲa/	[tʲumæ <sup>I</sup> k(a/æ)lʲa]	'bird: stork'
/atakalʲikpa/	[atak(a/æ)lʲikpa]	'lily (sp.)'

rounded cons.—dental

/awanpitʲiŋʲa/	[aw(a/æ)npitʲuŋʲa]	'rather tired'
/tiwantiʃa/	[tʲuw(a/æ)ntʲəʃa]	'bird: rufus fantail'

(ii) At the morpheme boundary

Morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies to all roots that begin with a vowel, marked -V in the following data. The order in which the morphophonemic rule and assimilation rule applies is optional. For the sake of consistency in rule ordering with Section 6.1.1(ii), the morphophonemic rule can be said to apply first.

In about 40% of the data, regressive vowel harmony occurs in the first syllable (see Section 6.6).

with root-initial vowel

/-a <sub>1</sub> iřapa/	[(a/æ)t <sub>1</sub> řapa]	'few'
/-a <sub>1</sub> ieřiwa/	[(a/æ)t <sub>1</sub> ieřuwa]	'young'
/ŋař-a <sub>1</sub> tiya/	[ŋař(a/æ)t <sub>1</sub> tiya]	'to look'
/ŋař-at <sub>1</sub> iřakina/	[ŋař(a/æ)t <sub>1</sub> iřakina]	'to pierce smoothly'
/-al <sub>1</sub> al <sub>1</sub> vikpa/	[(a/æ)l <sub>1</sub> (a/æ)l <sub>1</sub> vikpa]	'lips'
/-al <sub>1</sub> ařatata/	[(a/æ)l <sub>1</sub> (a/æ)řatata]	'dust'
/-al <sub>1</sub> ik <sup>w</sup> iřa/	[(a/æ)l <sub>1</sub> uk <sup>w</sup> uřa]	'paperbark tree'

with root-initial consonant

/a-t <sub>1</sub> iřiŋayikp <sup>w</sup> ina/	[(a/æ)t <sub>1</sub> əř <sup>w</sup> ŋa <sup>1</sup> kp <sup>w</sup> əna]	'just right'
/a-lařikawařiya/	[(a/æ)lařikawařiya]	'untidy'
/a-l <sub>1</sub> pil <sub>1</sub> iřa/	[(a/æ)lpil <sub>1</sub> əřa]	'slippery'
/a-l <sub>1</sub> anp <sup>w</sup> ina/	[(a/æ)l <sub>1</sub> anp <sup>w</sup> əna]	'ignorant'
/na-řayikpit <sub>1</sub> ina/	[n(a/æ)řa <sup>1</sup> kpit <sub>1</sub> ina]	'to spit out'
/yiŋa-řik <sup>w</sup> i <sub>1</sub> la/	[y <sub>1</sub> iŋ(a/æ)řuk <sup>w</sup> u <sub>1</sub> la]	'to ache, have pity'
/a-l <sub>1</sub> anma/	[(a/æ)l <sub>1</sub> (a/æ)ŋma]	'southeast'
/a-l <sub>1</sub> ařim <sup>w</sup> i <sub>1</sub> řta/	[(a/æ)l <sub>1</sub> (a/æ)řə <sup>w</sup> m <sup>w</sup> ə <sub>1</sub> řta]	'darkness'
/a-l <sub>1</sub> ařiŋan <sub>1</sub> ta/	[(a/æ)l <sub>1</sub> əř <sub>1</sub> ŋan <sub>1</sub> ta]	'burning hot'
/na-l <sub>1</sub> anp <sup>w</sup> i <sub>1</sub> řk <sup>w</sup> iwa	[n(a/æ)l <sub>1</sub> anp <sup>w</sup> u <sub>1</sub> řk <sup>w</sup> uwa]	'to be filled'

### 6.1.3 In closed syllables

The allophones [a] and [æ] vary freely in a closed syllable when the closure is a laminal, dental, /ř/ (see Sections 6.1.1/2) or a labial or velar. The variation occurs only in non-primary stressed syllables, except when two contiguous velars co-occur.

The CC clusters following the variant [æ] are both homorganic and heterorganic, the second consonant being labial or velar. The variation usually only occurs in this environment when the following vowel is a front (unrounded) vowel but can occur preceding the unrounded central vowel /a/. All known examples are listed.

(See Section 6.6 for exceptions where vowel harmony appears to be causing the variant [æ] in a closed syllable preceding a rounded vowel.)

labial/retroflex/velar——labial

/mampiřk <sup>w</sup> a/	[m(a/æ)m <sup>ɮ</sup> piřk <sup>w</sup> a]	'ironwood tree'
/apiřampa <sub>l</sub> pa/	[apə <sub>ɮ</sub> (a/æ)m <sup>ɮ</sup> palpa]	'flat'
/ŋařiŋampena/	[ŋařəŋ(a/æ)m <sup>ɮ</sup> pena]	'to bathe'
/ŋařikampama/	[ŋařik(a/æ)m <sup>ɮ</sup> pama]	'to put a fire out'

alveolar/retroflex——velar

/ařakpiliřa/	[ař(a/æ)kpə <sub>ɮ</sub> əřa]	'blunt'
/t <sup>ɮ</sup> im <sup>w</sup> iřaŋmiřa/	[t <sup>ɮ</sup> um <sup>w</sup> əřəŋmiřa]	'sea snake'
/ŋařapiřaŋpayina/	[ŋařapəř(a/æ)ŋpa <sup>ɪ</sup> yina]	'to trick'
/wanikařaŋpit <sup>ɮ</sup> a/	[wanikař(a/æ)ŋpit <sup>ɮ</sup> a]	'MB's children'

velar——velar

/aŋkaŋmina/	[ (a/æ)ŋk(a/æ)ŋmina]	'thieving'
/ap <sup>w</sup> ik <sup>w</sup> a <sub>l</sub> aŋaŋpa/	[ap <sup>w</sup> uk <sup>w</sup> a <sub>l</sub> (a/æ)ŋ(a/æ)ŋpa]	'where are those three?'
/aŋaŋpil <sup>ɮ</sup> a/	[ (a/æ)ŋaŋpil <sup>ɮ</sup> a]	'armpit'

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies as well as the allophonic rule.

with root-initial vowel

/-ampatepiřa/	[(a/æ)mp(a/æ)t̥(e/æ)p̥iřa]	'empty vessel'
/t̥-ampiřk <sup>w</sup> iṭařpa/	[t̥(a/æ)mp̥iřk <sup>w</sup> uṭařpa]	'short and broad: D class'
/-aṇaṇk <sup>w</sup> iwa/	[(a/æ)ṇaṇk <sup>w</sup> uwa]	'front of the chest'
/-aṇpat <sup>v</sup> aṇpat <sup>v</sup> a/	[(a/æ)ṇpa <sup>I</sup> t <sup>v</sup> aṇpa <sup>I</sup> t <sup>v</sup> a]	'tree (sp.)'
/n-aṇkiřat <sup>v</sup> ama/	[næṇkiřat <sup>v</sup> ama]	'to listen'

with root-initial consonant

/a-kp̥ilkiyałk <sup>w</sup> a/	[(a/æ)kp̥ilkiy(a/æ)łk <sup>w</sup> a]	'receding tide'
/a-ṇkin <sup>v</sup> ṇ <sup>w</sup> iřa/	[(a/æ)ṇkin <sup>v</sup> ṇ <sup>w</sup> uřa]	'broken'
/na-ṇpat <sup>v</sup> ama/	[næṇpa <sup>I</sup> t <sup>v</sup> ama]	'to smell'
/na-ṇkařiṇena/	[næṇkařiṇena]	'to split up'
/ṇař-aṇpiřat <sup>v</sup> ina/	[ṇařæṇp̥iřa <sup>I</sup> t <sup>v</sup> ina]	'to care for'

## 6.1.4 When the following syllable has a front vowel

Variation between [a] and [æ] occurs when the following syllable has a front vowel. The intervening consonant is most likely to be a labial or a velar.

Only open syllables have been listed in this section. When variation occurs in a closed syllable, the following syllable frequently has a front vowel (see Section 6.1.3).

## (i) Within the morpheme

The examples found to date are all listed below:

/lipalipa/	[lip(a/æ)lipa]	'canoe' (Mac)
/yimakimakina/	[yim(a/æ)kim(a/æ)kina]	'hornet'
/maṇṭakiřiyeřa/	[maṇṭ(a/æ)kiřiyeřa]	'yam'



/ŋařĩŋaŋĩlena/	[ŋ(a/æ)řəŋəŋĩlena]	'to pant'
/ařařĩk <sup>w</sup> iřa/	[ař(a/æ)řĩk <sup>w</sup> uřa]	'mangrove oyster'
/ŋařĩyařařĩkina/	[ŋařĩyæřařĩkina]	'to shake'
/ŋařĩkil <sup>v</sup> aŋpařama/	[ŋ(a/æ)řĩkil <sup>v</sup> aŋpařama]	'to stand in line'

(Note: The variation in the prefix /ŋařĩ-/ is very common.)

In the word, /ṭakat<sup>v</sup>ařařa/ [ṭakat<sup>v</sup>(a/æ)ř(a/æ)řa] 'nut (sp.)', the basic form is /ṭakat<sup>v</sup>ařařĩ+a/, thus conforming to the rule. It should also be noted, however, that [æ] is a common allophone between identical consonants (see Sections 6.1.1, 3).

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies at the morpheme boundary, together with the allophonic rule.

with root-initial vowel

/-amiyařiya/	[(a/æ)miyæřiya]	'bush shelter'
/-amiřeřa/	[(a/æ)mĩřeřa]	'crab (sp.)'
/-am <sup>w</sup> ĩtikpal <sup>v</sup> a/	[(a/æ)mũtũkpal <sup>v</sup> a]	'dew'
/ŋař-amiyikpinama/	[ŋař(a/æ)mi:kpinama]	'to catnap'
/n-apipa/	[næpĩpa]	'mother's brother'
/-awařŋkamiyeřa/	[awařŋk(a/æ)miyeřa]	'rather a long time'
/-ařĩřařa/	[(a/æ)řəř(a/æ)ṭa]	'fish (sp.)'
/yĩŋ-ařĩkařaŋa/	[yĩŋ(a/æ)řĩkařaŋa]	'to write'
/-ařĩk <sup>w</sup> a/	[(a/æ)řĩk <sup>w</sup> a]	'raw'
/-akiniwa/	[(a/æ)kinuwa]	'to that (place)'
/-aŋempa/	[(a/æ)ŋ(e/æ)mpa]	'place'

with a root-initial consonant

/a-mikpil <sup>v</sup> iřa/	[(a/æ)mikpil <sup>v</sup> əřa]	'impartial'
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/a-miyampena/	[(a/æ)miy(a/æ)mpe <sup>I</sup> na]	'what'
/a-mempeřk <sup>w</sup> a/	[(a/æ)m(e/æ)mpeřk <sup>w</sup> a]	'ten'
/a-pil <sup>~</sup> kirakayina/	[(a/æ)pil <sup>~</sup> kə <sup>~</sup> aka <sup>I</sup> yina]	'flat and smooth'
/a-řayika <sup>~</sup> liwa/	[(a/æ)řa <sup>I</sup> ka <sup>~</sup> liwa]	'string like'
/a-kil <sup>~</sup> anpeřeřa/	[(a/æ)kil <sup>~</sup> anp(e/æ)řeřa]	'forked'
/a-kil <sup>~</sup> ařpa/	[(a/æ)kil <sup>~</sup> ařpa]	'light'
/a-ŋamina/	[(a/æ)ŋamina]	'breast'

## 6.2 The allophones [a] and [a<sup>I</sup>]

In a V syllable or a syllable where the initial consonant is not a laminal or dental, [a] varies with [a<sup>I</sup>] when the initial consonant of the following syllable is /t<sup>~</sup>/ or /n<sup>~</sup>/. The allophone [a<sup>I</sup>] occurs most frequently when the syllable is primary-stressed. (For the allophones preceding /l<sup>~</sup>/, see Section 6.1.2.)

### (i) Within the morpheme

#### labial——laminal

/pat <sup>~</sup> a/	[p(a <sup>I</sup> /a)t <sup>~</sup> a]	'nail'
/mat <sup>~</sup> iwa/	[m(a <sup>I</sup> /a)t <sup>~</sup> uwa]	'fern (sp.)'
/aman <sup>~</sup> pan <sup>~</sup> t <sup>~</sup> iřa/	[aman <sup>~</sup> p(a <sup>I</sup> /a)n <sup>~</sup> t <sup>~</sup> iřa]	'quick manually'
/man <sup>~</sup> iŋ <sup>w</sup> in <sup>~</sup> a/	[m(a <sup>I</sup> /a)n <sup>~</sup> uŋ <sup>w</sup> un <sup>~</sup> a]	'wild fig'

#### alveolar——laminal

/niwaŋkiřat <sup>~</sup> a/	[nuwaŋkiř(a <sup>I</sup> /a)t <sup>~</sup> a]	'to run away'
/ŋařampiřat <sup>~</sup> a/	[ŋařampiř(a <sup>I</sup> /a)t <sup>~</sup> uwa]	'to care for'

#### velar——laminal

/niŋat <sup>~</sup> a/	[nuŋ(a <sup>I</sup> /a)t <sup>~</sup> a]	'to hit'
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/ŋaʃiŋkatʲikina/ [ŋaʃiŋk(a<sup>I</sup>/a)tʲikina] 'to lift out of'

rounded cons. — laminal

/aʃikʷanʲtʲiʃa/ [aʃukʷ(a<sup>I</sup>/a)nʲtʲəʃa] 'quick'

/niŋʷanʲtʲa/ [nuŋʷ(a<sup>I</sup>/a)nʲtʲa] 'to stop'

(ii) At the morpheme boundary

When the low vowel occurs at the morpheme boundary, [a] and [a<sup>I</sup>] vary but the glide only occurs in about 25% of the data.

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies at the morpheme boundary, together with the allophonic rule.

/-atʲiwatʲiwa/ [(a<sup>I</sup>/a)tʲuwatʲuwa] 'fern (sp.)'

/-atʲiriŋka/ [(a<sup>I</sup>/a)tʲəreŋka] 'ground'

/awaʃŋk-anʲeʃa/ [awaʃŋk(a<sup>I</sup>/a)nʲeʃa] 'always fighting'

with root-initial consonant

/a-tʲiwira/ [(a<sup>I</sup>/a)tʲuwura] 'youngest sibling'

/a-nʲakpʷita/ [(a<sup>I</sup>/a)nʲakpʷəta] 'brave'

There are examples where the vowel at the morpheme boundary varies between [a]~[æ]~[a<sup>I</sup>]~[æ<sup>I</sup>]. It occurs more frequently when the following laminal is /nʲ/ than when it is /tʲ/. It seems that, when the vowel is not bound by a preceding or a following laminal, it is optional as to which rule is applied. The rules applicable in the following examples are from Section 6.1.2 or 6.2.

between prefix and root

/-anʲiʃa/ [(a<sup>I</sup>/æ/a)nʲəʃa] 'mucus'

/-anʲtʲiŋiʃa/ [(a<sup>I</sup>/æ/a)nʲtʲiŋəʃa] 'shell: Natica'

/n-an <sup>y</sup> t <sup>y</sup> ařĩŋal <sup>y</sup> il <sup>y</sup> a/	[n(a <sup>I</sup> /æ)n <sup>y</sup> t <sup>y</sup> ařəŋal <sup>y</sup> il <sup>y</sup> a]	'boy'
/na-t <sup>y</sup> eřitĩnama/	[n(a <sup>I</sup> /æ/a)t <sup>y</sup> eřikĩna]	'to be finished'

between root and suffix

/an-at <sup>y</sup> a/	[(æ/a)n(æ <sup>I</sup> /æ/a)t <sup>y</sup> a]	'he'
/ap <sup>w</sup> iř-at <sup>y</sup> a/	[ap <sup>w</sup> əř(a/æ <sup>I</sup> )t <sup>y</sup> a]	'they (trial)'
/ŋal-at <sup>y</sup> a/	[ŋal(a/a <sup>I</sup> )t <sup>y</sup> a]	'she'
/ap <sup>w</sup> iŋ-at <sup>y</sup> a/	[ap <sup>w</sup> uŋ(a <sup>I</sup> /æ <sup>I</sup> /a)t <sup>y</sup> a]	'they (dual)'

There are three other examples where the application of either rule has occurred within the morpheme.

/aŋan <sup>y</sup> t <sup>y</sup> iŋan <sup>y</sup> t <sup>y</sup> iřa/		'shell (sp.)'
	[(a/æ)ŋ(a <sup>I</sup> /æ)n <sup>y</sup> t <sup>y</sup> iŋ(a <sup>I</sup> /æ)n <sup>y</sup> t <sup>y</sup> əřa]	
/man <sup>y</sup> iŋ <sup>w</sup> in <sup>y</sup> a/	[m(a <sup>I</sup> /æ/a)n <sup>y</sup> uŋ <sup>w</sup> un <sup>y</sup> a]	'wild fig'
/miyat <sup>y</sup> a/	[miy(æ/a/æ <sup>I</sup> )t <sup>y</sup> a]	'paddle'

### 6.3 The allophones [a<sup>I</sup>] and [æ<sup>I</sup>]

In a V syllable or a syllable where the initial consonant is not /y/, the allophones [a<sup>I</sup>] and [æ<sup>I</sup>] vary when the following consonant begins with /y/. When the preceding consonant is a sonorant, [a<sup>I</sup>] and [æ<sup>I</sup>] vary freely; when the preceding consonant is an obstruent [a<sup>I</sup>] usually occurs, sometimes without variation.

(i) Within the morpheme

labial—laminal /y/

/apayawa/	[apa <sup>I</sup> yawa]	'blunt'
/mayala/	[ma(a <sup>I</sup> /æ <sup>I</sup> )yala]	'aware of being deceived'

dental—laminal /y//taya/ [ta<sup>I</sup>ya]

'green tree snake'

alveolar—laminal /y//kalayīřa/ [kala<sup>I</sup>yīřa]

'sea perch'

/wiřayaŋk<sup>w</sup>iřa/ [wuř(a<sup>I</sup>/æ<sup>I</sup>)yaŋk<sup>w</sup>uřa]

'waterlily'

retroflex—laminal /y//maṭayaṇa/ [maṭ(a<sup>I</sup>/æ<sup>I</sup>)yina]

'initiation'

/k<sup>w</sup>iṛaya/ [k<sup>w</sup>uṛ(a<sup>I</sup>/æ<sup>I</sup>)ya]

'you're tricking me!'

laminal—laminal /y//kin<sup>y</sup>t<sup>y</sup>aya/ [kin<sup>y</sup>t<sup>y</sup>(a<sup>I</sup>/æ<sup>I</sup>)ya]

(expression of empathy)

velar—laminal /y//kayiwa/ [ka<sup>I</sup>yuwa]

'dillybag'

/ṇaya/ [ṇa<sup>I</sup>ya]

'I'

rounded cons.—laminal /y//ap<sup>w</sup>ik<sup>w</sup>aya/ [ap<sup>w</sup>uk<sup>w</sup>a<sup>I</sup>ya]

'approaching'

/yinip<sup>w</sup>iṇ<sup>w</sup>aya/ [yinup<sup>w</sup>uṇ<sup>w</sup>a<sup>I</sup>ya]

'loggerhead turtle'

/yimaṭiwaya/ [yimaṭuw(a<sup>I</sup>/æ<sup>I</sup>)ya]

'stingray'

## (ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3)  
co-occurs with the allophonic rule.

with root-initial vowel/-ayap<sup>w</sup>it<sup>y</sup>apa/ [(a<sup>I</sup>/æ<sup>I</sup>)yap<sup>w</sup>it<sup>y</sup>apa]

'different'

/-ayapiřa/ [(a<sup>I</sup>/æ<sup>I</sup>)yapiřa] 'naked'

with root-initial consonant

/a-yik<sup>w</sup>it<sup>v</sup>iya/ [(a<sup>I</sup>/æ<sup>I</sup>)yuk<sup>w</sup>ut<sup>v</sup>iya] 'small (sing.)'

