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by

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INTRODUCTION

The following pages present a selection of phonological analyses of seven New Guinea Languages. Four of these are members of the East New Guinea Highlands Stock, set up by S. Wurm ("The Languages of the Eastern, Western and Southern Highlands, Territory of Papua and New Guinea", published in A. Capell, 1961. *Linguistic Survey of the South-Western Pacific*, new and revised edition. Noumea: South Pacific Commission), three from the Eastern Gadsup-Auyuna-Awa-Tairora Family, and one from the Central (Hagen-Wahgi-Jimi-Chimbu) Family. The other three are from different areas: Iatmul belongs to the Ndu Family (D.C. Laycock, "The Sepik and its Languages", *Australian Territories* June 1961), and *The Ndu Language Family (Sepik District, New Guinea)*, Linguistic Circle of Canberra Publications, Series C, Books, No.1, Canberra 1965), while Kunimaipa and Weri belong to a family of languages spoken in the Lae, Wau, and Goilala Sub-districts.

It will be immediately apparent to the reader that all the papers have been written with the particular theoretical slant of K.L. Pike as outlined in such works as his book *Language*, and in "Practical Phonetics of Rhythm Waves", *Phonetica* VIII, 9-30. This has the value that all papers are consistent in terminology and outlook, thus making it much easier to compare and contrast them.

The first paper deals with Gadsup, and is a straightforward paper outlining the segmental phonemes and describing the contrasting tones. This is followed by a study of the geographically adjacent language, Binumarien, which exhibits contrastive word initial glottal stop and initial consonant clusters containing glottal stop. The paper on Awa is of particular interest, since as well as handling the basic segmental and tonal features, it gives in some detail the complications of the morphophonemic tone changes which take place with various classes of suffixes when added to noun stems. The papers on Chuave and Kunimaipa are important for another reason, since they both attempt to cover the full range of the phonological hierarchy, as conceived by Pike. Chuave begins with the lowest unit, the phoneme, and works upwards towards the phonological paragraph, while Kunimaipa begins at the upper end of the hierarchy with the phono-

logical sentence and works downward to the level of the phoneme. Thus these two contrasting descriptions give an excellent illustration of the application of Pike's theories to particular languages. The paper on Iatmul deals principally with the segmental features and reveals how the large number of vocoids may be viewed as allophones of only three vowel phonemes by careful study of their distribution. The paper on Weri provides a significant addition to our knowledge of tonal systems outside of the New Guinea Highlands. It is hoped that these papers will prove of interest, not only to those working in New Guinea linguistics, but also to linguists in general.

TABLE OF CONTENTS

	<i>Page</i>
<i>INTRODUCTION</i>	iii
GADSUP PHONEME AND TONEME UNITS , by Chester I. Frantz and Marjorie E. Frantz	1
0. Introduction	1
1. Segmental Phonemes	1
1.1. Attestation of Phonemes	1
1.2. Description	2
1.3. Inter-Phonemic Distribution	3
1.4. Frequency	5
2. Suprasegmental Phonemes	5
2.1. Contrast between Tones	5
2.2. Gliding Tones	6
2.3. Distribution	7
2.4. Stress	9
<i>Notes</i>	10
PHONEMES OF BINUMARIEN , by Des and Jennifer Oatridge	13
0. Introduction	13
1. Contrast	13
1.1. Chart of Phonemes	13
1.2. Contrast of Segmental Phonemes	14
1.3. Contrast of Tones	14
2. Variation	15
2.1. Variation of Segmental Phonemes	15
2.2. Variation of Tone	16
3. Distribution	17
3.1. Syllables Within Word	17
3.2. Phonemes Within Syllable and Word	18
3.3. Distribution of Tone	18
<i>Notes</i>	20
<i>Bibliography</i>	21

	<i>Page</i>
AWA PHONEMES, TONEMES, AND TONALLY DIFFERENTIATED	
ALLOMORPHS , by Richard E. Loving	23
0. Introduction	23
1. Segmental Phonemes	23
1.1. Consonantal Contrast	23
1.2. Consonantal Variation	23
1.3. Vocalic Contrast	24
1.4. Vocalic Variants	24
1.5. Distribution of Segmental Phonemes in Relation to the Syllable and Word	24
2. Tonemes	25
2.1. Tonemic Contrast	25
2.2. Tonemic Variants	26
2.3. Tonemic Distribution	26
3. Tonally Differentiated Allomorphs in Noun Phrases	27
3.1. Tonally Differentiated Allomorphs of Noun Stems and of Non-initial Modifiers in Noun Phrases	27
3.2. Tonally Differentiated Allomorphs of Noun Suffixes	29
<i>Notes</i>	32
CHUAVE PHONOLOGICAL HIERARCHY , by Joyce Swick	33
0. Introduction	33
1. Phonemes	33
1.1. Contrast	33
1.2. Variants	34
1.3. Distribution	36
2. Syllables	37
2.1. Contrast	37
2.2. Variants	37
2.3. Distribution	37
3. Phonological Words	38
3.1. Contrast	38
3.2. Variants	38
3.3. Distribution	39
4. Pause Groups	39
4.1. Contrast	39

	Page
4.2. Variants	41
4.3. Distribution	42
5. Morphophonemics	44
5.1. Nouns	44
5.2. Verbs	44
<i>Notes</i>	46
<i>Bibliography</i>	48
KUNIMAIPA PHONOLOGY: HIERARCHICAL LEVELS, by Alan Pence	49
0. Introduction	49
1. Phonological Sentence	50
2. Phonological Phrase	51
3. Phonological Word	52
4. Syllable	55
5. Phoneme	56
5.1. Contrast	57
5.2. Variation	58
5.3. Distribution	63
5.4. Orthography	65
<i>Notes</i>	66
THE PHONEMES OF IATMUL, by Philip Staalsen	69
0. Introduction	69
1. Chart of Phonemes	69
1.1. Vowels	69
1.2. Consonants	69
2. Vowel Phonemes	69
2.1. Allophones	70
2.2. Contrasts	70
3. Consonant Phonemes	70
3.1. Variants	71
3.2. Contrasts	72
4. Distribution of Phonemes Within the Syllable	72
5. Supra-segmental Features	74
<i>Notes</i>	76
<i>Bibliography</i>	76

	<i>Page</i>
WERI PHONEMES , by Helen and Maurice Boxwell	77
0. Introduction	77
1. Inventory of Phonemes	77
1.1. Chart of Phonemic Norms	77
1.2. Description of Contrastive Features	78
2. Interpretation	78
2.1. Status of Items which may be either Consonant or Vowel	78
2.2. Status of Items which may be either Sequence or Unit	79
3. Description of Phonemes	81
3.1. Chart of Phoneme Sequences	81
3.2. Consonants	81
3.3. Vowels	85
3.4. Tone	87
3.5. Stress	88
4. Distribution of Phonemes	88
4.1. General	88
4.2. Specific	89
4.3. Frequency of Phonemes	90
5. Orthography	90
5.1. Proposed Orthography	90
5.2. List of Pidgin Words	91
5.3. Sample Text, in Phonetic and Orthographic Script	91
<i>Notes</i>	93

GADSUP PHONEME AND TONEME UNITS

CHESTER I. FRANTZ and MARJORIE E. FRANTZ

0. Introduction.
1. Segmental Phonemes.
2. Suprasegmental Phonemes.

0. INTRODUCTION

The segmental phonemes and the phonemic tones of Gadsup will be described in this paper.¹

The segmental phonemes each occur with two or more allophones (except the bilabial nasal and glottal stop) which have similar phonetic characteristics and occurrences. The description of the distribution of the phonemes is based upon the four types of syllables observed. The four phonemic tones (two levels, two glides) are described in terms of their contrast and of their distinctive distributional and allophonic characteristics.

The existence of tones was at an early date highlighted to us through the fairly frequent use of "whistle talk". In Gadsup whistle talk, not only are the tones conveyed, but also the segmental phonemes of the utterance are articulated.

1. SEGMENTAL PHONEMES

The segmental phonemes of Gadsup consist of nine consonants: p, t, k, ʔ, b, d, m, n, y; and six vowels: i, ʌ, u, e, a, o.

1.1. Attestation of Phonemes. Consonants consist of two series of stops, a series of nasals, and a continuant. These contrast in identical and analogous environments as indicated in the following examples:

p/t/k/b/m/n/y pũ̀nì 'name of a tree'; tũ̀nì 'my face'; kũ̀mĩ
'he comes down'; bũ̀nì 'I went and they ...';
mũ̀mĩ 'pimple'; nũ̀mĩ 'lice'; yũ̀nì 'ashes'.
p/t/b/d/m/n/y pẽ̀nì 'old'; tẽ̀mĩ 'he talks'; bẽ̀mĩ 'he goes';

	děmì 'he puts'; ménì 'shoulder blade'; némì 'he eats'; yémì 'he comes'.
d/k/m	dúndè'í 'I bore through and then I ...'; kùndémì 'he arrived'; mùnděmì 'mushroom'.
k/?	màkè 'now'; ná'é 'why'.
?/m/n	àmà'í 'meat'; àmànì 'barbs'; àmàmì 'shadow'.

Vowel phonemes contrast in identical and analogous environments:

i/ʌ/u	àndimì 'bark'; àndǎnì 'scaling skin'; àndũnì 'hollow in tree'.
e/a/o	
i/e	ì'ídé'ú 'I sing/dance'; è'ídè'ú 'I don't want it'.
ʌ/a	bǎ 'rat'; bǎ 'you stay'.
u/o	kú'í 'gourd'; kò'í 'bean root'.

1.2. Description. Non-vocoids contrast as to points of articulation: bilabial vs. alveolar vs. velar vs. glottal. They contrast as to type of articulation: stop vs. nasal vs. continuant, and as to voicing vs. non-voicing. Vowels contrast as to high, mid, and low and as to front, mid, and back tongue positions.

1.21. The voiceless stops occur at the bilabial, alveolar, velar, and glottal points of articulation. These stops (except glottal) fluctuate between unaspirated and slightly aspirated. Aspiration tends to be more frequent and pronounced before high vowels. The alveolar stop, articulated with the blade of the tongue, also fluctuates initially to the alveolar affricate [ts]: tìbámì [tsibami] [t^hibami] 'a plate'. A fricative allophone occurs intervocalic for the three stops respectively: [p] ápùmí [apumi] 'his/your shoulder'; [s] àtì'í [asi'i] 'his/your nose'; [x] àkúmí [axumi] 'his/your muscle'. The fricative allophones will fluctuate to aspirated stops with some speakers. The voiceless glottal stop occurs with one allophone.

The voiced bilabial stop /b/ has two allophones [b] and [b̥]. The stop occurs following a bilabial nasal, íyébémì [iysmbemi] 'he/it is not here'. The fricative [b̥] occurs elsewhere: bémì [bemi] 'he goes'; ùbìkǎnò [ubixano] 'you fill it up!'. With some speakers [b̥] fluctuates with [b] utterance initial, bánùdámì [banuřami] [banuřami] 'morning'. The fricative allophone [b̥], when preceding the

vowels a, ʌ, and o has less friction, fluctuating to a flat [w] with some speakers: bónò [bono] [wono] 'you go!', báni [bani] [wani] 'a long while'. The voiced alveolar stop /d/ has a flapped allophone [ɾ] occurring intervocalic, tíḍěmi [t^hirɛmi] 'he hits me'.

The nasals occur at bilabial and alveolar points of articulation. The bilabial nasal has one allophone. The alveolar nasal has allophones: [ŋ] occurring preceding velar stop, únkámí [uŋkami] 'snore'; [n] occurring elsewhere: mʌníʔi [mʌniʔi] 'legend'; ʌnduni [ʌnduni] 'hole'.

The high, close, front, unrounded frictionized non-syllabic continuant /y/ varies to an allophone with more prominent friction when preceding high vocoids, and to an affricate [dʒ] following an alveolar nasal: [ɣ] kôʔyí [koʔɣi] 'lizard', [dʒ] ʌʔnònyóì [ʌʔnondʒoi] 'his/your hair of head'; [y] ʌyámí [ayami] 'his/your hand'.²

1.22. Vowels. /i/ the high front unrounded vowel has three allophones: [ɪ] open, occurs preceding a nasal or in fluctuation with [i] when following a nasal and preceding glottal stop, índèʔú [ɪndeʔu] 'I hear'; mʌníʔi [mʌniʔi] / [mʌniʔi] 'legend'; [i] close, occurs elsewhere; dùmítěmí [dumiseɪmi] 'he spits'; iyónémí [iyonemi] 'it is cold'; [i] voiceless, close varies with [i] utterance final, kʌmámí [kʌmami] / [kʌmami] 'sweet potato'.

/ʌ/ the central unrounded vowel has two allophones: [a] low, open, central occurs utterance initial, ʌkúmí [axumi] 'his/your muscle'; [ʌ] mid, open, occurs elsewhere, iyámí [iyami] 'a dog'; pʌʔkʌ [pʌʔka] 'he holds'.

/u/ the high, back, slightly rounded vowel has two allophones: [u] open, occurs preceding a nasal, ʌmǔní [amuni] 'top of'; ʌnděmí [undemi] 'he has arrived (come up)'; [u] close, occurs elsewhere, pùkèʔú [puxeʔu] 'I die'.

/e/ the mid, front, unrounded long vowel has two allophones: [ɛ] open, occurs preceding a nasal, ʌmèní [ameni] 'tail'; [e] close, occurs elsewhere, tápè [tape] 'taro'; èʔí [eʔi] 'banana'.

/a/ the low, open, front, unrounded long vowel, ʌʔkámí 'bark'; ʌpʌʔí 'forest area'.

/o/ the mid, close, back slightly rounded long vowel, óyámí 'new'; ʌmóʔí 'young shoot'.

1.3. Inter-Phonemic Distribution. A syllable consists of a single vowel nucleus plus an optional onset and an optional coda: V, VC, CV, CVC. No more than one toneme may occur on any single vowel.

1.31. All consonants except glottal stop occur syllable and utterance initial (see Section 1.1.). Only nasals and glottal stop occur syllable or utterance initial.

bēm 'it is'; nán 'rope'; má?kímí [ma?.kimi] 'in the house'; bāmpēmí [bāmp.ɸemi] 'yellow colour or plant from which this colour is made'; nándè [nan-de] 'how much'. Consonant clusters are only possible across syllable boundaries, namely pre-nasalization (at same point of articulation) or pre-glottalization of all consonants except glottal stop: ɸpimí 'rotten'; ɸmbâdá 'you sleep'; íntémí 'he smiles'; ɸndāni 'scaling skin'; ɸnkēmí [ɸnkemi] 'he thrusts'; ɸnnómí 'grass binding at head of arrow shaft'; ɸmmémí 'a ground beetle'; ɸ?nònyóí 'hair of head'; ɸ?pémí 'his/your under-arm'; ɸ?bémí 'a boil'; ɸ?tānī 'a grass'; bā?dīnī 'fly'; ɸ?kāmí 'bark'; ɸ?mēmí 'he is sick'; ɸ?nēmí 'he threw away'; ɸ?yāmí 'dead (dried) tree'.

Pre-nasalised and pre-glottalized contoids are interpreted as sequences of two phonemes and not as complex units for the following reasons: (1) These contoid clusters occur only medial, never initial or final. (2) All consonants but glottal stop may be preceded by a nasal of the same point of articulation or by glottal stop. (3) The morphophonemic changes which occur when two consonants are juxtaposed by affixation support the thesis that the clusters are sequences of two phonemes.³

1.32. All vowels occur utterance initial, medial, and final contiguous to any consonant.

Two vowel sequences have been charted in initial, medial, and final positions. In initial position, only the sequences ai, au, ao, ui, ei, ea, eu, eo, ai, ao, and oi occur. In medial position the following have been observed: /i/, /ɸ/, and /u/ preceded by any vowel; ae, oa, io, ao, eo. In final position clusters are limited by obligatory affixation; thus only /i/ and /o/ preceded by any vowel occur.

The phonetically long vocoids [e], [a], [o] (of approximately two moras of length) never occur short. It might be possible to interpret them as geminate occurrences of the vowels /i/, /ɸ/, and /u/; however, they are here interpreted as single vowel units for the following reasons:

(1) Sequences of the short vowels /i/, /ɸ/, and /u/ contrast in analogous environments with the long vowels /e/, /a/, and /o/.

ii/e yá?.kí.ì.ní⁴ 'it is a small stick'; pɸ?.kè.ní 'they held and they ...'; ɸ.nà.tí.ì.ní 'it is a married woman'; kò?.tè.mí 'lime gourd's thing'.

Λ/α bən.tà.λ.mà 'tall man'; pèn.dǎ.m
'a long taro'; λ.bǎ.nì 'flat area'.

uu/o tá.tù.ú?.'ì 'axes'; tí?.tǒ?.ì 'small thing'; à.pù.ú?.'
'ripe things'; ò.pǒ?.'ì

(2) No more than one toneme occurs on any long or short vowel.

(3) Tone perturbation on short and long vowels is parallel in occurrence.

1.4. Frequency. Frequency of phonemes was determined from a study of four texts comprising approximately 5926 segments and 1500 grammatical words. The consonants occur with a slightly higher frequency than the vowels. Text four contained 513 consonants and 451 vowels.

Each of the nasals occurs more frequently than any one of the stops or the continuant respectively, the ratio being at least two to one. The velar consonant /k/ and glottal stop /ʔ/ each occur one third more frequently than each of the bilabials /p/ or /b/ or the continuant /y/; and also occur more frequently (almost one fourth) than either one of the alveolar phonemes /t/ or /d/. The bilabial stops and the continuant, /p/, /b/, and /y/, are the least frequent of the consonants.

The front vowel /i/ is the most frequent, occurring three times more than each of the back vowels /u/ and /o/, and twice as much as each of the two front vowels /e/ and /a/ and the central vowel /ʌ/.

2. SUPRASEGMENTAL PHONEMES

Four contrastive tones have been noted in Gadsup: /´/ high, /`/ low, /˘/ up-glide, and /˙/ down-glide. We shall first indicate the various contrasts, and then proceed to amplify why it appears advisable to analyze the glides as units and not as sequences of two level tonemes. Finally we will state some of the distributional characteristics of the tones.

2.1. Contrast between the four tones is as follows:

(1) Contrast between /´/ high and /`/ low: mǎkùní 'earthquake', mǎkùní 'village'; bé?ú 'I go', bè?ú 'I stay'.

(2) Contrast between /´/ high and /˘/ up-glide: yǎpúmi 'a grasshopper', kǎbǎni 'a frog'; kátǒni 'type of grasshopper', kǒnǎmi 'a fog or cloud bank'.

(3) Contrast between /´/ high and /˙/ down-glide: ódémì

'a small animal', *ôdémí* 'he is abstaining'; *índè* 'I hear', *ândl* 'trunk of a tree'.

(4) Contrast between /' / low and /~/ up-glide: *ʎ'němí* 'he throws away', *ö'ěmí* 'spirit'; *ʎpù* 'ripe', *ʎpù* 'knot hole in tree'.

(5) Contrast between /' / low and /^ / down-glide: *ʎnòní* 'the securing knot for bark skirts', *ʎnôní* 'obese'; *àní* 'a path', *âní* 'the point of ...'.

(6) Contrast between /~/ up-glide and /^ / down-glide: *únă* 'a bag', *yùnâ* 'food'; *ʎkâm* 'name of a tree', *âkâm* 'his/your ear'.

2.2. Gliding Tones. As analysis of tone has proceeded, it has been noted that members of the grammatical classes of noun and verb manifest opposing tonal characteristics. Verb stem tones are perturbed only through affixation, whereas noun stem tones may also be perturbed by association with other word bases.⁵

The gliding tonemes are here set up chiefly on the basis of evidence from nouns since glides on verbs are very limited in occurrence. The factors listed below related to the functioning of glides in Gadsup make it appear preferable to interpret them as gliding tonemes.

(1) The extent of the pitch difference between the start of the glide and the end point of the glide is less than that between the phonemic high and low tones in a similar environment: *káúyâmí* [*káúyâmí*] 'a drum', *â'yûmí* [*â'yûmí*] 'that which is set aside or designated for a particular reason'; *òpò'í* [*òpò'í*] 'leaf used with betel nu [*àpùú'í*] 'ripened foods'; *índě̀nò* [*índě̀nò*] 'you listen!', *índàó̀nò* [*índàó̀nò*] 'you ask!'; *ítàndáú'í* [*ítàndáú'í*] 'bows', *ʎnàpù'í* [*ʎnàpù'í*] wife'; *ʎnàtíí* [*ʎnàsíí*] 'a woman (married)', *àní* [*àní*] 'a path'.

(2) Glides occur on all vowels, with only one glide occurring on any single vowel. When the glide occurs on the ultima on a phonetically short vowel preceding a nasal, the particular nasal is lengthened and carries part of the glide tone.⁶ However, in the same position preceding a glottal, the vowel takes the whole glide. For example: *âkâmí* 'his/your ear'; *mʎní'í* 'legend'.

(3) The starting point of a glide is conditioned by the

preceding tone: (a) following a low tone a rising glide begins at low, *iyǎmì* [iyǎmì] 'a dog'; (b) following a high tone a rising glide begins at mid, *kábǎnì* [kábǎnì] 'a frog'. In rapid speech, the rising glide is shortened, and may be easily mistaken for a phonetic mid tone; (c) following a low tone a falling glide begins at mid, *ákú?í* [ǎxú?í] 'his/your thigh'; (d) following a high tone a falling glide begins at high, *mémêmì* [mémémì] 'a goat'. The high and low tonemes are not conditioned in this way by preceding t

(4) When occurring utterance final, an up-glide may fluctuate to a level allotone, the pitch of which is the same as the starting pitch of the glide. For example: a mid to high glide fluctuates to a mid tone, [káyō] / [káyō] 'an ant'. An up-glide or a down-glide preceded by silence begins at low and at mid respectively, [kǒnǎmì] 'fog or cloud bank', [ǒpémì] 'his/your mouth'.

