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by

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# SELEPET VOCOID CLUSTERS

K. A. McELHANON

0. Introduction.
1. The Problem Stated.
2. Interpretation of Contrasting Sequences.
3. Interpretation of Mutually Exclusive Sequences.

## 0. INTRODUCTION

The purpose of this paper is to present the problem of vocoid clusters in the Selepet language with the various alternative solutions proposed, discussed and evaluated.<sup>1</sup> A phonemic analysis of vocoids yields the results shown in Chart I. The vowels contrast vertically as to high, mid and low tongue positions and horizontally as to front and back tongue positions.

Chart I  
VOWEL PHONEMES

i	u
e	o
a	ɔ

## 1. THE PROBLEM STATED

Clusters of vocoids may occur in the patterns given below. Occurrence of the period indicates a sequence of vocoids with a timing of two moras. Absence of the period indicates a sequence with a timing of one mora. A raised vocoid indicates a non-syllabic vocoid. Except where pertinent to the argument, data will be written without regard for allophones. The patterns are:

*Pattern 1* ( $v^v$ ) in which stress may occur only on the second member as in  $i^i\acute{o}go$  'strike them' and  $u^u\acute{a}t$  'chase it!'.<sup>2</sup>

*Pattern 2* (·**v**<sup>v</sup>)

first member as in *ʒ*<sup>o</sup>m 'variety of pandanus' and *gá*<sup>e</sup>k 'let him come!'.

*Pattern 3* (**v**<sup>v</sup>**v**) in which stress may occur only on the second member as in *i*<sup>a</sup>*i* 'they spoke' and *u*<sup>o</sup>*i* 'touch it!'.

*Pattern 4* (**v**<sup>v</sup>.**v**) or (**v**.**v**<sup>v</sup>) in which stress may occur on either member but not on both as in *hé*ak 'breath' or *hó*re-*á*kbe 'I myself will cut it'.

*Pattern 5* (**v**.**v**<sup>v</sup>) in which stress may occur only on the third member as in *tú*hu<sup>i</sup>*é*kbe 'I'll do it for them' and *só*h<sup>o</sup>*i**é*kbe 'I'll tie them'.

*Pattern 6* (**v**<sup>v</sup>.**v**<sup>v</sup>) or (**v**.**v**<sup>v</sup>**v**) in which stress may occur on the first or second member but not on both as in *ó*a<sup>i</sup>n 'we became' and *tú*hu<sup>a</sup>*i*tgot 'because we did it'.

*Pattern 7* (**v**<sup>v</sup>.**v**) or (**v**<sup>v</sup>.**v**<sup>v</sup>) in which stress may occur on either the first or third member but not on both as in *hó*<sup>u</sup>ok 'let him spear it' and *hó*h<sup>o</sup>*i**á*ksap 'it raised itself up'.

*Pattern 8* (**v**<sup>v</sup>.**v**<sup>v</sup>) or (**v**<sup>v</sup>.**v**<sup>v</sup>**v**) in which stress may occur on the first or the fourth member but never on both as in *hó*<sup>u</sup>*i*et 'you (dual) spear it!' and *hó*h<sup>o</sup>*i**i**é*ksap 'he lifted them up'.

*Pattern 9* (**v**<sup>v</sup>.**v**<sup>v</sup>) or (**v**<sup>v</sup>.**v**<sup>v</sup>**v**) in which stress may occur on the first or third member but not on both as in *hó*<sup>u</sup>a<sup>i</sup> 'they speared it' and *hó*h<sup>o</sup>*i**á**i*ron 'at the time you raised it'.

Only Pattern 4 does not contain non-syllabic vocoids.

These patterns exhibit vocoid clusters from two to four in number. For our purposes it is convenient to consider sequences of two vocoids at a time. Chart II indicates those sequences of two vocoids that have been observed.<sup>3</sup>

## Chart II

ii	ie	ia	iɔ	io	iu
ei		ea	eɔ	eo	eu
ai	ae			ao	au
ɔi	ɔe			ɔo	ɔu
oi	oe	oa	oo		ou
ui	ue	ua	uo	uo	uu

In two-vocoid sequences of one mora's timing the following clusters have been observed:

*Group A:* e<sup>i</sup>, e<sup>u</sup>, a<sup>i</sup>, ɔ<sup>i</sup>, o<sup>i</sup>, u<sup>i</sup>, a<sup>e</sup>, ɔ<sup>e</sup>, o<sup>e</sup>, a<sup>o</sup>, a<sup>u</sup>, ɔ<sup>o</sup>, ɔ<sup>u</sup> and o<sup>u</sup>.