/a-yayikiřeřa/ [(a<sup>I</sup>/æ<sup>I</sup>)yæ<sup>I</sup>:kiřeřa] 'happy'

/ya-yařa<sup>nta</sup>ŋ<sup>w</sup>a/ [y(a<sup>I</sup>/æ<sup>I</sup>)yařa<sup>nta</sup>ŋ<sup>w</sup>a] 'brown snake'

/na-yama/ [næ<sup>I</sup>yæma] 'to say, do'

In syllables where the initial consonant is /y/, and the following syllable begins with /y/, the allophone [æ<sup>I</sup>] occurs. This correlates with the common allophone between laminals being [æ] (see Section 6.1.1).

/yaya/ [yæ<sup>I</sup>ya] 'footstep'

/yayařa/ [yæ<sup>I</sup>yařa] 'tendon'

#### 6.4 The allophone [ɔ]

In a syllable where the initial consonant is a rounded consonant, /p<sup>w</sup>, m<sup>w</sup>, k<sup>w</sup>, ŋ<sup>w</sup>, w/, the allophone [ɔ] varies with [a] when the following consonant is a labial, flap /ř/, retroflex /ɽ/, velar or rounded consonant. The occurrence is rare preceding /ř/ and /ɽ/. (See Section 3.2 for interpretation concerning /m<sup>w</sup>a/ and /p<sup>w</sup>a/.)

(i) Within the morpheme

/m<sup>w</sup>ampa<sup>ta</sup>/ [m<sup>w</sup>ɔmpa<sup>ta</sup>] (personal name)

/ŋayin<sup>v</sup>t<sup>v</sup>ik<sup>w</sup>apa/ [ŋa<sup>I</sup>:n<sup>v</sup>t<sup>v</sup>uk<sup>w</sup>apa] 'I, also'

/yinik<sup>w</sup>ampa/ [yɪnuk<sup>w</sup>(ɔ/a)mpa] 'bark of paperbark trees'

/yiwama/ [yɪw(ɔ/a)ma] 'bush fly'

/a<sup>ti</sup>wapa/ [a<sup>ti</sup>uw(ɔ/a)pa] 'today'

rounded cons.——/ř/ or /r/

/alawitawařa/	[alawutaw(v/a)řa]	'story'
/am <sup>w</sup> ara/	[am <sup>w</sup> (v/a)ra]	'fishing spear'
/waran <sup>v</sup> ta/	[w(v/a)ran <sup>v</sup> ta]	'quickly'

rounded cons.——velar

/yiniŋ <sup>w</sup> iŋ <sup>w</sup> aŋpa/	[yinuŋ <sup>w</sup> uŋ <sup>w</sup> oŋpa]	'edible reptile'
/maŋiyiwaŋa/	[maŋiyuw(v/a)ŋa]	'shark'
/naniyiwaŋk <sup>w</sup> a/	[naniyuwoŋk <sup>w</sup> a]	'old man'
/wiřakpartiwakina/	[wuřakpartuw(v/a)kina]	'to frighten'

rounded cons.——rounded cons.

/wiřam <sup>w</sup> ak <sup>w</sup> a/	[wuřamok <sup>w</sup> a]	'double barred finch'
/tamp <sup>w</sup> ak <sup>w</sup> a/	[tampok <sup>w</sup> a]	'tobacco'
/lik <sup>w</sup> ak <sup>w</sup> a/	[luk <sup>w</sup> (v/a)k <sup>w</sup> a]	'en route'
/yaŋ <sup>w</sup> aŋ <sup>w</sup> a/	[yaŋ <sup>w</sup> (v/a)ŋ <sup>w</sup> a]	'eel'
/p <sup>w</sup> ap <sup>w</sup> iwa/	[p <sup>w</sup> (v/a)p <sup>w</sup> uwa]	'pawpaw.'

## (ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) co-occurs with the allophonic rule.

with root-initial vowel

/niw-ampil <sup>v</sup> a/	[nuw(v/a)mpil <sup>v</sup> a]	'to stay'
/w-ap <sup>w</sup> iwařka/	[w(v/a)p <sup>w</sup> uwařka]	'to hide'
/w-ařayikpat <sup>v</sup> ina/	[w(v/a)řæ <sup>1</sup> :kpat <sup>v</sup> ina]	'to strip bark off'

6.5 The allophone [a<sup>u</sup>] and [æ<sup>u</sup>]

In a V syllable or a CV syllable where the consonant is any

consonant other than a rounded consonant, the allophones [a] and [a<sup>u</sup>] vary freely when the following syllable begins with a rounded consonant, /k<sup>w</sup>/ and /w/. Only /a/ appears to occur preceding /p<sup>w</sup>/, /m<sup>w</sup>/ and /ŋ<sup>w</sup>/. Some speakers use only the allophone [a] or an offglide which is barely discernible.

(i) within the morpheme

/mawiriřa/	[m(a <sup>u</sup> /a)wureřa]	'red seaweed'
/eřiřipawa/	[æřiřipa <sup>u</sup> wa]	'bush'
/al <sup>y</sup> aŋkatawa/	[al <sup>y</sup> aŋkata <sup>u</sup> wa]	'obstinate'
/yalak <sup>w</sup> a/	[yæ <sup>l</sup> (a <sup>u</sup> /a)k <sup>w</sup> a]	'here'
/ařawa/	[ař(a <sup>u</sup> /a)wa]	'inside'
/min <sup>y</sup> aŋawa/	[min <sup>y</sup> aŋ(a <sup>u</sup> /a)wa]	'stone-headed spear'
/matawa/	[mat(a <sup>u</sup> /a)wa]	'initiation'
/yil <sup>y</sup> ak <sup>w</sup> a/	[il <sup>y</sup> (a <sup>u</sup> /a)k <sup>w</sup> a]	'wild honey'
/yak <sup>w</sup> it <sup>y</sup> ina/	[y(a <sup>u</sup> /a)k <sup>w</sup> ut <sup>y</sup> ina]	'there'
/apayawa/	[apa <sup>r</sup> y(a <sup>u</sup> /a)wa]	'blunt'
/tiŋawa/	[tuŋa <sup>u</sup> wa]	'father's sister'
/yaŋkawa/	[yaŋk(a <sup>u</sup> /a)wa]	'fish (sp.)'

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) co-occurs with the allophonic rule.

with root-initial vowel

/-awit <sup>y</sup> a/	[(a <sup>u</sup> /a)wit <sup>y</sup> a]	'fog'
/-awilka/	[(a <sup>u</sup> /a)wulka]	'scar, scab'
/-ak <sup>w</sup> iŋ <sup>w</sup> a/	[(a <sup>u</sup> /a)k <sup>w</sup> uŋ <sup>w</sup> a]	'water'



with root-initial consonant

/a-wiyita/	[(a <sup>u</sup> /a)wiyɪta]	'straight'
/a-wil <sup>ɤ</sup> apa/	[(a <sup>u</sup> /a)wil <sup>ɤ</sup> apa]	'one, only'
/a-k <sup>w</sup> iřaka/	[(a <sup>u</sup> /a)k <sup>w</sup> uřaka]	'hard'

The allophone [æ<sup>u</sup>] varies freely with [a<sup>u</sup>] in the one word:

/yawɪ/	[ya <sup>u</sup> :~yæ <sup>u</sup> :]	'yes'
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## 6.6 Vowel harmony

Vowel harmony is usually regressive, occurring in the word-initial and word-medial syllables. It occurs within the morpheme and at the morpheme boundary.

The harmony involving the phoneme /a/ is between allophones and is optional. The allophones, [a] and [æ], and to a much lesser extent [a<sup>i</sup>] and [æ<sup>i</sup>] harmonise with each other. The harmony usually regresses to only the preceding syllable but a few words have been noted where it regresses to two preceding syllables. It can also occur between two non-contiguous syllables when the intervening syllable has a high vowel. This is particularly noticeable in reduplicated roots.

Harmony occurs most frequently when the environment for the harmonised vowel is one in which the allophonic variation would normally occur. There are, however, a few examples where the resultant allophone is not in an environment listed in Sections 6.1-4.

## (i) Within the morpheme

In the following data, regressive harmony to one or two preceding syllables is illustrated.

/aṛakpawiya/	[aṛakpawiya~æṛakpawiya]	'a long time ago'
/ṭakat <sup>ɤ</sup> ařařa/	[ṭakat <sup>ɤ</sup> ařařa~ṭakat <sup>ɤ</sup> æřařa]	'nut (sp.)'

/aman <sup>ʏ</sup> t <sup>ʏ</sup> an <sup>ʏ</sup> t <sup>ʏ</sup> iŋiʃa/	[aman <sup>ʏ</sup> t <sup>ʏ</sup> an <sup>ʏ</sup> t <sup>ʏ</sup> iŋəʃa~ amæn <sup>ʏ</sup> t <sup>ʏ</sup> æn <sup>ʏ</sup> t <sup>ʏ</sup> iŋəʃa]	'joint fluid'
/alantapiʃa/	[alantəpiʃa~aləntəpiʃa]	'empty'
/am <sup>w</sup> iŋalpapiʃa/	[amunəlpapiʃa~amunəlpəpiʃa]	'plant (sp.)'
/ŋaʃiyaʃaʃikina/	[ŋaʃiyaʃəʃikina~ ŋaʃiyəʃəʃikina]	'to tremble'
/yiʃantayapa/	[yiʃantə <sup>i</sup> yapa~yiʃantə <sup>i</sup> yəpa]	'to separate'
/aŋkayiwaya/	[aŋka <sup>i</sup> yuwa <sup>i</sup> ya~aŋkə <sup>i</sup> yuwə <sup>i</sup> ya]	'tamarind'

Vowel harmony can be seen to occur in the following examples when a syllable with a high vowel intervenes.

/yaliniyalina/	[yaliniyalina~yəliniyəlina]	'upright sides'
/aŋalpinałpiʃa/	[aŋalpɯŋəłpiʃa~aŋəłpɯŋəłpiʃa]	'plant (sp.)'
/tumin <sup>ʏ</sup> t <sup>ʏ</sup> aʃmin <sup>ʏ</sup> t <sup>ʏ</sup> aʃma/	[tumin <sup>ʏ</sup> t <sup>ʏ</sup> aʃmin <sup>ʏ</sup> t <sup>ʏ</sup> aʃma~ tumin <sup>ʏ</sup> t <sup>ʏ</sup> əʃmin <sup>ʏ</sup> t <sup>ʏ</sup> əʃma]	'grasshopper'
/yimakimakina/	[yimakɨmakina~yiməkɨwəkina]	'hornet'
/niyaminiyata/	[niyaminiyata~niyəminiyaɤta]	'do it like this'

In the following example, vowel harmony has caused the allophone [æ] to occur where [a<sup>i</sup>] would be expected (see Section 6.2).

/aŋpat <sup>ʏ</sup> aŋpat <sup>ʏ</sup> a/	[aŋpa <sup>i</sup> t <sup>ʏ</sup> (a/æ)ŋpat <sup>ʏ</sup> a~ æŋpæt <sup>ʏ</sup> æŋpa <sup>i</sup> t <sup>ʏ</sup> a]	'tree (sp.)'
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(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) at the morpheme boundary. Either the allophonic rules (see Sections 6.1-4, 6.2, 3) or vowel harmony apply in the following examples. The result in either case is harmony between the allophones.

/-al <sup>ʏ</sup> aʃata/	[əl <sup>ʏ</sup> əʃata]	'dusk'
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/ya <sub>l</sub> aŋayikpa/	[y(a/æ)læŋæ <sup>1</sup> kpa]	'those two over there'
/-akat <sup>v</sup> iřa/	[ækæt <sup>v</sup> əřa~akat <sup>v</sup> əřa]	'cleared'

For further examples see Parts (ii) of Section 6.6.

There are three examples where [æ]~[a] occurs in the closed syllable /řVŋ/ where the following syllable is [k<sup>w</sup>u]. This variation is not according to the rule (see Section 6.1(d)). In each one, vowel harmony occurs across syllables with a high vowel. The harmony, however, would have to be posited as progressive to account for these exceptions. The only other possible analysis is that the velar closure causes variation irrespective of the following CV, but this disagrees with the much stronger system where [a] and [æ] precede /ak<sup>w</sup>i/ and /aki/ respectively. (See Section 6.1(d).)

/yalk <sup>w</sup> iřaŋk <sup>w</sup> iřa/	[yalk <sup>w</sup> uřaŋk <sup>w</sup> uřa~ yalkiřaŋk <sup>w</sup> uřa]	'fish (sp.)'
/al <sup>v</sup> iŋařikiřaŋk <sup>w</sup> iřa/	[al <sup>v</sup> iŋařikəřaŋk <sup>w</sup> uřa~ al <sup>v</sup> iŋařikəřaŋk <sup>w</sup> uřa]	'inflamed'
/yaŋkiřaŋk <sup>w</sup> iřa/	[y(a/æ)ŋkiřaŋk <sup>w</sup> uřa]	'snail'

7. THE MID VOWEL /e/

The mid vowel has two allophones, viz., [e] and [æ].

[e] mid, front, unrounded vowel.

[æ] low, front, unrounded vowel. The articulation is further described in Section 5.

The basic allophone of /e/ is [e] which almost always is the allophone occurring in stressed syllables. The allophone [æ] occurs in variation with [e] mostly in unstressed syllables, e.g., /emepa/ [émepa~æmépa] 'song'; /niŋilikená/ [níŋilúkéná] and /nanilikenima/ [nánilúkənuíma] 'to go'.

The allophone [æ] of the phoneme /e/ overlaps with [æ] of the phoneme /a/ (see Section 6). Both allophones have the same phonetic quality. The assignment of [æ] to a specific phoneme is based on free variation with the basic allophones of each phoneme, i.e. with [a] /a/ and [e] /e/. Occurrences of [æ] which do not vary have been assigned to the phoneme which normally is found varying in that particular environment.

With overlapping allophones, phonemic variation, vowel harmony and limited distribution, the contrast between /a/ and /e/ is open to question. The contrast, however, does occur.

Clear evidence of contrast between /a/ and /e/ is best illustrated in analogous environments. There are minimal pairs but one member of some pairs is a loanword or a shortened form. In other instances, the Umbakumba communilect uses alternate synonyms.

(a) The following words contrast minimally at Angurugu but Umbakumba Aborigines use the synonyms /tʷaya/ and /kʷitʷa/ for /peřa/ and /keřa/, respectively.

/pařa/ [pařa]	'N.W. wind' (Mac)
/peřa/ [peřa]	'go away!'
/kařa/ [kařa]	'do you agree?'
/keřa/ [k(e/æ)řa]	'hey, look!'

(b) Shortened forms of words occur as the second member of the pair.

/eřa/ and /mema/ are the shortened forms of /aŋkeřa/ and /memema/, respectively.

/ařa/ [ařa]	'forehead'
/eřa/ [(e/æ)řa]	'vomit'
/mama/ [mama]	'it doesn't matter'
/mema/ [m(e/æ)ma]	'this: M class'

(c) Analogous pairs

The following examples show the contrast between /a/ and /e/ in all the environments where /e/ occurs. No contrast occurs preceding /n/.

/e/		/a/	
/tak <sup>w</sup> eřik <sup>w</sup> eřa/	'shining flycatcher'	/a <sup>l</sup> am <sup>w</sup> ik <sup>w</sup> ařa/	'murderer'
/ak <sup>w</sup> iweřiqmil <sup>va</sup> /	'cloudy'	/map <sup>w</sup> iwařa/	'fig'
/wa <sup>n</sup> i <sup>n</sup> eřipiřa/	'everyone'	/a <sup>n</sup> wařa/	'smoke'
/meřiwa/	'current'	/mařiwayit <sup>va</sup> /	'fern (sp.)'
/memeřpa/	'calf of leg'	/mařpiyi <sup>n</sup> ta/	'tree (sp.)'
/peřika/	'gate'	/pařit <sup>va</sup> /	'porridge'
/amempeřk <sup>wa</sup> /	'ten'	/mapařk <sup>wa</sup> /	'fighting sticks'
/amiřeřa/	'crab'	/takat <sup>va</sup> ařařa/	'nut (sp.)'
/apil <sup>ve</sup> řa/	'visible'	/yil <sup>va</sup> ařa/	'pipe'
/awař <sup>n</sup> kan <sup>ve</sup> řa/	'fighting'	/k <sup>w</sup> in <sup>va</sup> ařa/	'wild fig'
/ma <sup>n</sup> takiřiyeřa/	'yam'	/m <sup>w</sup> i <sup>n</sup> tiyařa/	'oyster' (Mac)

/ṇařik <sup>w</sup> iyeřpa/	'to miss'	/ak <sup>w</sup> il <sup>v</sup> ařpa/	'light'
/yim <sup>w</sup> inteřma/	'snail'	-	
/taṇinteřa/	'black cockatoo'	/aṭiṭařa/	'hot'
/yilikeřa/	'fruit (sp.)'	/yakařa/	'trevally'
/ak <sup>w</sup> ant <sup>v</sup> iřema/	'sticky'	/am <sup>w</sup> iřama/	'whispered'
/aṇempa/	'place'	/aṇampa/ <sup>8</sup>	'where?'
/am <sup>w</sup> iřepa/	'stringybark sheets'	/aṇapa/	'that there'
/yiwepa/	'red ant'	/aṭiwapa/	'today'
/p <sup>w</sup> it <sup>v</sup> iketa/	'cat'	-	
/m <sup>w</sup> ik <sup>w</sup> ena/	'sweat'	-	
/m <sup>w</sup> iřiq <sup>w</sup> ena/	'rain forest'	-	
/mena/	'why'	-	
/ak <sup>w</sup> il <sup>v</sup> ipena/	'bright'	-	
/yik <sup>w</sup> il <sup>v</sup> penta/	'barramundi'	-	
/enena/	'this'	-	
/yaṇṭiřena/	'shell (sp.)'	-	
/apaṭit <sup>v</sup> ena/	'cruel'	-	
/ṭiliṇena/	'salt'	-	
/akena/	'but'	-	
/yimenta/	'turtle (gen.)'	/ṭimanta/	'billed heron'
/ṇařipenta/	'to be wounded'	/mapanta/	'hibiscus'
/yinitena/	'coral'	-	

Chart 8 shows the distribution of /e/ between consonants. The vowel occurs most frequently preceding a syllable with an initial /ř/ or /n/.

CHART 8Distribution of /e/

following C preceding	p	m	n̄	n	ɣ
labial		e/æ	e	e	e
dental			e		e/æ
alveolar		e		e	e
retroflex	e			e	e
laminal	e/æ			e	e/æ
velar		e		e	e/æ
rounded C	e		e/æ	e/æ	e

The allophone [æ] of the phoneme /e/ occurs in similar environments to those for its occurrence as an allophone of /a/ (see Section 5). This led to difficulties in early analysis and the problem was only solved when additional data provided the free variation with the basic allophones of each phoneme.

### 7.1 Allophonic variation

In the following data, the allophone [æ] varies with [e] but not with [a]. In at least 75% of the data, the variation occurs when the following consonant is /ɣ/.

#### 7.1.1 Within a syllable with an initial laminal or dental

When the syllable-initial consonant is a laminal or dental, [æ] varies freely with [e]. The initial consonant of the following syllable is /ɣ/ or, to a lesser extent, a labial.

(i) Within the morpheme

laminal—labial

/awin<sup>v</sup>empa/ [awin<sup>v</sup>(e/æ)m<sup>p</sup>a] 'angry'

laminal—alveolar /ř/

/miŋin<sup>v</sup>t<sup>v</sup>eřik<sup>w</sup>a/ [miŋin<sup>v</sup>t<sup>v</sup>(e/æ)řuk<sup>w</sup>a] 'top shell'

/ŋařit<sup>v</sup>eřik<sup>w</sup>a/ [ŋařit<sup>v</sup>(e/æ)řuk<sup>w</sup>a] 'to finish'

/a<sub>1</sub>tiyeřiwa/ [a<sub>1</sub>tiy(e/æ)řuwa] 'young'

/ŋařik<sup>w</sup>iyerpa/ [ŋařuk<sup>w</sup>iy(e/æ)řpa] 'to miss'

dental—alveolar /ř/

/mamaleři<sub>1</sub>piřa/ [mamal<sub>1</sub>(e/æ)ři<sub>1</sub>piřa] 'fighting spear'

/akaleři<sub>1</sub>ŋk<sup>w</sup>iřa/ [akal<sub>1</sub>(e/æ)řuŋk<sup>w</sup>uřa] 'orange stone'

/aleři<sub>1</sub>ŋm<sup>w</sup>iŋ<sub>1</sub>tiřa/ [al<sub>1</sub>(e/æ)řəŋm<sup>w</sup>əŋ<sub>1</sub>təřa] 'well looked after'

/aleři<sub>1</sub>kawařiya/ [al<sub>1</sub>(e/æ)ři<sub>1</sub>kawařiya] 'untidy'

/yile<sub>1</sub>řpa/ [yil<sub>1</sub>(e/æ)řpa] 'palm tree'

7.1.2 When the following syllable begins with a dental

When a dental occurs initially in the following syllable, [e] and [æ] vary freely.