(5) The up-glide toneme has a level allotone occurring medially between two high tones which contrasts with the high, down-glide and low tonemes. (*kátǒnì*-sg.) [kǎsǒyú?í] 'type of grasshopper', (*bǎ?dǒnì*-sg.) [bǎ?dòyú?í] 'clothes', (*mémêmì*-sg.) [mémémù?í] 'goats', *tópǎdó?í* 'a machete'.

(6) To summarize, gliding tones are here interpreted as unit tonemes for the following reasons:⁷ glides are of shorter range than sequences from one tone level to another; the starting point of glides is conditioned by the preceding tone in a manner not paralleled by sequences of high and low tones; the up-glide has level allotone; glides occur on all single vowels, and can occur before all consonants including glottal stop.

2.3. Distribution. All tonemes have been observed in utterance initial, medial, and final positions. *ónì* 'stone', *ǒnì* 'face', *òní* 'ditch', *ǎní* 'a point of', *ǎpù* 'ripe', *ǎpǔ* 'knot hole in a tree', *ǎyô* 'his/your hair', *bǎ?yí* 'tree kangaroo', *kátǒnì* 'a grasshopper', *bǎ?dǒnì* 'wearing apparel', *yúpúmì* 'type of a grasshopper', *mémêmì* 'goat'. Sequences of three or more high or low tones have been observed in utterances, however sequences of no more than three glides occur.

Of the sixteen possible sequences of two contiguous tones, only two have not been observed: up-glide high, and up-glide down-glide. *yǎpùmì* 'a grasshopper', *kátǒnì* 'type of grasshopper', *ákúmì* 'his/your calf of leg', *mémêmì* 'a

goat', *m̀̀k̀̀ǹ̀i* 'village', *ì̀ỳ̀m̀̀i* 'dog', *à̀̀ỳ̀m̀̀i* 'wing', *ò̀̀'è̀̀m̀̀i* 'a spirit', *ò̀̀nè̀̀m̀̀i* 'he chokes', *à̀̀dà̀̀* 'you call out for him'.

The following summary of the distribution of glides is based on their occurrence on noun stems. They are even more limited in occurrence on affixes and on verbs. Because of the rather severe limitations on the distribution of glides (below), it was not helpful to chart tone sequences on longer than two syllable words.

Glides occur with one out of every three noun stems (36%). Chart 1 indicates for each stem group (according to the number of syllables in a stem) the total number of stems analyzed (Total Stems), those stems with glides (Stems with Glides) and their percentage (Percent Glides) in relation to the total number of stems, and finally the total number of glides observed (Total Glides).

Chart 1
OCCURRENCE OF GLIDES WITH NOUN STEMS

<i>Number of Syllables</i>	<i>Total Stems</i>	<i>Stems with Glides</i>	<i>Percent Glides</i>	<i>Total Glides</i>
1	42	9	20	9
2	139	49	35	54
3	82	28	34	30
4	18	12	67	13
5	4	4	100	5
TOTALS:	285	102	36	111

Of the total number of noun stems which have glides, 91% of them have glides on the ultima, 9% have glides elsewhere (involving 17 stems and 18 glides). Nine stems have more than one glide, one of which does not have a glide on the ultima. Chart 2 indicates a breakdown of the total glides above, showing the number of glides which occur on each syllable of the stem in relation to the ultima (*U*); where *P* is penalt, *aP* is antepenalt, and *X* is the syllable preceding the antepenalt.

Chart 2
LOCATION OF GLIDES WITHIN NOUN STEMS

<i>X</i>	<i>aP</i>	<i>P</i>	<i>U</i>
3	2	13	93

2.4. Stress. Stress is nonphonemic. In analogous environments syllables: (1) with *a*, *e*, or *o* have more stress than those with *ʌ*, *i*, or *u*; (2) with high, rising, or falling tones have more stress than those with low; (3) with a phonetic stop onset have more stress than those with nonstop onset. Combinations of these features lead to varying degrees of non-contrastive stress.

NOTES

1. This paper was prepared under the auspices of the Summer Institute of Linguistics. The material for it was collected over a period of two years residence at the village of Ommomunta. Much of the detailed checking of this paper was done with the help of two informants, Aupi and Yaduma, both young men of about 18 years of age. The authors gratefully acknowledge the assistance and encouragement of Howard McKaughan and the editorial help of Alan Pence given in the preparation of this paper.

According to Wurm (1960), (1961) and (1961), Gadsup is a member of the Gadsup-Auyana-Tairora language family. It is spoken in the Eastern Highlands near Kainantu by over 7000 people constituting about three major dialects.

2. The high front vocoid [i] / [ɪ] occurs as a syllable nucleus in numerous utterances. As a syllable onset this vocoid occurs with friction [ɣ]. For example: diyî 'he opens', iyâmi 'a dog', yî'î 'sickness (their)', î'î 'song or dance'.

3. Refer to Frantz (1962) pp.46-7.

4. The lowered dot (.) is used to indicate the phonemic syllable break.

5. This contrast is apparently a characteristic of the group of languages of which Gadsup is a member. Bee and Glasgow (1962) found morphophonemic perturbation of tone on Usarufa nouns and noun phrases to be of a type distinct from that on verbs (p.117). McKaughan has in conversation mentioned that Tairora nouns and verbs manifested an obvious contrast after only preliminary analysis. There is also indication of the same sort of dichotomy in other New Guinea Highland languages (see in this volume Loving on Awa and Steinkraus on Tifalmin). We do not attempt to predict what may be the conditioning factors of such a contrast.

6. As implied in Section 1.31., nasal clusters do occur: ânómî 'important man', annômî 'area at small of back'; ùmōñî 'theft', úmmómî 'day after tomorrow'. Geminate clusters of nasals on nouns do not occur at stem final positions. Length of nasals at such morpheme boundaries is

conditioned by the preceding vowel; long following i, A, or u; and following e, a, or o short.

7. A possible alternative to this analysis is to consider the glides to be close-knit tone sequences of the high and low tonemes, having special distributional characteristics. This interpretation would seem to present advantages in the description of the level allotones of the up-glide, and in correlating data from nouns with that from verbs. However, it is felt that total complexity is reduced by the analysis presented.

PHONEMES OF BINUMARIEN

DES and JENNIFER OATRIDGE

0. Introduction.
1. Contrast.
2. Variation.
3. Distribution.

0. INTRODUCTION

The segmental and suprasegmental phonemes of Binumarien are presented in this study in terms of their contrast, variation and distribution.¹

Binumarien belongs to the Tairora, Gadsup, Auyana, Awa language group as indicated by S.A. Wurm (1961). It is most closely related to Tairora.

It is spoken by one hundred and seventeen people living in three small villages on the North Eastern boundary of the Kainantu subdistrict. Within the memory of the older men, the Binumariens were more numerous; but because of tribal fighting resulting in prolonged residence in the Markham Valley and resultant malaria, their numbers have been greatly reduced.

To the West and South live the Gadsups, to the North, the Azeras in the Markham Valley. The closely related language of Kambaira is in the South East. Some of the men speak Azera and Gadsup while others speak Gadsup and Tairora beside their own language. All the men except the very old, speak Neo-Melanesian.

1. CONTRAST

1.1. Chart of Phonemes

	<i>Bilabial</i>	<i>Alveolar</i>	<i>Velar</i>	<i>Glottal</i>
Stops	p	t	k	ʔ
Fricatives	ɸ	s		
Nasals	m	n		
Vibrant		r		
Semivowels	w	y		

(Continued on page 14)

1.1. Chart of Phonemes - continued from page 13

	Front	Central	Back
High	i		u
Mid	e ²		o
Low		a	

High Tone /´/

Low Tone Unmarked (/˘/ in section 3.3. only)

1.2. Contrast of Segmental Phonemes

- p : p /putaá/³ 'rotten', /pukaá/ 'tobacco'; /upeékáa/ 'push into', /apeeka/ 'difficult'.
- t : r /raʔárará/ 'will break', /táʔárará/ 'will cross river'; /páíraka/ 'type of tree', /paitáká/ 'type of frog'.
- t : s /patáa/ 'scrape', /pasaá/ 'type of bird'; /túká/ 'root', /suká/ 'sour'.
- k : ʔ /ásáúku/ 'your hand', /ásáúʔa/ 'old person'; /kukúma/ 'type of bird', /ʔuʔúsá/ 'fence'.
- i : ee /pipá/ 'he's gone', /peepa/ 'arrow'; /páiní/ 'dog', /paééná/ 'red dye'.
- ii : ee /máriiʔa/ 'I have been (there)', /máreeʔa/ 'I took it'.
- u : oo /múná/ 'smoke', /moóná/ 'the next day'; /uróóna/ 'type of bird', /ooraúná/ ' '.
- uu : oo /ʔtóo/ 'O.K.!', /ʔtuú/ 'type of yam'.
- i : ii /máriño/ 'he stays', /máriino/ 'he has been staying'; /akíiʔa/ 'head', /ákiʔtá/ 'pith (of sugar cane)'.
- a : aa /máaʔá/ 'house', /maʔá/ 'ground'; /saaká/ 'sugar', /sáká/ 'fill with water'; /taáká/ 'type of tree', /táká/ 'frog'.
- ʔ : # word initially
/ʔáféʔá/ 'I see', /apéká/ 'difficult'; /ó/ 'mouth', /ʔo/ 'dividing line'; /ʔuʔúsá/ 'fence', /úʔóná/ 'moon'

1.3. Contrast of Tones. There are two phonemic tone levels, (h)igh and (l)ow. (Only high is marked.)

- l-h : h-h /iní murí mǎríʔtánoo./ 'My lemon is here.'
 /iní múrí mǎríʔtánoo./ 'My mole is here.'
- h-l : h-h /iní sumpa antáa./ 'Cut my sweet potato.'
 /iní nántá antáa./ 'Cut my forest.'
- l-h : l-l /iní saná suʔáa./ 'Cook my taro.'
 /iní paki suʔáa./ 'Cook my gum.'
- h-l : l-l /iní sáni mǎríʔtánoo./ 'My stone axe is here.'
 /iní aʔti mǎríʔtánoo./ 'My skin is here.'
- h-h : l-l /iní táká suʔáa./ 'Cook my frog.'
 /iní paki suʔáa./ 'Cook my gum.'
- h-l : l-h /iní sumpa mǎríʔtánoo./ 'My sweet potato is here.'
 /iní muri mǎríʔtánoo./ 'My lemon is here.'

2. VARIATION

For the purpose of this paper a word is defined as the minimal phonological unit which can occur in isolation.

2.1. Variation of Segmental Phonemes

2.11. Unaspirated stops are /p/, /t/, /k/ and /ʔ/. When occurring intervocally /p/, /t/ and /k/ are lengthened. [píp·à:nà]⁴ 'insect', [pit·ūt·ū] 'type of bird', [kùk·ūřā] 'beads'.

/p/ and /t/ have voiced variants following nasals at their respective points of articulation. In addition /t/ may vary from an alveolar position to a dental position before /i/ and /e/ in some speakers.

/k/ and /ʔ/ have labialized off glides when they are preceded by /u/ except when followed by /u/. [úk^wAsī] 'wood grub', [áú^wá:náí] 'shade'.

2.12. Voiceless fricatives are /p/ and /s/. [āpè:k·ā] 'hard', [sàínīsà] 'small plant'. /s/ has a variant [ts] which occurs word initially. It is used only by some older speakers.

2.13. Voiced nasals are /m/ and /n/.⁵ A variant of /m/ is [m^w] which occurs after /u/ except before /u/. [tùm^wānā] 'type of pandanus fruit'.

2.14. /r/ is the retroflexed alveolar flap [ř]. [řāʔāřāřā] 'will break'.

2.15. Semivowels are /y/ and /w/. /w/ has a second variant [b] which sometimes fluctuates with [w]. [lā̀à:bīngūsūnā]

'type of yam', [kū̀bò:nànǎ] / [kū̀wò:nànǎ] 'small wallaby'.

2.16. The high vowel phonemes /i/ and /u/ both have two variants. [ɪ] and [ʊ] occur before nasal initial consonant clusters and [i] and [u] occur in all other positions. [pímbúmbú'á:nǎ] 'type of insect', [ít.ít.íǎ] 'shut it', [súmbǎ]

2.17. The mid vowels /e/ and /o/ each have one variant, the phonemic norm. /eetá'tí/ [è:t.á'dí] 'type of rat', /kú-kóó'oona/ [kúk.ó:'ò:nǎ] 'type of sweet potato'.

2.18. The variants of the central vowel phoneme /a/ are conditioned as follows:

When occurring after /i/ in a vv sequence /a/ has a fronted quality [ʌ<] [kǎ'díǎ<řǔ] 'worm'. The vowel quality is lowered to low open [a] when two occur together in a geminate cluster, except utterance finally when carrying a high low tone sequence. In this instance the [ʌ] quality is retained. The low close variant [ʌ] also occurs elsewhere.

2.2. **Variation of Tone.** Binumarien has a system of register tones which show only two significant levels. These levels are heard within a simultaneous falling intonation contour which is spread over the utterance concerned. The following examples show how this is applied. Each vowel is of one mora of length and carries its own register tone.

2.21. In words carrying a series of high tones on all vowels, all tones after the first fall successively lower.

/sáárisá/ [sá:řísá] 'cricket'. This would be more accurately transcribed [sa:řísá].

2.22. A series of word final high tones following a low tone is phonetically mid. /nammári/ [nám:ǎřǐ] 'water'.

2.23. Words carrying a series of low tones on all syllables begin at a low mid level and drop successively lower throughout the word, except when the word occurs utterance finally. The final low tone then rises to form a short rising glide and the vowel on which it occurs is lengthened.

/sasoota mǎráa/ [sasó:t.ǎ mǎráa] 'take the wood'

/iní sasoota [iní sasó:t.ǎ] 'my wood'.

The rising glide has been assigned to low tone because it remains low and the vowel remains short when utterance non-final. Its occurrence contrasts with the sequences low-low and low-high, and with high tone in an utterance final

syllable: /sasoota/ 'type of wood', /sapaa/ 'eel trap';
/karoopáá/ 'water melon', /ʔumisá/ 'red dye'.

3. DISTRIBUTION

3.1. Syllables Within Word

3.11. Nuclei. There are two types of syllable, short and long. The nucleus of short syllables consists of one vowel of one mora of length carrying one register tone. The nucleus of a long syllable consists of two contiguous vowels, like or diverse, two moras of length and carries two register tones.⁶ Long syllables have been set up because the phonemes /e/ and /o/ never occur singly, but only in geminate clusters.

3.12. General Distribution. The syllable patterns are V and VV optionally preceded by onset of one or two consonants. For description of permitted arrangements in the word, syllables are classed as *main*, with onset and nucleus, and *auxiliary*, with no onset.

(1) *Main.* There appear to be no limitations of distribution of main syllables either with reference to position in the word or position relative to each other. There may be some minor restrictions on their distribution relative to auxiliary syllables in the word.

(2) *Auxiliary.* Word initially only one V syllable or one or two VV syllables occur. /a.ʔti/ 'skin', /óó.aa.ma.ra/ 'mouth'.^{6a}

Word medially short auxiliary syllables occur contiguous to long main syllables, and long auxiliary syllables occur contiguous to short main syllables.

/pee.ú.ná/ 'type of tree', /pi.óó.sá/ 'wallaby'.

A long auxiliary syllable contiguous to a long main syllable occurs commonly in the speech of young people in words where they omit a glottal stop pronounced by older speakers.

/paaʔóótáná/ > /paaóótáná/ 'type of nettle'

/kúkóóʔoona/ > /kúkóóoona/ 'type of sweet potato'

/tátóóʔeesa/ > /tátóóeesa/ 'type of grub'.

Medial sequences of auxiliary syllables have been observed in one word only, /ʔiú.aa.óó.ná/ 'scrub turkey'.

Auxiliary syllables do not occur in word final position except in the following example: /róó.i.ráá.i/ 'bamboo cleaning stick'.

3.2. Phonemes Within Syllable and Word

3.21. Consonants. All consonants may manifest onset in CV and CVV syllables.

In CCV and CCVV syllables, glottal stop and nasals fill the first consonant position of the onset. Bilabial and alveolar stops, nasals and semi-vowel /y/ fill the second. The resulting consonant clusters are as follows:

/ʔp/, /ʔt/, /ʔm/, /ʔn/, /mp/, /nt/, /nn/, /mm/ and /ʔy/.⁷

Of these only /ʔt/, /ʔm/, /ʔn/ and /ʔy/ have been observed occurring word initially.

3.22. Semivowels. /y/ and /w/ occur as syllable onsets and are comparatively rare phonemes occurring most frequently in place and personal names.

/aayakaráání/ 'type of yam', /yankawána/ 'place name', /wóowá/ 'man's name'.

3.23. Vowels. /i/, /a/ and /u/ occur as short syllable nuclei. Long syllable nuclei consist of geminate vowel clusters /ee/, /oo/, /aa/, /ii/, /uu/ and diverse clusters /ua/, /au/, /ai/, /ia/, /ui/, /iu/. The phonemes /e/ and /o/ never occur singly but only in geminate clusters.

The vowel clusters /ui/, /ii/ and /uu/ have not been observed word initially.

All permitted vowel sequences except /iu/ and /uu/ occur in long syllables in medial position. In sequences of main plus auxiliary all vowel combinations have been observed except: /aa/, /ee/, and /oo/ plus /a/; /aa/ and /oo/ plus /u/; /i/ plus /ee/; and /a/ plus /aa/.

/i/, /a/, and /u/ may occur as the vowel of short main syllables in word final position. All permitted vowel sequences except /ui/, /iu/ and /ii/ may occur as the nuclei of word final long main syllables.

3.3. Distribution of Tone. Tone sequences on words of up to five vowels have been charted. Distributional limitations have been observed only on words of three, four and five vowels having all long, or short and long syllables.

3.31. On three and four vowel words following the first high tone all other tones will be high preceding a final high. /' ' ' /, / ' ' ' ' /, / ' ' ' ' ' / . In five vowel words with CVV.CVV.CV syllable pattern, this restriction applies only to the penultimate and final syllables. / ' ' ' ' ' / .

3.32. Following a high tone on antipenultimate vowel, and preceding low tone on final vowel, a penultimate vowel will carry low tone. /' /, /' /, /' /, /' /, /' /.

3.33. The tone sequence high high has not been observed on a final long syllable of a multisyllabic word.

NOTES

1. The data for this paper were collected by the authors during a stay of two and a half years in the village of Onikuródarannai while working with the New Guinea Branch of the Summer Institute of Linguistics. The Administration name for this group of people 'Binumarien', was derived from a former village name /Pinumaarénai/. The people call themselves and the language /Afaqína/. A large number of informants were used during this time but two middle-aged men, Aaʔti and the Government-appointed chief, Maraaʔaroo, were the principal ones. The tone analysis was done at a linguistic workshop under the direction of Dr K.L. Pike. The outline for this paper was suggested by the theoretical framework of Pike (1954, 1955, 1960). Our informants at the workshop were Tata and Kuntaʔpi. We wish to record our thanks to members of the Institute for help with this analysis.

2. The phonemes /e/ and /o/ never occur singly but only in geminate clusters.

3. When two /a/ [Λ̃] phonemes occur contiguously, the vowel quality is changed to [a].

4. Throughout this paper, the raising and lowering wedge on the phonetic symbols [ɔ̂] and [Λ̂] have been omitted and the symbols written [ɔ] and [Λ]. [:] equals two moras of length and [.] equals one and a half moras of length. Phonetic pitch is symbolized [´] high, [ˉ] mid, [˘] low.

5. Voiced velar nasal /ŋ/ is a loan phoneme from Azera. It occurs in place and personal names and in a few loan words.

/uŋáʔa/ 'place name'; /tuŋúŋa/ 'house post'.

Voiced velar stop [g], variant of the phoneme /k/ occurs after /ŋ/ in loan words from Azera.

/yaŋkawána/ 'place name'; /saŋkuma/ 'corn'.

6. In slow and deliberate speech two clear phonetic syllable pulses are heard particularly on geminate clusters [e.e] [ɔ.ɔ] [a.a].

6a. The boundaries of phonemic syllables are indicated by a dot but are not themselves considered phonemes.

7. The /ʔy/ cluster of phonemes is separate from the [ʔy] conditioned variant of /ʔ/. /ʔy/ occurs initially in question words and in one word /uʔyáa/ 'put'. An alternative analysis of the consonant clusters /ʔp/, /ʔt/, /ʔm/, /ʔn/ and /ʔy/ as single phonetically complex phonemes is also possible.

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AWA PHONEMES, TONEMES, AND TONALLY DIFFERENTIATED ALLOMORPHS

RICHARD E. LOVING

0. Introduction.
1. Segmental Phonemes.
2. Tonemes.
3. Tonally Differentiated Allomorphs in Noun Phrases.

0. INTRODUCTION

Tonally differentiated allomorphs in noun phrases as well as the tonemes and segmental phonemes of Awa¹ will be described in this paper.²

An interesting feature of Awa noun phrases is that most noun suffixes do not have basic tonemes but derive their tonemes depending on: (1) the suffix stem class of which they are a part; (2) the toneme of the preceding syllable; (3) whether or not the preceding toneme has been perturbed; (4) the class of the stem on which they occur.

In the first few days of language study, minimal toneme pairs of object words in isolation indicated the presence of phonemic tone levels.

A unique feature of segmental phonemes in Awa is the occurrence of /æ/ as a seventh vowel phoneme in an area of five and six vowel languages.

1. SEGMENTAL PHONEMES

The segmental phonemes of Awa include nine consonants: p, t, ʈ, k, ʔ, m, n, w, y, and seven vowels: i, u, e, o, æ, ʌ, a.

1.1. Consonantal Contrast. The stops and affricate /p, t, ʈ, k, ʔ/ contrast as in: ipiçæʔ³ 'he cries', itiɰ 'raw', içiʔ 'he plucks', kikiʔ 'it is crowded', iʔiçá 'bird name'. The nasals /m, n/ contrast as in niéʔ 'they gave me', miéʔ 'he is there'. The semi-vocoids /w, y/ contrast as in: ayayátiʔ 'drought', æwæ 'talk'.

1.2. Consonantal Variation. A voiced variant of the stops

/p, t, k/ occurs intervocalic following front vowels as in [ibicæʔ] /ipicæʔ/ 'he cries', [idigiʔ] /itikiʔ/ 'he stands', [kigiʔ] /kikiʔ/ 'it is crowded'.⁴ A voiced flap variant of the stop /t/ and a voiced fricative variant of the stops /p, k/ occur intervocalic following mid and back vowels as in [aře] /ate/ 'woman', [ube] /upe/ 'sand', [ogâ] /okâ/ 'alive'. A voiced affricate variant of the affricate /č/ occurs following /n/ as in [wandžǎ] /wandčǎ/ 'ghost'.

A velar variant of the nasal /n/ occurs preceding the stop /k/ as in [ɬwanǰká] /ɬwanká/ 'tree'.

A voiced alveopalatal grooved fricative occurs as an allophone of /y/ preceding the vowel /i/ and less frequently fluctuates with [y] in other environments as in: [ɬži] /ɬyi/ 'tree name', [ɬbuži] /ɬpuyi/ 'woman's name', [ɬžu] [ɬyu] /ɬyu/ 'seed', [ožôʔmedôʔ] [oyôʔmedôʔ] /oyôʔmetô/ 'they pulled up'.

1.3. Vocalic Contrast. The seven vowels contrast as in: píti 'heart', putuputu 'thunder', petaté 'banana', pontō 'harp', pətaqkota 'naked', pátéʔta 'plate', and patání 'person'.

1.4. Vocalic Variants. Word initial /um/ is actualized etically as a portmanteau phone, [m.], as in [m.oʔ] /umoʔ/ 'rat'.

The vowels /i, u, ɬ/ occur as short vowels initially and medially. Word final, either in isolation or at the end of a phonological phrase, these vowels occur with length as in: [idobîbî.] /itopîpi/ 'noise', [puřuburu.] /putuputu/ 'thunder', [kɬɬɬɬ.] /kɬɬɬɬ/ 'bird'.

1.5. Distribution of Segmental Phonemes in Relation to the Syllable and Word. A syllable consists of a single vowel nucleus plus an optional onset and an optional coda; that is, the patterns CV, CVC, V, VC occur. All consonants except glottal stop occur syllable initial. Only nasals and glottal stop occur syllable final. Any vowel may fill the V slot of any syllable type. Only one toneme occurs with any one syllable.

Within a phonological word, any consonant may occur intervocalic. All but /y, ʔ/ occur word initial. Only /ʔ/ occurs word final. Across syllable boundaries the following consonant clusters occur: /mp/, /nt/, /nč/, /nk/, /ʔm/, /ʔn/, /ʔp/, /ʔt/, /ʔk/. These clusters occur only word medial, never initial or final.

The seven vowels each occur word initial, medial, and final, and also preceding and following each of the nine

consonants.

The vowels /o, æ, ʌ, a/ have not been observed preceding either /æ/ or /a/ within words. All other combinations of vowels are possible in sequences of two. In sequences of three, the following combinations have been observed: /iau/ ániaú 'mother and daughter', /iae/ apíae 'tomorrow!', /iai/ iwiái? 'he is thinking', /iao/ iwiáo 'think', /iæi/ apiæí 'grass ashes', /iɹi/ katiɹi? 'slippery', /iuæ/ iúæ 'our mouth', /uæi/ nuæi 'my chin', /eoe/ koweoe 'go and bring!', /oiʌ/ apitoiʌ 'disintegrated', /æiʌ/ æíʌ 'silent', /ʌio/ ʌiô 'toe joint', /ʌoi/ paoi? 'he married', /ʌie/ ʌie 'foot!', /ʌeʌ/ mʌeʌwě 'animal fat', /aœ/ iwiáœ 'think!'. In sequences of four the following combination occurs /iaœ/ iwiáœ 'think!'.

Any syllable type may occur word initial, medial, or final. A sequence of V syllables within a word occurs in contrast with a sequence of VCV syllables in which the C is /w/ or /y/ as in: ʌiʌ? 'stem', ʌyʌ 'intestines', ʌtaúe 'why', áwʌna 'different'.

2. TONEMES

Awa tonemes include high, falling, rising, and low.

2.1. Tonemic Contrast. In one syllable words there is contrast between these tonemes as in: ná 'breast', nâ 'taro', pã 'fish', nà 'house'.

In two syllable words ten of the possible sixteen toneme combinations occur as in: tʌtí 'dew', tʌpã 'beetle name', átè 'afraid', nãpô 'Is it a taro?', nãmí? 'It is a taro.', â?mè 'frog name', à?kí 'yam', màgô 'man's name', àtè 'ear', àtè 'woman'. Of the sixteen possible patterns, note that four of the six which do not occur are those in which the initial toneme is rising. The two remaining patterns, high-falling and falling-high, occur on the last two syllables of three syllable words as in: wènʌwã 'his sister's husband', ʌwãwʌ 'sister's husband'.

In three syllable words all tonemes contrast word final as in: kʌmpòtʌ 'cassowary', ʌyàtʌ 'hair', òtítʌ 'taboo', kʌpʌtʌ 'bird'. All tonemes except rising contrast word medial as in: kʌpʌtè 'bird name', kʌpʌtʌ 'bamboo', ʌyàpʌ 'belly'. All tonemes except rising contrast word initial as in: tónʌnʌ 'bark belt', mò?kʌkè 'someday', nònàwè 'fog'. Of the sixty-four possible combinations of these tonemes on three syllable words, twenty-three have been found to occur. See examples above and the following: òyétʌ 'egg', ʌwiã 'his

tibia', *nònáwǎ?* 'ditch', *pòpâkí?* 'whistle', *nánúâ* 'my sister's husband', *wènáwâ* 'his sister's husband', *áwâwá* 'sister's husband', *ǎíǎ* 'silent', *àkâmpû* 'deaf', *wánèpâ* 'cassarina', *té?táté* 'two', *té?túkà* 'trap', *átúó* 'his lips'.

2.2. Tonemic Variants. High toneme has a range of phonetic variants as follows. Utterance final high occurs as a phonetic upglide from high, while non-final highs in a series step gradually up from a high mid pitch to the final upglide. Elsewhere high toneme occurs as phonetic high pitch.

Examples: ^{5 4 3 2-1}*íkátáde* / *íkátádé* / 'opossum name'; ^{2 8 2-1}*té?táté* / *té?táté* / 'two'; ^{2 7 8-9}*ótítá* / *ótítá* / 'taboo'; ^{8 2 8-9}*ká?tó?pe* / *ká?tó?pè* / 'potato'.

Falling toneme has a range of phonetic variants as follows. Following high toneme it glides from high to mid. Between high and low, or utterance final following high, it glides from high to low. Utterance final following other than high it glides from mid to low. Utterance medial following tonemes other than high its pitch is level mid.

Examples: ^{3 2 2-1}*áwâwá* / *áwâwá* / 'sister's husband'; ^{4 3 2-8}*nánúwâ* / *nánúwâ* / 'my sister's husband'; ^{8 5 8-9}*kápátá* / *kápátá* / 'bamboo'; ^{8 5 5-8}*ákâmpû* / *ákâmpû* / 'deaf'; ^{7 8 5-8}*lyá?nó* / *lyá?nó* / 'head'.

Rising toneme occurs as a glide from low to low mid as in: ^{7 8 8-7}*ápiá* / *ápiá* / 'nose'; ⁸⁻⁷*ó* / *ó* / 'new'.

Low toneme has a range of phonetic variants as follows. Utterance final low occurs as a phonetic downglide from low. The final low in a series of lows preceding high toneme is low in pitch, while non-final lows in a series step gradually down from a low mid pitch to the final low in the series. Elsewhere low toneme occurs as phonetic low pitch.

Examples: ^{5 6 7 8-9}*támèmiá* / *támèmiá* / 'opossum name'; ^{7 8-9}*áté* / *áté* / 'woman'; ^{6 7 8 2-1}*tùncòtèti?* / *tùncòtèti?* / 'afternoon'; ^{8 2 8-9}*ká?tó?pe* / *ká?tó?pè* / 'potato'.

2.3. Tonemic Distribution. All of the tonemes occur with each of the vowels word final. High, falling, and low tonemes occur with each of the seven vowels word medial. High and low tonemes occur with each of the vowels word initial. Falling toneme occurs with /o/ and /a/ word initial. It is expected that a larger corpus of data will reveal the occurrence of falling toneme with more of the

vowels word initial. Not more than two falling tonemes have been observed in sequence. Rising toneme occurs only word final.

Low toneme is the most frequent in occurrence. The next most frequent is high toneme. Rising toneme is the least frequent. In ten pages of Awa folktale text the percentage of occurrences were as follows: low 68%, high 22.8%, falling 5.4%, and rising 3.8%. The percentage of rising tonemes would be higher in a listing of lexical items since word final rising tonemes are perturbed to low tonemes phrase medially in text.

3. TONALLY DIFFERENTIATED ALLOMORPHS IN NOUN PHRASES

Two types of tonemic perturbation occur throughout the language:

(1) A word-final rising toneme becomes low whenever followed by another word in the same phonological phrase as in: pǎ 'just' plus póétá? 'pig' becomes pǎ póétá? 'just a pig'; pǎ 'just' plus nǎ 'taro' becomes pǎ nǎ 'just taro'.

(2) A word-initial low toneme becomes a falling toneme whenever preceded in the same phonological phrase by a word whose final toneme is rising as in: pǎ 'just' plus tânú 'flea' becomes pǎ tânú 'just a flea'; pǎ 'just' plus kǎpǎtǎ 'bird' becomes pǎ kǎpǎtǎ 'just a bird'.

Within verb phrases the tonemes of a verb stem are perturbed not only by certain modifiers which precede them, but also by the suffixes with which they occur. Within noun phrases,⁵ however, noun stems are never perturbed by their suffixes most of which have no basic tonemes. These stems may only be perturbed by words which occur in satellite⁶ positions in noun phrases.

3.1. Tonally Differentiated Allomorphs of Noun Stems and of Non-initial Modifiers in Noun Phrases. In addition to the general perturbation just described, unperturbed satellite words in noun phrases are grouped into three classes depending on how they perturb the word which contiguously follows. Noun stems in their phonological relationships with suffixes fall into the first two of these classes.

Class I satellite words cause following one-syllable words to perturb to rising toneme and cause multi-syllable words to perturb to low for the first toneme and to high for all subsequent tonemes as in: kǎwè? 'good' plus nǎ 'house' becomes kǎwè? nǎ 'good house'; ǎnò?tǎ 'big' plus kǎpǎtǎ 'bird' becomes ǎnò?tǎ kǎpǎtǎ 'big bird'.

All satellite words whose final toneme is low or falling occur in Class I. In addition to those words, the following satellite words whose final toneme is rising, and satellite words whose final toneme is high occur in Class I: wíǎ? 'yellow', wà?tǒ 'short', ǒ 'new', sǎiyǒ 'foolish', àù?mǎ 'poor hunting', ànǎ 'selfish', tàù?táú? 'red', sùànsúá 'fast', èyòyó 'light', iwíá 'thinking', wítǎ 'laughing'.

Class II satellite words cause following words to perturb to all high tonemes as in: pǎpùcǎ 'black' plus wǎ 'man' becomes pǎpùcǎ wǎ 'black man'; kǎpǎntǎ 'sick' plus kǎpǎtlǎ 'bird' becomes kǎpǎntǎ kǎpǎtlǎ 'sick bird'.

Nouns or pronouns plus the suffix -tǎncǎ⁷ 'similar', and nouns plus the suffix -te 'from' occur in Class II as in: tó?pǎlǎtǎncǎ 'like an earthworm' plus wǎ 'man' becomes tó?pǎlǎtǎncǎ wǎ⁸ 'earthworm-like man'; kǎlǎnǎntǎpǎtǎ 'from Kainantu' plus mǎpǎ 'boy' becomes kǎlǎnǎntǎpǎtǎ mǎpǎ 'the boy from Kainantu'.

The following satellite words occur in Class II: àpǎ? 'no good', pǎpùcǎ 'black', sǒpùyǎ 'thin', tǎpǒitǎlǎ 'dark', tǎmùncǎ 'close by', itǎkǎtǎtǎ? 'many', itǎlǎ 'raw', kǎpǎntǎ 'sick', tǎkǎtǎtǎ 'looking', tǎtǎ 'cooking', óukǎ 'sleeping', itǎ 'understanding', à?pǎ 'chopping', kǎ?kǎ 'burning'.

Class III satellite words do not cause tonemes in following words to be perturbed as in: itǎ 'not' plus nǎ 'house' becomes itǎ nǎ 'not a house'; itǎ 'not' plus kǎpǎtlǎ 'bird' becomes itǎ kǎpǎtlǎ 'not a bird'.

This class includes the clitic itǎ 'not', the modifiers mò?kǎ 'all', pǎ 'just' and all possessives. The possessives are made up of noun or pronoun plus -nǎ 'possessive marker' as in: wǎnǎ 'his' plus pǒétǎ? 'pig' becomes wǎnǎ pǒétǎ? 'his pig'; pǒétǎ?nǎ 'the pig's' plus à?kǎ 'yam' becomes pǒétǎ?nǎ à?kǎ 'the pig's yam'.

Notice that the general perturbation described in the first paragraph of Section 3 still occurs even though the satellite word is in Class III as in: wǎnǎ 'his' plus kǎpǎtlǎ 'bird' becomes wǎnǎ kǎpǎtlǎ 'his bird'; nǎnǎ 'my' plus nǎ 'house' becomes nǎnǎ nǎ 'my house'.

Perturbed satellite words in turn cause all following satellite and head words in a noun phrase to be perturbed to all high tonemes as in: ítǒ?kǎ (Class I) 'no good' plus cǎiǒ (Class I) 'foolish' plus pǎtǒcǎ (Class II) 'blind' plus wǎù?kǎ 'people' becomes ítǒ?kǎ cǎiǒ pǎtǒcǎ wǎù?kǎ 'bad, foolish, deaf people'; àwǎtǎ (Class I) 'sick' plus pǎtǒcǎ (Class II) 'blind' plus àtlǎtǎ 'girl' becomes àwǎtǎ pǎtǒcǎ àtlǎtǎ 'sick, deaf girl'.

3.2. Tonally Differentiated Allomorphs of Noun Suffixes.

Noun suffixes are divided into those with a basic toneme and those without a basic toneme. Those without a basic toneme are further divided into suffix classes set up on the basis of the particular pattern with which they derive tonemes when occurring with noun stems.

3.2.1. Noun Suffixes which have Basic Tonemes. The tonemes of these suffixes remain unchanged. These suffixes include -è 'augmentative', -tàpà 'large', -tâpîâ, -tâpîââmô, -tâpîâ?pómò 'dubitative', as in: tînú 'flea' plus -è 'augmentative' becomes tînúè 'a flea'; nâ 'house' plus -tâpà 'large' becomes nâtàpà 'big house'; ânôtâ 'big' plus nâtàpà 'big house' becomes ânôtâ nâtàpà 'great big house'.

The suffix -tâníâ? 'very long' remains unchanged when following unperturbed noun stems as in: nâkâ 'vine' plus -tâníâ? 'very long' becomes nâkâtâníâ? 'a very long vine'. Following perturbed noun stems, however, this suffix has a sequence of high tonemes as in: ânôtâ 'big' plus nâkâtâníâ? 'very long vine' becomes ânôtâ nâkâtâníâ? 'a big long vine'.

3.2.2. Noun Suffixes Without Basic Tonemes which follow Unperturbed Noun Stems. Factors influencing the tonemes which these suffixes have are: (1) the toneme of the preceding syllable; (2) whether or not the preceding toneme has been perturbed; (3) the phonological class of the stem on which the suffix occurs.

Suffixes without basic tonemes are divided into suffix classes as follows:

Suffix Class I is made up of those one-syllable suffixes which have a high toneme when following a stem-final high or rising⁹ toneme, and have a rising toneme when following a stem-final low or falling toneme. The suffixes in this class are: -mî? 'predicative', -mè 'identificational', -tæ 'conjunctive plural'.

Examples: póétâ? 'pig' plus -mè 'identificational' becomes póétâ?mé 'the pig'; ânôwâ 'mother' plus -tæ 'conjunctive plural' becomes ânôwâtæ 'his mother and others'; àtè 'woman' plus -mî? 'predicative' becomes àtèmî? 'it is a woman'; âyâtâ 'hair' plus -mè 'identificational' becomes âyâtâmè 'the hair'.

Suffix Class II is made up of those one-syllable suffixes which have a falling toneme when following a stem-final low, falling, or rising toneme, and have a low toneme when following a stem-final high toneme. The suffixes in this class are: -pò 'question marker', and -çè? 'personal dual'.

Examples: àtè 'woman' plus -po 'question marker' becomes àtèpô 'Is it a woman?'; ànôwā 'mother' plus -de? 'personal dual' becomes ànôwāde? 'and his mother'; nā 'taro' plus -po 'question marker' becomes nāpô 'Is it a taro?'; póétá? 'pig' plus -po 'question marker' becomes póétá?pò 'Is it a pig?'.

Suffix Class III is made up of those one-syllable suffixes whose toneme is determined by the Class of the preceding noun stem as well as its stem-final toneme. The suffixes are: -pa 'animate to, at'; -ne 'possessive marker'; -ka 'actor marker'; -ta? 'at, on'; -ca? 'purposive collective'. They have: (1) rising toneme when following all Class I noun stems whose stem-final toneme is low, falling, or rising; (2) low toneme when following all Class I noun stems whose stem-final toneme is high; (3) high toneme when following all Class II noun stems.

Examples: nā 'taro' plus -ca? 'purposive collective' becomes nācā? 'taro collecting'; àtè 'woman' plus -ne 'possessive marker' becomes àtèně 'the woman's'; ápøkǎ (Class I) 'tree top' plus -ka 'actor marker' becomes ápøkǎkǎ 'the tree top did it'; tǎnú (Class I) 'flea' plus -ka 'actor marker' becomes tǎnúkǎ 'the flea did it'; òyétá (Class II) 'egg' plus ta? 'at, on' becomes òyétátá? 'on the egg'; pǎ (Class II) 'fish' plus ca? 'purposive collective' becomes pǎcā? 'fish collecting'.

Suffix Class IV is made up of those two-syllable suffixes whose toneme is determined by the Class of the preceding noun stem as well as its stem-final toneme. The suffixes are: -dape 'causational, referential'; -tate 'dual'; -tato 'trial'; mati 'plural'; -ka?ta 'elongated'; -ka?ka? 'conjunctive'; -ta?te 'instrumental'; -pi?pe? 'in'; -tapa 'over, across'.

They have: (1) low-high tonemes when following all Class I noun stems whose stem final toneme is low or falling; (2) low-rising tonemes when following all Class I noun stems whose stem final toneme is high; (3) falling-rising tonemes when following all Class I noun stems whose stem final toneme is rising; (4) high-high tonemes when following all Class II noun stems.

Examples: kǎpǎtǎ 'bird' plus -tato 'trial' becomes kǎpǎtǎtǎtó 'three birds'; nā 'taro' plus -mati 'plural' becomes nāmátí 'many taros'; tǎnú (Class I) 'flea' plus -tate 'two' becomes tǎnútǎtě 'two fleas'; ápøkǎ (Class I) 'tree top' plus -ka?ka? 'conjunctive' becomes ápøkǎkǎkǎ? 'and a tree top'; òyétá (Class II) 'egg' plus -tate 'dual' becomes òyétátáté 'two eggs'; pǎ (Class II) plus -mati 'plural' becomes pámátí 'many fish'.

Suffix Class V consists of one suffix *-tanɕʌ* 'similar' and has: (1) low-high tonemes when following all nouns whose stem-final toneme is low or falling; (2) low-rising tonemes when following all nouns whose stem-final toneme is high; (3) falling-rising tonemes when following all nouns whose stem final toneme is rising.

Examples: *nà* 'house' plus *-tanɕʌ* 'similar' becomes *nàtànɕʌ* 'like a house'; *tànú* 'flea' plus *-tanɕʌ* 'similar' becomes *tànútànɕʌ* 'like a flea'; *pǎ* 'fish' plus *-tanɕʌ* 'similar' becomes *pàtànɕʌ* 'like a fish'.

Suffix Class VI consists of two suffixes which have: (1) low-falling tonemes when following all nouns whose stem-final toneme is low or falling; (2) high-low tonemes when following all nouns whose stem final toneme is high or rising. The suffixes in this Class are: *-pomo* 'dubitative'; *-poʔpoʔ* 'dubitative conjunctive'.

Examples: *nâ* 'taro' plus *-pomo* 'dubitative' becomes *nâpòmô* 'a taro?'; *nà* 'house' plus *-poʔpoʔ* 'dubitative conjunctive' becomes *nàpòʔpôʔ* 'and a house?'; *tànú* 'flea' plus *-pomo* becomes *tànúpòmô* 'a flea'; *pǎ* 'fish' plus *-poʔpoʔ* 'dubitative conjunctive' becomes *pápóʔpòʔ* 'and a fish?'.

3.2.3. Noun Suffixes Without Basic Tonemes which follow perturbed Noun Stems. Following perturbed noun stems, suffixes in suffix classes II, V, and VI have the same tonemes which they have when following unperturbed stem final high tonemes as in: *ɔwàtè* 'sick' plus *àtàtì* 'girl' plus *-po* 'question marker' becomes *ɔwàtè àtátípǒ* 'Is it a sick girl?'; *kɔwèʔ* 'good' plus *àtápá* 'yam' plus *-tanɕʌ* 'similar' becomes *kɔwèʔ àtápátànɕʌ* 'like a good yam'; *pɔtòɕʌ* 'blind' plus *àtè* 'woman' plus *-pomo* 'dubitative' becomes *pɔtòɕʌ àtépòmô* 'a blind woman?'.