(i) Within the morpheme

Only one example has been recorded to date:

/tiwet<sub>1</sub>iřa/ [tuw(e/æ)təřa] 'white cockatoo'

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies at the morpheme boundary, together with the allophonic rule.



There is only one root, to date, that begins with the vowel /e/ followed by a syllable beginning with a dental.

/-eṭiřa/	[(e/æ)təřa]	'hole: A class'
/m-eṭiřa/	[m(e/æ)təřa]	'cave: M class'

The first word (above) shows a minimal difference with [(a/æ)təřa], the shortened form of /aṭiřapa/ 'some'. Note the overlap of the allophone [æ] which is assigned to the phoneme /e/ where it varies with [e] and to /a/ where it varies with [a].

### 7.1.3 In closed syllables

The allophones [æ] and [e] vary freely in a closed syllable when the consonant closure is a labial, flap /ɣ/ (see Section 6.1.1 for examples), or an alveolar /n/.

/ṇařap <sup>w</sup> iliwenta/	[ṇařap <sup>w</sup> uluw(e/æ)nta]	'to stoop'
/mentepa/	[m(e/æ)ntepa]	'roots of rushes'

### 7.1.4 When the following syllable has a front vowel

Variation between [æ] and [e] occurs when the following syllable has a front vowel. The intervening consonant is a labial or /ɣ/. The CV syllables which are not primary-stressed (i.e. not penultimate) tend to have the allophone [æ] in conversational speech.

This is the environment where most difficulties in the analysis of /a/ and /e/ have occurred. All words recorded with [e~æ] in this environment are listed.

The allophone [æ] of the phoneme /e/ occurs in an open syllable preceding /mi/, whereas [æ] occurs as an allophone of /a/ in a closed syllable preceding the sequence /mpi/ (see Section 6.1.3).

Given that the conditioning factor for either phoneme is a following /Ci/, this contrast in environment is not significant. In present data, where the phoneme /a/ precedes /-mi/, no variation with [æ] has been recorded. There are two examples listed below where [æ] as the only allophone has been assigned to the phoneme /e/ when it precedes /mi/. There is one controversial word, [(a/æ)ŋæmina], which has been tentatively analysed as /aŋamina/ 'breasts' because [a] occurs in the word /aŋam<sup>w</sup>i<sub>la</sub>/ 'behind the breasts' which has the same root/classifying prefix.

(i) Within the morpheme

labial—labial

/memiřma/	[m(e/æ)miřma]	'nape of neck'
/memiřeřa/	[m(e/æ)miřeřa]	'flathead'
/memiřik <sup>w</sup> iřa/	[m(e/æ)miřək <sup>w</sup> uřa]	'rib'
/t <sub>um</sub> emeřpa/	[t <sub>um</sub> (e/æ)meřpa]	'bird: quail'
/nanamemikpina/	[næn(a/æ)mæmɪkpina]	'to help'

The above words can be seen to contrast with /a/ in the following words where [æ] as an allophone of /a/ does not occur.

/mamin <sup>y</sup> a/	[mamɪn <sup>y</sup> a]	'firefly'
/mamil <sup>y</sup> iŋařa/	[mamɪl <sup>y</sup> iŋařa]	'mangroves'
/mamin <sup>y</sup> t <sup>y</sup> awit <sup>y</sup> awa/	[mamɪn <sup>y</sup> t <sup>y</sup> awit <sup>y</sup> awa]	'bird: pardalote'

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies at the morpheme boundary.

/ŋař-eřipalit <sup>y</sup> ina/	[ŋař(e/æ)řipalit <sup>y</sup> ina]	'to spread out'
/yɪŋ-eřikeřa/	[yɪŋ(e/æ)řikeřa]	'to go/look backwards'
/-eřimin <sup>y</sup> t <sup>y</sup> a/	[(e/æ)řimɪn <sup>y</sup> t <sup>y</sup> a]	'to keep still'

/y-eřeřa/	[y(e/æ)řeřa]	'forked'
/akilʷaŋeřeřa/	[ækɪlʷæŋp(e/æ)řeřa]	'forked tree'

The word /ŋař-ařikařena/ 'to draw, write' contrasts with those above. The assignment of [æ] preceding /ři/ to either /a/ or /e/ has been particularly difficult because of some words recorded as only [æ] (see Section 6.1.4) and others where the variants [a~æ~e] all occur (see Section 7.2). It seems as if the phoneme /e/ is becoming more common than /a/ preceding /ři/ with some speakers.

The exceptions to the morphophonemic rule No.1 are as follows:

with root-initial vowel

/-emepa/	[(e/æ)mepa]	'song'
/-eminta/	[(e/æ)minta]	'nose'

The above words contrast with /-amilʷiŋwiřa/ [amɪlʷuŋwuřa] 'yabby'.

/-epiŋa/	[(e/æ)pɪŋa]	'anthill'
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This word contrasts with /-apɪlʷeřa/ [apɪlʷeřa] 'visible'. There are only two other words, recorded to date, which begin with the sequence [api] but both have a variant form in which a retroflex consonant occurs, viz., /a(ɾ)piyaɾpʷiwa/ [a(ɾ)piyaɾpʷuwa] 'four'; /a(ɾ)piyakarpiya/ [a(ɾ)piyakarpiya] 'three'

The following three words are irregular morphologically. They are analysed as having a root-initial vowel but are exceptions to the morphophonemic rule for vowel deletion (see Section 1.3) in that the second, not the first, vowel elides when a CV prefix occurs, e.g., *ti+epina* > /tɪpina/ 'that: D class'. If a root-initial consonant were posited it would allow the morphophonemic rule to apply for the CV

prefix but lead to the necessity to have two allomorphs, /a/ and /e/, for Class A nouns and adjectives, e.g., a+wil<sup>ɣ</sup>apa > /awil<sup>ɣ</sup>apa/ 'one: A class'; e+pina > /epina/ 'that: A class'. Rather than posit two allomorphs to cope with just three words, they are regarded as irregular and exceptions to the morphophonemic rule.

/-epa/	[(e/æ)pa]	'any?'
/-epina/	[(e/æ)pina]	'this: not here'
/-eminiŋka/	[æmɪniŋka]	'strange'

The word /epa/ contrasts with /apa/, the shortened form of both /aŋapa/ 'that over there' and /aɾakpa/ 'now'.

The Angurugu communilect contrasts /ap<sup>w</sup>iniwa/ [ap<sup>w</sup>ənuwa/ 'those two men' with /epina-wa/ [epinuwa] 'that-to'. At Umbakumba, this contrast has been neutralised and /epiniwa/ is used for both in everyday speech. The meaning of the homonyms is distinguished by context.

## 7.2 Vowel harmony

Vowel harmony occurs between the phonemes /a/ and /e/. The harmony is regressive to the immediately preceding syllable. It also occurs in a non-contiguous syllable with a high, front vowel intervening. Other examples where two mid vowels are in harmony with each other, but where no contrast with /a/ occurs, can be found in Section 7.1, e.g., /memeŋpa/ 'calf of the leg'.

In the following examples, the pressure of vowel harmony seems to be the primary factor in causing the phonemic variation.

### (i) Within the morpheme

/miy(a/e)mpeŋa/	[miy(a/æ/e)mpeŋa]	'what?'
/ay(a/e)ŋmiy(a/e)ŋma/	[a <sup>i</sup> y(a/æ/e)ŋmiy(a/æ/e)ŋma]	'thin'

## (ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies.

/-(a/e)meniṭaṛa/	[(a/æ/e)meniṭaṛa]	'dorsal fins'
/-(a/e)mepa/	[(a/æ/e)mepa]	'song'
/-(a/e)ṛipeṛipa/	[(a/æ/e)ṛipeṛipa]	'bush'

Vowel harmony occurs across morpheme boundaries in the following word.

/ak <sup>w</sup> (a/e)ṛ-eṛikpa/	[ak <sup>w</sup> aṛ(e/æ)ṛikpa~	'turtle poles'
ak <sup>w</sup> eṛeṛikpa/		

## 7.3 Phonemic variation

Phonemic variation between /e/ and /a/, and /e/ and /i/ occurs. The latter variation is infrequent and is listed in Section 8. The variation between /a/ and /e/ is very common.

The phonemic variation between /a/ and /e/ can be clearly observed in the morpheme /-aṇa/~/-ena/ (location near speaker). This occurs in the series of demonstratives used in both communities. The demonstratives are prefixed according to the set of classifiers for nominals.<sup>11</sup>

/yaṇ-aṇa/	'these: 1st excl. pl.'
/kaṇ-aṇa/	'these: 2nd pl.'
/waṇ-aṇa/	'these: W class pl.'
/en-ena/	'this: A class sing.'

The same variation occurs in the word, /yiniyaṛiwen-a-yiniyaṛiwaṇa/ 'native cat'. At Umbakumba, /-ena/ as a tense suffix is used where the Angurugu communilect uses /-aṇa/ on verbs such as

/niŋilikenā~niŋilikānā/ 'to go'.

The most common environment for variation is preceding /ř/. There is only one exception. Many of the occurrences precede the syllable /ři/.

(i) Within the morpheme

labial——alveolar /ř/

/m(a/e)řitʷa/ [m(a/æ/e)řitʷa]

'edible root (sp.)'

laminal——alveolar /ř/

/paliy(a/e)řa

'mast' (Mac: palayara)

/yay(a/e)ră/

'tendon'

/yiwartʷ(a/e)řa/

'lizard (sp.)'

/mamʷikayařa~mamʷikiyeřa/

'sun's rays'

/yiniy(a/e)řma/

'S.E. wind'

/miy(a/e)řiya/

'bird's nest'

/miy(a/e)řawa/

'kurrajong'

dental——alveolar /ř/

/aḷ(a/e)řitʷaṇtiřa/

'confused'

/yil(a/e)řitenta/

'whistle snake'

velar——alveolar /ř/

/yinik(a/e)řpiyama/

'caterpillar (gen.)'

/aŋ(a/e)řipa/

'this way'

rounded cons.——alveolar /ř/

/ŋařiw(a/e)řikampilʷama/

'to trust'

/ŋařiw(a/e)řipikina/

'to think, feel'

/ŋařiw(a/e)řikpiřitena/	'to feel nauseated'
/ŋařiw(a/e)řiwir̥t̥ena/	'to choose to work well'
/aw(a/e)řikawařiya/	'sad'

Phonemic variation can also be observed in roots in different morphological constructions. The variants [a~æ~e] have not been recorded in each word. It should be noted that [e] occurs without variation in the instances in the primary-stressed penultimate syllable (see Section 7).

/a-y(a/e)pit̥apa/ [a <sup>i</sup> y(a/e)pit̥apa]	'separate, different'
/ŋaři-y(a/e)pit̥apa/ [ŋařiy(a/æ)pit̥apa]	'to separate, divide'
/a-y(a/e)pa/ [a <sup>i</sup> yepa]	'sea shelf or cloud shutting off the sunshine'
/a-y(a/e)pawiya/ [a <sup>i</sup> yepawiya]	'when the shelf ...'
/-apil̥(a/e)řa/ [apil̥eřa]	'visible'
/ŋař-apil̥ařikat̥iŋwa/ [ŋařapil̥ařika <sup>i</sup> t̥yũwa]	'to make oneself visible'

In the following examples, the variants [a~æ~e] in different morphological constructions can be observed as well as a phonemic variation in the laminal and dental consonants. (The sequence /-l̥eři~l̥aři~l̥eři~l̥aři/ is a bound prefix that is a semantic classifier which occurs in addition to noun classification.)

/al̥(a/e)řim̥wir̥ta/ [al̥(a/æ)řəm̥wər̥ta]	'darkness'
/al̥(a/e)řim̥wir̥ta/ [al̥(e/æ)řəm̥wər̥ta]	'darkness'
/al̥ařiŋwal̥il̥a/ [al̥(a/æ)řəŋwal̥il̥a]	'darkness'
/al̥(a/e)řit̥ata/ [al̥eřit̥ata]	'dusk'

/a<sub>l</sub>(a/e)řitata/ [a<sub>l</sub>(a/æ)řitata] 'dusk'

(ii) At the morpheme boundary

The morphophonemic rule No.1 for vowel deletion (see Section 1.3) applies at the morpheme boundaries.

with a root-initial vowel

/(a/e)řipatyā/ [(a/e)řipa<sup>i</sup>tyā] 'going from the speaker'

/(a/e)řipapa/ [(a/e)řipapa] 'going towards the speaker'

In the following words, the variation between the phonemes /a/ and /e/ can be seen throughout the different morphological constructions which have the same root.

/-(a/e)piřa/ [(e/æ)piřa] 'man-made hole: A class'

/ay-(a/e)piřa/ [a<sup>i</sup>y(a/æ/e)piřa] 'empty (as of a billycan)'

/ak<sup>w</sup>iw-(a/e)piřa/ [ak<sup>w</sup>uw(a/æ/e)piřa] 'too big (as of a dress)'

/amat<sub>l</sub>-(a/e)piřa/ [amat<sub>l</sub>æpiřa] 'vacant area'

/aŋ<sup>w</sup>ir<sub>l</sub>t<sub>l</sub>-(a/e)piřa/ [aŋ<sup>w</sup>ur<sub>l</sub>t<sub>l</sub>(a/æ)piřa] 'dry soak'

/n-(a/e)řikpa/ [n(e/æ)řikpa] 'to throw'

/yir<sub>l</sub>-(a/e)řikpa/ [yir<sub>l</sub>(a/æ)řikpina] 'to throw'

/ak<sup>w</sup>ař-eřikpa/ [ak<sup>w</sup>ař(e/æ)řikpa] 'pole for prodding turtles'

with root-initial vowel

There is one word where [a-æ-e] vary. The occurrence of the allophone [e] is rare. When /a/ is the phoneme, the root begins with a consonant and the application of the morphophonemic rule for vowel deletion (see Section 1.3) is regular. If /e/ is the phonemic variant, its use signals a root-initial vowel and the vowel deletion rule does not work. Until further checking for accuracy of data,



the word is being spelt with only the phoneme /a/.

/a-řikawařiya/ [(a/æ/e)řikawařiya] 'untidy'

The allophone [æ] preceding /n/ also poses a problem as to its emic status when it occurs in the initial syllable of a word. The segment is being analysed tentatively as an allophone of the phoneme /a/ but it may prove to be an allophone of /e/. The allophone [æ] usually occurs when alveolar /n/ precedes the vowel, thus causing the allophone to occur between two identical alveolars. The allophone [e] freely varies with [æ] word initially but is not as common as [e].

The allophone [æ] is analysed as emically /a/ for the following reasons:

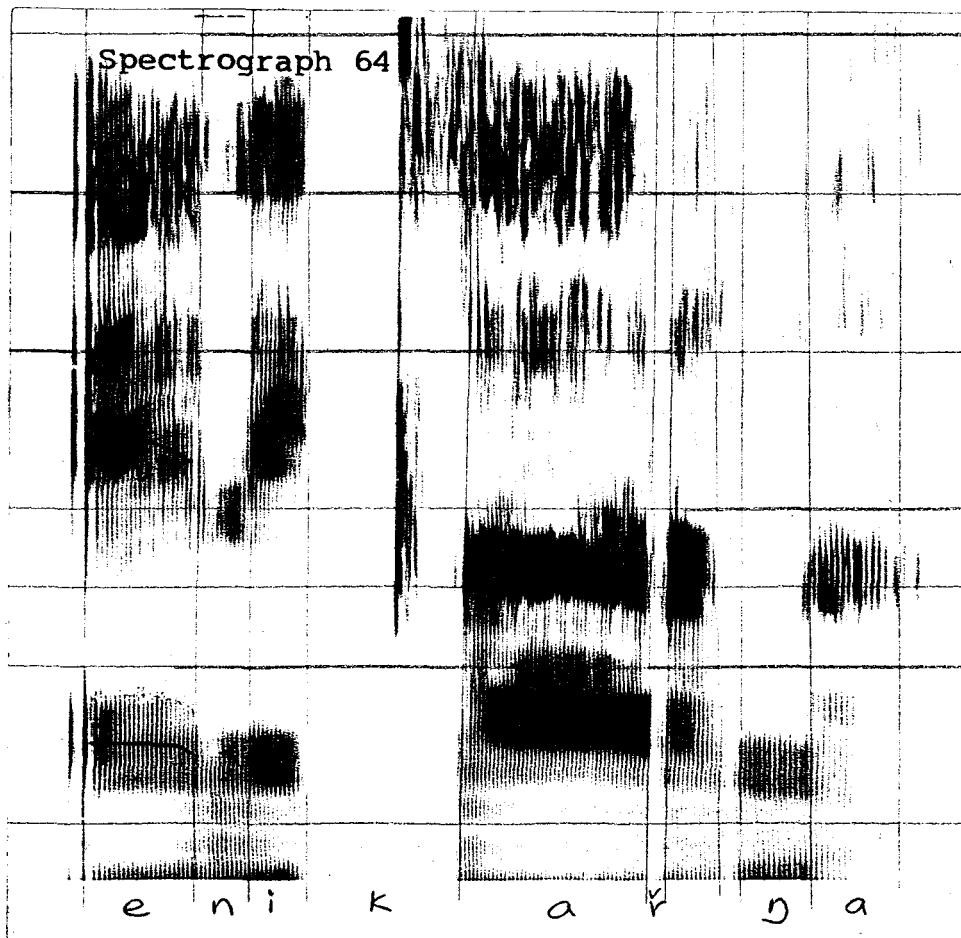
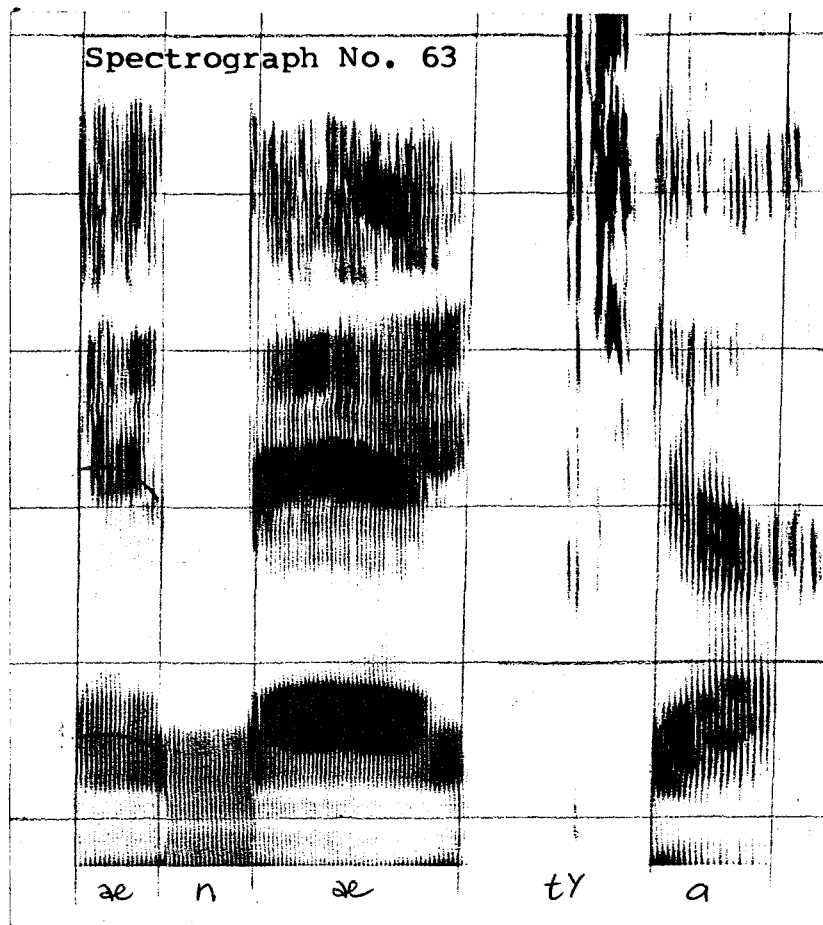
- (a) The Aboriginal literates write /a/ in this environment. It is possible, however, that there is confusion with the writing of [æ] as /a/ in English but, if so, they are relating the allophone to the English [æ] not [ɛ].
- (b) The prefixation system for nominals has [æni] (non-feminine) as against [(a/æ)ti] (feminine). It seems to me to be more consistent to analyse both of these initial allophones as /a/.
- (c) The spectrographs lend weight to the possibility of the alveolar /n/ having been a lamino-palatal consonant which is frequently preceded by the allophone [æ] of the phoneme /a/ (see Section 6.1.2). A contrast can be seen between an alveolar /n/ and a backed alveolar /nʰ/ in the following spectrographs. The backed alveolar is indicated by the high offset of formant two.