Following perturbed noun stems, suffixes in suffix classes I, III, and IV have all high tonemes as in: *ɔwàtè* 'sick' plus *àtàtì* 'girl' plus *-ne* 'possessive marker' becomes *ɔwàtè àtátíné* 'the sick girl's'; *pɔtòɕʌ* 'blind' plus *àtè* 'woman' plus *-tate* 'dual' becomes *pɔtòɕʌ àtétáté* 'two blind women'.

NOTES

1. Awa is a New Guinea Eastern Highlands language, spoken by some estimated 1,200 people north and south of the Lamari river, Kainantu subdistrict. Awa belongs to the Kainantu group of languages including Tairora, Gadsup, Auyana, and Awa as the major representatives.
2. The material for this paper was gathered over a one and a half year residence at the village of Mobuta under the auspices of the Summer Institute of Linguistics. The author is indebted to Eunice Pike, Dorothy James, and Alan Pence for editorial help in preparation of this paper.
3. Except where examples of tonemes are given, low toneme throughout this paper will be unwritten.
4. The tentative analysis presented in Loving and McKaughan (1963) footnote 3, has here been re-aligned. What were there described as occurrences of medial voiceless stops are here presented as sequences of glottal plus stop. Thus initial voiceless stops and medial voiced stops and fricatives are treated as allophones.
5. Certain grammatical noun phrases which always have pause are not treated, since pause always interrupts the phonological phrase.
6. Words which occur in satellite positions in noun phrases will hereafter be referred to in this paper simply as satellite words.
7. The tone of these suffixes depends on the stem-final toneme which precedes them, and therefore the tonemes are not written when the suffix is listed in isolation.
8. This perturbation takes precedence over that described in the second paragraph of Section 3.
9. For ease of description we are giving basic tonemes of the stems.

CHUAVE PHONOLOGICAL HIERARCHY¹

JOYCE SWICK

0. Introduction.
1. Phonemes.
2. Syllables.
3. Phonological Words.
4. Pause Groups.
5. Morphophonemics.

0. INTRODUCTION

The purpose of this paper is to present a description of the Chuave² phonological hierarchy: phonemes (segmental phenomena), syllables, phonological words (including supra-segmental phenomena) and pause groups (including subsegmental phenomena). Each of these levels may be defined as a rhythm wave of the hierarchy.³ A rhythm wave in Chuave is a rhythm group which has absence or presence of nucleus or nuclei (peak or crest); it has initial and final margins; and it has prenuclear ascending and postnuclear descending slopes.⁴ A phone is a wave in a syllable, a syllable a wave in a *P*-word, a *P*-word is a wave in a pause group and a pause group is a wave in a phonological paragraph.

Analysis of Chuave phonology on the basis of contrast, variation and distribution has revealed what is pertinent at each level and how each level relates to subsequent levels.

Analysis on the pause group level is not exhaustive. Further research will undoubtedly reveal new types.

1. PHONEMES

1.1. Contrast. The nucleus of a phoneme is contrastive as to point and type of articulation. Employing three articulatory zones, consonants are shown in Chart A. Ranging from front, to central, to back, vowels are shown in Chart B.

Chart A

CONSONANTS

	<i>Bilabial</i>	<i>Alveolar</i>	<i>Velar</i>
Stops		t	k
	b	d	g
Fricatives	f	s	
Nasals	m	n	
Vibrant		r	
Semi-Vowels	w	y	

Chart B

VOWELS

	<i>Front</i>	<i>Central</i>	<i>Back</i>
High	i		u
Low	e	a	o

Consonant phonemes contrast in identical and analogous environment.⁵

/w/ v. /b/	/ewiúm/	'his saliva'	/ebiúm/	'his soap'
/w/ v. /f/	/wíro/	'you (2) come'	/fíro/	'you (2) go'
/f/ v. /b/	/féo/	'you fold'	/béo/	'you work'
/m/ v. /b/	/kamá/	'black'	/kabá/	'moon'
/n/ v. /d/	/néem/	'father of'	/déem/	'feces'
/t/ v. /d/	/táwa/	'here'	/dáwa/	'tree type'
/t/ v. /r/	/ditóo/	'you tell'	/díro/	'you (2) speak'
/t/ v. /s/	/tán/	'to lean'	/sán/	'digging stick'
/r/ v. /d/	/furó/	'I went'	/fudó/	'you break'
/m/ v. /n/	/gáam/	'skin'	/gáán/	'child'
/y/ v. /s/	/yúwa/	'name'	/súwa/	'place'

Vowel phonemes contrast in identical and analogous environments.

/e/ v. /i/	/enayé/	'I give'	/ináye/	'I put'
/e/ v. /a/	/kowiýé/	'stump'	/kowiýá/	'tongs'
/o/ v. /u/	/kóba/	'dish'	/kúba/	'stick'
/o/ v. /a/	/sumó/	'He hit?'	/sumá/	'He hit!'

1.2. **Variants.** All stops have a fortis variant P-word

initial and when they occur as second member of a consonant cluster. The *P*-word initial fortis variant of voiceless stops is aspirated. Intervocally, a lenis variant for each occurs, which for voiced stops, fluctuates in rapid speech with a voiced fricative. Each alveolar stop has a fronted variant *P*-word initial which fluctuates with the phonemic norm.

Examples:⁶ /b/ /bé/ [b_hé] 'to work', /dúmba/ [d_húmba] 'it is', /kabugá/ [k_habugá] [k_habugá] 'bird'; /t/ /táwa/ [t_háwa] [t_háwa] 'here', /kamúntagóme/ [k_hamúntagóme] [k_hamúntagóme] 'daytime'; /ewaitome/ [ewaitome] 'strong'; /d/ /dáwa/ [d_háwa] [d_háwa] 'tree type'; /ibíndome/ [ibíndome] [ibíndome] 'heavy'; /dumédo/ [d_humédo] [d_humédo] 'he talks'; /k/ /kabá/ [k_habá] [k_habá] 'moon'; /dénkábu/ [d_henkábu] [d_henkábu] 'mosquito'; /díkéme/ [díkéme] 'it's finished'; /g/ /goúme/ [goúme] 'it's gone'; /degobá/ [degobá] [degobá] 'sweet potato type'; /nígi/ [nígi] [nígi] 'dew'.

The voiceless bilabial fricative /f/ has one allophone [f]: /fí/ 'belt', /kamúnfége/ 'cloud', /wífaimé/ 'he sleeps'.

The voiceless alveolar fricative /s/ has [s] only: /súna/ 'middle', /mwiýúmsume/ 'it is hot', /ásúri/ 'sneeze'.

The bilabial nasal /m/ has one allophone: /mánsinóm/ 'ground', /konmori/ 'road', /káma/ 'black'.

The alveolar nasal /n/ has three allophones: [ŋ] fronted occurs syllable initial: /manóm/ [maŋóm] 'his mother', /néfínó/ [néfínó] 'Do you understand?'; [n] occurs syllable final: /erán/ [eřán] 'grass type', /sinbói/ [řinbói] 'to push'; [ŋ] occurs preceding vocoid velars: /ními súngwa/ [ními súngwa] 'it rained', /dungeró/ [dungeró] 'It stopped and ...'.

Consonants /m/ and /n/ have lengthened lenis variants when they occur *P*-word final.

The alveolar flap /r/ has one allophone [ř] only:⁷ /irirí/ 'bridge', /aró/ 'sun'.

Semi-vowels /w/ and /y/ have one allophone each: [w] /wéom/ 'tail', /áwom/ 'his father'; [y] /yai/ 'man', /té moyó/ 'thou stay'.

Each vowel has a lengthened variant when it occurs as the nucleus of a stressed syllable, and a lenis lengthened variant when it occurs *P*-word final: /komári/ [komá.ři.] 'before', /gémábo/ [gé.má.bo.] 'spider'.

Vowels are sometimes nasalized *P*-word final following a nasal consonant: /bwimé/ [bwimé] [bwimé] 'rotten'; /néfínó/ [nefínó] [néfínó] 'Do you understand?'.
 Vowel phonemes /i/, /u/ and /o/ each have a lower variant and /a/ has a higher variant [ʌ] which occurs preceding /n/ in a closed syllable. The phonemic norm occurs elsewhere: /ibíndome/ [ibíndome] 'heavy', /ararí/ [ařarí] 'long'; /sán/ [sán] 'digging stick', /kabá/ [kabá] 'moon'; /kamún/ [kamún] 'sky', /búna/ [búna] 'short'; /konmori/ [konmoří] 'path', /kóba/ [kóba] 'dish'. The mid front vowel /e/ has only one allophone [e] /fumé/ 'he is gone', /bebiye/ 'they (2) work'.

1.3. Distribution. The distribution of the phoneme may be described in terms of the syllable. A syllable is a rhythm wave consisting of a simple vowel nucleus with optional pre-*N* (C, Cw), and post-*N* (C), margins and is a point of potential stress placement.

There are five syllable types: CV, V, VC, CVC, and CwV (w represents labialization). Any consonant may occur in the pre-*N* C slot position in CV and CVC; only /b/, /m/, /k/, /g/ and /f/ occur in the C slot of CwV; only consonants /m/ and /n/ occur in the post-*N* slot in CVC and VC.

A single phoneme may occur as the highest level of the hierarchy. The phoneme /o/ 'yes', as spoken in isolation is simultaneously a phoneme, syllable, word and pause group.

Any vowel may occur as a syllable nucleus in any syllable type with the only restriction being the non-occurrence of /u/ in the CwV type. There are no limitations of two vowel sequences which may occur across syllable boundaries within the *P*-word. The following three vowel sequences have been recorded: nóai 'cough', kóiom 'wing', bíai 'old', yogamaíí 'them', kamdiaú 'blue sky', bóie 'to cut'.

In some of the vowel sequences across syllable boundaries, an intervening /w/ or /y/ contrasts with its absence: ké.a 'bamboo type', ke.wá 'lamp'; fe.ó 'you fold', fe.í.yó 'you (two) fold'; kó.i.om 'wing', ko.i.yóm 'navel'.

Across syllable boundaries, consonant clusters which may occur consist of /m/ or /n/ plus any other consonant except the following combinations: /nw/, /nt/, /nn/, /nr/, /ny/, /mm/, /mr/, /mn/, and /my/. /mt/ kámtagóme 'daytime', /mk/ eraromgámkwoingwa 'green', /mb/ dúmba 'it is', /md/ kurákáamdume 'he is angry', /mg/ kurákáamgoúme 'he is not angry', /mf/ káamfi 'to be sorry', /ms/ mwiýumsúme 'it is hot', /mw/ ninumwí 'ice'; /nk/ wánkan 'to walk and look', /nb/ sínbói 'to push', /nd/ kaándo 'look and...', /ng/

dungeró 'it is and...', /nf/ kamúnfége 'white sky', /ns/ mansinóm 'earth', /nm/ kánmoyé 'to look and stay'.

2. SYLLABLES

2.1. Contrast. The five Chuave syllable types contrast as to relationship of nucleus to pre-N and post-N margins.

(1) V consists of a simple vowel nucleus: imé 'he put', óri 'large', í 'this'.

(2) VC has a simple vowel nucleus with optional pre-N and post-N margins: oóngo 'tomorrow', bián 'twine type', wiúmbiai 'husband'.

(3) CV has a simple vowel nucleus with an obligatory pre-N margin. This pattern is the most frequent: bó 'sugar', kabá 'moon', énugú 'smoke'.

(4) CVC consists of a simple vowel nucleus with obligatory pre- and post-N margins: kán 'string', munmaní 'many', kibám 'his shoulder'.

(5) CwV has a simple nucleus with an obligatory labialized pre-N margin: fwi 'salt', édongwá 'fire', súngwamé 'he has fought'.

2.2. Variants. Syllables that occur in *P*-word nuclear position are characterized by stress, high pitch, slight intensity and lenis length. Non-nuclear syllables are stressless, are neutral in pitch which ranges from low to mid and are relaxed and non-lengthened. A non-nuclear syllable has lenis length when it occurs *P*-word final. An extra-high pitch variant occurs with a double stressed geminate vowel cluster across syllable boundaries. A syllable has lengthened variants depending upon how many syllables compose a *P*-word. A one syllable word may be as long or nearly as long as a polysyllabic word at substitution points within a pause group.

2.3. Distribution. The distribution of the syllable may be described in terms of the *P*-word. A *P*-word is a rhythm wave with an obligatory simple or complex nucleus determined by the stressed syllable or syllables. The optional pre-N slope is slightly accelerated with crescendo⁸ and has a slight rise in pitch and the obligatory post-N slope has decrescendo and a gradual decline in speed, intensity and pitch with the final margin characterized by lenis length of final syllable. A *P*-word may be comprised of from one to eight syllables. All syllable types have been observed in

one syllable words and in all positions in two, three and four syllable words.

3. PHONOLOGICAL WORDS

3.1. Contrast. *P*-words contrast in Chuave as to stress placement. (See Section 2.2. for features defining stress.) There are as many potential stress placements in a *P*-word as there are syllables. Every *P*-word must contain at least one stressed syllable. In describing stress patterns, *v*. is used to represent a syllable.

All one syllable *P*-words are stressed when pronounced in isolation.

Two syllable *P*-words have the following patterns: (1) *v.v.* *kúba* 'stick'; *báre* 'to kick'. (2) *v.v.* *kubá* 'bamboo type'; *toró* 'to cut'. (3) *v.v.* *dúdí* 'insane'.

Three syllable *P*-words may have the following patterns: (1) *v.v.v.* *nímbigá* 'leak'; *gíngódí* 'to snore'. (2) *v.v.v.* *yágóri* 'eagle'; *ágúre* 'to hold'. (3) *v.v.v.* *áurom* 'mole'; *wánmoi* 'to live'. (4) *v.v.v.* *noníki* 'year'; *ewísi* 'to spit'. (5) *v.v.v.* *amámó* 'yam type'; *tabásí* 'to clap'. (6) *v.v.v.* *kiarí* 'fence'; *kuneí* 'to steal'. (7) *v.v.v.* *énugú* 'smoke'; *tóyadi* 'to pour'.

Four syllable words may have the following patterns: (1) *v.v.v.v.* *kábúóri* 'flute'. (2) *v.v.v.v.* *kúriabá* 'bird type'. (3) *v.v.v.v.* *ónosúná* 'night'; *géogéó* 'to knock'. (4) *v.v.v.v.* *kámabanóm* 'talk'; *ágomai* 'to hold'. (5) *v.v.v.v.* *kobónbumbé* 'butterfly type'; *amiagé* 'to yawn'. (6) *v.v.v.v.* *binówíom* 'his hair'; *beifuró* 'to work and go'. (7) *v.v.v.v.* *kamúnfége* 'white sky'; *moitéfo* 'to stop and go'. (8) *v.v.v.v.* *kobónbea* 'kangaroo type'; *kegóboi* 'to whistle'. (9) *v.v.v.v.* *tobaróbá* 'butterfly type'; *koiyósí* 'to tie'. (10) *v.v.v.v.* *korowaré* 'chicken'; *megubaú* 'to retch'.

3.2. Variants. Pitch on-glide and off-glide slopes toward the nucleus of the *P*-word are often lost on the pause group level, particularly in unstressed to stressed sequences: *gaán* [gán] 'child', *oóngo* [óngol] 'tomorrow'.

A *P*-word has lengthened variants which depend upon how many *P*-words compose the pause group. *P*-words in a long pause group are shorter and are longer in a short pause group.

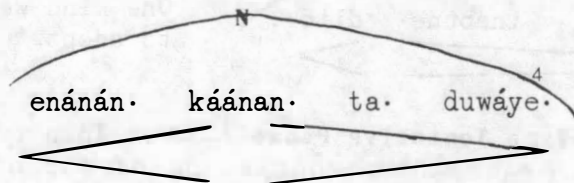
Polysyllabic *P*-words with the same number of syllables have a timing variant according to sequence of syllable type. A *v.v.* sequence is shorter in timing than a *CV.CV.* *goiyóm* (*CV.V.CVC.*) 'old'; *onobá* (*V.CV.CV.*) 'snake'.

3.3. Distribution. The distribution of the *P*-word may be described in terms of the pause group. A pause group is a rhythm wave with absence or presence of a nucleus which is an over-riding stress on one of the lexical stresses as a point of emphasis. In some pause groups the nucleus is indeterminate. The margins of pause groups are well-defined and produce contrastive types of pause groups. *P*-words occur in all positions in a pause group.

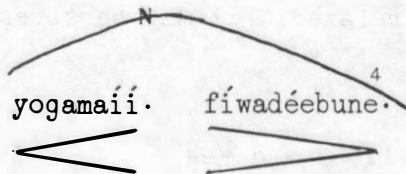
4. PAUSE GROUPS

4.1. Contrast. Pause groups contrast as to final and three types of tentative pause. They are: (1) Final Pause; (2) Narrative-Continuation-Type Tentative Pause; (3) Anticipation-Type Tentative Pause; (4) Hesitation-Type Tentative Pause. The optional pre-N slope of each of the pause group types is characterized by a crescendo, a rise in register and an acceleration over a series of words. The presence of a nucleus is characterized by a peak which is the longest, loudest, and highest syllable in the pause group. Absence of nucleus is a smooth transition from the pre-N slope crescendo to the post-N slope decrescendo. The pause groups are identified by contrastive post-N slopes.

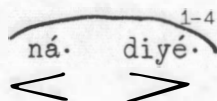
4.1.1. Final Pause /·/. The post-N slope of the final pause is a decrescendo wave over a series of words ending with a word final non-stressed syllable with low pitch⁹ or a stressed syllable with high and falling pitch. There is deceleration with a gradual decline in speed and intensity with length and relaxation. A nucleus is indicated by N.



'All right, I
would like to
give a talk.'

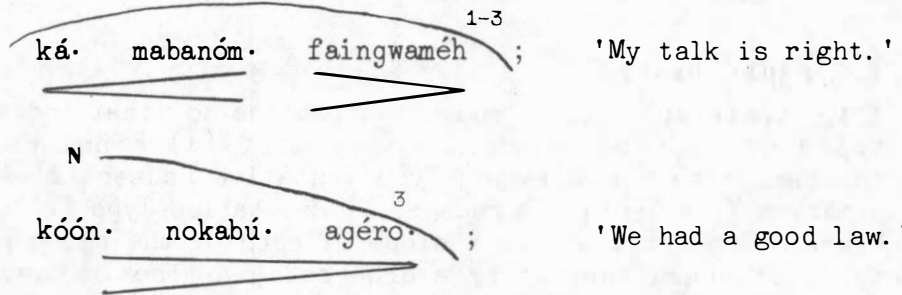


'We were happy
when they came.'

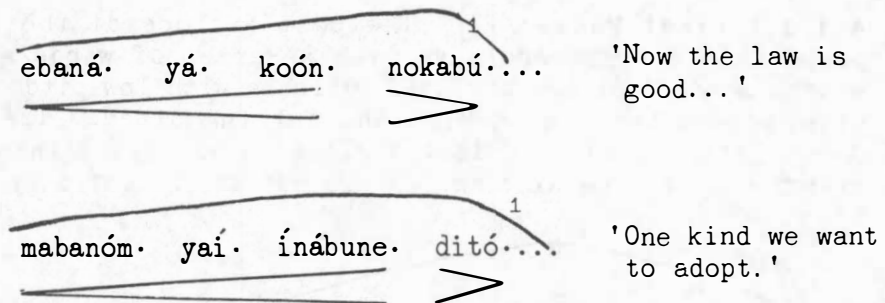


'I talk.'

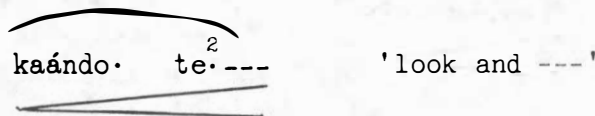
4.1.2. Narrative-Continuation-Type Tentative Pause /;/. The post-N slope of this tentative pause type is a ballistic decrescendo (fast fade or decline) usually over a shorter series of words with non-relaxation in contrast to decrescendo of final pause with relaxation. There is devoicing and a slight downglide on the final syllable when stressed. Non-stressed syllable final is neutral in pitch.

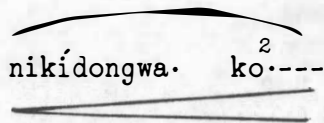


4.1.3. Anticipation-Type Tentative Pause /.../. This type of tentative pause group has the same ballistic decrescendo in the post-N slope as described in the preceding pause group but syllable final is always stressed with accompanying high pitch and slight length but is non-relaxed.



4.1.4. Hesitation-Type Tentative Pause /---/. This type is usually a minimal pause group consisting of one or two words. The post-N slope is a lengthened final syllable without decrescendo and non-relaxed. It may be stressed or non-stressed.




 níkídongwa. ko²---- 'half was bad ----'

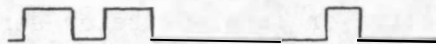

 kogonán¹---- 'work ----'

4.2. Variants

4.2.1. Voice Quality Variants.¹⁰ Within the contrastive pause group types there are variants due to voice quality and register depending upon the attitude of the speaker. This sub-segmental analysis has further substantiated the multiple stress hypothesis for Chuave since characteristic contrastive pitch patterns may be lost but stress is maintained on the basis of intensity and length. Lines below the word indicate low pitch register; above the word, high pitch register; on the word, mid or normal pitch register; extra high above the word, extra-high pitch.

(1) Disapproval or disdain - a very low pitch register with near laryngealization:

koón níkídongwa ko agéro te



'We still held our bad way of life.'

(2) Excitement, approval, elation - the pause group rises to a high pitch register.

yogamáí yuropín yogamáíí béimoibúne díre

'We gathered and talked and ...'

(3) Narrative - the pitch register is normal - mid.

ebehá kabá namba tú muni nónígi káam 62

'It is now February, 1962.'

(4) Extreme anger or panic (usually found in conversation) approaches a falsetto with loss of pitch contrast.

noón éa kwingwá ú súna umé
'Whose pig came to my garden!!!!!!'

4.2.2. Pre- and post-N Slope Variants. There are lengthened variants of pre- and post-N slopes depending upon the position of a nucleus in a pause group. There is a nucleus in each of the following pause groups signalled by a double stressed geminate vowel cluster.

^N
kóón nokabú agéro 'We had a good law.'

^N
enánán káánan ta duwáye 'All right, I would like
to give a talk.'

^N
té ebená yáá '... and now ...'

4.3. Distribution. The distribution of the pause group may be described in terms of the phonological paragraph. A *P*-paragraph is the largest wave within the phonological hierarchy of Chuave. A nucleus is indeterminate. The pre-N slope may be either a tentative or final pause or series of pauses but a *P*-paragraph closes only with a final pause group. Features marking the pre- and post-N slopes of the *P*-paragraph are exaggerated features of the slopes of the final pause group. There is a decrescendo over the terminal pause group with pitch lower than any other point in the *P*-paragraph with length, relaxation and exaggerated pause. A subsequent *P*-paragraph is indicated by crescendo, a marked rise in register and acceleration over the initial pause group.

Text: (*P*-paragraph, pause group, and *P*-word are abbreviated as *P-p*, *p-g*, and *P-w* respectively.)

P-p _____

p-g > < > < > < > < > < > < > < > < > < > < >
P-w < > < > < > < > < > < > < > < > < > < > < > < >
 te² koón óri nokabú¹ ... ímaridénoinga no kaándo te mirinóm gáworóga mógomé.³⁻⁴
 and law big good show-comp.-us-dep. vb. we looked and stomach-ours small came up-it.

P-p _____

p-g > < > < > < > < > < > < > < > < >
P-w < > < > < > < > < > < > < > < > < > < > < >
 Mirinóm mógongoró yogamaí yúrópín yogamaíí áma fíwadéebune.⁴
 stomach-ours came up-dep. vb. they European they both hear-happy-comp.-we.

Translation:

... of a good law the Europeans told us; we listened and were pleased.
 We all were happy as we heard.

5. MORPHOPHONEMICS

5.1. Nouns. Stress perturbation does not occur across *P*-word boundaries but within the *P*-word as a result of suffixation. When two, three and four syllable nouns are suffixed to show possession, the antepenult syllable of the stem retains its stress or non-stress but the stress of the ultima perturbs to that of the penultimate. If as a result of perturbation the two final syllables of the stem are stressed, the possessive suffix has a geminate vowel cluster with stress on the first vowel. If the two final syllables of the stem are unstressed, the possessive suffix has a single vowel and is stressed:

kóba 'dish'	ná kóbánám 'my dish'
kubá 'bamboo'	ná kubanám 'my bamboo'
kabuǵá 'bird'	ná kabuganám 'my bird'
nímbigá 'leak'	ná nímbigánám 'my leak'
kábúóri 'flute'	ná kábúorínám 'my flute'
korowaré 'chicken'	ná korowarenám 'my chicken'.

The perturbation is the same for all person suffixes.

If a noun stem terminates with a double stressed geminate vowel cluster, a reciprocal perturbation takes place: the double stress of the stem perturbs to non-stress, losing the final vowel syllable, and the suffix perturbs to a double stressed geminate vowel cluster:

kawíí 'grass skirt'	ná kawináám 'my skirt'
sanobíí 'knife'	ná sanobináám 'my knife'.

5.2. Verbs. On verb stems, the majority of stress patterns are non-perturbed and non-perturbing. Of those with which perturbation does occur, some conditioning factors are phonological and some are morphological.

5.2.1. Phonological Conditioning. In two syllable verb stems, there is a phonological conditioning of patterns *V.V.* and *V.V.* each perturbing to *V.V.* when suffixed by an unstressed first order suffix among other suffixes:

báre 'to kick'	barenangeró 'He will kick first.'
toró 'to cut'	toronangeró 'He will cut first.'

There is a reciprocal perturbation if a verb stem terminates with a double stressed geminate vowel cluster: the double stress perturbs to the first suffix and the stem perturbs to non-stress, losing a verb stem final syllable: *káamfíí* 'to be sorry', *káamfinááye* 'I will be sorry'.

5.2.2. Morphological Conditioning. When the suffixes *-yé*

(stative aspect), -*nó* (interrogative mode), and -*ró* (dependent verb indicator) occur contiguous to a verb stem with the patterns of *V.V.* or *V.V.V.* the stem perturbs to *V.V.* and *V.V.V.* respectively.

	- <i>yé</i> <i>stative</i>	- <i>nó</i> <i>interrog.</i>	- <i>ró</i> <i>dep. vb. ind.</i>
Class			
báre	baré- <i>yé</i>	baré- <i>nó</i>	baré- <i>ró</i>
'to kick'	'I kick'	'Do you kick?'	'I kick and...'
tóyadi	tóyadi- <i>yé</i>	tóyadi- <i>nó</i>	tóyadi- <i>ró</i>
'to pour'	'I pour'	'Do you pour...?'	'I pour and...'

If another suffix occurs between the stem and any of these suffixes, the perturbation does not take place.

tóyadi 'to pour' tóyadi-*nó* 'Do you pour?'
tóyadi-*ké-dé-nó* 'Did you not pour?'

NOTES

1. This paper supercedes *Chuave Phonology*, 1962, Wolfenden and Swick, unpublished.

2. Chuave is spoken by some 19,000 persons living in the Eastern Highlands District of Australian New Guinea. The analysis here presented is based on the dialect spoken at Gomia No.1, a village near the Chuave Patrol Station, forty-four miles southwest of Goroka. Wurm (1961) classifies the language as a member of the Hagen-Wahgi-Jimi-Chimbu language family, and the Chimbu-Chuave sub-family. It is bordered by related languages Sinasina, Dom and Nomane, as well as unrelated languages Gimi and Siane.

This paper was prepared following eighteen months field work under the auspices of the Summer Institute of Linguistics between July 1960 and October 1962. The main informant was Waiwo, a youth about eighteen years old.

For helpful criticism and suggestions regarding the stress analysis, I am indebted to K.L. Pike, University of Michigan and E. Pike, Summer Institute of Linguistics. I am also indebted to my husband, Ronald Swick, for grammatical analysis and editorial suggestions. Appreciation is also expressed to SIL colleagues E. Wolfenden (Philippine Branch), A. Pence, and D. James for their assistance.

3. "Practical Phonetics of Rhythm Waves", Pike, 1962, has been particularly helpful in the analysis of Chuave high level phonology.

4. Pre-nuclear and post-nuclear are hereafter referred to as pre-N and post-N. Phonological word and phonological paragraph are *P*-word and *P*-paragraph.

5. It is not possible at this point to predict in detail the influence that loan words from Neo-Melanesian may have upon the Chuave phonemic system. Loan words are used frequently by many speakers, simultaneously with the vernacular equivalent, but the majority of the speakers fully accommodate these words to the system described in this paper.

Possible introductions are: (1) phoneme /p/, filling an obvious gap in the system - /pepa/ 'paper', /kap/ 'cup';

(2) phoneme /l/, /luluai/ (řuřuai) 'village leader';
 (3) /t/, /k/, /f/, /s/ and /r/ as syllable codas.

6. Some of the symbols used throughout this paper are: /·/ syllable division occurring between phonemes; /' / acute accent over the vowel indicates a stressed, nuclear syllable; C̣ fortis consonant; C̣ lenis consonant; C̣ fronted consonant; C^h aspirated consonant; Ṿ nasalized vowel; V· and C· lengthened vowel or consonant.

7. The occurrence of a lateral flap (ľ) has been noted in four instances contrasting in analogous environment with vibrant (ř). Because of its infrequency, we are not treating the lateral flap as an additional phoneme. With some speakers, fluctuation has been noted in these four instances with vibrant.

8. Crescendo, symbolized by <, is an increase in intensity of voicing. Decrescendo, symbolized by >, is fade or decay of voicing.

9. Relative pitch is marked over the syllable: 1 high, 2 mid, 3 low, and 4 extra low.

10. Pike (1959, p.45) defines voice quality as a sub-segmental item which is internally structured.

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KUNIMAIPA PHONOLOGY: HIERARCHICAL LEVELS

ALAN PENCE

0. Introduction.
1. Phonological Sentence.
2. Phonological Phrase.
3. Phonological Word.
4. Syllable.
5. Phoneme.

0. INTRODUCTION

This paper is a description of the Kunimaipa phonological system in terms of a hierarchy of levels.¹ On each level, units which occur are described in relation to units with which they contrast, their internal modes of variation, and their distinctive distribution. Each level is seen as having units which are in turn distributed on higher levels.² A full expansion of the system is seen in the example (extracted from text),

gi; zaqar so; got / e; teagan; bon / na; egar ora; eg //

'Going to inspect (the traps) he saw nothing; they were empty.'

The whole is a phonological sentence (//). It is subdivided into three phonological phrases (/), six phonological words (double space), and numerous syllables and phonemes. Pitch is marked by solid and broken lines: high pitch above the letters, mid pitch below the letters, and low pitch considerably below the letters.³ Solid lines indicate crucial pitch points; dotted lines indicate non-focal or fluctuating pitches.

In other examples a single syllable or segment may occur as the highest level of the system. The phoneme /e/ occurs as a syllable. When spoken in isolation with intonation and other features,

e; // 'yes',

it is a phonological word and simultaneously a phonological

phrase and phonological sentence.

Intonation (described in Pence 1964)⁴ is considered to be an independent system, closely related to the hierarchy treated in this paper.

To facilitate description, levels of the hierarchy will be taken up in descending order. The analysis is made in terms of aural perception, and is in some respects tentative and incomplete.⁵

1. PHONOLOGICAL SENTENCE

It might be possible to postulate a level of the Kuni-maipa phonological hierarchy above phonological sentence. It has been noted that texts are spoken in a series of gradually dropping pitch groupings (based on observation of peak pitches). These groupings are larger than the phonological sentence. If such a level of the hierarchy were to be postulated (phonological paragraph?), it would be defined as beginning high pitched and dropping throughout. By this analysis each time a general pitch range change is made from low to high, a new unit begins. This has not been investigated in detail, and will not be pursued further.

Phonological sentence (hereafter *P*-sentence) is defined by borders rather than nuclei. The terminus of the unit is marked by one or more of the following features: (a) glide of high and low intonemes on the final syllable to either extra high pitch or extra low (extremes of the register); (b) lengthening of a final vowel or consonant; (c) fast decrescendo (ballistic) on the final syllable; (d) pause following the final syllable. The beginning syllables of a *P*-sentence are faster than a preceding *P*-sentence final syllable.

No contrastive *P*-sentence types are distinguished. Variants of the single type observed are those conditioned by high, mid, and low intonational pitches, and glides between them (described in 2.).

bedep // 'a wild one'

ka:rom pa:ruparo pot taga:pug // 'Across there they all
did this...'

pim:gipizotanaŋ ma:in // 'With his vegetables, singly'

po:boz ne:tib ok gaog // 'So I told this story.'

2. PHONOLOGICAL PHRASE

The nucleus of the phonological phrase (*P*-phrase) occurs on its last syllable (unless that syllable is voiceless), or occasionally on two final contiguous *V* syllables. The nucleus is obligatory to the occurrence of the *P*-phrase. There are ten nucleus types, determined by occurrence of any of the following pitch levels and glides on the nuclear syllable: high, mid, low, high-low, high-mid, mid-low, mid-high, mid-high-low, high-high-low, and mid-low-mid. These pitches occur depending on the attitude of the speaker, and are phonologically contrastive. Borders of the *P*-phrase are marked by either of the following features which distinguish it from *P*-sentence: (a) controlled decrescendo on the final syllable which begins very late in the syllable; (b) variants of pitch patterns which are different from those which occur at *P*-sentence boundaries (i.e. non-extreme variants of high and low intonemes). Pause and length of final syllable may also occur at a *P*-phrase boundary.

te: pelabosik / 'at the wall'
 te: pelabo:sik / 'at the wall'
 te: pelabo:sik / 'at the wall'
 te: pelabos:ik / 'at the wall'
 te: pelabos:ik / 'at the wall'
 te: pelabo:sik / 'at the wall'
 te: pelabo:s,ik / 'at the wall'
 te: pelabo:s,i:k / 'at the wall'
 te: pelabosika / 'at the wall'
 te: pelabo:sika / 'at the wall'

All syllables in a *P*-phrase before the nucleus are optional in occurrence and are termed prenuclear. There are four pitch patterns which occur on prenuclear syllables: mid-high (stepping), low-high (rising), high-low (falling), and mid-mid (level).

na: raere:tot / 'It won't be folded.'
 nara: ere:tot / 'It won't be folded.'

nar:aeretot / 'It won't be folded.'

naraaeretot / 'It won't be folded.'

In addition to the occurrence of prenuclear patterns with nuclear patterns (resulting in numerous contrastive phrase types), various sequences of prenuclear pitch patterns have been observed attached to a single nucleus. The example,

ga:boetai +ete:gan / 'Turning he saw her...'

shows a sequence of a stepping prenuclear (so named because of the up-step from mid to high) followed (+) by a rising prenuclear followed by a high nuclear pattern. Of the 16 possible sequences of two prenuclear patterns that are possible, 11 have been observed. Sequences of three prenuclear patterns occurring as satellites to a single nucleus are fairly common, and sequences of four have been observed (no example given here).⁶

po:ek det +gela:gapug / 'up there he climbed...'

po:boz +ano:gon / 'So I told you this and...'

nimot bobai +e:mooga:pug / 'They came to get your things...'

ka:rom +pa:ruparo pot +taga:pug // 'Across there they all did this...'

This system gives a nearly unlimited potential number of contrastive *P*-phrase types; however, probably only about 50 of them have been actually observed. Pence 1964 gives a full description of details of this intonation system.

3. PHONOLOGICAL WORD

Phonological word (*P*-word) in Kunimaipa is defined by nuclear stress, CV pattern, timing regularity, and juncture characteristics.

3.1. Placement of the *P*-word nucleus (and thus stress) is dependent on CV patterns. Each *P*-word has a nuclear syllable. On words longer than one syllable, this is the syllable closed by the final C; or on *P*-words which end in a sequence of contiguous V syllables, on the last of those syllables. Stress (heard as slight length or slight intensity, or both) occurs on the nuclear syllable.

líb 'ashes'
 lopót 'centre'
 goulosakár 'both'
 máop 'owner'
 mabábo 'red'
 mutitáé 'pea'
 nakái 'near'
 teteuá 'type of marsupial'

Non-contrastive, fluctuating word stresses have been noted on syllables which carry intonational high pitch, following fortis consonants, on low vowels (a, o, e), and on sequences of contiguous vowels. In fast speech these etic stresses tend to disappear.

3.2. *P*-words may end in any of the four syllable types (V, CV, CVC, and VC); however, CVC and VC syllables occur only at *P*-word boundaries. Thus grammatical words with internal CVC or VC syllables constitute more than one *P*-word. In text occasionally two grammatical words are spoken as one *P*-word.

dédkaeé 'type of banana'
 gorótñaur 'type of snake'
 mitmitip 'mosquito'

3.3. *P*-words occur with a feature of timing regularity. Regardless of number of syllables, *P*-words within a *P*-phrase tend to occur with similar lapsed time. Those with a large number of syllables are condensed into about the same amount of time as *P*-words with fewer syllables (one and two syllable *P*-words are drawn out). Occasionally syllables are omitted as timing requirements are met. There is some variation in this timing, which is fluid and in no way exact; however, phonological word boundaries may be partially identified in text by observation of it.

3.4. Juncture characteristics of the *P*-word have been studied both in text, and with the use of elicited minimal or near minimal utterances differing in juncture placement. In fast speech *P*-word junctures are extremely difficult to identify, and many of the characteristic features may be absent. At medium speed, the following features of *P*-word juncture have been noted: (a) a *P*-word final syllable is longer (the final segment is lengthened) than a following *P*-word initial syllable, usually as much as a full mora; (b) a pitch pattern change, prenuclear or nuclear, may occur at *P*-word juncture; (c) a rhythm change may occur at this

point, slow to fast or fast to slow; (d) decrescendo followed by crescendo often occurs at *P*-word juncture; (e) a non-phonemic transition vocoid occurs *P*-phrase medially following a *P*-word final dental or alveolar consonant (/s/, /t/, /d/, /r/, /z/, /l/, /n/) when the succeeding *P*-word begins with /b/ or /g/. This transition vocoid is always mid central in quality and is very lenis.

piḡ olag 'It was he who wiped it.'
 pi golag 'He filled it.'
 gobitanan 'with the tall grass'
 agob bitapan 'He will chop lots of it.'
 itinadakar ḡadag 'Two fires are burning.'
 itinad kar ḡadag 'The fire is burning well.'
 det ḡelagapug 'He climbed up...'
 nim bir bak tenipug 'You did your traps...'

3.5. Three contrastive word types are set up in Kunimaipa on the basis of CV patterns of the nuclear syllable. Type I *P*-words have nuclear syllables which are alternate CVC or CV; type II *P*-words have nuclear syllables which are either VC or V; type III *P*-words have nuclear syllables of two shapes: those which are always V, and one syllable CV *P*-words.

Each *P*-word ending in a consonant has a variant ending in a vowel (which has been added). Such final vowels may be of any of the five vowel qualities. They are phonemic (minimal contrast occurs) but optional in occurrence. They occur only in emphatic speech (and are non-obligatory there); they are limited to *P*-sentence final position, and they may occur voiceless or voiced. They produce pattern fluctuation in the nuclear syllables of types I and II.

Type I examples:

tepelabos, tepelabosi 'wall'
 bip, bipu 'offspring'
 abar, abara 'sky'
 boteb, botebo 'powder, lime'
 tiz, tiza 'Pull it out.'

Type II examples:

reip, reipi 'we two (excl.)'
 goer, goera 'small thing'
 titiat, titiati 'head dress'
 rouaez, rouaeza 'Stand up.'
 eb, ebe 'here'

Type III examples:

ba 'Take it.'

raie 'bow'
 gapanabezai 'afternoon'
 i 'right here'

P-words of from one to eleven syllables occur:

bap 'spike'
 geber 'digging stick'
 telebas 'nail, hoof, claw'
 gabareneg 'He certainly put it in.'
 qarabagasik 'at the groove'
 gapanabezai 'afternoon'
 lelamaribunarj 'with his two relatives'
 boloi boloiqariḅ 'two crickets'
 kuraivauraiqariḅ 'two butterflies'
 belagalaizumarezaro 'two rainbows'
 belagalaizumarezaronarj 'with two rainbows'

3.6. *P*-words are distributed primarily into *P*-phrases. Any of the three types of *P*-words may occur in initial, medial or final position in a *P*-phrase.

4. SYLLABLE

Kunimaipa has four syllable types: V, CV, VC, and CVC. These are summarized by the composite formula: (C) V (C) (the obligatory nucleus is optionally preceded by onset and optionally followed by coda). Syllable margins are indeterminate. In a sequence of syllables, peaks of intensity could be considered nuclei and slight decrescendo points between them the margin areas. A sequence of vowels is considered a sequence of syllables.

e 'yes'
 a.ma.i 'mother'
 na 'Eat.'
 le.les 'seed'
 em 'Come.'
 ma.ot 'again'
 men 'Cut it.'
 re.deḅ 'painting, decoration'

Syllables vary non-contrastively in length according to their placement in the *P*-word. Those occurring in nuclear position are lengthened; those in non-nuclear position are shorter.

The four syllable types may be divided into two classes on the basis of their occurrence in the *P*-word. CV and V syllables occur initially, medially, and finally in the *P*-

word; types VC and CVC occur only finally. Within the limits of this restriction, all other sequences of two syllables may occur in the *P*-word.

a.u 'amazement, surprise'
 i.bo 'water'
 e.nar 'axe'
 u.as 'lightening'
 ba.e 'what (reply)'
 be.la 'Put into (bag).'
 ne.keb 'egg, abdomen'
 ta.et 'hair, feather'

P-words of up to eleven syllables in length have been observed (see examples in 3.5.). There are no apparent restrictions on the sequences of CV and V syllables that may occur; however, sequences of more than four consecutive V syllables are improbable.

u.eb 'blood'
 po.i.e.ta.par 'tapioca'
 pu.a.u 'bladder'
 ta.i.e.u.a 'type of bird'
 pu.lor 'forest, jungle'
 u.le.rip 'worm'
 ba.ri.si 'whet stone'
 ri.ri.ɲas 'step, stile, bridge'
 ma.ok 'new, fresh, unfinished'

In a sampling of text, 60% of the syllables were of CV type; 25% were of CVC type; 9% were of V type, and 5% were of VC type. This indicates that the predominant *P*-word pattern is a sequence of consecutive CV syllables closed with a final CVC syllable. An occasional *P*-word closes with a V, VC, or CV syllable, and an occasional *P*-word contains a medial or initial V syllable.

5. PHONEME

Kunimaipa has fifteen consonant phonemes occurring at bilabial, dental, alveolar (including retroflexed) and velar (including backed) points of articulation. Obstruents (rows 1-3 on Chart A) contrast in voicing, in distribution of allophones, and in point and manner of articulation. They have a large number of conditioned and freely varying allophones, the fricative and affricate ones of which occur most frequently. Certain of the consonants have overlapping allophones. The dominant factor in conditioning of consonant and vowel allophones is position in the *P*-word

or *P*-phrase rather than contiguous segments. Vowels occur at front, mid, and back positions in high and low tongue heights. Each of the consonants except one has wide distribution. Consonants are slightly more frequent in occurrence than vowels, with the backed velar consonant the most frequent of them.