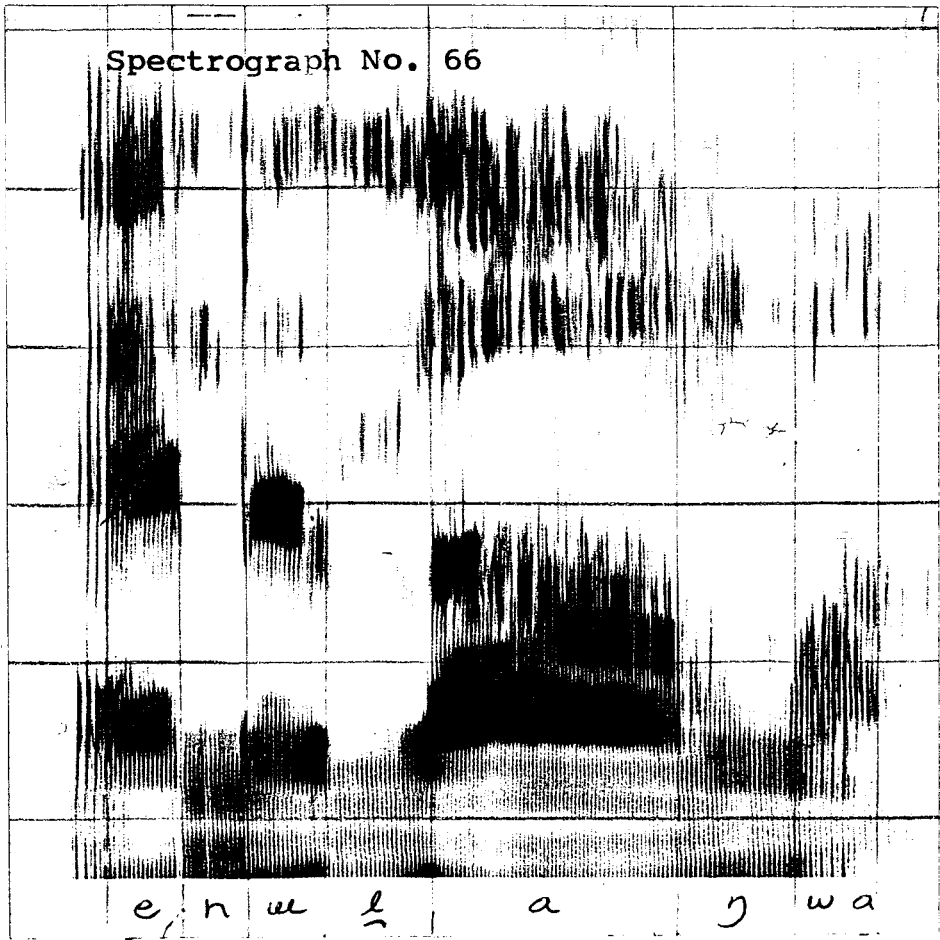
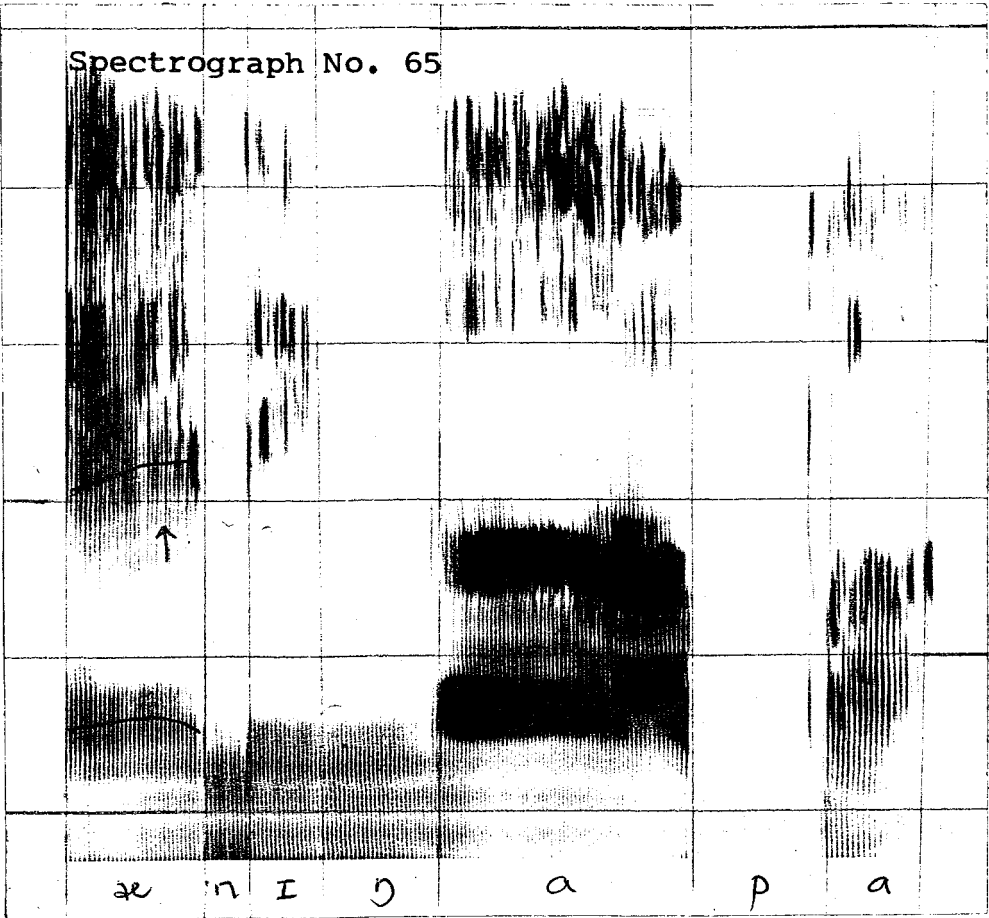
## Spectrograph

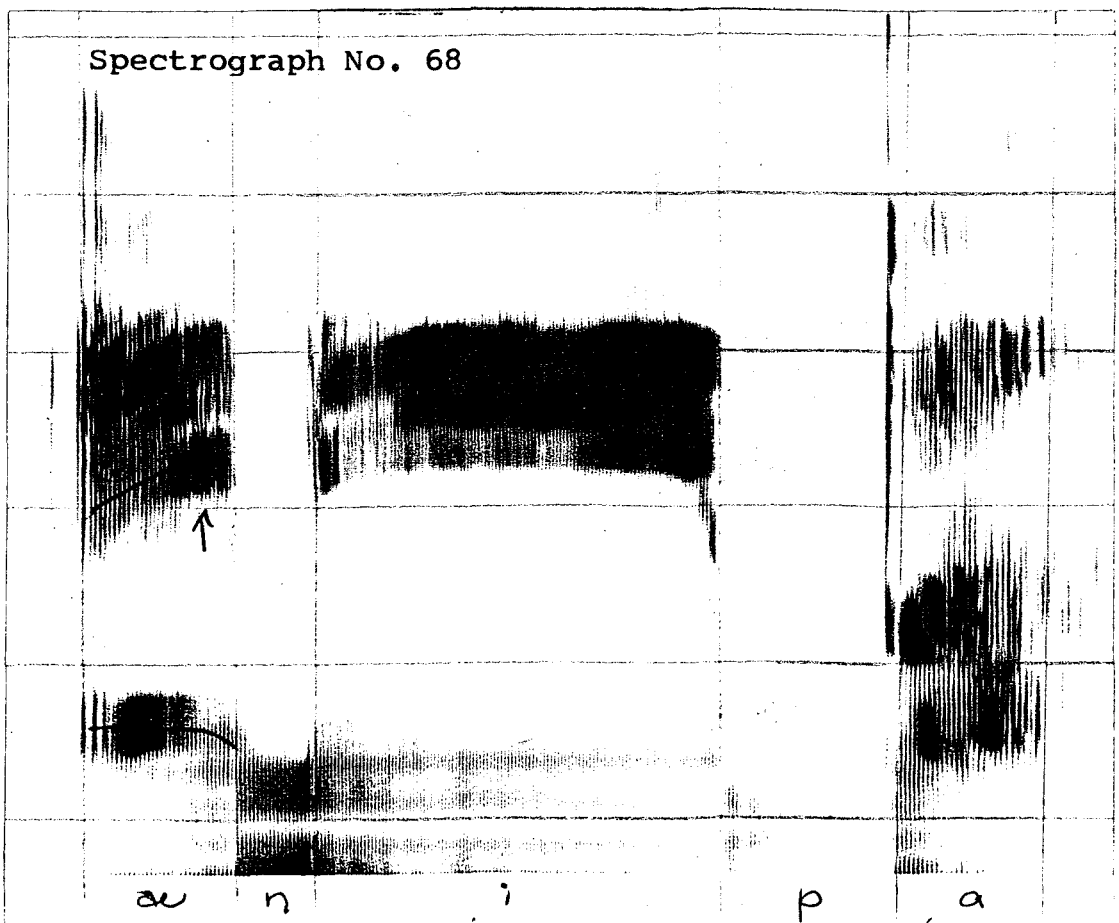
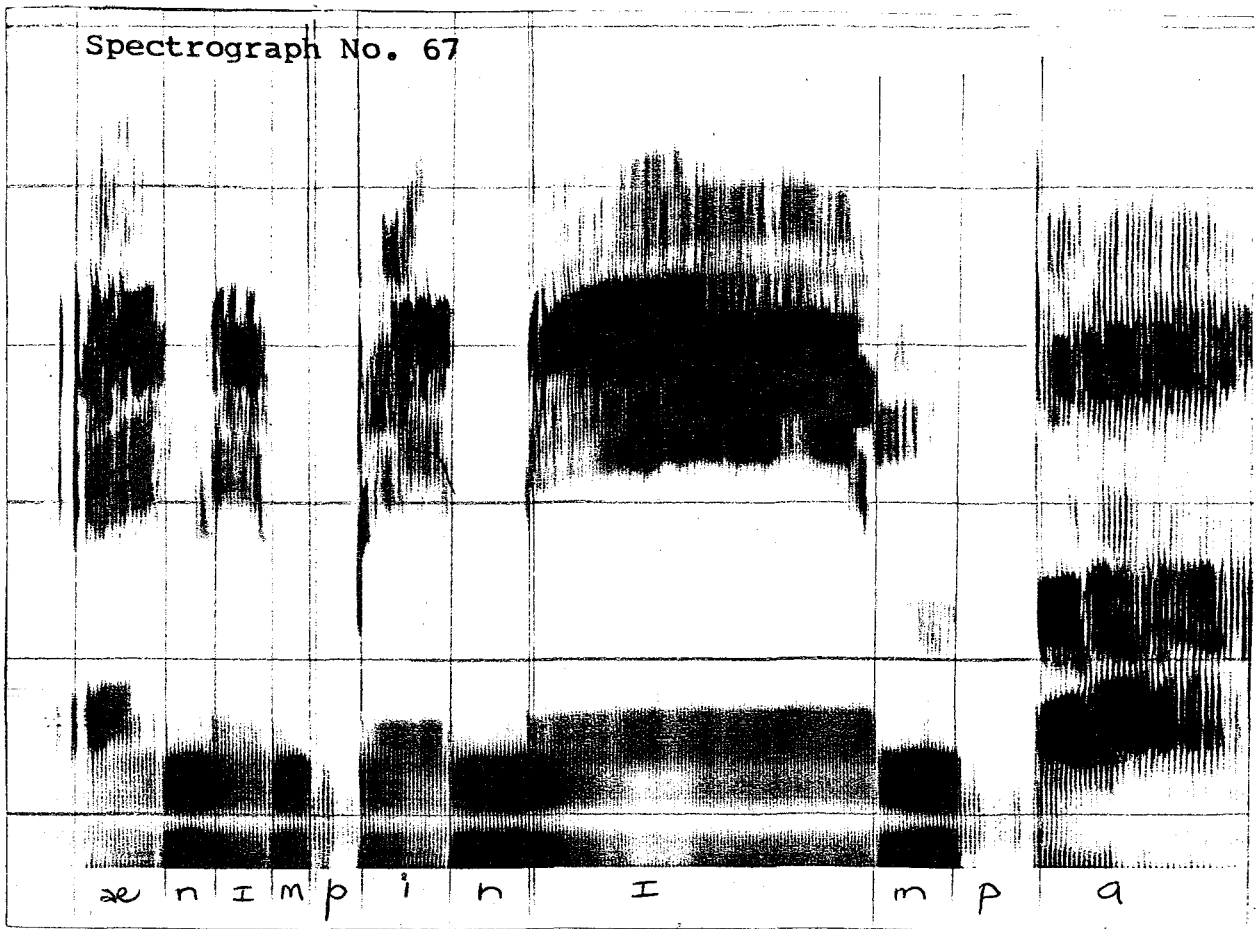
No.63	/anatʲa/	[ænətʲa]	'he (dative)'
64	/anikaʃiŋa/	[enikaʃəŋa]	'mother's country'
65	/aniŋapa/	[æniŋapa]	'good'
66	/anilaŋʷa/	[enuɭaŋʷa/	'he (poss.)'
67	/animpinimpa/	[æɪmpinɪmpa]	'shrub (sp.)'
68	/anipa/	[ænipa]	'alive'

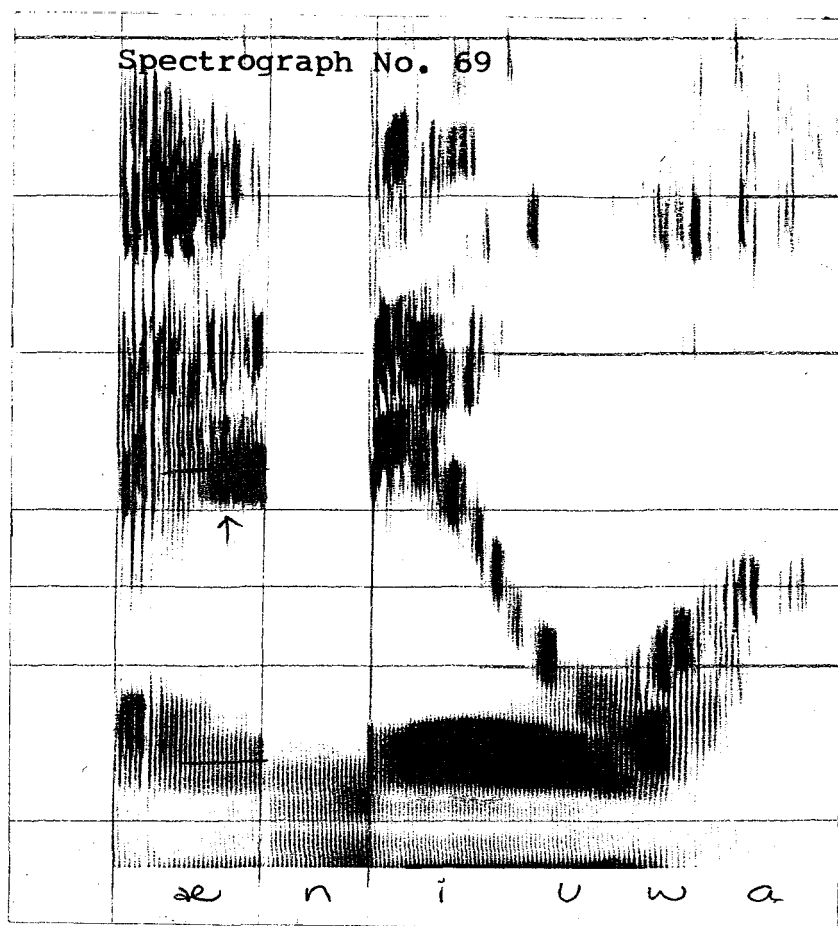
In spectrograph No.69, /aniwa/ [enuwa] 'he' shows an offglide from the nasal similar to that of a laminal. The utterance was recorded as [æɪuwa~æn<sup>i</sup>uwa] which correlates with the [i] offglide recorded also with other laminals (see Section 4.2.5).

The sound shift in the consonant has developed to the point where alveolar /n/ is phonemic but the emic status of the vowel is still in doubt.









8. THE HIGH VOWEL /i/

The high vowel /i/ has six allophones: [i], [ɪ], [ɯ], [u], [ɔ], and [ə]. The phonetic values are:

- [i] high, close, front unrounded vowel
- [ɪ] high, open, front unrounded vowel
- [ɯ] high, open or close, back unrounded vowel. This vowel can also be very short and centralized in an unstressed syllable in longer words, i.e. closer to [ɨ].
- [u] high, open or close, back rounded vowel.
- [ɔ] mid, back rounded vowel
- [ə] mid, central to back, unrounded vowel.

The basic allophone of the phoneme /i/ is [ɯ]. The symbol /i/ has been used for ease in typing. Chart No.9 lists the allophones, with [ɪ] representing both [i] and [ɪ] and [ə] having been omitted so that a clearer presentation could be made with only the crucial phonetic realizations entered. Generally speaking, the allophones [u] and [ɔ] occur contiguous to a rounded consonant; [ɪ] occurs contiguous to a laminal, labial or velar stop or non-indigenous alveolar; [ɯ] occurs elsewhere. A loss of phonetic specification in the allophones which normally occur in some specific environments is apparent in the allophone [ə], details of which are listed in the relevant sections.

The crucial feature in the analysis of the high vowel is rounding or lack of it. In early transcription of the vowels, the allophone [ɯ] was written as a central, slightly rounded vowel [ʊ]. The error arose because the phonetic value of the sound is very similar (though less rounded) to the centralised [ʊ] of Australian English. Native speakers of English react to the sound according to the phonemic

CHART 9

Allophones of /i/

C preceding	following C		labial m p		dent	alveolar t/n/l ħ		retro	lam	velar k ŋ		rounded k <sup>w</sup> others	
labial			i	i	i	i	i	-	i	i	i	-	-
dental			u	u	i/u	i/u	i/u	u	i	u	u	u/i	u
alveolar			u	i	u	i	u	u	i	i	i/u	u/i	u
retroflex			u	i	u	i	u	u	i	i	u	u/i	u
laminal			u	i/u	i/u	i	i/u	i/u	i	i	i	u/i	u
velar			i/u	i/u	u	i	i	u	i	i	u	-	-
rounded cons.													
w, k <sup>w</sup> , ŋ <sup>w</sup>			u	u	u/ɔ	u	u/ɔ	u/ɔ	u/i	-	u/ɔ	u	u
p <sup>w</sup> , m <sup>w</sup>			u/u	-	u/u	-	u/u	u/u	u/i	u/u	u/u	u/i	u



pattern of their own language and often hear the sound as [u] without being aware of the non-rounding of the lips. The distribution of the allophones of the high vowel depends on the accurate designation of the feature of rounding.

In adult literacy classes, the spelling of the high vowels /i/ and /u/ was a constant problem throughout the two-and-a-half years. The first literates were given 40 hours of instruction using the 33 books in the primer series. Later, in advanced lessons of 2-3 hours weekly over a period of six months, not one person could spell the vowels accurately according to the existing analysis. Coupled with this, there was the problem that literates guessed where to write /k<sup>w</sup>/ or /ŋ<sup>w</sup>/, or /k/ or /ŋ/ preceding [u]. They always watched my lips when I checked this area of pronunciation. The types of error that occurred did not show any consistency or evidence as to their concept of a basic emic system, e.g.