Chart A
PHONEMES

p	s	t	k
b	d	r	g
ɸ	z	l	ŋ
m		n	
i			u
e	a		o

5.1. Contrast. In *P*-word initial position contrast between /b/ and /ɸ/ is neutralized. Only the phone [b̥] occurs there. In medial and final positions [b̥] [b̬] [bb̥] [b̬] [ɸ] [w̥] and [w̬] occur. These medial and final phones are di-

vided into two phonemes, the main contrast between which is fortis vs. lenis. On the surface it might seem appropriate to assign initial [b̥] to medial and final /ɸ/ (throughout the paper written /b/). However, variation and factors of distributional frequency suggest the combination of the initial fortis stop with the lenis phoneme: (a) *P*-word initial [b̥] when occurring *P*-phrase medially occurs as a lenis fricative except following /p/ and /m/. In fast speech even in these environments, the lenis fricative occurs. Thus by this analysis we avoid a very complicated and almost unpredictable morphophonemics. (b) By the present analysis, the phoneme /ɸ/ has a fairly even (and frequent) distribution in all positions, and the phoneme /b/ is correspondingly rare in the positions in which it occurs. The voiced stops /d/ and /g/ are also rare.

Bilabial phonemes contrast in the following examples: pap 'unable', ɸap 'spike', map 'all'; gapez 'type of snake', mabes 'climbing ring', mabas 'red thing', lamab 'sickness'; apet 'breast', abar 'sky', abas 'garden', emap 'He will come.'.

Dental and alveolar consonants contrast in the following examples: *sagan* 'He went and...', *taŋar* 'tongue', *daŋar* 'weapon', *raŋiz* 'Light it.', *zaŋig* 'in the excreta', *laŋaŋ* 'He trimmed it.', *naŋaŋ* 'He told me.', *eser* 'type of arrow', *etek* 'You will see.', *edek* 'You will demolish.', *erek* 'You will come down.', *ezeŋ* 'You will pierce.', *elek* 'You will cut.', *enar* 'axe'.

Velar obstruents have the following contrasts:

(a) /k/ contrasts with both /g/ and /g̊/ in that it is always voiceless. Voiceless allophones of the other two phonemes occur only in fluctuation with voiced ones *P*-phrase finally.

(b) Both /g/ and /g̊/ are usually stops *P*-phrase initially. Although /g/ is usually a stop and /g̊/ is usually a fricative *P*-phrase medially, they sometimes overlap in this characteristic. In most positions /g/ is fortis and /g̊/ is lenis; however, the main contrast between them is point of articulation (/g̊/ is backed).

Velar consonants contrast in the following examples: *karom* 'across there', *garoŋ* 'point', *garar* 'arrow tip', *ŋarabagas* 'crack'; *eker* 'sport', *tegaŋ* 'female', *teger* 'scratch', *eŋap* 'toe'.

The nasal consonants contrast in the following examples: *map* 'all', *nap* 'one person', *ŋaip* 'angry one'; *emaŋ* 'He came.', *enas* 'knife', *eŋas* 'leg'; *am* 'same', *an* 'Give us.', *aŋ* 'Tell us.'.

The five vowels contrast in the following examples: *irig* 'down there', *eraŋ* 'He came down.', *araŋ* 'He flew.', *oraŋ* 'He slept.', *uraŋ* 'He hit it.', *niŋ* 'you yourself', *neŋ* 'I myself', *naŋ* 'He ate.', *noŋ* 'I ate.', *mumuŋ* 'whole'.

5.2. Variation

5.2.1. Consonant Variants.

In this section consonant phonemes are described in groupings according to manner of articulation. Chart B shows the major contoid phones which, because of overlap, are grouped according to the phonemes of which they are a part. In each of the cases of overlapping allophones, the voiced phoneme has a *P*-phrase final or *P*-word initial voiceless allophone which varies freely with the voiced one. This treatment is intended to cover the major contoid phones, and not necessarily to be exhaustive.

Chart B
CONTOID PHONES

p ph
pp p̥

ṣ tṣ ṣv

t th
tθ

k kh ḳ kḥ
kx x ḳx x̣

ḅ
ḅ̣

ḍ ṭ
ḍ̣ ṭ̣

ṛ̌ ɣ̣
ṭṛ̌ ṛ̣̌ ɣ̣̣

g̣ ḳ
g̣̣

ḅ
bḅ̣ ḅ̣ p̣̣
ẉ̣ ẉ̣

ḍẓ ẓ̣ ṣ̣
ỵ̣

ḷ ḷ̣
dḷ ḷ̣ lḷ̣

g̣
gg̣̣ g̣̣ x̣̣

(m)

(n)

(ŋ)

(1) *Voiceless Obstruents*. The stops /p/, /t/, and /k/ may be slightly aspirated *P*-phrase initially. /p/ and /k/ occur *P*-phrase medially as fricatives or occasionally as affricates in other than slow speech. *P*-phrase initially and finally, and in slow speech they occur as stops or affricates. The voiceless dental fricative /s/ occurs *P*-phrase initially as either affricate or fricative; elsewhere it is a fricative. Before low vowels it occurs with a high, front, unrounded off-glide. It is probably articulated with the tongue blade. *P*-phrase medially the alveolar stop /t/ may occasionally be pronounced with slight friction; elsewhere it is a stop. The velar stop varies in point of articulation according to the height of the vowel which it precedes: before high vowels it is at velar point of articulation and before low vowels it is backed.

Examples: /p/ papap [p^hapap] [pappap] 'father'; /s/ suas [tsuas] [suas] 'plate, dish', gasag [gas^yag] 'He definitely went.'; /t/ titiat [t^hitiat] [titθiat] 'head dress'; /k/ kakam [k^hakxam] [kaxam] [kakxam] 'pain', kiitak [ki.tak] [k^hi.tak] 'at the bags'.

(2) *Voiced Fortis Obstruents*. Any of the voiced fortis stops, /b/, /d/, /g/, may be pronounced with friction (as fricative or affricate) medially and finally in fast speech. The voiced alveolar retroflexed flap, /r/, may occur as a trill medially or finally, and occasionally is represented by the allophone [tr] initially; finally it usually occurs voiceless. Both /d/ and /g/ occur (rarely) voiceless word initially.

Examples: /b/ abar [abar] [ab̥ar] 'sky', aṅar ab [aṅar ab̥] [aṅar ab̥] 'people'; /d/ dumop [d̥umop] [t̥umop] 'grub', redeb̥ [r̥eð̥ew] [red̥ew] 'decoration', bad [bad̥] [bað̥] 'Hang it up.'; /r/ raripar [t̥r̥aṛipaṛ] [r̥aṛipaṛ] [r̥aṛipaṛ] 'we all (incl.)'; /g/ gogob̥ [g̥ogow] [k̥ogow] 'work', gezag [g̥ezag] [g̥ezag] 'He definitely stayed.'

(3) *Voiced Lenis Obstruents*. All of the phonemes in this group have *P*-phrase final voiceless allophones which fluctuate with the voiced ones. The lenis fricative, /b/ is a stop *P*-phrase initially; medially and finally it is a fricative or occasionally an affricate. The bilabial and dental fricatives, /b/ and /z/, sometimes occur as the semi-vocoids [w] and [y]. /b/ is represented by [w] when contiguous to /u/ and /o/, and in *P*-phrase medial and final

environments rarely has more than very lenis friction (such an allophone could be called a flat [w]). /z/ usually has a high front off-glide before low vowels. It is probably articulated with the tongue blade. The voiced alveolar lateral /l/ sometimes occurs long, and may be represented by the allophone [dl] word initially and contiguous to high vowels. The lenis voiced velar fricative, /g/, is always backed, though this backing is very slight before /i/ and /u/. It is a stop or affricate *P*-phrase initially; medially and finally it is a fricative or occasionally an affricate.

Examples: /b/ *b*ebeŋ [b̥ebeŋ] [b̥ebbeŋ] 'lungs', *bozabo* [b̥ozawo] [w̥ozawo] 'time, season', *biib* [b̥i·b̥] [b̥i·p̥] 'trap'; /z/ *zeitakaz* [z̥eitak̥az] [dz̥eitak̥as] [y̥eitak̥az] 'for the village', *azap* [adz̥ap] [az̥ap] [az̥^vap] 'kinship term'; /l/ *leles* [lel·is̥] [dledleŋ] 'seed', *gol* [godl̥] [gol̥] [got̥] 'Fill it.'; /g/ *gigaret* [g̥ig̥gařet] [gg̥ig̥gařet] 'witchcraft', *porag* [pořag̥] [pořax̥] 'at the same time'.

(4) *Nasals*. The bilabial, alveolar, and velar nasals each have one allophone.

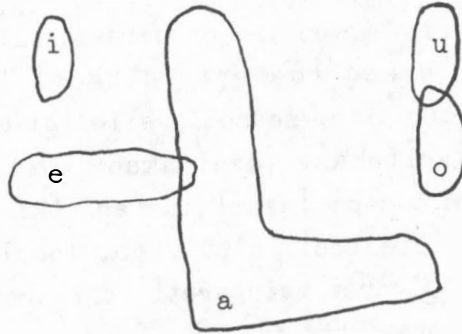
Examples: /m/ *mamag* [mamog] 'beginning', *biitom* [b̥i·tom] 'vine'; /n/ *nonop* [nonop] 'mother', *ban* [b̥an] 'thumb'; /ŋ/ *ŋaŋalelet* [ŋaŋalelet] 'hair', *seŋ* [s̥eŋ] 'You went.'.

5.2.2. Vowel Variants. Each of the five phonemic vowels has a range of allophones which occur in environments influenced by (a) position in the *P*-word; (b) timing; and (c) contiguous consonants and vowels. The first two factors seem to take precedence over the last in the conditioning of allophones, producing a variety of quality and length allophones. Higher allophones of /e/ and /a/ occur in short or unstressed syllables; lower allophones of /o/, /i/, and /u/ occur there. Each of the vowels has a voiceless allophone which occurs *P*-word finally (see Section 3.5.). Four degrees of phonetic length have been noted: (a) vowels are longest when they occur simultaneously as *P*-word and *P*-phrase nucleus; (b) those which occur as *P*-word nucleus in *P*-phrase non-nuclear position are next most long; (c) shortest length occurs in the first syllable of multisyllabic *P*-words (when occurring in isolation) and one or two of the middle syllables of *P*-words of more than four syllables; (d) normal length occurs elsewhere.

A certain amount of free fluctuation which occurs with each of the vowels makes it impossible to make exact state-

ments of the distribution of allophones. The following sections give allophones of each vowel which are in addition to those mentioned above.

Chart C
VOWEL VARIANTS



(1) /a/ has a range of central allophones from [a] up to [i] and in the low and mid areas from front central to back. The effect of contiguous consonants and vowels was charted in the last syllable of the *P*-word: the allophone [a] tends to occur following voiceless stops, voiced fricatives, /ŋ/, and /r/; [ʌ] and [ə] tend to occur following /s/, voiced stops, /l/, /m/, and /n/; backed allophones tend to occur contiguous to /k/ and /g/; mid central allophones occur contiguous to high vowels. In other positions in the word, allophones are similarly influenced.

Examples: *zabazabap* [dzʌbɪzəbʌp] 'type of bird'; *lelamap* [lələɪmʌp] 'kinship term'; *raerez* [rəɪrɪz] 'Fold it.'; *daŋasipar* [dəŋəsɪpʌr] 'weapon'; *ababap* [əbʌbʌp] 'spider'; *baɟar* [bʌɟər] 'house post'; *na* [na.] 'Eat.'; *titiat* [titiat] 'head dress'.

(2) /o/ has allophones [o] and [u]. [o] occurs following /g/ and /k/, preceding /g/, /k/, and /b/ and contiguous to other vowels; [u] occurs elsewhere.

Examples: *okox* [okox] 'way down'; *tokob* [tukob] 'lengthwise piece'; *nonor* [nunor] 'road'; *bolop* [bulop] 'pig'; *moromorot* [morumurut] 'scar'; *goelep* [goilip] 'rat'; *buo* [buo] 'type of bird'.

(3) /e/ has allophones which range vertically between [ɛ] and [ɪ], and horizontally from front to front central at these levels. Lower allophones occur word finally following vowels, elsewhere contiguous to /i/ and /b/ and in *P*-word final open syllables; central allophones occur contiguous to /k/ and /g/; [ɪ] tends to occur elsewhere.

Examples: apetei [ʌpɪteɪ] 'breast'; bɛdep [bɪdɪp] 'wild one'; gɛləb [gɛləw] 'stone'; tɛgɛrɛŋ [tɪgɛrɪŋ] 'You scratched.'; tɛpɛ [tɛpɪ] 'paper'; ŋɛdet [ŋɪdɪt] 'wax'; ne [ne.] 'I'.

(4) /u/ has allophones [ʊ] and [u]. [ʊ] tends to occur before /g/ and [u] occurs elsewhere.

Examples: mumuɣat [mumuɣat] 'whole one'; sapanɛpuɣ [sʌpʌnɪpuɣ] 'He having gone...'; urus [uɾʊs] 'garden mound'; tupumak [tupumʌk] 'men's house'; uas [uas] 'lightening'; eut [ɛut] 'tobacco'; gu [gu.] 'yes'.

(5) /i/ has a range of allophones from [i] to [ɪ]. Lower allophones occur before /s/, /z/, /r/, and /k/, and contiguous to /g/; a slightly higher allophone occurs following /a/ and /o/; [ɪ] occurs elsewhere.

Examples: beegir [be.giɾ] 'betel nut'; marasik [marʌsɪk] 'on the hand'; ipinorig [ipinoɾɪɣ] 'On the spine'; itis [itɪs] 'firewood'; raie [ɾaie] 'bow'; aipilɔb [ʌpɪlow] 'kidney'; mitmitip [mitmitip] 'mosquito'; itɪŋad [itɪŋʌd] 'fire'; pi [pi.] 'he'.

5.3. Distribution. This section will describe distribution of phonemes into syllable and *P*-word, and frequency of phonemes.

5.3.1. Phonemes in the Syllable. All consonants occur as both onset and coda of the four syllable types. All vowels occur as nucleus of any of the syllable types.

5.3.2. Phonemes in the *P*-word. Sequences of consonant plus a following contiguous vowel were charted in the *P*-word. In initial position the following have not been observed: /b/ with any vowel, /lu/, /ŋi/. In *P*-word medial position the following have not been observed: /bo/, /gi/, /ŋu/, /di/. Since final syllables are rare in occurrence, it was not productive to chart this position. Disregarding sequence limitations, it has been observed that all phonemes except

/b/ occur in initial, medial, and final positions in the *P*-word. The phoneme /b/ occurs only medially and finally. Section 5.2. gives examples of these occurrences.

Out of the 25 sequences of two vowels which are possible in Kunimaipa, only one has not been observed in the *P*-word: /iu/.

Examples: biitom 'vine', dimie 'cloth', gouria 'wallaby', piosia 'type of snake', peis 'thing', peek 'crooked', abdedeap 'type of insect', georeap 'type of snake', eut 'tobacco', ɲaip 'angry one', raerez 'Fold it.', gaat 'Wait.', maok 'new, unfinished', taurum 'floor', zi uloi 'fruit', goes 'small thing', goalep 'Mid-Waria person', soon 'You went.', rouaez 'Stand.', batapuir 'type of sweet potato', ueb 'blood', guap 'kinship term', buo 'type of bird', zuut 'similar'.

Eight three vowel sequences have been observed: /eua/, /oia/, /aie/, /aua/, /aia/, /uau/, /uai/, and /iai/.

Examples: puteua 'type of marsupial', gogoia 'type of bird', raie 'bow', kauazair 'type of sweet potato', rataia 'type of marsupial', puau 'bladder', karuai 'type of taro', giproriai 'type of insect'.

Three four vowel sequences have been observed: /aiai/, /auia/, and /ouae/.

Examples: gumaiair 'type of taro', menauia 'chant', rouaez 'Stand up.'.

One five vowel sequence has been observed: /aieua/.

Example: taieua 'type of bird'.

Consonant clusters occur only across syllable and *P*-word boundaries (or in an occasional fast, elided form).⁸ Within the syllable contoid clusters occur only as fluctuant allophones of single consonant phonemes.

5.3.3. Frequency of Phonemes. A phoneme count was made of 35 pages of narrative text, totalling approximately 7,000 phonemes. In this text phonemes occurred in the following order of frequency: /a/, /o/, /g/, /e/, /p/, /t/, /i/, /b/, /r/, /n/, /m/, /u/, /ɣ/, /k/, /ŋ/, /z/, /s/, /l/, /d/, /b/. The text was of two different kinds: legend and descriptive narrative. The legend was analyzed separately and then a comparison made with the totals for the whole 35 pages. It was noted that because of certain affixation which occurred frequently in the descriptive narrative, /o/, /i/, and especially /g/ show higher occurrence than normal. The only other disparity in the two results was that /t/ was found to be less frequent in the total count.

Vowels constituted 46% of the total phoneme occurrences. Of the vowels, /a/ constituted 37%, /o/ 22%, /e/ 20%, /i/ 12% and /u/ 9%. Bilabials, alveolars, and velars were the most frequent consonant groups, and were about evenly divided in their occurrence (31%, 31%, and 30% respectively were the exact figures). Dentals had only 8% of total consonant occurrence. By analyzing the consonant occurrences from another standpoint, it was found that the voiced lenis obstruents were the most frequent, constituting 33% of total consonant occurrence. Voiceless obstruents had 30%, nasals had 20%, and voiced fortis obstruents had 17% occurrence.

5.4. Orthography. The orthography here suggested has in the main been in use for a number of years in the Kunimaipa area. Literature in the dialect here studied will require symbolization of the velar nasal phoneme, not found in other dialects. It is proposed also that consistency be used in the symbolization of *P*-word final optional vowels. Two factors bear on this problem: (a) it is desirable to preserve the lexical contrast dependent on the symbolization of these vowels and (b) symbolization of them can be useful in denoting features of intonation. It might appear convenient to standardize the writing of Kunimaipa either by always symbolizing a CV final variant of a word (whether or not such a variant would ever occur in that position) or by always symbolizing the C final variant (even in cases where CV would be very likely to occur). The approach advocated here is that the optional vowels be symbolized only where necessary to carry intonational or lexical contrast. In Pence 1964, examples are transcribed in the practical orthography.

<i>Phoneme</i>	<i>Symbol</i>	<i>Phoneme</i>	<i>Symbol</i>	<i>Phoneme</i>	<i>Symbol</i>
p	p	g	g	ŋ	ng
s	s	b	v	i	i
t	t	z	j	e	e
k	k	l	l	a	a
b	b	ɟ	h	o	o
d	d	m	m	u	u
r	r	n	n		

NOTES

1. Kunimaipa is spoken by about 8,000 people, the majority of whom live in the Goilala Sub-District of the Central District of Papua; and a few of whom live in the adjoining area of the Morobe District of the Territory of New Guinea. There are four principle dialects of Kunimaipa: Hate (Upper Kunimaipa), Hereve (Lower Kunimaipa), Karuama, and Hajili (Gajili). The present analysis is based on the Hajili dialect as spoken in the lower Bubu River Valley.

Previous work has shown that Kunimaipa is related to Tauade and possibly Fuyuge (see Steinkraus and Pence, 1960). Preliminary comparison suggests a close relationship with Wele (Upper Waria) and a more distant one with Biangai (spoken in the Wau area).

Field work in the Kunimaipa area was carried out by the author for approximately 8 months during the period from October 1959 to October 1962. Various informants have been used in checking data for the paper, compiled from a dictionary and from taped text.

2. This view is taken from Pike (1954, 1955, and 1959) with refinement by Longacre (1961).

3. This system of symbolization is adapted from Pike (1945) p. 110ff.

4. Pence, A., "Intonation in Kunimaipa (New Guinea)" in A. Pence, E. Deibler, P.M. Healey and B.A. Hooley, *Papers in New Guinea Linguistics No. 1*, Linguistic Circle of Canberra Publications, Series A, Occasional Papers, No. 3, Canberra 1964: 1-15.

5. Patricia Pence compiled data for this paper on the frequency of phonemes. I am indebted to S.I.L. colleague Eunice Pike whose stimulus and help have made possible the completion of this study. Thanks are due also to various other S.I.L. colleagues, especially Dorothy James, who read and gave helpful comments on the manuscript.

6. The occurrence of sequences of prenuclear patterns may imply units on a level between *P*-phrase and *P*-word in the hierarchy. This line of inquiry has not been investigated.

7. The vocoids [i] and [u] are interpreted as vowels in all

their occurrences for the following reasons: (a) Non-suspect data contains numerous vowel glides: *kaeb* 'dislike', *guguae* 'blanket', *maot* 'again', *raerez* 'Fold it.'; (b) Reverse sequences of suspect glides occur: *maɲair* 'Teach.', *titiat* 'head dress', *piosia* 'type of snake', *gopoiɓ* 'cold', *maugereb* 'pumpkin', *puam* 'type of taro', *toutag* 'He sits.', *buo* 'type of bird'; (c) [y] and [w] occur as allophones of the phonemes /z/ and /b/ respectively, and as such contrast with /i/ and /u/: *mabar* 'red thing', *mauair* 'type of tree', *marab* 'branch', *barau* 'type of tree', *gupaz* 'type of taro', *upai* 'nothing', *somaz tog* 'I'm about to go.', *sobai sag* 'He left to go.'; (d) In loan words from Neo-Melanesian, Kuni-maipa /b/ replaces NM /w/, and Kunimaipa /z/ replaces NM /y/: *zam* 'yam', *basim* 'Wash it.'

8. As noted in 3.2., certain grammatical words with internal consonant clusters have been observed. There is no pattern to the elements of the clusters (e.g. /tɲ/, /pr/, /mɣ/, /rt/, /rɓ/, /sk/) and the occurrence in the words of more than one *P*-word nucleus supports the conclusion that they are divided into more than one *P*-word.

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THE PHONEMES OF IATMUL

PHILIP STAALSEN

0. Introduction.
1. Chart of Phonemes.
2. Vowel Phonemes.
3. Consonant Phonemes.
4. Distribution of Phonemes Within the Syllable.
5. Supra-segmental Features.

0. INTRODUCTION

This paper is a description of the phonology, both segmental and supra-segmental, of the Iatmul language.¹ The material for this paper was collected in the village of Brugnowi.² Possibly the most interesting feature of the phonology is the three vowel phonemes, their allophones, and distribution of those allophones.

1. CHART OF PHONEMES

- 1.1. Vowels:
- | | | |
|-------|-------|----------------------------------------|
| High: | /i̥/: | [i], [ɪ], [u], [ʊ], [ʔi], [i̥] |
| Mid: | /ə/: | [e], [ɛ], [o], [ɔ], [ʔe],
[ʔo], [ə] |
| Low: | /a/: | [ʔa], [a] |

1.2. Consonants:

	Front	Central	Back
Stops:	/p/:	/t/:	/k/:
	[p ^m], [p ^h], [p ^ə], [p]	[t ⁿ], [t̥], [t]	[k ^ŋ], [k ^h], [k ^ə], [k]
Fricatives:	/b/:	/s/:	/g/:
	[b]	[s̥], [š]	[g], [g]
Nasals:	/m/:	/n/:	/ñ/:
	[m]	[ŋ], [n]	[ñ]
Resonants:	/w/:	/l/:	/y/:
	[w]	[l], [ř]	[y]

2. VOWEL PHONEMES

The vowels of Iatmul are /i̥/, /ə/, and /a/, forming a one dimensional system of high, mid, and low vowel.

2. 1. Allophones

2. 1. 1. High vowel /i/ has allophones: [i] before /y/ or /ñ/, [ɪ] after /y/ or /ñ/, [u] before /w/, [ʊ] after /w/, [ʔi] before /y/ and not following a consonant, [ɨ] elsewhere. If a vowel occurs between /y/ and /w/ or between /w/ and /y/, the consonant following the vowel determines the environment. An example of this is: [yuwiy] /yɨwiy/ 'grass'.

2. 1. 2. Mid vowel /ə/ has allophones: [e] before /y/, /ñ/, or /ɨy/, [ɛ] after /y/ or /ñ/, [o] before /w/, [ɔ] after /w/, [ʔe] before /y/ and not following a consonant, [ʔo] before /w/ and not following a consonant, [ə] elsewhere.

2. 1. 3. Low vowel /a/ has allophones: [ʔa] not following a consonant and [a] elsewhere. This phoneme is usually of longer duration than the other vowel phonemes but there is no contrast between [a] and [a:].

2. 2. **Contrasts.** In the following examples, phonetic as well as phonemic transcription will be used to illustrate the unusual distribution of vowel phoneme allophones.

2. 2. 1. /ɨ/ contrasts with /ə/: [likəntɨ] /likəntɨ/ 'it's here', [likəntə] /likəntə/ 'smoked meat', [ntuw] /ntiw/ 'man', [ntow] /ntew/ 'shrunken', [mp^əriygəntɨ] /mpliygəntɨ/ 'it fell down', [mp^əreygəntɨ] /mpleygəntɨ/ 'it is rotten' (as fish).

2. 2. 2. /ə/ contrasts with /a/: [maɨiy] /malɨy/ 'rat', [məɨiy] /məɨiy/ 'mud flats', [kwəlɨntɨ] /kwəlɨntɨ/ 'he is there without a reason', [kwaɨntɨ] /kwaɨntɨ/ 'he is sleeping', [ŋkayatⁿ] /nkayat/ 'floor', [ystuwɨntɨ] /yətɨwɨntɨy/ 'they all walk'.

3. CONSONANT PHONEMES

The consonants of Iatmul are /p, t, k, b, s, ɟ, m, n, ñ, w, l, y/ forming a two dimensional consonant system. The one dimension is divided by place or articulation into front, central and back. Front is labial, central ranges from dental to alveo-palatal and back denotes the area behind the alveo-palatal region. The other dimension is divided by manner of articulation into stops, /p, t, k/; fricatives, /b, s, ɟ/; nasals, /m, n, ñ/; and resonants, /w, l, y/.

3.1. Variants

3.1.1. The final stops of Iatmul have been described as, "unreleased and in free variation with each other".³ There is, in fact, a voiceless nasal release which is often hard to detect. The release is homorganic with the stop as to point of articulation: [p^m], [tⁿ], and [k^ŋ]. These phonetic sequences of stop plus voiceless nasal have been interpreted as allophones of the stops /p/, /t/, and /k/, occurring utterance finally. The "variation" of final stops is often conditioned. If a form with a final stop is followed by a form beginning with a stop or nasal-stop consonant sequence, the final stop of the preceding form assimilates to the point of articulation of the stop of the following form and the nasal release is lost. For example: [ma^ʔatⁿ] /maat/ 'small' becomes [ma^ʔak nkey] /maak nkey/ 'small house' and [ma^ʔap mpəp^m] /maap mpəp/ 'small moon', but does not change from its usual form in isolation in [ma^ʔat ntuwiy] /maat ntiwiy/ 'small mountain'. The fluctuation on some stop final forms when uttered in isolation reflects this assimilating feature of final stops. However some stop final forms of some speakers do show contrast between stops when uttered in isolation. [mpəp^m] /mpəp/ 'moon' and [mpəkⁿ] /mpək/ 'pig' contrast /p/ and /k/ in final position. [ʔabisetⁿ] /abiset/ 'Sepik River' and [ʔabisək^ŋ] /abisək/ 'lagoon' contrast /t/ and /k/.

The utterance initial allophones are [p^h], [t̚], and [k^h], the front and back stop being aspirated and the allophone of the central stop interdental.

/p/ and /k/ are the only stops to occur before /l/ and the allophones [p^ə] and [k^ə], stop with mid vowel off glide, occurs in this position. These have not been interpreted as /kəl/ or /pəl/ since other consonants establish a CC pattern (see 4.1.1.) and because there is phonetic dissimilarity between /pəl/ as in /pəliy/ 'waves' and /pl/ as in /pliwnawiy/ 'place name'.

The norms [p], [t], and [k] occur in all other environments.

3.1.2. Of the fricatives /b, s, ɣ/ only /b/ has one allophone, [b]. /s/ has two allophones, [s̠], slightly backed and [s̠̚], retroflexed. These two fluctuate freely in all environments. /ɣ/ has allophones [ɣ] and [g] which also fluctuate freely.

3.1.3. Of the nasals, only /n/ has more than one allophone. /m/ and /ñ/ have the allophones [m] and [ñ] re-

spectively. /n/ has two allophones, [ŋ] velar occurring contiguous to /k/ and [n] alveolar occurring elsewhere. Utterance finally [n] and [ŋ] may fluctuate. This final position fluctuation is analogous to that of the final stops except that [n] and [ŋ] never contrast. Although /n/ does contrast with /m/ and /ñ/ (see 3.2.3.), there is environmentally determined fluctuation between all nasal phonemes as with the stops. Only /m/ occurs preceding /p/ and only /ñ/ occurs preceding /y/. For example: /lan/ 'husband' + /pit̪i/ 'he plucked' = /lam pit̪i/ 'husband plucked' and /lan/ + /yinti/ 'he went' = /lañ yinti/ 'husband went'.

3.1.4. Of the resonants, /l/ has two allophones, [l] alveolar lateral vibrant and [ɾ] alveolar flap. These two allophones fluctuate freely. The other resonants, /w/ and /y/, have one allophone each.

3.2. Contrasts

3.2.1. Stops contrast with each other: /pit̪i/ 'he plucked', /tit̪i/ 'it broke', /kit̪i/ 'it dried'. Also /p/ contrasts with /b/, /bit̪i/ 'he cooked'. /t/ contrasts with /l/, /wit̪iy/ 'they heard', /wilit̪iy/ 'a type of shell'. /k/ contrasts with /g/, /kik̪intaliḡə/ 'it's over there', /kig̪intaliḡə/ 'There is food.'. /k/ also contrasts with [ʔ], [k^haʔiy] 'no', [k^hakiy] 'mud'.

3.2.2. Fricatives contrast with each other: /asi/ 'shoot', /aḡi/ 'eat', /abi/ 'look'. Also /b/ contrasts with /w/: /baalə/ 'canoe', /waalə/ 'dog'.

3.2.3. Nasals contrast with each other: /mina/ 'your' (male singular), /nina/ 'our' (plural), /ñina/ 'your' (feminine singular).

3.2.4. Resonants contrast with each other: /lint̪i/ 'he is', /yinti/ 'he went', and /winti/ 'hunger'.

4. DISTRIBUTION OF PHONEMES WITHIN THE SYLLABLE

4.1. The syllable of Iatmul may be defined as a peak of sonority consisting of one vowel phoneme with optional non-sonorous margins.

4.1.1. The margin preceding the peak may consist of a single, a sequence of two, or a sequence of three consonant phonemes. These sequences of consonants were considered as sequences rather than complex phonemes mainly for economy of

phonemes. An interpretation considering the sequences as complex phonemes would simplify the syllable structure at the expense of complicating the phoneme picture. This alternate interpretation would be equally adequate.

Any of the twelve consonant phonemes may occur singly in the preceding syllable margin (in the following examples, [.] will indicate syllable break), /p̄i.t̄i/ 'he plucked', /nə.kə.tə/ 'another', /m̄i.ñ̄a/ 'breast', /s̄i.ɡat/ 'shall we shoot?', /b̄a.liy/ 'heavy', and /ȳi.w̄in/ 'I went'.

There are ten two-consonant sequences which may make up the preceding margin: /mp/, /nt/, /nk/, /b̄w/, /b̄l/, /mw/, /pl/, /kw/, /kl/, and /ts/. /mp̄i.la/ 'your' (dual), /nt̄iw/ 'man', /nk̄iw/ 'water', /wa.a.b̄wiy/ 'cloth', /ka.b̄ləy/ 'bad', /mw̄ik/ 'wind', /pl̄iw.mp̄ə.li.ɡə.nt̄i/ 'it is underneath', /kwa.nt̄i/ 'he slept', /kla.nt̄i/ 'he got', /tsə.ɡə.liy/ 'tongs'.

There are four three-consonant sequences which may make up the preceding margin: /mpl/, /nk̄w/, /nkl/, /nts/. /mpl̄əw.ɡə.nt̄i/ 'it is shrunken', /nk̄wa.ləy/ 'wild bamboo', /nk̄la.li/ 'she cried', /nts̄a.nk̄iy/ 'wash!'.

4.1.2. The syllable peak may consist of any one of the three vowel phonemes. If there is a sequence of two vowels there is always a syllable break between them. There are three such sequences in Iatmul: /aa/ as in [k^ha[?]atⁿ] /ka.at/ 'mayfly', /aə/ as in [k^ha[?]ow] /ka.əw/ 'enemy', and /āi/ as in [k^ha[?]iy] /kāiy/ 'no'.

If the syllable contains no margin preceding the peak, the peak must consist of /a/, never /ə/ or /ī/. [ʔawa] /a.wa/ 'yes'.

4.1.3. The margin following the peak (following margin), may consist of either a single consonant phoneme or a sequence of two consonant phonemes. The single consonants which may occur as the following margin are: /p/, /t/, /k/, /n/, /m/, /ñ/, /y/, and /w/. /m/ and /ñ/ occur only when a following form begins with /p/ or /y/ (see 3.1.3.). /mp̄ək/ 'pig', /mp̄əp/ 'moon', /ab̄isət/ 'Sepik River', /man/ 'leg', /wiy/ 'grass', /nk̄iw/ 'water'.

There are only two sequences of two consonants which may occur as the following margin: /yt/, and /yk/. These sequences occur very rarely. /ka.iyk/ 'shadow', /nk̄wəyt/ 'type of vine'.

4.1.4. **Syllable Types.** The constituency of peak and margins in all their possible combinations yields twelve syllable types. Of these twelve types only ten have been

found to occur: V /a.wa/ 'yes', CV /sɪ/ 'name', CCV /nta/ 'something', CCCV /nkla/ 'type of tree', VC /ay/ 'go', CVC /lan/ 'husband', CCVC /mpan/ 'fish trap anchor', CCCVC /nkwət/ 'you all', VCC /ma.ɪyt/ 'rain'. CCVCC and CCCVCC have not been found.

5. SUPRA-SEGMENTAL FEATURES

5.1. Stress, tone and length are not phonemically pertinent. Stress is sometimes related to and predictable by the vowel: /a/ is usually of greater intensity than either /ɪ/ or /ə/. Loudness is not always concurrent with highest pitch of intonation. There is no contrastive stress.

5.2. Pitch becomes important as intonation. The following intonation data is not exhaustive.

Intonation shows contrast contiguous to pause in the stream of speech. The main body of an utterance is usually spoken with a level, dronelike intonation or a slight dropping intonation, by steps, throughout the utterance. Changes in intonational pitch coincide with syllable boundaries, that is, a step from one pitch to another does not occur except at a syllable break. There is one exception to this rule (see 5.2.5.). There are five intonation contours that will be described.

5.2.1. Statement intonation occurs before a pause and is characterized by a (3-4) drop on the final two syllables. In this description numeral 4 will indicate lowest pitch and 1 will indicate highest.

5.2.2. Question intonation occurs before a final pause and is characterized by a (3-1) rise on the final two syllables. When a question word is used the question utterance ends with statement intonation. A question without a question word differs from a statement only by intonation. An example of this is: /tə.²mpə² yə.³ntɪ⁴/ 'he already came', /tə.²mpə² yə.³ntɪ¹/ 'did he already come?', and /a.²nta.²sɪ.²bɪ² yə.³ntɪ⁴/ 'when did he come?'.

5.2.3. Recapitulation intonation occurs after a pause and before a non-final pause and is characterized by a (3-1) rise. This intonational contour occurs only on verb forms.

For example, /wa.²a.lə² kla.³ntɪ⁴/ /kla.³ntɪ¹ yə.³ntɪ⁴/ '(the) dog got (it)' 'having gotten (it), he came'. The two occurrences of /klantɪ/ differ only by intonation which affects

their grammatical function.

5.2.4. Sequence intonation has two variants, the one characterized by a (2-1) rise occurs at the beginning of an utterance and the other characterized by a (3-2) rise occurs following a pause between items in sequence. That is, the first variant (2-1) occurs on the first item in a list while the second (3-2) occurs on all subsequent items in the list.

/wá.a.lə́ wá.ak yə́.mpɛ́k/ '(the) dog and (the) crocodile came'.

5.2.5. Emphasis intonation usually occurs concurrent with a short form which constitutes an entire utterance. It is characterized by a tone 3 on the second to last syllable and a 2-4 glide on the final syllable. An example of this is:

/mɛ́.nɛ́y/ 'eye' and /mɛ́.nɛ́y/ 'eye!'. The second utterance of 'eye' would normally be in response to a question such as, 'What did you say?'.

NOTES

1. This paper is based on data collected during 5 months residence in the village of Brugnawi while working under the auspices of the New Guinea branch of the Summer Institute of Linguistics. Many informants were used ranging in age from 15 to 60 years. The data was organised during a linguistic field study programme conducted by Eunice V. Pike at the Summer Institute of Linguistics base in New Guinea from February-March 1963.

The name Iatmul was first used by Bateson (1932).

2. Laycock (see Capell 1962, p.44) divided Iatmul into dialects calling the dialect spoken at Brugnawi village Nayura.

3. op. cit.

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WERI PHONEMES

HELEN and MAURICE BOXWELL

0. Introduction.
1. Inventory of Phonemes.
2. Interpretation.
3. Description of Phonemes.
4. Distribution of Phonemes.
5. Orthography.

0. INTRODUCTION

Weri is a language spoken by an estimated 2000-3000 speakers in the Weri Valley and several neighbouring valleys, Ono and Biar, at the headwaters of the Waria River in the Morobe District of the Territory of New Guinea. It belongs to the same language family as Kunimaipa and Biangai.

The corpus of data, including a dictionary of about 1000 words, was gathered in the village of Sim over a period of 7½ months from January 1962 to September 1963. The main informant has been a 21 year old girl, Yawa, who also speaks Kate, and during the earlier months a young man of about 25 named Asi. Use was also made of data gathered by David and Ruth Cummings of S.I.L. during an earlier residence of eight months.

1. INVENTORY OF PHONEMES

1.1. Chart of Phonemic Norms

Consonants:

	<i>Bilabial</i>	<i>Alveolar</i>	<i>Velar</i>
<i>Stops</i>	p	t	k
<i>Fricative</i>		s	
<i>Nasals</i>	m	n	ŋ
<i>Lateral</i>		l	
<i>Vibrant</i>		ɹ	
<i>Semi-vowels</i>	w	y	

Vowels:

	<i>Front</i>	<i>Central</i>	<i>Back</i>
<i>High</i>	i		u
<i>Mid</i>	ɪ		ʊ
<i>Low</i>	e ¹	a	o

Tone:	<i>High</i>	'
	<i>Low</i>	Unmarked

1.2. Description of Contrastive Features. Weri consonants occur at three points of articulation: bilabial, alveolar, and velar. Only the stops and nasals contrast in all three positions, while semi-vowels occur at bilabial and alveolar points of articulation.

Bilabial consonants show a three-way contrast, with stop, nasal, and semi-vowel; while there is a contrast between stop and nasal for velar consonants. The major consonantal contrast is at the alveolar point of articulation, with stop, fricative, nasal, lateral, vibrant, and semi-vowel all contrasting here.

Both front and back vowels contrast in high, mid, and low positions. A central low vowel contrasts with its front and back counterparts.

There is also a contrast between high and low tone.

2. INTERPRETATION

2.1. Status of Items which may be either Consonant or Vowel. [i] and [u] have been interpreted as /y/ and /w/ when they are non-syllabic and occur in syllable initial consonant position. When they take the peak of syllabicity and occur in vowel position in a syllable they are interpreted as /i/ and /u/.

- /yéwáís/ 'I come'
- /ápyewas/ 'I search for'
- /íntíp/ 'bird'
- /níáman/ 'I will speak to you'
- /ní/ 'you'
- /wesyámi/ 'I send'
- /éwiset/ 'tobacco'
- /úlan/ 'cough'
- /úlúpít/ 'heart'
- /kú/ 'yes'

2.2. Status of Items which may be either Sequence or Unit

2.2.1. Though there are no non-suspect consonant clusters, [mp], [nt], and [ŋk], which occur only in syllable final position, have been interpreted as sequences.

The alternative interpretation, as unit phonemes, creates three extra phonemes which are limited to syllable final position. Though the present interpretation, as a sequence of two phonemes, creates two extra syllable patterns with limited fillers of the final two consonant slots, this is preferred because -

1. the sequence occurs across morpheme boundaries in some cases;
2. all the reverse sequences occur;
3. the phonetic syllable division is always between the two when followed by a vowel.

/kútúm-pel/ 'sky'	/kaúp-ment/ 'tree type'
/kepún-tepar/ 'two heads'	/yókót-námp/ 'boy'
/íng-ketúlte/ 'ankle'	/úmkek-ŋes/ 'large box'

2.2.2. Suspect VV clusters have been interpreted as sequences of two vowels because of non-suspect VV clusters and reverse sequences which occur. A non-phonemic primary or secondary stress may occur on either one or neither of the members of such clusters. High tone may occur on either, neither, or both.

/néa/ 'Speak to me!'
 /óán/ 'from up there'
 /náikeliŋ/ 'pumpkin'
 /paímént/ 'tree type'
 /kartípulu/ 'female friends'
 /kóimap/ 'bird type'
 /koínte/ 'grass area'
 /kaúpment/ 'tree type'
 /aulú/ 'back of knee'
 /áúlú/ 'place name'
 /kílaáméntíal/ 'two trees'
 /iop/ 'man's name'
 /múa/ 'he struck'
 /úámú/ 'joint in stem of plant'

2.2.3. Long vowels have been interpreted as sequences of two vowels because they contrast with short vowels and because of the non-suspect VV pattern. Either may carry a stress and either may have a high tone.

/íís/ 'vegetable water'	/ís/ 'Go up!'
/íít/ 'blood'	/ít/ 'eye'
/ísáǎɪp/ 'man's name'	/áǎɪp/ 'you two'
/kíít/ 'two teeth'	/kít/ 'sun'
/fíɲk/ 'bird type'	/ɪɲk/ 'along there'
/lééplía/ 'dried up'	/léɲɪ/ 'Stop!'
/wééǎ/ 'Bury!'	/wéǎ/ 'Chop with grain!'
/ɲéep/ 'egg'	/ɲép/ 'press'
/noók/ 'I (agentive)'	/nókóǎɪɲ/ 'I can't find'
/ɲóónúp/ 'moon'	/ɲolúp/ 'not yet'
/ɲáap/ 'blunt'	/náǎk/ 'having eaten'
/flááǎ/ 'two mothers'	/fláǎ/ 'story'
/káát/ 'houses'	/kát/ 'rat'
/kúum/ 'hot'	/kúm/ 'vomit'
/pátɯp/ 'duck'	/pású/ 'roof bearer'
/ɲúút/ 'bottom eyelashes'	/ɲúsi/ 'village name'
/kúúǎ/ 'Chop!'	/kúsí/ 'yesterday'
/puúk/ 'he (agentive)'	/kúk/ 'sound'

2.2.4. Because of the trend to prefer an alternative analysis with a minimum of phonemes, and because of some limitations of distribution, the possibility of interpreting [i] and /ɪy/, and [u] as /ɯw/ or /ɯo/ were investigated.

This interpretation was rejected, and the interpretation as simple vowel phonemes preferred because -

1. all seven vowels clearly contrast in all positions;
2. there is no limitation of distribution of vowels in the different syllable types or in the word;
3. it provides the simplest and most reasonable description of distribution of all phonemes. Other interpretations create some severe limitation of distribution;
4. it provides the simplest definition of a syllable and fewer syllable types;
5. it avoids the multiplication of consonant and vowel clusters associated with the other interpretations.