<u>orthography</u>	<u>spelling by literates</u>	
alikura	alukura	'house'
alika	aluka/alika	'foot'
arrurra	arriarra	'wind'
ababurna	ababirna	'many'
adurrapa	adirrapa	'some'
nurrungka	nirringka	'to see'
adinupa	adunupa	'now'
-murra	-mirra	(by means of)

At that stage, /p<sup>w</sup>/ and /m<sup>w</sup>/ had not been taught.

An attempt was made to rectify the situation by respelling some of the words. This helped in common vocabulary because of the Aborigines' excellent visual memory but the same confusion existed

in unseen words during creative writing sessions. At this point, I began detailed documentation of the phonetics of the language in order to find an adequate phonemic solution. The final answer came when Mrs. Tapinkuta Yantarrnga, who was learning to read and write, recorded on cassette all words with a high vowel in the stressed penultimate syllable preceding /ř/. She neutralised the vowel, thus forcing my attention to be focused on the preceding consonant. This led to the positing of /p<sup>w</sup>/ and /m<sup>w</sup>/ as phonemic and to a solution to the vowel analysis.

The consonants (see Section 4) and the high vowel allophones divide into two major categories: rounded and unrounded. Rounded consonants and vowels function as a whole within the syllabic unit, i.e. there is a prosodic feature of rounding that applies to the whole syllable. If the consonantal rounding is simultaneous, the non-native speaker usually responds to the rounding of the vowel. Where /p<sup>w</sup>/ and /m<sup>w</sup>/ are articulated with lip rounding by compression, the contiguous vowel allophones are [u]~[ə]. If lip rounding by compression is treated as applying to the vowel also, the allophone [u] would replace [u] on chart No.9 when contiguous to a rounded consonant. This would then show a dichotomy between the high vowel allophones dependent on whether the consonants are rounded or unrounded. It is interesting to note that the Aborigines in the above examples have spelt words where the allophones are [u] or [ə] with the letter i, e.g. /apap<sup>w</sup>iṇa/ is ababirna (= apapṇa). The only word that does not agree with the present analysis is adunuba (see (b) below).

In the previous analysis, the phoneme /i/ had two allophones, [i] and [ɪ], and the phoneme /u/ had one, [u]. The allophone, [u], was written as [ɪ] or [u] and the variation was considered to be phonemic. The extent of the phonemic variation can be seen by looking

at Chart 9 for instances where [ɪ] and [ʊ] vary. This variation is now analysed as being allophonic, with the vowel consistently recorded as [ʊ] when there was no lip-rounding.

The environment that gives the maximum difficulty in assigning allophones is that preceding a labial. It would appear that the feature of rounding has been lost in many occurrences of /p<sup>w</sup>a/ and /m<sup>w</sup>a/, and that the preceding vowel has become an unrounded high back vowel, e.g. [aɹɯma] 'big'. Alternatively, it is possible that the rounding of the final labial consonant of a word (i.e. preceding /a/) has not been correctly recorded.

There are a few words in the data that seem to signal that contrast exists between /i/ and /u/ as phonemes. In each case there is either a loanword involved or another possible analysis.

(a) The allophone [ʊ] occurs preceding /m/ except, to date, in one English loanword. The loanword has a stressed, lengthened vowel whereas the indigenous words have a short vowel which is only optionally stressed.

/aɹɯma/	[aɹɯma~áɹɯma]	'big'
/atálɯma/	[atálɯma~atálɯma]	'river'
/atvikiriyima/	[a <sup>i</sup> tʷikiri:ma]	'icecream' (Eng.)

(b) The Macassan word, /təɹipa/ [təɹipa] 'trepang' contrasts with the indigenous word, /təɹpa/ [təɹpa~təɹupa~təɹukpa] 'stingray (sp.)'. The occurrence of [ʊ] preceding /Ca/ is in common usage in the language (see Section 8.5) even though the loanword conforms to the basic system as shown on Chart No.9.

The English loanwords, /tʷiyipa/ [tʷi:pa] 'sheep' and /tʷiwipa/ [tʷu:pa] 'soap', have contrastive long vowels. This contrast can be maintained under the interpretation of V: as VCV (see Section 3).

Lengthened vowels in English loans can also be seen in words of more than two syllables where there is a possible stress change, e.g.

/p<sup>w</sup>iliwina/ [p<sup>w</sup>ulú:na~p<sup>w</sup>uluwúna] 'balloon'; /t<sup>y</sup>ip<sup>w</sup>iwina/ [t<sup>y</sup>up<sup>w</sup>ú:na~t<sup>y</sup>up<sup>w</sup>uwúna] 'spoon'; /miyilka~mílka/ [mí:lka~miyílka~mílka] 'milk'.

The word, [atínúpa] 'now' is an indigenous word which has been recorded with the allophone [ɪ] as well as [u] in a variant morphological form where a change of stress can occur, viz., [atínipawíya~átínúpawíya] 'in a little while'. All other data recorded in the penultimate stressed syllable has the allophone [i] in this environment, e.g. /anipa/ [ænipa] 'alive'. The allophone [u] can occur preceding /Ca/ in free variation with [ɪ] (see Section 8.5). There is a strong possibility that this word is an example of a word-final /a/, i.e., /atínipa+wiya/, seeing that the expected form \*atínip<sup>w</sup>iwiya does not occur (see Section 1). The word, /atínipa/ has also been recorded as [atínúpa] where [ɲ] is a fronted alveolar with [u] then occurring in the normal dental environment.

The word /t̪(w/ɪ)r̪impa/ 'tadpole', is the only one recorded to date where the allophone [ɪ] occurs between /r̪/ and /m/. The normal allophone is [u] as shown on Chart 9. This sequence occurs in only one other word to date, [ap<sup>w</sup>ər̪umpa] 'blistered', thus showing [ɪ] and [u] contrasting in an analogous environment. No variation in either word has been recorded, and the second word has not been heard at Angurugu.

(c) There are two words at Angurugu which show a contrast between /i/ and /u/, viz., [kalik<sup>w</sup>a] 'calico'; [kaluk<sup>w</sup>a] 'coconut'. Both are loanwords as neither commodities are indigenous to the island. The Umbakumba Aborigines do not use these words but substitute /t̪impala/ 'any cloth' and /kawik<sup>w</sup>inata/ 'coconut'. In trying to check this

contrast at Umbakumba, it was apparent that there was confusion as to the pronunciation of the two words. Those who know English well can differentiate the minimal difference once the words are said. Non-phonemic variation between [i] and [u] occurs in a number of words, as listed in Section 8.2.

The Macassan loanword, /tʲiwiřa/ [tʲu:řa] 'book, paper' can be said to be contrastive with /yinitʲiřa/ [yɪnitʲiřa] 'rocky outcrop' if the lengthened vowel is not perceived.

If the words listed in (a) to (c) above are used as evidence for phonemic contrast between /i/ and /u/, the whole phonemic analysis of the high vowel rests on a few words where only one or two in each case are opposed to a larger, consistent body of data. Added to this, is the fact that emic contrast depends in most of these cases on loanwords. The following analysis is based on the overall system of the language, with explanations provided as above. The system of rounded versus unrounded vowels is clear but the distribution of unrounded allophones is not symmetrical. The lack of symmetry is attributed to the loss of the contrast between a labial or velar and its rounded counterpart, and to the emic development of the alveolar series, other than /ɹ/. If /i/ and /u/ are said to contrast, phonemic variation then occurs in all places on Chart 9 where [i/ɪ] alternates with [u] or [ʊ].

The four conditioning factors for variation in the high vowel /i/ are similar to those for the low vowel /a/ (see Section 6.1).

(a) The preceding consonant determines the specific allophone.

/niŋi-ɭamaɾa/	[niŋɯɭamaɾa]	'to sleep well'
/yi-ɭamaɾa/	[yɪɭamaɾa]	'orchid'

/niŋ<sup>w</sup>i-p<sup>w</sup>iɾa<sub>˩</sub>/ [nuŋ<sup>w</sup>up<sup>w</sup>əɾa<sub>˩</sub>] 'I'm a wallaby'

/yi-p<sup>w</sup>iɾa<sub>˩</sub>/ [y(ɪ/u)p<sup>w</sup>əɾa<sub>˩</sub>] 'wallaby'

(b) The initial consonant of the following syllable determines the allophone.

/niŋ<sup>w</sup>i-m<sup>w</sup>itʲa/ [nuŋ<sup>w</sup>u-m<sup>w</sup>utʲa] 'oyster'

/yiŋ<sup>w</sup>a/ [y(ɪ/u)ŋ<sup>w</sup>a] 'crow'

/niŋ<sup>w</sup>i-ŋ<sup>w</sup>iɭa/ [nuŋ<sup>w</sup>uŋ<sup>w</sup>uɭa] 'I'm a trepang'

/yi-ŋ<sup>w</sup>iɭa/ [yuŋ<sup>w</sup>uɭa] 'trepang'

It also can be seen in the alternate form of the following word:

/wanikikpaɬika-wanik<sup>w</sup>ikpaɬika/ 'bird (sp.)'

[wanikikpaɬuka-wanuk<sup>w</sup>ukpaɬuka]

(c) In closed syllables

This conditioning factor is minor but there does appear to be a greater frequency of the 'allophone [u] in closed syllables.

(d) When the vowel in the following syllable is a front versus a non-front vowel.

The high back unrounded allophone most frequently occurs preceding a labial plus the non-front unrounded vowel /a/. The high front allophone most frequently occurs preceding a labial plus front allophone.

## 8.1 The allophones [u], [ɔ], [ʊ] and [ə]

### 8.1.1 The allophone [u]

When the preceding consonant is any consonant except a labial or a velar, the allophone [u] occurs if the following syllable begins

with a rounded consonant. The allophone is noticeably rounded with extreme protrusion of the lips.

The conditioning of the vowel also occurs if the syllable is closed. The allophone [u] always occurs if the closure is the homorganic nasal preceding a rounded consonant, e.g. /ŋkʷ/. It can optionally occur if the consonant of a heterorganic cluster closes the syllable (see also Section 8.1.2).

The allophone [u] does not occur following a labial or velar because the prosodic feature of rounding applies to the whole syllable,<sup>12</sup> i.e., the consonant and vowel are either both rounded or both unrounded. (See Section 1.3 for the Assimilation rule across morpheme boundaries.)

(i) Within the morpheme

rounded cons. — rounded cons.

/ampamp <sup>w</sup> iwa/	[ampamp <sup>w</sup> uwa]	'a pair'
/aʃakp <sup>w</sup> ip <sup>w</sup> ila/	[aʃakp <sup>w</sup> up <sup>w</sup> əla]	'a point'
/ap <sup>w</sup> ik <sup>w</sup> aya/	[ap <sup>w</sup> uk <sup>w</sup> aya]	'approaching'
/ap <sup>w</sup> iŋ <sup>w</sup> iʃa/	[ap <sup>w</sup> uŋ <sup>w</sup> uʃa]	'stupid'
/am <sup>w</sup> ik <sup>w</sup> a/	[am <sup>w</sup> uk <sup>w</sup> a]	'live coals'
/m <sup>w</sup> il <sup>w</sup> k <sup>w</sup> a/	[m <sup>w</sup> ul <sup>w</sup> k <sup>w</sup> a]	'stomach'
/yinimam <sup>w</sup> iwa/	[yɪnumam <sup>w</sup> uwa]	'egg'
/am <sup>w</sup> iŋk <sup>w</sup> itʃa/	[am <sup>w</sup> uŋk <sup>w</sup> utʃa]	'too tight'
/tʃaʃawir <sup>w</sup> ik <sup>w</sup> a/	[tʃaʃawur <sup>w</sup> uk <sup>w</sup> a]	'peaceful dove'
/ak <sup>w</sup> iŋ <sup>w</sup> a/	[ak <sup>w</sup> uŋ <sup>w</sup> a]	'water'
/ak <sup>w</sup> iwaʃa/	[ak <sup>w</sup> uwaʃa]	'torn'
/ap <sup>w</sup> iʃiŋ <sup>w</sup> iwa/	[ap <sup>w</sup> uʃiŋ <sup>w</sup> uwa]	'they'
/yaŋ <sup>w</sup> iŋ <sup>w</sup> a/	[yaŋ <sup>w</sup> uŋ <sup>w</sup> a]	'eel'
/mam <sup>w</sup> iŋ <sup>w</sup> iŋtʃa/	[mam <sup>w</sup> uŋ <sup>w</sup> uŋtʃa]	'knot'

dental—rounded cons.

/t̥ikʷa/	[t̥ukʷa]	'perhaps'
/yimʷint̥iŋʷa/	[yimʷunt̥uŋʷa]	'cypress pine'
/t̥iŋkʷaʃa/	[t̥uŋkʷaʃa]	'N.E. to E. wind'
/anik̥atiwa/	[ən̥ikaɬuwa]	'new'
/aɬiwaɸa/	[aɬuwɸa]	'today'
/t̥iŋaɬiwa/	[t̥uŋaɬuwa]	'hawksbill turtle'
/ayaɬikʷa/	[ayaɬukʷa]	'paperbark tree'
/l̥ikʷakʷa/	[l̥ukʷakʷa]	'en route'
/aɬiŋkʷalʷalʷiʃa/	[aɬuŋkʷalʷalʷəʃa]	'plant (sp.)'
/aɬimʷiŋkʷa/	[aɬumʷuŋkʷa]	'very big'
/yilʷaŋm̥wilim̥wila/	[yilʷaŋm̥wulum̥wila]	'stone fish'

alveolar—rounded cons.

/meʃiwa/	[meʃuwa]	'current'
/mamʷir̥ikʷa/	[mamʷuʀukʷa]	'road'
/meʃiŋʷa/	[meʃuŋʷa]	'yellow ochre'
/pʷilikʷa/	[pʷulukʷa]	'cattle'
/anipʷiwak̥ita/	[ən̥upʷuwɔk̥uɬa]	'silly'
/aniŋkʷiʃakpa/	[ən̥uŋkʷuʀakpa]	'old'
/aniŋʷim̥enta/	[ən̥uŋʷum̥enta]	'harpoon barb'
/yinikʷampa/	[yinukʷɔmpa]	'bark of a paperbark tree'
/maʃiŋm̥iʀta/	[maʃuŋm̥əʀta]	'black plum'

retroflex—rounded cons.

/aŋɬiwa/	[aŋɬuwa]	'bloodwood tree'
/yimaŋpʷiŋiŋʷa/	[yimaŋpʷəŋuŋʷa]	'blowfly'



/aɲiŋkʷaya/	[aɲuŋkʷaya]	'tomorrow'
/awiriŋkʷa/	[awuɾuŋkʷa]	'swamp'
/t̪it̪ʷariwa/	[t̪it̪ʷaruwa]	'friar bird'
/yipaɾiŋkʷa/	[yipaɾuŋkʷa]	'mullet'

laminal—rounded cons.

/matʷiwa/	[ma <sup>I</sup> tʷuwa]	'fern (sp.)'
/atʷiŋʷa/	[atʷuŋʷa]	'tiredness'
/tʷikʷa/	[tʷukʷa]	'sugar'
/manʷiŋʷinʷa/	[ma <sup>I</sup> nʷuŋʷinʷa]	'wild fig'
/amiɭʷikʷa/	[amiɭʷukʷa]	'safe'
/akiɭʷiŋkʷa/	[akiɭʷuŋkʷa]	'mortuary rites'
/ayiwaya/	[a <sup>I</sup> yuwa <sup>I</sup> ya]	'weak'
/yil̪kʷa/	[y(u/w)lkʷa]	'toad fish'
/tʷiwiʃa/	[tʷu:ʃa~tʷuwuʃa]	'book'
/tʷiwitʷ/	[tʷu:tʷ~tʷuwutʷ]	'off with you!'
/tʷipʷiwina/	[tʷupʷuna~tʷupʷuwuna]	'spoon'
/amakʷilʷimʷita/	[amakʷilʷumʷuʔa]	'big'

(ii) At the morpheme boundary

See Assimilation rules Nos. 2 and 3 in Section 1.3.

/ŋaʃi-mʷit̪ilʷakpina/	[ŋaʃumʷuʔilʷakpina]	'to cough'
/ŋaʃi-mʷit̪ena/	[ŋaʃumʷuʔena]	'to put on one's knee'
/ŋaʃi-mʷit̪ayina/	[ŋaʃumʷuʔayina]	'to row'
/wiʃi-ŋkʷaniŋapa/	[wuʃuŋkʷæniŋapa]	'show-off'
/mʷi-wiʃakʷi-pʷikʷaya/	[mʷuwuʃakʷupʷukʷaya]	'those approaching'
/niŋʷi-wuʔena/	[nuŋʷuwuʔena]	'to climb'
/ni-walʷiwina/	[nuwalʷuwuna]	'to be cooked'

The contrast between /k/ and /k<sup>w</sup>/ in word roots is neutralised when the suffix /-iwa/ is added. In the following examples the root ends in /mi/ and /pi/, respectively, but these change to /m<sup>w</sup>i/ and /p<sup>w</sup>i/.

/a <sub>ɬ</sub> al <sup>y</sup> im <sup>w</sup> -iwa/	[a <sub>ɬ</sub> al <sup>y</sup> um <sup>w</sup> uwa]	'to the river'
/awil <sup>y</sup> ap <sup>w</sup> -iwa/	[awil <sup>y</sup> ap <sup>w</sup> uwa]	'to one: A class'

### 8.1.2 The allophones [u]~[ɔ]

When the preceding consonant is a rounded consonant /w, k<sup>w</sup>, ŋ<sup>w</sup>/, the allophones [u] and [ɔ] vary freely if the following syllable begins with a dental, /ʃ/, retroflex or velar. Only [u] occurs when the following syllable begins with a labial.

The allophone [ə] can also optionally occur preceding a syllable beginning with /ʃ/ or a retroflexed consonant.

(i) Within the morpheme

#### rounded cons. — labial

/ya <sub>ɬ</sub> k <sup>w</sup> ima <sub>ɬ</sub> a/	[ya <sub>ɬ</sub> k <sup>w</sup> uma <sub>ɬ</sub> a]	'shell: bivalve'
/k <sup>w</sup> impam <sup>w</sup> i <sub>ɾ</sub> a/	[k <sup>w</sup> umpam <sup>w</sup> ə <sub>ɾ</sub> a]	'fish (sp.)'
/t <sub>ɬ</sub> ip <sup>w</sup> il <sub>ɬ</sub> k <sup>w</sup> ima/	[t <sub>ɬ</sub> up <sup>w</sup> ulk <sup>w</sup> uma]	'water goanna'
/aŋ <sup>w</sup> ipina/	[aŋ <sup>w</sup> upina]	'sky'
/amaŋ <sup>w</sup> imaŋ <sup>w</sup> a/	[amaŋ <sup>w</sup> umaŋ <sup>w</sup> a]	'a girl grabbed by the wrist'

#### rounded cons. — dental

/yik <sup>w</sup> it <sub>ɬ</sub> ik <sup>w</sup> it <sub>ɬ</sub> a/	[yuk <sup>w</sup> (ɔ/u)t <sub>ɬ</sub> uk <sup>w</sup> (ɔ/u)t <sub>ɬ</sub> a]	'heart'
/am <sup>w</sup> il <sub>ɬ</sub> i <sub>ɾ</sub> ŋ <sup>w</sup> a/	[am <sup>w</sup> ul <sub>ɬ</sub> u <sub>ɾ</sub> ŋ <sup>w</sup> a]	'heel'
/yiŋ <sup>w</sup> il <sub>ɬ</sub> a/	[yuŋ <sup>w</sup> (u/ɔ)l <sub>ɬ</sub> a]	'trepang'

/alawitawaŋa/	[alawutawoŋa]	'story'
/alaŋkʷilaŋkʷala/	[alaŋkʷulaŋkʷala]	'sharp'
/akʷitaŋa/	[akʷutaŋa]	'near'
/kʷintia/	[kʷuntəa]	'snake (sp.)'

rounded cons. — alveolar

/pariwiŋa/	[paruw(u/ɔ/ə)ŋa]	'plant (sp.)'
/tiwiŋiwilʷa/	[tuwuŋuwilʷa]	'rainbow'
/mawitaŋa/	[mawutaŋa]	'berry (sp.)'
/yaŋkʷiŋa/	[yaŋkʷ(u/ɔ)ŋa]	'house fly'
/timʷiŋkʷiŋa/	[tumʷuŋkʷ(u/ɔ/ə)ŋa]	'kookaburra'
/akʷiŋəŋa/	[akʷ(u/ə)ŋəŋa]	'prickle (sp.)'
/kʷiliŋa/	[kʷuliŋa]	'rudder' (Mac.)
/aŋʷiŋa/	[aŋʷ(u/ɔ/ə)ŋa]	'smoke'
/apʷiŋʷiŋa/	[apʷuŋʷ(u/ɔ/ə)ŋa]	'stupid'

rounded cons. — retroflex

/yimawira/	[yimaw (u/ɔ)ɾa]	'moon'
/aŋʷira/	[aŋʷ(u/ɔ/ə)ɾa]	'fire'
/yikʷira/	[yukʷ(u/ɔ)ɾa]	'grey hair'
/kʷiraya/	[kʷ(u/ə)ɾæ <sup>I</sup> ya]	'it's a trick'
/amʷiŋkʷirɬa/	[amʷuŋkʷ(u/ɔ)ɾɬa]	'clean'
/mawirɬaŋa/	[maw(u/ɔ)ɾɬaŋa]	'woolly butt tree'
/aŋʷinɬa/	[aŋʷ(u/ə)ɱɬa]	'ankle'
/kʷiŋkʷina/	[kʷunkʷ(u/ɔ)ɱa]	'trevally'
/mawinaŋkaya/	[maw(u/ɔ)ɱaŋka <sup>I</sup> ya]	'stone axe'
/akʷitikʷita/	[akʷ(u/ɔ)ɬukʷ(u/ɔ)ɬa]	'sacred'
/alikʷira/	[alikʷura]	'house'

rounded cons. — velar/yik<sup>w</sup>iŋpa/ [yuk<sup>w</sup>(u/ɔ)ŋpa]

'opossum'

(ii) At the morpheme boundary

/ma<sub>l</sub>amik<sup>w</sup>i-man<sup>y</sup>t<sup>y</sup>a/ [ma<sub>l</sub>am<sup>w</sup>uk<sup>w</sup>uman<sup>y</sup>t<sup>y</sup>a]

'in the canoe'

/niŋk<sup>w</sup>i-laŋ<sup>w</sup>a/ [nuŋk<sup>w</sup>u<sub>l</sub>aŋ<sup>w</sup>a]

'yours (sing.)'

/ŋawi-ta/ [ŋawu<sub>l</sub>ta]

'that's enough'

(emphatic)'

## 8.1.3 The allophones [u]~[w]~[ə]

When the preceding consonant is a rounded consonant /p<sup>w</sup>, m<sup>w</sup>/, the allophones [u] and [w] vary freely if the initial consonant of the following syllable is a labial, dental, alveolar /ʃ/, or retroflex. When the initial consonant of the following syllable is a velar or retroflex, usually the allophone [w] occurs.

The allophone [ə] occurs in free variation with [u] or [w] when the initial consonant of the following syllable is a dental, /ʃ/ or retroflex.

The rounding of the consonant is usually simultaneous in these environments and, with a following unrounded vowel, is lip rounding by compression. Many non-aboriginals identify the /C<sup>w</sup>V/ by the u-ish quality of the vowel.

(i) Within the morpheme

rounded cons. — labial/amp<sup>w</sup>ima/ [amp<sup>w</sup>(u/w)ma]

'not sweet'

rounded cons.——dental

/aʃip <sup>w</sup> ita/	[aʃup <sup>w</sup> (u/ə)ta]	'strong'
/an <sup>ʷ</sup> akp <sup>w</sup> ita/	[an <sup>ʷ</sup> akp <sup>w</sup> (u/w/ə)ta]	'brave'
/ŋaʃip <sup>w</sup> itina/	[ŋaʃup <sup>w</sup> (u/ə)ti <sup>h</sup> na]	'to swell'
/mil <sup>ʷ</sup> aŋp <sup>w</sup> iliʃa/	[mil <sup>ʷ</sup> aŋp <sup>w</sup> ɯl <sup>h</sup> əʃa]	'burrawong'
/map <sup>w</sup> ilala/	[map <sup>w</sup> (u/ə)la <sup>h</sup> la]	'shallow sea'
/t <sup>h</sup> imakp <sup>w</sup> ila/	[t <sup>h</sup> umakp <sup>w</sup> (u/ə)la]	'pelican'
/aŋk <sup>w</sup> il <sup>ʷ</sup> im <sup>w</sup> ita/	[aŋk <sup>w</sup> il <sup>ʷ</sup> um <sup>w</sup> (u/ə)ta]	'all'
/ŋaʃim <sup>w</sup> itayina/	[ŋaʃum <sup>w</sup> (u/w)ti <sup>h</sup> ayina]	'to paddle, row'
/am <sup>w</sup> it <sup>h</sup> il <sup>ʷ</sup> a/	[am <sup>w</sup> (u/w)ti <sup>h</sup> il <sup>ʷ</sup> a]	'cough'
/am <sup>w</sup> ina/	[am <sup>w</sup> (u/ə)na]	'urine'
/yil <sup>ʷ</sup> aŋm <sup>w</sup> ilim <sup>w</sup> ila/	[il <sup>ʷ</sup> aŋm <sup>w</sup> əl <sup>h</sup> um <sup>w</sup> (u/w/ə)la]	'stone fish'
/m <sup>w</sup> ilaʃiŋk <sup>w</sup> a/	[m <sup>w</sup> (u/w)laʃuŋk <sup>w</sup> a]	'white berry'
/m <sup>w</sup> ilawiraŋka/	[m <sup>w</sup> (u/w)lawuraŋka]	'pandanus nut'
/m <sup>w</sup> iliʃa/	[m <sup>w</sup> ɯl <sup>h</sup> əʃa]	'reef'

rounded cons.——alveolar

/ap <sup>w</sup> iʃat <sup>ʷ</sup> a/	[ap <sup>w</sup> (u/ə)ʃa <sup>h</sup> t <sup>ʷ</sup> a]	'they'
/akap <sup>w</sup> iʃa/	[akap <sup>w</sup> (u/ə)ʃa]	'who?'
/t <sup>h</sup> amap <sup>w</sup> im <sup>w</sup> iʃa/	[t <sup>h</sup> amap <sup>w</sup> um <sup>w</sup> (u/ə)ʃa]	'olive python'
/ampak <sup>w</sup> im <sup>w</sup> iʃa/	[ampak <sup>w</sup> um <sup>w</sup> (u/ə)ʃa]	'later on'
/am <sup>w</sup> iʃit <sup>ʷ</sup> uŋ <sup>w</sup> a/	[am <sup>w</sup> (u/w)ʃit <sup>ʷ</sup> uŋ <sup>w</sup> a]	'dull'

rounded cons.——retroflex

/ap <sup>w</sup> iʃampalpa/	[ap <sup>w</sup> (u/ə)ʃampalpa]	'flat'
/a <sup>h</sup> ap <sup>w</sup> iʃa/	[a <sup>h</sup> ap <sup>w</sup> (u/ə)ʃa]	'bark'
/apap <sup>w</sup> iŋa/	[apap <sup>w</sup> (u/ə)ŋa]	'many'
/ap <sup>w</sup> ita/	[ap <sup>w</sup> (u/ə)ta]	'dangerous sea creatures'

/tɪlʷapʷiŋta/	[tɪlʷapʷ(u/ə)ŋta]	'frog'
/nakʷimʷina/	[nakʷ(u/ə)mʷ(u/ə)na]	'to put'
/mamʷira/	[mamʷ(u/ə)ra]	'cormorant'
/mamʷirikʷa/	[mamʷ(u/ə)rukʷa]	'road'
/mʷiriřpa/	[mʷ(u/w)riřpa]	'upper back'
/yimʷiŋta/	[yimʷ(u/ə)ŋta]	'louse'
/amʷirita/	[amʷ(u/ə)rita]	'black'
/amʷiŋta/	[amʷ(u/ə)ŋta]	'shoulder'
/mʷiriŋʷena/	[mʷ(u/w)ruŋʷena]	'rain forest'
/tiŋʷira/	[tuŋ(u/ə)ra]	'white clay'

rounded cons. — velar

/yiniŋmʷikalila/	[yiniŋmʷukaləla]	'cypress pine needles'
/mʷikayiwa/	[mʷuka <sup>i</sup> yuwa]	'dillybag'
/amʷikʷirita/	[amʷukuruta]	'hermit crab'
/amʷikayařa/	[amʷuka <sup>i</sup> yařa]	'spreading roots'
/mamʷika/	[mamʷuka]	'bandicoot's nest'
/mamʷikiyalija/	[mamʷukiyælija]	'crab (sp.)'
/mʷiŋawa/	[mʷuŋawa]	'shell: margarite'
/amʷiŋpa/	[amʷuŋpa]	'bush shelter'
/amʷiŋmʷiřa/	[amʷuŋmʷəřa]	'crayfish'
/mʷiŋarikʷa/	[mʷuŋarukʷa]	'fishing line'

8.2 The allophones [i]~[ɪ]~[u]

(a) When the preceding consonant is a rounded consonant /pʷ, mʷ, kʷ, ŋʷ/, the allophones [i~ɪ] and [u~ʊ] freely vary when the initial consonant of the following syllable is any laminal. At Umbakumba, [i] is the most frequent allophone while at Angurugu [u] is the most commonly used. (See Section 8.1 for allophonic rules.)

(i) Within the morpheme

/ap <sup>w</sup> it <sup>ɤ</sup> ap <sup>w</sup> iřa/	[ap <sup>w</sup> (u/w/i)t <sup>ɤ</sup> ap <sup>w</sup> əřa]	'muscular ache'
/t̥at̥iyap <sup>w</sup> it <sup>ɤ</sup> ařka/	[t̥at̥iyap <sup>w</sup> (u/i)t <sup>ɤ</sup> ařka]	'my son's daughter'
/am <sup>w</sup> it <sup>ɤ</sup> iwiřa/	[am <sup>w</sup> (u/w/i)t <sup>ɤ</sup> uwuřa]	'money'
/k <sup>w</sup> it <sup>ɤ</sup> a/	[k <sup>w</sup> (u/i)t <sup>ɤ</sup> a]	'hey, look!'
/am <sup>w</sup> iŋk <sup>w</sup> it <sup>ɤ</sup> a/	[am <sup>w</sup> uŋk <sup>w</sup> (u/i)t <sup>ɤ</sup> a]	'too tight'
/ayik <sup>w</sup> it <sup>ɤ</sup> iya/	[a <sup>i</sup> yuk <sup>w</sup> (u/ɪ)t <sup>ɤ</sup> iya]	'small (sing.)'
/ak <sup>w</sup> il <sup>ɤ</sup> ipena/	[ak <sup>w</sup> (u/ɪ)l <sup>ɤ</sup> uipena]	'bright'
/k <sup>w</sup> in <sup>ɤ</sup> ařa/	[k <sup>w</sup> (u/ɪ)n <sup>ɤ</sup> ařa]	'wild fig'
/aŋ <sup>w</sup> in <sup>ɤ</sup> a/	[aŋ <sup>w</sup> (u/i)n <sup>ɤ</sup> a]	'pus'
/man <sup>ɤ</sup> iŋ <sup>w</sup> in <sup>ɤ</sup> a/	[ma <sup>i</sup> n <sup>ɤ</sup> uŋ <sup>w</sup> (u/i)n <sup>ɤ</sup> a]	'wild fig'
/t̥iŋ <sup>w</sup> iyařka/	[t̥uŋ <sup>w</sup> (i/u)yařka]	'my father's sister'

The same type of variation also occurs in the Nunggubuyu cognate /t<sup>ɤ</sup>aŋawila/ [t<sup>ɤ</sup>aŋaw(ɪ/ u)la] 'maple tree (Nung: t<sup>ɤ</sup>aŋawili).

(b) When the preceding consonant is any consonant except a velar or rounded consonant, the allophones [i~ɪ] and [u] freely vary when the following syllable begins with the rounded consonant /k<sup>w</sup>/.

All known examples are listed. The variation seems to occur because an unrounded vowel would normally follow the preceding consonant, whereas the rounded vowel normally occurs preceding a rounded consonant (see Section 8.1).

(i) Within the morpheme

labial—rounded cons.

/yamp <sup>w</sup> iřk <sup>w</sup> a/	[yampiřk <sup>w</sup> a~yamp <sup>w</sup> uřk <sup>w</sup> a]	'parrot fish'
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dental—rounded cons.

/aniŋt̥iřk <sup>w</sup> a/	[aniŋt̥(ɪ/u/ə)řk <sup>w</sup> a]	'banksia tree'
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alveolar——rounded cons.

/ameniŋkʷa/	[æmen(u/ɪ)ŋkʷa]	'young stringbark tree'
/aniŋkʷa/	[æn(u/i)ŋkʷa]	'fishing spear (gen.)'
/t̪it̪ʷiniŋkʷa/	[t̪it̪ʷɪn(u/ɪ)ŋkʷa]	'echidna'
/meřikʷiřa/	[meř(u/i)kʷuřa]	'fish: long tom'
/t̪akʷeřikʷeřa/	[t̪akʷeř(u/i)kʷeřa]	'bird: shining fly-catcher'

retroflex——rounded cons.

/aɾikʷa/	[aɾ(u/i)kʷa]	'raw'
/mamʷiɾikʷa/	[mamʷuɾ(u/i)kʷa]	'road'

laminal——rounded cons.

/at̪ʷiřkʷiɬařpa/	[at̪ʷ(u/ɪ)řkʷuɬařpa]	'fresh water pool'
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## 8.3 The allophones [i], [ɪ], [u] and [ə]

## 8.3.1 The allophones [i], [ɪ] and [ə]

(a) When the preceding consonant is any consonant except a rounded consonant /pʷ, mʷ, kʷ, ŋʷ/, the allophones [i] and [ɪ] vary freely when the initial consonant of the following syllable is a laminal. (See Section 8.5.)

Only the allophone [i] occurs preceding /y/. It is also the most common allophone occurring between two identical laminals.

The allophone [ə] has not been recorded preceding a laminal.

(i) Within the morpheme

rounded cons.——laminal

/awit̪ʷa/	[awit̪ʷa]	'mist'
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/tiwiřiwilʲa/	[tuwuřuw(i/ɾ)lʲa]	'rainbow'
/wiya/	[wiya]	'here you are'
/awinʲempa/	[awinʲæmpa]	'fighting'

labial——laminal

/wanikařaŋpitʲa/	[wanikařaŋpitʲa]	'brother's children'
/awapilʲa/	[awɔpɪlʲa]	'warm'
/yampiya/	[yampiya]	'throat'
/yipilʲipilʲa/	[ɣipɪlʲipɪlʲa]	'thunder'
/tatiyampinʲa/	[tatiyampinʲa]	'son's daughter'
/amapinʲtʲiřiřa/	[amapinʲtʲəřəřa]	'long'
/taŋanʲtʲaminʲtʲařka]	[taŋanʲtʲaminʲtʲařka]	'my MF's sister'
/atamiya/	[atamiya]	'shell: turban'
/maminʲa/	[maminʲa]	'firefly'
/aminʲiřa/	[aminʲəřa]	'smooth and flat'
/milʲalʲa/	[mɪlʲælʲa]	'amulet'
/amilʲiŋařa/	[amɪlʲiŋařa]	'remnant'

dental——laminal

/amʷitilʲa/	[amʷutɪlʲa]	'phlegm'
/tinʲinʲa/	[tɪnʲ(i/ɾ)nʲa]	'corneal ulcer'
/atiyeřiwa/	[atiyeřuwa]	'young'
/mamʷikiyaɭiya/	[mamʷukiyæɭiya]	'crab (sp.)'

alveolar——laminal

/wiřapalitʲa/	[wuřapalitʲa]	'owner'
/tititʲa/	[tətɪtʲa]	'metal'
/anitʲa/	[anitʲa]	'liquor'
/meřitʲa/	[meřitʲa]	'soap tree'

/yininʷa/	[yɪninʷa]	'bristleworm'
/mamʷiřinʷinʷa/	[mamʷuřinʷinʷa]	'fruit: paper berry'
/wiṭařiya/	[wuṭařiya]	'morning'

retroflex—laminal

/apaṭitʷena/	[apaṭitʷena]	'cruel'
/aṇʷinṭitʷa/	[aṇʷunṭitʷa]	'crumpled'
/maṇʷininʷa/	[maṇʷuninʷa]	'crab'
/ṭimʷiṇaṇiyaṇṭa/	[ṭumʷuṇaṇiyaṇṭa]	'dragonfly'
/mʷiṇaṇiyaṇṭa/	[mʷuṇaṇiyaṇṭa]	'shell: horse conch'
/aṇařiya/	[aṇařiya]	'baby'
/mařitʷa/	[mařitʷa]	'root (sp.)'

laminal—laminal

/wiřatʷitʷa/	[wuřatʷitʷa]	'bird (gen.)'
/ayikʷitʷiya/	[a <sup>ɪ</sup> yukʷutʷiya]	'small'
/mamatʷiyiṇa/	[mamatʷiyiṇa]	'sorcery'
/ṭinʷinʷa/	[ṭinʷinʷa]	'corneal ulcer'
/yalʷilʷa/	[yæɫʷ(i/ɾ)lʷa]	'flying fox'
/wiřimilʷitʷa/	[wuřumɪlʷitʷa]	'butterfly'
/amilʷimilʷinʷtʷa/	[amɪlʷumɪlʷinʷtʷa]	'soil'
/yiya/	[yiya]	'and (in a list)'

velar—laminal

/yiwaṅkitʷa/	[yuwaṅkitʷa]	'baby wallaby'
/kinʷtʷaya/	[kɪnʷtʷaya]	(expression of empathy)
/alʷakilʷa/	[alʷakɪlʷa]	'mackerel'
/yiṇakiya/	[yɪṇakiya]	'magpie goose'
/yiniṇilʷa/	[yɪniṇɪlʷa]	'sandbar'

/yinipařiqinʷtʷa/	[yinmpařiqinʷtʷa]	'gum tree'
/mʷiqinʷtʷařikʷa/	[mʷuqinʷtʷařukʷa]	'shell: great top'
/amarqilʷařa/	[amarqilʷařa]	'unkind'

(ii) At the morpheme boundary

/mi-tʷiřkʷitařpa/	[mitʷuřkʷutařpa]	'shallow pool of salt water'
/ti-nʷařiqʷa/	[tinʷařuqʷa]	'tame: D class'
/qaři-lʷaŋpatʷaŋa/	[qařilʷaŋpa <sup>1</sup> tʷaŋa]	'to crush'
/ni-yikʷitʷiya/	[niyukʷutʷiya]	'small: N class'

(b) When the preceding consonant is a laminal /tʷ, y/, the allophones [i] and [ɪ] vary freely when the initial consonant of the following syllable is an alveolar or velar. The allophone [ə] can optionally occur preceding flap /ř/.  
 occur preceding flap /ř/.