3. DESCRIPTION OF PHONEMES

3.1. Chart of Phoneme Sequences

	i	ɪ	e	a	o	ʊ	u	p	t	k	s	m	n	ŋ	l	ľ	w	y	
i	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x
ɪ		x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x
e	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x
a	x	x		x		x	x	x	x	x	x	x	x	x	x	x	x	x	x
o	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x			
ʊ	x	x	x	x		x		x	x	x	x	x	x	x	x		x	x	
u		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	
p	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x	x	x
t	x	x	x	x	x	x	x		x	x				x	x		x	x	x
k	x	x	x	x	x	x	x			x				x	x		x		
s	x	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x
m		x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	
n	x	x	x	x	x	x	x		x	x			x	x	x		x	x	x
ŋ	x	x	x	x	x	x	x		x	x				x	x	x	x	x	
l	x	x	x	x	x	x	x	x	x	x			x	x	x		x	x	
ľ	x	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x	
w	x	x	x	x	x														
y			x	x	x														

3.2. Consonants

- /p/ [p] Voiceless bilabial stop.
 [b] Lightly voiced bilabial stop, occurring intervocalically in free fluctuation with [p].
- | | | |
|------------|-----------------|-------------|
| /pólúp/ | [pó'lŭp] | 'pig' |
| /ká pá/ | [ká pá/ká bá] | 'breast' |
| /kapít/ | [ká'pít/ká'bít] | 'pot' |
| /úlpífníp/ | [úlpí:f'níp] | 'shirt' |
| /káúp/ | [ká'ŭp] | 'tree type' |
- /t/ [t] Voiceless alveolar stop.
 [d] Lightly voiced alveolar stop occurring intervocalically in free fluctuation with [t].

	/tolí/	[tò'lí]	'what'
	/kátákí/	[kátákí'ɾ/ kádákí'ɾ]	'to the house'
	/katúp/	[kà'túp/kà'dúp]	'rat'
	/últé/	[úl'té]	'hat'
	/kaút/	[kà'út]	'end'
/k/	[k]	Voiceless velar stop.	
	[g]	Lightly voiced velar stop, occurring inter- vocalically in free fluctuation with [k].	
	/kól/	['kól]	'dry'
	/kákátí/	[kákà'tí/ kágà'tí]	'inside the house'
	/kákàl'ní/	[kákàl'ní/ kágàl'ní]	'other side of the house'
	/kélkaa/	[kélkà'ɾ]	'armpit'
	/yáak/	[yá'ɾk]	'garden'
/s/	[s]	Voiceless fronted alveolar grooved fricative, oc- curring utterance initially and finally, and some- times medially though this generally tends to be lightly voiced.	
	[ts]	Voiceless fronted alveolar grooved affricate, oc- curring in the same position as [s] with some speakers.	
	[z]	Lightly voiced fronted alveolar grooved fricative, tending to occur in utterance medial position, but freely fluctuating with [s] contiguous to voiced consonants and less frequently word initially and finally.	
	[tz]	Lightly voiced fronted alveolar grooved affricate, occurring in the same position as [z] with some speakers.	
	/sí/	['sĩ/'tsĩ]	'Go!'
	/ní sɾ/	['ní 'zɾ/'ní'tzɾ]	'You go!'
	/wáís/	[wá'ís/wá'its]	'Come!'
	/yéwáisma/	[yéwáiz'mà/ yéwáitz'mà]	'Is he coming?'
	/ní yéwáisin ma/	['ní yéwáiz̄in'mà/ 'ní yéwáitz̄in'mà]	'Are you coming?'

/sa/	['sǎ/'tsǎ]	'went'
/pí sa/	['pí'sǎ/'pí'tsǎ]	'he went'
/kúp sípín/	['kúp sí'pín/ 'kúp zǐ'pín]	'will ripen'

Contrasts between /t/ and /s/:

/tí/ 'Take out!'	/sí/ 'Go!'
/kat/ 'rat'	/kas/ 'afraid'
/wát/ 'Carry!'	/wás/ 'Make!'
/wétak/ 'having carried'	/wésak/ 'having made'
/kútum/ 'sky'	/kúsúm/ 'grass type'

/m/ [m] Voiced bilabial nasal.

/mí/	['mí]	'Put!'
/man/	['mǎn]	'Give him!'
/íměi/	['íměi]	'water'
/ompúp/	[òm'púp]	'man'
/kaúúm/	[kàú'íúm]	'You sleep (future)!'

/n/ [n] Voiced alveolar nasal.

/ŋ/ [ŋ] Voiced velar nasal.

Contrasts between /n/ and /ŋ/:

/ní/ 'Eat!'	/ŋín/ 'Sharpen!'
/nán/ 'Give me!'	/ŋáan/ 'before'
/ún/ 'You all stay (future)!'	/uŋ/ 'woman'
/íněi/ 'axe'	/iŋés/ 'leg'
/pán/ 'very'	/pǎŋ/ 'betel nut'

/l/ [ɭ] Voiceless retroflexed lateral, occurring utterance final contiguously following back vowels.

[ɮ] Voiced retroflexed lateral, occurring elsewhere following back vowels.

[ɮ̥] Voiceless alveolar lateral, occurring utterance final contiguously following non-back vowels.

[l] Voiced alveolar lateral, occurring elsewhere.

/áplupu/	[áplū'bū]	'liver'
/lflámúp/	[lílá'múp]	'parent-in-law'
/kélte/	[kél'tè]	'blanket'
/káplak/	[káp'lak]	'mud'
/ketúlte/	[kètúl'tè]	'joint'

/kúl/	[ˈkúl]	'pandanus nut'
/kúlmént/	[kúlˈmént]	'pandanus palm'
/íl/	[ˈí]	'Cut (singular)!'
/íler/	[íleˈɾ]	'Cut (plural)!'
/ímpulu/	[ímpuˈlɔ]	'sore'

/ǐ/ [ǐ] Voiceless alveolar flapped lateral, occurring utterance final in fluctuation with voicing.

[ǐ] Voiced alveolar flapped lateral, occurring elsewhere.

/pí iyarǐ/	[ˈpí iyāˈɾǐ]	'he washes'
/pí iyarǐma/	[ˈpí iyāˈɾǐˈmā]	'Is he washing?'
/tanúǐ/	[tāˈnūǐ]	'Dance (singular)!'
/tanúǐler/	[tānūǐleˈɾ]	'Dance (plural)!'
/ǐúúkan/	[ǐúːˈkān]	'night'

Contrasts between /l/ and /ǐ/:

/koúlúpú/	'smoke'	/kólúpú/	'skin'
/úlúp/	'seed'	/úlyt/	'vein'
/wál/	'Hang on line!'	/wǎl/	'sharpening stone'
/wǎlíí/	'long'	/wǎlí/	'Close!'
/lflámúp/	'parent-in-law'	/lflǎnewel/	'stairs'

Contrasts between /t/ and /ǐ/:

/tí/	'Dig up!'	/ǐí/	'Extinguish!'
/tí/	'Take out!'	/ǐí/	'Break!'
/wétak/	'having carried'	/wǎlak/	'having sliced'
/kotúp/	'young person'	/kólup/	'skin'
/wát/	'Carry!'	/wǎl/	'sharpening stone'

/w/ [w] Voiced high close back rounded non-syllabic vocoid.

Contrasts between /p/ and /w/:

/pí/	'he, she'	/wí/	'Put!'
/pǎŋ/	'betelnut'	/wǎŋ/	'boat, aeroplane'
/pák/	'wind, roll'	/wák/	'having taken'
/mápi/	'place name'	/náwin/	'did not put'
/yépel/	'rains'	/yéwat/	'I make'

/y/ [y] Voiced high close front unrounded non-syllabic vocoid.

Contrasts between /y/ and /t/:

/tókóǐí/	'Bow your head!'	/yókóǐǐm/	'you are finding'
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/tén/ 'we (exclusive)'	/yén/ 'I am eating'
/tán/ 'steep'	/yán/ 'ground'
/tapít/ 'that thing'	/yapít/ 'sugar cane'
/ténta/ 'we also'	/tánja/ 'is singing'

Contrasts between /s/ and /y/:

/séɪ/ 'Go!'	/yéɪ/ 'is doing'
/sóɪ/ 'wet'	/yók/ 'right'
/sáŋkel/ 'Read!'	/yáŋkel/ 'in the ground'
/kásuɪ/ 'village name'	/kayául/ 'is sleeping'
/kíseɪ/ 'Rest!'	/kíyes/ 'is resting'

3.3. Vowels

/i/ [i] Voiced high close front unrounded vocoid.

/ɪ/ [ɪ] Voiced high open front unrounded vocoid.

Contrasts between /i/ and /ɪ/:

/í/ 'water'	/f/ 'banana'
/inéɪ/ 'axe'	/ímú/ 'fence'
/ní/ 'you sg.'	/ní/ 'Eat!'
/wí/ 'Put!'	/wí/ 'Get!'
/nín/ 'to you'	/níŋ/ 'You all eat (future)!'

/e/ [e] Voiced mid open front unrounded vocoid.

Contrasts between /ɪ/ and /e/:

/f/ 'banana'	/é/ 'here'
/ní/ 'Eat!'	/né/ 'I, me'
/wí/ 'Come!'	/wel/ 'Slice!'
/pínt/ 'grass type'	/ként/ 'wind'
/lí/ 'Break!'	/lé/ 'and'

Contrasts between /i/ and /e/:

/í/ 'water'	/é/ 'here'
/ní/ 'you singular'	/né/ 'I, me'
/lí/ 'Extinguish!'	/lé/ 'and'
/nín/ 'to you'	/nén/ 'to me'
/ínt/ 'bird'	/ént/ 'take off'

/a/ [a] Voiced low open central unrounded vocoid.

Contrasts between /e/ and /a/:

/é/ 'here'	/á/ 'Speak!'
/éɪɪ/ 'this'	/áɪɪ/ 'Come up!'
/né/ 'I, me'	/na/ 'he ate'
/ként/ 'wind'	/kant/ 'bite'
/yémeŋk/ 'I give him'	/yémaŋk/ 'he gives him'

/o/ [o] Voiced mid close back rounded vocoid.

Contrasts between /a/ and /o/:

/á/ 'Speak!'	/ó/ 'up there'
/ápi/ 'Come up!'	/ópe/ 'frog type'
/kánt/ 'bite'	/kónt/ 'hook'
/katúp/ 'rat'	/kotúp/ 'young person'
/ká/ 'house'	/kó/ 'black'

/u/ [u] Voiced high open back rounded vocoid.

Contrasts between /o/ and /u/:

/óm/ 'only'	/úm/ 'Stay!'
/kóntét/ 'hook'	/kúnte/ 'inanimate shadow'
/tol/ 'what'	/túl/ 'collapse'
/kot/ 'small'	/kút/ 'decay'
/kó/ 'black'	/tú/ 'Pick!'

/u/ [u] Vocoid high close back rounded vocoid.

Contrasts between /u/ and /u/:

/úpít/ 'knife'	/úpísú/ 'navel'
/tú/ 'Pick!'	/kú/ 'yes'
/kúnúm/ 'heavy'	/kúnúm/ 'clay type'
/mú/ 'Hit!'	/kú/ 'yes'
/kút/ 'decay'	/kúk/ 'sound'

Contrasts between /o/ and /u/:

/ópe/ 'frog type'	/úpísú/ 'navel'
/kó/ 'black'	/kú/ 'yes'
/kot/ 'small'	/kúk/ 'sound'

Contrasts between all vowels:

/ní/ 'you'	/lí/ 'Extinguish!'
/ní/ 'Eat!'	/lí/ 'Break!'
/né/ 'I, me'	/lé/ 'and'
/na/ 'he ate'	/lá/ 'bow'
/kó/ 'black'	/lóšflá/ 'mountain'
/mú/ 'Hit!'	/yálu/ 'perspire'
/kú/ 'yes'	/lú/ 'landslide'
/nin/ 'to you'	/il/ 'Wash!'
/nfn/ 'You all eat (future)!'	/wíl/ 'Come along!'
/nén/ 'to me'	/éřip/ 'village name'
/nan/ 'Give to me!'	/ářip/ 'you two'
/ŋolúp/ 'new'	/olúp/ 'what'
/ŋún/ 'talk'	/sýlok/ 'jump'
/ŋúnŋúún/ 'prayer'	/úlút/ 'vein'

3.4. Tone. Tone is a feature of many New Guinea languages especially in the main highland area.² Weri, a member of the Kunimaipa-Fuyege-Tauade-Weri-Biangai family,³ has two emic tones, high tone indicated by an acute accent over the vowel, and low tone which is left unmarked. Unlike most tone languages, the pitch range between high and low tone is quite narrow. Tone perturbation has not been observed.

3.4.1. Description

/ˊ/ [ˊ] High pitch with slight downglide, occurring word final. This glide drops further on an open syllable than on a closed.

[ˊ] High pitch, occurring elsewhere.

/elímes/ [èlí'mès] 'large sharpening stone'

/ítú/ [í'tú] 'eye'

/ítút/ [í'tút] 'eyes'

/lámú/ [là'mú] 'pimple'

/lámút/ [là'mút] 'pimples'

/Low/ [-] Mid pitch, occurring medially following a high tone and before a low tone in a series of two or more lows, except where the series of two lows is a word final geminate cluster. In this case the first member carries a low pitch and the second a mid. Where there is a series of mid allotones, each one steps progressively down in pitch.

[ˋ] Low to very low downglide, occurring elsewhere word finally. This glide drops further on an open syllable than on a closed.

[ˋ] Low pitch, occurring elsewhere.

/úmkektepaí/ [úmkektē'pāí] 'two boxes'

/ákunet/ [ákū'nèt] 'time'

/ŋúntúlv/ [ŋúntú'lv] 'friends'

/síplaap/ [síplà'p] 'lizard'

/kolúprií/ [kolùpi'í] 'stone club'

In words up to four syllables, four tone patterns, one two syllable, and three four syllable, have not been observed. They are low-low, high-high-low-high, high-low-high-high, and high-low-low-high.

3.4.2. Tone Contrasts

Between high-high and low-high:

/lélút/ 'bridges'	/pelút/ 'pandanus leaves'
/kópút/ 'tree type (plural)'	/kopút/ 'thighs'
/ŋélú/ 'bamboo'	/ŋelú/ 'bean'

Between high-high and high-low:

/kóntát/ 'hooks'	/kóntup/ 'girls'
/úŋút/ 'thorn'	/úŋup/ 'wife'

Between high-low and low-high:

/wáput/ 'needles'	/watút/ 'horns'
/wápít/ 'road juncture'	/yapít/ 'sugar'
/úmup/ 'frog'	/ompúp/ 'man'

3.5. Stress. Stress in Weri is non-phonemic, occurring on the final syllable of a word. Each preceding alternate syllable carries a secondary stress. Often in four and five syllable words the stress on the antepenultimate syllable is equal to or heavier than that on the ultimate.

/ŋíntíp/	[ŋín'típ]	'bee'
/kúlípú/	[kúlí'pú]	'hair of arm'
/úlúámít/	[úlúá'mít]	'mist'
/ákunetepaǎ/	[ákūnētē'pǎǎ]	'times'

4. DISTRIBUTION OF PHONEMES

4.1. General. The syllable, the unit chosen for the description of distribution, is defined as a unit of tone placement. It consists of a single vowel nucleus with an optional marginal onset of one consonant, and an optional closure of one or two consonants.

The following CV patterns have been observed:

V	/á/	'Speak!'
	/ínél/	'axe'
	/líer/	'Extinguish!'
VC	/óm/	'only'
	/kaúpment/	'tree type'
	/saút/	'I went'
VCC	/ínt/	'bird'
	/ompnémp/	'man'
	/káíŋk/	'miss'
	/kaumpnémes/	'sweet potato'

CV	/né/	'I, me'
	/kotúp/	'young person'
	/ílolu/	'waterfall'
CVC	/kan/	'road'
	/kélte/	'blanket'
	/piáľipta/	'they two also'
	/kóntup/	'girl'
CVCC	/ként/	'wind'
	/kóntnamp/	'girl'
	/omnámpa/	'the man also'

Any syllable type may occur in any position in a word or as a whole word.

Words of up to seven syllables have been observed.

/ní/	'you'
/ténip/	'we two (exclusive)'
/piáľip/	'they two'
/ɣuntúpúľu/	'leeches'
/ɣásúmétépaľ/	'two head pads'
/ľíľíɣewelraľ/	'two ladders'
/móľmóľaimentiaľ/	'two tomatoes'

4.2. Specific. Four classes of consonants and one of vowels occur. Semi-vowels occur only syllable initial. Nasals occur in all positions except the final C of CC. Stops occur in all positions except the initial C of CC. /s, l, ľ/ occur in all single C positions. All vowels may occur in all positions.

Because /w/ and /y/ only occur syllable initial they do not occur in vowel-consonant sequences within a syllable. Of the 63 possible vowel-consonant combinations, /ik/ and /us/ have not been observed. Seven of the possible 77 consonant-vowel sequences within a syllable have not been observed. Six of these involve /y/ and /w/. They are /yi, yI, yu, yU, wu, and wU/. The other is /mi/.

Limitations of CC sequences across syllable borders may be noted in the chart of phoneme sequences (p.81). One point of interest is that /s/ has not been observed as the second member of a CC cluster.⁴

There are 49 possible sequences of two vowels, but there appears to be no pattern to the ones which have not been

noted. To date the following have not been observed: /iɪ, ii, iu, eo, ae, oe, uɪ, uo, uu, uɪ, uo, uu/. 22 three vowel sequences have also been noted as well as the following four sequences: /oɪau, oɪau, and auau/.

4.3. Frequency of Phonemes. A phoneme count was made of 17 pages of text totalling 3,664 phonemes. Vowels totalled 46 percent, and consonants 54 percent, of the phonemes. Of the vowels /a/ comprised 31 percent, /ɪ/ 25 percent, /e/ 12 percent, /i/ 11 percent, /u/ 8 percent, /o/ 8 percent, and /u/ 5 percent. Front vowels, totalling 48 percent of the vowels, were much more frequent than back vowels with 21 percent. The stops were the most frequent consonants with 41 percent of the consonant occurrence. Next followed nasals with 26 percent, laterals with 15.5 percent, semi-vowels with 11 percent, and fricatives with 6.5 percent. Of all the phonemes, the frequency from most to least was as follows: /a, ɪ, k, n, p, t, e, i, l, m, u, w, o, s, l, ŋ, u, y/.

5. ORTHOGRAPHY

5.1. Proposed Orthography

	<i>Phoneme</i>	<i>Proposed Symbol</i>
/p/	[p, b]	p
/t/	[t, d]	t
/k/	[k, g]	k
/s/	[s, z, ts, tz]	s
/m/		m
/n/		n
/ŋ/		ng
/l/	[l, ɫ, ɭ, ɮ]	l
/ɹ/	[ɹ, ɻ]	r
/w/		w
/y/		y
/i/		ē
/ɪ/		i
/e/		e
/a/		a
/o/		o

Proposed Orthography - continued

<i>Phoneme</i>	<i>Proposed Symbol</i>
/ʊ/	u
/u/	ü
/ʻ/	Unmarked
/Low tone/	Unmarked

} Low func-
} tional load

5.2. List of Pidgin words as pronounced by the vernacular speaker (using practical orthography):

<i>Pidgin</i>	<i>Weri</i>	<i>English</i>
ananas	ananasip	pineapple
anien	anëanët	onion
balus	parüsu	aeroplane
bateri	paterë	battery
didiman	tëtëman	agricultural officer
dokta	rot	doctor
dram	taramit	drum
fok	pokit	fork
gras	karasit	grass
hama	amaat	hammer
kabis	kapës	cabbage
kiap	këap	government officer
krismas	kërësmakë	Christmas
manggo	mangkoop	mango
masta	masap	white man
muli	mürë	citrus fruit
pika	pëëker	pick
pepa	pepewer	paper
sop	sokopnemes	soap
tin	tënet	tin
trak	taraku	truck
wel	weel	oil

5.3. Sample Text, in Phonetic and Orthographic Script

1. ne pene wanamkan e wil waul iak petilulmiak wi:n
ne pene wangamkan e wir waür iak petërülmiak wiin

mołisuk ni pene es ŋai si pil yenia 2. pit iak mak
morisuk në pene es ngai si pil yenia pët iak mak

3. miak o ka:tak is ku:p ðe yunaŋmu ðe ðei ðe iak koil
miak o kaatak ës kuup re yünangmü re reë re iak koër

wawau 4. o yailu:k si es ngaim wiak 5. yokota:ĩ es
wawau o yailuuk si es ngaim wëak yokotaar es

naun in ten yunakı:ĩ 6. yuna es utnent ne nent iak wais
naun in ten yünakiir yüna es ütinent ne nent iak waës

7. yunaḡmua pita pimin wia un 8. nem put wak wais e
yünangmüa pëta pëmin wëa un nem put wak waës e

wi ulmiaut kalkuli
wë ülmiaüt karküre

1. This morning I came here and when I had finished work and put (things) away, Maurice said to me, "You go now and get some firewood." 2. So I said, "Yes." 3. I went to the house and looking around found Kuup, Yunangmu, and Rei. 4. We went up to the bush and after looking for firewood for a long time, put it down. 5. The two boys didn't get any firewood, only we, Yunangmu and I. 6. Yunangmu got a bundle of firewood, and I one, and came. 7. Yunangmu put away hers for herself. 8. I went along and brought my things and put them away here under the house.

NOTES

1. Here and throughout the paper, in both phonetic and phonemic script, 'e' represents 'ɛ' and 'o' represents 'õ'. In addition, suprasegmentally, 'ˆ' represents high pitch with a slight downglide and '˘' represents low to very low downglide.

2. See A. Capell, *A Linguistic Survey of the South-Western Pacific*, New and Revised Edition, South Pacific Commission, *Technical Paper No. 136*, Noumea, 1962, p.113; and Stefan Wurm, "Tonal Languages in New Guinea and Adjacent Islands", *Anthropos*, vol.49, pp.697-702 (1954).

3. See *Languages of the Goilala Sub-district* by Walter Steinkraus and Alan Pence, Summer Institute of Linguistics. Printed and published by the Department of Information and Extension Services, Port Moresby, Territory of Papua and New Guinea, April 1964. Apart from Weri, Biangai also has phonemic tone, but Kunimaipa has no phonemic prosodies.

4. Except the girl's name /kúnsawe/, a borrowed word.