(i) Within the morpheme

laminal——alveolar

/akʷilařmpitʷina/	[akʷulařmpitʷina]	'beside'
/titʷiniŋkʷa/	[titʷinuŋkʷa]	'echidna'
/tʷinapa/	[tʷinapa]	'gun'
/yakʷitʷina/	[yakʷutʷina]	'there'
/yina/	[y (ɪ/i)na]	'knee'
/tʷawiyina/	[tʷawiyina]	'friends (pl.)'
/pinʷtʷila/	[pinʷtʷila]	'pencil'
/wiřitʷilikʷa/	[wuřitʷɪlukʷa]	'fish (sp.)'
/wiyita/	[wiyita]	'straight'
/kalayīřa/	[kala <sup>1</sup> y (ɪ/ə)řa]	'sea perch'
/yiřma/	[yiřma]	'white gum'

/ayiřpiyiřpa/	[a <sup>i</sup> y <sup>i</sup> řpiyiřpa]	'continuous'
/aŋan <sup>v</sup> t <sup>v</sup> iŋan <sup>v</sup> t <sup>v</sup> iřa/	[aŋan <sup>v</sup> t <sup>v</sup> iŋan <sup>v</sup> t <sup>v</sup> (i/ə)řa]	'shell (sp.)'

laminal——velar

/pat <sup>v</sup> ikala/	[pat <sup>v</sup> ikala]	'billycan'
/at <sup>v</sup> ikama/	[at <sup>v</sup> ikama]	'hawk moth'
/al <sup>v</sup> ikařip <sup>w</sup> iṭa/	[al <sup>v</sup> ikařp <sup>w</sup> ṭa]	'inedible'
/al <sup>v</sup> ikil <sup>v</sup> iŋpařŋa/	[al <sup>v</sup> ikil <sup>v</sup> iŋpařŋa]	'lungs'
/akpilk <sup>w</sup> iṛakayiŋa/	[ækpilk <sup>w</sup> uṛaka <sup>i</sup> y <sup>i</sup> ŋa]	'smooth sand dune'
/mamat <sup>v</sup> iyiŋa/	[mamat <sup>v</sup> iyiŋa]	'sorcery'
/ṭak <sup>w</sup> il <sup>v</sup> iŋat <sup>v</sup> aŋa/	[ṭak <sup>w</sup> il <sup>v</sup> iŋat <sup>v</sup> aŋa]	'stars'
/mamil <sup>v</sup> iŋařa/	[mamil <sup>v</sup> iŋařa]	'mangroves'
/al <sup>v</sup> iŋpil <sup>v</sup> iŋpiřa/	[al <sup>v</sup> iŋpil <sup>v</sup> iŋpiřa]	'plant (sp.)'
/l <sup>v</sup> al <sup>v</sup> iŋa/	[l <sup>v</sup> æl <sup>v</sup> iŋa]	'knife'

(ii) At the morpheme boundary

/yi-karpa/	[yikaṛpa]	'woomera'
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(c) When the preceding consonant is a labial, the allophones [i] and [ɪ] vary freely when the following syllable begins with a labial, dental, alveolar or velar consonant. The allophone [ə] can optionally occur preceding flap /ř/ but this is not common.

(i) Within the morpheme

labial——labial

/napipa/	[næpipa]	'mother's brother'
/ak <sup>w</sup> ipipayika/	[ak <sup>w</sup> upipa <sup>i</sup> ka]	'drinkable fluid'
/ŋařimimpatiŋa/	[ŋařimimpatiŋa]	'to shut one's eyes'

labial—dental

/mĩnta/ [mĩnta]	'tree (sp.)'
/akpĩlkiyalk <sup>w</sup> a/ [ækpĩlkiyalk <sup>w</sup> a]	'receding tide'

labial—alveolar

/yinipiřa/ [yinipiřa]	'bird (sp.)'
/yimařipiřa/ [yimařipiřa]	'stingray (sp.)'
/ŋařil <sup>v</sup> ipina/ [ŋařil <sup>v</sup> ipina]	'to take a stick out of the foot'
/aŋ <sup>w</sup> ipina/ [aŋ <sup>w</sup> up(i/i)na]	'sky, clouds'
/pitita/ [pĩtita]	'potato'
/pinata/ [pinata]	'peanut'
/piřita/ [pĩři:ta]	'rice'
/eminta/ [æmĩnta]	'nose'
/aŋkaŋmina/ [æŋkaŋmina]	'thieving'
/napiřiminama/ [napiřumĩnama]	'to rumble'
/tĩmiřimara/ [tĩmiř(w/ə)mařa]	'sandfly'
/memiřeřa/ [mæmiřeřa]	'flathead'
/memiřma/ [mæmiřma]	'nape'
/tĩmiřa/ [tĩm(i/ə)řa]	'dove'
/aŋmiřa/ [æŋm(i/ə)řa]	'wide, fat'
/tĩmiřaŋmiřa/ [tĩmiřæŋm(i/ə)řa]	'sea snake'
/yiniŋk <sup>w</sup> eřimiřa/ [yĩnuŋk <sup>w</sup> eřimiřa]	'sea snake'

(Note: The occurrence of [ə] is unusual. It occurred when checking a set of [m<sup>w</sup>V] and [mV] where the vowel was neutralised to highlight the phonetic quality of the consonant.)

labial——velar

/ak <sup>w</sup> iɾipɾipika/	[ak <sup>w</sup> urɾipɾipika]	'cannibalistic'
/epɪŋa/	[æpɪŋa]	'anthill'
/ŋaʃikpikpaʃiŋina/	[ŋaʃikpɪkpaʃəŋina]	'too heavy to lift'
/pikaŋa/	[pikaŋa]	'fish hook'
/ŋaʃiweʃipikina/	[ŋaʃuweʃipikɪna]	'to think'
/ak <sup>w</sup> iwiʃimika/	[ak <sup>w</sup> uwɪʃimika]	'whistle'
/wanimikiʃa/	[wanimɪkɪʃa]	'their names'
/amɪkpɪl <sup>v</sup> iʃa/	[amɪkpɪl <sup>v</sup> (i/ə)ʃa]	'peaceful'
/mikiʃa/	[mɪkɪʃa]	'swamp nuts'
/mɪkpɪl <sup>v</sup> iʃa/	[mɪkpɪl <sup>v</sup> uʃa]	'bark strips'

(ii) At the morpheme boundary

/mi-pina/	[mɪpɪna]	'not here'
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(d) When the preceding consonant is an alveolar or a retroflex, only the allophone [i] occurs when the following consonant is a labial.

(i) Within the morpheme

alveolar——labial

/anipa/	[ænɪpa]	'living'
/yinipa/	[yɪnɪpa]	'red ochre'
/lipaŋa/	[lɪpaŋa]	'bait'
/aɾampeʃipiʃa/	[aɾæmpeʃipiʃa]	'flat'
/yaʃipeʃa/	[yæʃipeʃa]	'fish (sp.)'
/aŋaʃipa/	[aŋaʃɪpa]	'(go) that way'
/aʃipat <sup>v</sup> a/	[æʃipa <sup>ɪ</sup> t <sup>v</sup> a]	'(go) the other way'
/kaʃipa/	[kaʃɪpa]	'turtle shell'

/lipalipa/	[lipalipa]	'canoe' (Mac.)
/minimpatʲa/	[minɪmpa <sup>ɪ</sup> tʲa]	'seaweed'
/animpinimpa/	[æn(i/ɪ)mpin(i/ɪ)mpa]	'shrub (sp.)'

retroflex——labial

/aripa/	[aripa]	'dry ground'
/kʷiripa/	[kʷuripa]	'passionfruit' (Eng.)
/yimaripiřa/	[ymaripɪřa]	'stingray (sp.)'

(ii) At the morpheme boundary

/yini-piřa/	[ynipɪřa]	'seagull'
/yini-pařa/	[ynipařa]	'honey'

(e) When the preceding consonant is an alveolar or velar, the allophones [i] and [ɪ] vary freely when the following consonant is a velar.

(i) Within the morpheme

alveolar——velar

/peřika/	[peřika]	'gate' (Eng.)
/aleřikawařiya/	[aleřikawařiya]	'untidy'
/akʷařařikpa/	[akʷæřæřikpa]	'turtle poles'
/yařikalɪwa/	[yæřikalɪwa]	'shell: coquinas'
/yɪlařikiřa/	[yɪlařikiřa]	'fern (sp.)'
/eminiŋka/	[æminiŋka]	'strange'
/yilikeřa/	[yilikeřa]	'fruit'
/papilikenə/	[papɪlikena]	'galvanised iron'
		(Mac.)

velar—velar

/yakika/	[yakika]	'testicles'
/wanikikpaṭika/	[waŋ(i/w)kikpaṭuka]	'bird (sp.)'

(ii) At the morpheme boundary

/ni-kaṣaṇa/	[nikaṣaṇa]	'to cook in ashes'
/ṇaṣi-kampama/	[ṇaṣik(a/æ)mpama]	'to put the fire out'
/niṇi-kikamaṣa/	[niṇikikamaṣa]	'not to know how to learn'

(f) When the preceding consonant is a velar, the allophones [i], [ɪ] and [ə] vary freely when the initial consonant of the following syllable is an alveolar.

velar—alveolar

/amaṇkiṣa/	[amaṇkiṣa]	'kind'
/akina/	[ak(ɪ/ə)na]	'that'
/mikiṣa/	[mik(i/ə)ṣa]	'swamp nut'
/maṇṭakiṣiyeṣa/	[maṇṭakiṣiyeṣa]	'yam'
/mʷiṇinaṣa/	[mʷuṇinaṣa]	'yam'
/anʷtʷiṇiṣa/	[anʷtʷiṇ(ɪ/ə)ṣa]	'shell: Natica'
/aṭikina/	[aṭuk(ɪ/ə)na]	'that end'

## 8.3.2 The allophones [ɪ], [u] and [ə]

(a) When the preceding consonant is a laminal, the allophones [ɪ] and [u] vary freely when the initial consonant of the following syllable is a labial, dental, alveolar /ʃ/ or a retroflex.

The allophone [ə] freely varies with [ɪ] and [u] when the preceding consonant is a laminal other than /y/.



(i) Within the morpheme

laminal—labial

/yipil <sup>v</sup> ipil <sup>v</sup> a/	[yɪpɪl <sup>v</sup> (ɪ/w)pɪl <sup>v</sup> a]	'thunder'
/ŋaʃal <sup>v</sup> imparinama/	[ŋaʃal <sup>v</sup> (ɪ/w)paɾinama]	'to eat'
/ak <sup>w</sup> il <sup>v</sup> ipena/	[ak <sup>w</sup> ul <sup>v</sup> (ɪ/w)pɛna]	'brightly coloured'

laminal—dental

/yilpa/	[y(ɪ/w)lpa]	'edible root (sp.)'
/ayilpiyilpa/	[a <sup>i</sup> y(ɪ/w)lpiy(ɪ/w)lpa]	'bush'
/yirik <sup>w</sup> itvil <sup>v</sup> laŋ <sup>w</sup> a/	[yɪrɪk <sup>w</sup> ut <sup>v</sup> (ɪ/w/ə)l <sup>v</sup> laŋ <sup>w</sup> a]	'bandicoot'

laminal—alveolar

/malviʃimil <sup>v</sup> a/	[mal <sup>v</sup> (ɪ/w)ʃəmɪl <sup>v</sup> a]	'red-collared lorikeet'
/lviʃilviʃa/	[l <sup>v</sup> (ɪ/w)ʃɪl <sup>v</sup> uʃa]	'tasselled'
/amalviʃa/	[amal <sup>v</sup> (ɪ/w)ʃa]	'juice'
/anviʃa/	[an <sup>v</sup> (ɪ/w/ə)ʃa]	'mucus'
/tɪmant <sup>v</sup> imant <sup>v</sup> iʃa/	[tɪmant <sup>v</sup> umant <sup>v</sup> (ɪ/w/ə)ʃa]	'cricket'
/aʃik <sup>w</sup> an <sup>v</sup> tiʃa/	[aʃuk <sup>w</sup> a <sup>i</sup> n <sup>v</sup> tiʃ(ɪ/ə/w)ʃa]	'quick'
/aliŋatviʃəʃa/	[alɪŋat <sup>v</sup> (ɪ/ə)ʃəʃa]	'long'
/akatviʃiʃa/	[akat <sup>v</sup> (ɪ/ə)ʃəʃa]	'cleared'

(Note: There are two exceptions to the above rules where the allophones are [i~ɪ] and where [w~ə] has not been recorded, viz.,

/yinit<sup>v</sup>iʃa/ [yɪnit<sup>v</sup>(ɪ/i)ʃa] 'rocky outcrop'; /yɪnt<sup>v</sup>iʃa/ [y(ɪ/w)nt<sup>v</sup>ɪra] 'fish (sp.)'.

laminal—retroflex

/yirɪmpa/	[y(ɪ/w)rɪmpa]	'seagull'
/yiʈa/	[y(ɪ/w)ʈa]	'lawyer vine'

/atʲiɾiŋka/ [atʲ(ɪ/w/ə)ɾuŋka] 'ground'

(ii) At the morpheme boundary

/patʲi-l̥aŋʷa/ [pa<sup>I</sup>tʲ(ɪ/w)l̥aŋʷa] 'about a nail'

/yi-n̥ana/ [yɪn̥ana] 'fingernail'

/yi-r̥aka/ [yɪr̥aka] 'didjeridu'

(b) When the preceding consonant is a dental, the allophones [ɪ], [w] and [ə] vary freely when the initial consonant of the following syllable is a dental or alveolar. The allophone [ə] does not seem to occur preceding /n/.

When the preceding consonant is a dental /t̥/ and the following consonant is also a dental, the most frequent allophone is [ɪ]. In some of the examples, only [ɪ] has been recorded in the stressed penultimate syllable in this environment.

#### dental—dental

/t̥iŋiŋa/	[t̥(ɪ/w)ŋ(ɪ/w/ə)ŋa]	'mosquito'
/aɭiɭa/	[aɭ(w/ə)ɭa]	'sponge'
/aɭiɭa/	[aɭ(ɪ/w/ə)t̥a]	'paint'
/t̥il̥anta/	[t̥(ɪ/w)l̥anta]	'rock wallaby'
/makat̥it̥amʷiʃa/	[makat̥(ɪ/w)t̥amʷəʃa] <sup>7</sup>	'string necklace'
/wiʃant̥iŋta/	[wuʃant̥iŋta]	'mouse'
/wiʃat̥itiʷaʃka/	[wuʃat̥itiʷaʃka]	'avoidance relatives'
/akal̥ilaʃŋkʷiʃa/	[akal̥(ɪ/w)laʃŋkʷuʃa]	'orange stone'
/mamal̥ila/	[mamal̥(ɪ/ə)la]	'casuarina needles'

#### dental—alveolar

/t̥iweɭiʃa/ [t̥uweɭ(w/ə)ʃa] 'white cockatoo'

/et̪iʃa/	[æt̪(ɪ/w/ə)ʃa]	'hole'
/yim <sup>w</sup> iṭiʃiŋ <sup>w</sup> a/	[yim <sup>w</sup> ʷt̪(w/ə)ʃuŋ <sup>w</sup> a]	'catfish'
/aṭiʃiŋ <sup>w</sup> ana/	[at̪(w/ə)ʃuŋ <sup>w</sup> ana]	'big'
/ṭiʃapata/	[ṭ̪(ɪ/w/ə)ʃapata]	'pronged spear' (Nung.)
/ṭinta/	[ṭ̪inta]	'bamboo'
/ṭiniŋk <sup>w</sup> ilaŋ <sup>w</sup> a/	[ṭ̪(ɪ/w)nuŋk <sup>w</sup> ulaŋ <sup>w</sup> a]	'dugong'
/aṭinakpa/	[at̪(ɪ/w)nakpa]	'(to go) ahead'
/ṭaṭiniŋk <sup>w</sup> iʃa/	[ṭ̪at̪(ɪ/w)nuŋk <sup>w</sup> uʃa]	'shell: olive'
/ṭitit̪va/	[ṭ̪(w/ə)tit̪va]	'metal'
/aliʃat̪apiʃa/	[al̪iʃat̪apiʃa]	'empty'
/aŋp <sup>w</sup> iliʃa/	[æŋp <sup>w</sup> əl̪(w/ə)ʃa]	'blunt'

## (ii) At the morpheme boundary

/ṭi-t̪aʃiŋka/	[ṭ̪(ɪ/w)t̪aʃuŋka]	'woman'
/ṭi-l̪iŋena/	[ṭ̪(ɪ/w)l̪uŋena]	'salt'
/ṭi-ʃakp <sup>w</sup> iliʃa/	[ṭ̪uʃakp <sup>w</sup> ul̪(w/ə)ʃa]	'blunt'

(c) When the preceding consonant is an alveolar, the allophones [ɪ], [w] and [ə] vary freely when the initial consonant of the following syllable is an alveolar. Only the allophones [w] and [ə] have been recorded between two flap /ʃ/. The allophone [ə] does not seem to occur preceding /t/ or /l/.

## (i) Within the morpheme

alveolar—alveolar

/yaliniyalina/	[yal(ɪ/ə)niyal(ɪ/ə)na]	'upright sides'
/kaliʃa/	[kal(ɪ/ə)ʃa]	'plant (sp.)'
/tiʃimala/	[t̪(ɪ/ə/w)ʃumala]	'north wind'

/piřita/	[pɪři:ta]	'rice'
/tʲiŋkʷilili/	[tʲuŋkʷulɪli]	'plant (sp.)'
/ařiřa/	[ař(ʷ/ə)řa]	'wind'
/t̪iřiřa/	[t̪(ʷ/ə)ř(ʷ/ə)řa]	'batfish'

(ii) At the morpheme boundary

/ni-řiŋka/	[n(ʷ/ə)řuŋka]	'to see'
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### 8.3.3 The allophones [ʷ] and [ə]

The examples listed below illustrate the distribution of the basic allophone [ʷ] and its reduced form [ə].

(a) When the preceding consonant is any consonant except a rounded consonant or velar, the allophone [ʷ] occurs when the following syllable begins with a labial. In all but one example, the following labial is /m/. (See also Section 8.6 for variation caused by vowel harmony.)

(i) Within the morpheme

#### dental—labial

/aŋalipa/	[aŋalɪpa]	'over there'
/alimilʲa/	[alɪmɪlʲa]	'bloodwood tree'
/ŋařalʲilʲat̪ima/	[ŋařalʲilʲat̪uma]	'to hang down'
/aŋima/	[aŋuma]	'mangrove'

#### alveolar—labial

/yařimilʲa/	[yařumɪlʲa]	'coral'
/awiřimalʲa/	[awuřumalʲa]	'pretending'
/at̪iyeřimanʲtʲa/	[at̪iyeřumanʲtʲa]	'sibling'

/nap <sup>w</sup> iřiminama/	[nap <sup>w</sup> uřuminama]	'to rumble'
/awilimařa/	[awulummařa]	'boomerang'
/palimaņa/	[palumaņa]	'hat'
/nařimal <sub>ḱ</sub> kat <sup>v</sup> ika/	[nařumalkat <sup>v</sup> ika]	'to fly'

retroflex—labial

/ařima/	[ařuma]	'big'
/ŋařakak <sup>w</sup> iřimaṭina/	[ŋařakak <sup>w</sup> uřumaṭina]	'to learn'
/ŋařapařima/	[ŋařapařuma]	'feel for something unseen'
/ŋařiwařimat <sup>v</sup> ina/	[ŋařuwařumat <sup>v</sup> ina]	'to lift up'
/ap <sup>w</sup> iřimpa/	[ap <sup>w</sup> əřumpa]	'blistered'

laminal—labial

/aṭal <sup>v</sup> ima/	[aṭal <sup>v</sup> uma]	'river'
/at <sup>v</sup> imara/	[at <sup>v</sup> umara]	'oyster stick'
/ŋařil <sup>v</sup> imaṭikina/	[ŋařil <sup>v</sup> umaṭukina]	'to lose'

(ii) At the morpheme boundary

/waṇi-maṭaṅk <sup>w</sup> a/	[waṇumaṭaṅk <sup>w</sup> a]	'their bodies'
/waṇi-metiřa/	[waṇ(w/ɾ)mæt(ɪ/ə)řa]	'their mouths'
/ni-maṇṭapiřa/	[numæṇṭæpiřa]	'empty-handed'
/yini-mam <sup>w</sup> iwa/	[yinumam <sup>w</sup> uwa]	'egg'

(b) When a dental is contiguous to the vowel, allophones [w] and [ə] freely vary. The other consonant is an alveolar or velar.

(i) Within the morpheme

dental—velar

/at̪ika/	[at̪(ʋ/ə)ka]	'fish: neon tetra'
/wan̪ik̪ikpat̪ika/	[wan̪ik̪ikpat̪uka]	'bird (sp.)'
/al̪ika/	[al̪(ʋ/ə)ka]	'foot'
/m̪w̪iŋal̪ika/	[m̪w̪uŋal̪uka]	'pandanus fruit'
/yil̪ikar̪in̪ʔt̪a/	[yil̪ukar̪in̪ʔt̪a]	'shell: green razor clam'
/wan̪iŋʋanim̪pal̪ikpa/	[wan̪uŋʋan̪umpal̪ukpa]	'dingo'
/t̪at̪ikak̪ak̪ʋa/	[t̪at̪ukak̪ʋok̪ʋa]	'cone shell'
/am̪w̪it̪ikpal̪ʋa/	[am̪w̪ut̪ukpal̪ʋa]	'dew'
/aŋant̪iŋa/	[aŋant̪(ʋ/ə)ŋa]	'sharp'
/aŋat̪iŋat̪iŋa/	[aŋat̪uŋat̪iŋa]	'sloping'
/m̪w̪iŋiŋa/	[m̪w̪uŋuŋa]	'burrawong palm'
/aŋiŋa/	[aŋ(ʋ/ə)ŋa]	'food'
/al̪iŋat̪iŋiŋa/	[al̪uŋat̪iŋiŋa]	'long'
/al̪iŋak̪iŋepa/	[al̪uŋak̪iŋepa]	'milkwood tree'
/al̪iŋayik̪piŋa/	[al̪uŋæ <sup>I</sup> k̪piŋa]	'broad'

alveolar—dental

/wiŋiliŋiŋa/	[wuŋuliŋiŋa]	'bird (sp.)'
/wiŋilik̪iŋiŋa/	[wuŋulik̪iŋiŋa]	'white ants'
/yik̪iŋiŋa/	[yuk̪uŋ(ʋ/ə)ŋa]	'swordfish'

velar—dental

/t̪aŋiŋiŋa/	[t̪aŋuŋ(ʋ/ə)ŋa]	'mother-in-law'
/al̪aŋiŋiŋa/	[al̪aŋuŋ(ʋ/ə)ŋa]	'shell: triton'

(ii) At the morpheme boundary

/ti-ŋaliŋa/	[t̪uŋaluŋa]	'hawksbill turtle'
/ti-ŋaya/	[t̪uŋa <sup>I</sup> ya]	'widowed'

(c) When the preceding consonant is any consonant except a labial, laminal or rounded consonant, the allophones [w] and [ə] vary freely when the initial consonant of the following syllable is a retroflex. (No occurrences of a high vowel between a labial and a retroflex have been recorded to date.)

(i) Within the morpheme

dental—retroflex

/tiwantiṛa/	[tuwanti(w/ə)ṛa]	'bird: rufous fantail'
/tiṇṭiṛka/	[t(w/ə)ṇṭ(w/ə)ṛka]	'my mother'
/tiṛaṇka/	[t(w/ə)ṛaṇka]	'lizard (sp.)'

alveolar—retroflex

/yimwiṛiṛa/	[yimwuṛ(w/ə)ṛa]	'twigs'
/amaṛiṛa/	[amaṛ(w/ə)ṛa]	'crab's eye seed'
/aṇwiṛiṛa/	[aṇwuṛ(w/ə)ṛa]	'magpie'
/tīliṛiṇṭa/	[tūliwuṛ(w/ə)ṇṭa]	'tree python'
/tiraka/	[tūṛaka]	'truck'

velar—retroflex

/aṇiṇṭa/	[aṇṇṭa]	'chin'
/tiṇiṛa/	[tūṇ(w/ə)ṛa]	'white clay'
/taṇiṇṭeṛa/	[tāṇ(w/ə)ṇṭeṛa]	'black cockatoo'

(ii) At the morpheme boundary

/ti-ṇṭiṛka/	[t(w/ə)ṇṭ(w/ə)ṛka]	'my mother'
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(d) When the preceding consonant is a retroflex, [w] and [ə] vary

freely when the initial consonant of the following syllable is any consonant except a labial, laminal or rounded consonant.

(i) Within the morpheme

retroflex—dental

/amanina/	[aman(ʷ/ə)na]	'charcoal'
/am <sup>w</sup> ik <sup>w</sup> irita/	[am <sup>w</sup> uk <sup>w</sup> ər(ʷ/ə)ta]	'hermit crab'

retroflex—alveolar

/tintiřka/	[t(ʷ/ə)nt(ʷ/ə)řka]	'my mother'
/kantiřa/	[kan̥t(ʷ/ə)řa]	'horns, antennae'
/yantiřena/	[yan̥tuřena]	'shell (sp.)'
/mawiriřa/	[mawur(ʷ/ə)řa]	'seaweed'

(Note: There is one exception in the word, /waṭiři-waṭiřa/ [waṭiř(i/a)] 'Borrooloola Aborigines'. The occurrence of a final /i/ signals that it is probably a loanword.)

retroflex—retroflex

/aṇ <sup>w</sup> it <sup>w</sup> irira/	[aṇ <sup>w</sup> ut <sup>w</sup> (ʷ/ə)r(ʷ/ə)ra]	'hollow'
/yim <sup>w</sup> ina/	[yim <sup>w</sup> əṇ(ʷ/ə)na]	'stingray (sp.)'
/aṇtinta/	[an̥t(ʷ/ə)nta]	'heart'
/k <sup>w</sup> iyariṭa/	[k <sup>w</sup> iyar(ʷ/ə)ṭa]	'cyclone, storm'
/ṭiṭila/	[ṭ(ʷ/ə)ṭula]	'bell'
/aṭiṭiřa/	[aṭəṭəřa]	'hot'

retroflex—velar nasal

/ariṅka/	[ar(ʷ/ə)ŋka]	'head'
/m <sup>w</sup> iriṅa/	[m <sup>w</sup> əṅa]	'backbone'



/akpiriŋka/	[ækpəɾ(ɯ/ə)ŋka]	'dry'
/amariŋka/	[amarɯŋka]	'edible roots (gen.)'
/ariŋmařa/	[aɾ(ɯ/ə)ŋmařa]	'limping'

(ii) At the morpheme boundary

/amati-laŋ <sup>w</sup> iya/	[amatɯlaŋ <sup>w</sup> iya]	'through the grass'
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#### 8.4 In closed syllables

In the following words, the vowel in the closed syllable is conditioned by the same factors as pertain in the preceding sections 8.1-3. The following consonant that closes the syllable is the conditioning factor.

Other examples are listed in the previous sections. See Section 8.5 for examples where the conditioning factor is the initial consonant and vowel in the following syllable.

(i) Within the morpheme

/am <sup>w</sup> iŋtikpal <sup>ɤ</sup> a/	[am <sup>w</sup> (ɯ/ə)t̪(ɯ/ə)kpal <sup>ɤ</sup> a]	'dew'
/t̪impala/	[t̪ɯmpala]	'cloth' (Mac.)
/ŋařiwiřikpina/	[ŋařuwuřikpina]	'to scold'
/wiřil <sup>ɤ</sup> impil <sup>ɤ</sup> impiya/	[wuřil <sup>ɤ</sup> (i/ɯ)mpil <sup>ɤ</sup> (i/ɯ)mpiya]	'night heron'
/t̪il <sup>ɤ</sup> impa/	[t̪il <sup>ɤ</sup> (i/ɯ)mpa]	'cuttlefish'
/yilpa/	[y(i/ɯ)lpa]	'root vegetable'
/ŋařiwil <sup>ɤ</sup> ikpil <sup>ɤ</sup> a/	[ŋařuwil <sup>ɤ</sup> ikpil <sup>ɤ</sup> a]	'to obey'
/t̪itařiŋka/	[t̪uŋtař(ɯ/ə)ŋka]	'woman'

(ii) At the morpheme boundary

The only consonants which occur initially in a CC cluster root initially appear to be velars. See Section 4: palatalised consonants.

## 8.5 When the following vowel is a front vowel

When the following syllable begins with a labial, the allophones [i], [ɪ] and [u] are conditioned by the vowel in the following syllable. The allophones [i~ɪ] usually occur preceding [i/æ/e], and the allophones [ɪ~u] preceding [a].

The variation between [ɪ] and [u] in this environment is most frequent in unstressed syllables, particularly in the last unstressed syllable of a CVCV prefix. The variation has not been recorded in every instance (see Section 5 for strong versus weak consonants).

The distribution of the allophones can be seen in the following examples:

/yimaripiʃa/ [yimaripiʃa] 'stingray (sp.)'

/alʋikaʃiparipara/ [alʋɪkarɪparɪpara] 'light'

/ti-pina/ [tipɪna] 'not here'

/wiʃi-palanta/ [wuʃ(ɪ/u)palanta] 'non-aboriginal'

/panimpiʃa/ [panɪmpɪʃa] 'Venus' (Mac.)

/tɪrimpa/ [tɪ(ɪ/u)rɪ(ɪ/u)mpa] 'tadpole'

## (i) Within the morpheme

Two environmental factors occur in some of the following examples: a following vowel and closure of the syllable.

/ŋaʃiripeʃikina/ [ŋaʃɪrɪ(ɪ/u)peʃkɪna] 'to go ashore'

/amʷiʃikpalʷa/ [amʷuʃɪkpalʷa] 'soft'

/tɪʃikpa/ [tuʃɪkpa] 'bird: masked plover'

/atɪʃiŋayikpʷina/ [atɪʃ(ɪ/u)ŋæ<sup>1</sup>kpʷəna] 'appropriate'

/yikpa/ [y(ɪ/u)kpa] 'pheasant'

/alʲalʲikpa/	[alʲæɫʲ(ɪ/w)kpa]	'lips'
/malʲikpitʲina/	[malʲ(ɪ/w)kpitʲina]	'sailing boat'
/alʲiŋpa/	[alʲ(ɪ/w)ŋpa]	'clap sticks'
/aŋkipařŋʷařŋʷa/	[aŋk(ɪ/w)pařŋʷařŋʷa]	'heavy'

(ii) At the morpheme boundary

/niŋi-mentʲa/	[niŋ(w/ɪ)mentʲa]	'I'm a turtle'
/yini-manipa/	[yin(w/ɪ)mænipa]	'wild honey'
/nani-miya/	[næmumiya]	'to pick up'
/wiřani-miyatʲa/	[wuřænimiyætʲa]	'wings'
/wani-mariřpa/	[wanumari:řpa]	'their backs'

## 8.6 Vowel harmony

Regressive vowel harmony occurs within the morpheme and across the morpheme boundary. The harmony sometimes causes an unexpected allophone in a certain environment, which may or may not be in free variation with the normal allophone. (See Chart 9, Section 8: Introduction for allophonic norms.)

Vowel harmony can be seen in the following examples, but can also be observed in examples in the preceding sections where a succession of vowels harmonise within expected environments:

/akʷiriŋkʷiwiřa/	[akʷuřuŋkʷuwuřa]	'anchor';	/ayaŋʷiřikʷiriwiřa/
[a <sup>i</sup> yaŋkʷuřukʷuřuwuřa]	'corner';	/aminʲtʲiminʲtʲiřiřa/	
[aminʲtʲiminʲtʲiřiřa]	'longest'.		

(i) Within the morpheme

In the following examples, vowel harmony regresses to one or two preceding syllables.

/mawilʲilʲikʷa/	[mawulʲulʲukʷa~mawɪlʲɪlʲukʷa]	'berry (sp.)'
/mamikiyaliya/	[mam(i/w)kiyæliya]	'crab (sp.)'
/akʷititʲitʲiŋʷa/	[akʷutitʲitʲiʊŋʷa]	'gate'
/yiniŋkʷeʃimiʃa/	[yɪnuŋkʷeʃ(w/i)miʃa]	'seasnake'
/alʲaŋiʃiyata/	[alʲaŋ(i/ə)ʃiyata]	'sulky'
/akʷiweʃiŋmilʲa/	[akʷuweʃiŋmilʲa]	'cloudy sky'
/akʷilʲikiyaʃama/	[akʷulʲ(i/w)kiyaʃama]	'to dribble'
/ŋaʃiwiʃimika/	[ŋaʃuwiʃimika]	'to whistle'
/atʲatʲipina/	[atʲatʲipina]	'this side'
/ŋaʃilʲikpina/	[ŋaʃulʲ(i/w)(k)pina]	'to hunt'
/ŋaʃilʲipina/	[ŋaʃilʲɪpina]	'to take a stick out of the foot'

## (ii) At the morpheme boundary

/tʲi-ŋinʲtʲapena/	[tʲ(i/w)ŋinʲtʲapena]	'dolphin'
/tʲi-pina/	[tʲipina]	'not here'
/tʲi-miʃimara/	[tʲimɪʃumara]	'sandfly'
/tʲi-miʃa/	[tʲ(i/w)miʃa]	'dove'
/kini-ʃiŋka/	[kunnuʃuŋka]	'to see'

Vowel harmony can be seen in the following words where reduplication occurs. The root-final allophone in the first root is in harmony with that of the second root. The usual allophonic rules for rounded allophones apply (see Section 8.1.1).

/yi-maki-maki-na/	[yɪmækɪmækɪna]	'mud wasp'
/a-milʲi-milʲi-nʲtʲa/	[amɪlʲ(i/w)mɪlʲɪnʲtʲa]	'soil'
/a-kʷiri-kʷiri-pika/	[akʷurɪkʷurɪpika]	'cannibalistic'
/a-ŋwiʃipwi-ŋwiʃipi-ʃa/	[aŋʷuʃ(w/i)pʷuŋʷuʃipɪʃa]	'fish (sp.)'
/maŋki-maŋki/	[maŋk(i/w)maŋki]	'pointing bone' (Nung)

## 8.7 Phonemic variation

The vowel /i/ varies freely with the phoneme /a/ in certain words. The phonemic variation has only been found to occur in the words listed below. Most of the variation is contiguous to a laminal or dental.

/y(a/i)nʏtʏeřikina/	'in the opposite direction'
/kʷiyar(a/i)ṭa/	'cyclone'
/y(a/i)ḷakʷa/	'here'
/ṭ(a/i)tʏiniṅkʷa/	'bandicoot'
/tʏ(a/i)ya/	'go away!'
/ṇařaniṅm(a/i)kina/	'to mention'
/yinipařiṅ(a/i)nʏtʏa/	'gum tree'
/yitʏařakama~yitʏirakama/	'Olive Ridley turtle'
/nakʷim(a/i)ṇa/	'to put'

The vowel /i/ also varies with /e/ in a few words. Macassan and English words with [ɛ] appear to have an indigenised form where [i~i] occurs, e.g. the Javanese word lépak-lépak 'small container' is probably the cognate form of the indigenised /lipalipa-lʏipalʏipa/ 'canoe'; /tʏiři/ 'Jerry' (Eng.). Both the English and the indigenised forms now co-occur resulting in phonemic variation.

/malʏ(i/e)řimilʏa/	'red collared lorikeet'
/m(i/e)nimpatʏa/	'seaweed'
/p(i/e)nʏtʏila/	'pencil'
/amempeřkʷa~aminpeřkʷa/	'ten'

## 9. CONCLUSION

"The speech of monolingual natives of some languages is comprised of more than one phonemic system: the simultaneously existing systems operate partly in harmony and partly in conflict. No rigidly descriptive statements of the facts about such a language accounts for all the pertinent structural data without leading to apparent contradictions." (Kenneth L. Pike and Charles C. Fries: "Co-existent Phonemic Systems" in Brend 1972: 51) .

Conflict between two or more phonemic systems is seen in the phonemic analysis of Anindilyakwa. Data of indigenous origin has been used as the basis of analysis in order to present what is believed to be the predominant phonemic system. Loanwords from English and Macassan, and Nunggubuyu cognates have been identified wherever possible because of the conflict that arises from these sources.

It would seem possible that, with the very long words, Anindilyakwa originally had two emic vowels and a consonantal system that differentiated five points of articulation. The phoneme /e/ still has a limited distribution and frequently varies with /a/. It may have been an allophone of /a/ contiguous to laminals and /ɣ/. The alveolar series (except the very common /ɣ/) has developed from contact with Macassan and English to the extent where alveolar /m/ is common and dental /n̪/ and laminal /nʲ/ now carry a very low functional load. The rounded consonants /pʷ/ and /mʷ/ appear to be almost lost preceding /a/.

The sound shifts in the consonants have resulted in problems in determining the emic status of the vowels. It would appear that, while the consonants have gained emic status, the vowels have not to date. The consonantal changes, however, make it difficult to make clear, non-contradictory statements about vowel allophones, e.g.,

[æ] preceding alveolar /n/ is probably still in its form as conditioned by a following laminal /nʲ/ or possibly dental /n̪/; the occurrence of [ɪ] versus [ʊ] preceding /ma/ is possibly conditioned by an earlier contrast between /ma/ and /m a/. The literate Aborigines of Umbakumba have experienced great difficulty in spelling the high vowel when written and taught as /i/ and /u/, and in writing /e/ in some environments.

It seems, therefore, that the vowel changes have not yet acquired emic status for the native speakers, though some can hear the etic differences because of their contact with English phonics during their schooling. Their facility in writing English, however, will probably necessitate the use of i and u in the orthography, the latter being used when the lips are rounded by protrusion.

The occurrence of a series of rounded consonants is unusual for Aboriginal languages but is known to occur in Tiwi (see Godfrey and Leeding 1974). An analysis similar to this one is that of Mr. Gavan Breen who, by interpretation, has posited a series of rounded consonants as counterparts of the full series of unrounded consonants, together with a two-vowel system, for the Arandic languages of central Australia. His analysis also incorporates pre-palatalised consonants.<sup>13</sup> The major difference between his analysis and mine is that Arandic rounded consonants are analysed by interpretation, whereas those in Anindilyakwa have an actual phonetic realisation.

Continuing research is necessary in order to resolve some issues raised in the paper. Further analysis should consider:

- (a) the positing of a series of palatalised velar stops and the subsequent effect on the analysis of the emic glide [æ<sup>ɪ</sup>]
- (b) the possibility of long versus short vowels, dependent on a

contrast in the length of the low vowel

- (c) their possible classification of homorganic nasal plus stop as a single versus a complex unit (necessary for the teaching of literacy).

An analysis of the suprasegmental features of stress/rhythm/timing also remains to be done as a major research project.



FOOTNOTES

- 1 Because the high vowel has rounded and unrounded allophones, the phonetic script has been added for clarity whenever the rounded allophones occur.
  
- 2 In the present taped stories, only the older people seem to use the final [u:] for words other than verbs.
  
- 3 The English meaning of verbs is shown only as an infinitive because affixation often involves lengthy translations which are irrelevant in this paper.
  
- 4 There are verbal prefixes which are CV(C)CVCV also, viz., /-m<sup>w</sup>intaki/ and /wiřaki/. These conform to the formula given in its most expanded form but have an additional CV(C) syllable preceding the given formula.
  
- 5 In other cases where the Aborigines have not accepted the elision, the phonetic forms are excluded in the analysis.
  
- 6 Differences in the pronunciation of some phonemes in the process of language acquisition are not discussed in this paper.
  
- 7 Both phonemic and phonetic representations are used in this section because of difficulties arising because [u] is an allophone of /i/ following a rounded consonant.
  
- 8 Two Aborigines, in literacy classes, brought to my attention the sequence written as ku. They told me this was like kwa, kwi and

kwe and should be spelt with a kwu. The emic feature of the rounded consonant was thus recognised preceding the rounded vowel [u].

- 9 One literate wrote [æ<sup>ɪ</sup>ka] 'tree (gen.)' as ayika and other literates frequently spelt the word as aka.
  
- 10 Some examples of [æ] where the allophone [a] has not also been recorded are listed. These occur in the same environment as the two allophones of /a/. No contrast has been observed between the two vowels either because all other occurrences in the same environment vary freely, or because only [æ] occurs in the environment in one or two words. The occurrence of [æ] as an allophone of /e/ does not occur in these particular environments.
  
- 11 There are two sets of classifying prefixes for nouns and adjectives. I have, therefore, set up a third class of words, tentatively called "nominals", which function as nouns or adjectives but are morphologically distinct in that they take the second set of class-markers, viz., wani, yani, etc. as opposed to wiři, yiři, etc.
  
- 12 English loanwords with a rounded vowel are indigenised by rounding the consonant following the vowel, e.g. /tʲikʷa/ [tʲukʷa] 'sugar'; /tʲawikʷa/ [tʲa<sup>u</sup>:kʷa] 'chalk'; /tʲiwipa/ [tʲuwupa] 'soap'. Where English loanwords have an unrounded vowel, only the word-final /a/ is added, e.g., /tʲaka/ [tʲaka] 'jug'; /tʲiyipa/ [tʲi:pa] 'sheep'. The relationship between a rounded consonant and a preceding rounded vowel is thus readily apparent.
  
- 13 The information concerning the Arandic analysis is taken from orthographical materials supplied by Mr. Breen to the Institute of

Aboriginal Development, Alice Springs. It has not been possible to ascertain whether the analysis has been published.

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