*Group B:* i<sub>i</sub>, i<sub>e</sub>, i<sub>a</sub>, i<sub>ɔ</sub>, i<sub>o</sub>, i<sub>u</sub>, u<sub>u</sub>, u<sub>o</sub>, u<sub>a</sub>, u<sub>ɔ</sub>, u<sub>e</sub> and u<sub>i</sub>.

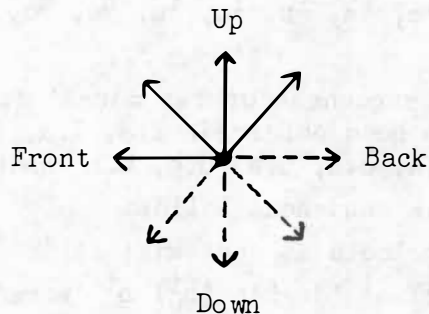
In two-vocoid sequences of two moras' timing the following clusters have been observed: i.e, i.a, i.ɔ, i.o, i.u, e.a, e.ɔ, e.o, o.a, o.ɔ, u.a, u.e, u.ɔ and u.o.

Examples of the sequences follow:

(e<sup>i</sup>) mem kepe<sup>i</sup> 'hold it and twist it!'; (e<sup>u</sup>) ge<sup>u</sup>na<sup>o</sup> (man's name); (a<sup>i</sup>) a<sup>i</sup> 'dig!'; (ɔ<sup>i</sup>) ɔ<sup>i</sup> 'work'; (o<sup>i</sup>) tatbo<sup>i</sup>t 'we (dual) should have stayed'; (u<sup>i</sup>) pu<sup>i</sup> 'chicken'; (a<sup>e</sup>) ga<sup>e</sup>k 'let him come!'; (ɔ<sup>e</sup>) soho<sup>e</sup>k 'let him tie it!'; (o<sup>e</sup>) to<sup>e</sup>n 'in the water'; (a<sup>o</sup>) ka<sup>o</sup>k 'white'; (a<sup>u</sup>) ba<sup>u</sup> 'pig'; (ɔ<sup>o</sup>) bo<sup>o</sup>k<sup>i</sup>ap 'it broke'; (ɔ<sup>u</sup>) ɔ<sup>u</sup>n 'now'; (o<sup>u</sup>) lo<sup>u</sup>m 'carrying'; (i<sub>i</sub>) i<sub>i</sub>ngiap 'he gave it to them'; (i<sub>e</sub>) i<sub>e</sub>k 'look at them!'; (i<sub>a</sub>) i<sub>a</sub>p 'he spoke'; (i<sub>ɔ</sub>) i<sub>ɔ</sub>k 'he'; (i<sub>o</sub>) i<sub>o</sub>ngo 'strike them!'; (i<sub>u</sub>) i<sub>u</sub> 'this'; (u<sub>u</sub>) u<sub>u</sub>on 'what'; (u<sub>o</sub>) u<sub>o</sub>san 'where'; (u<sub>ɔ</sub>) u<sub>ɔ</sub>ko 'cockatoo'; (u<sub>a</sub>) u<sub>a</sub>t 'chase it!'; (u<sub>e</sub>) u<sub>e</sub>som 'floating'; (u<sub>i</sub>) u<sub>i</sub>giliŋ 'kind of grass'; (i.e) si.ep si.ep 'kind of bird'; (i.a) si.ap 'it burned'; (i.ɔ) i.ɔk 'let him sleep!'; (i.o) si.op 'it burned'; (i.u) pi.u pi.u 'kind of bird'; (e.a) he.ak 'breath'; (e.ɔ) gore.ɔk 'let her sew!'; (e.o) gore.on 'you sewed it!'; (o.a) go.aksom 'bending over'; (o.ɔ) toho.ɔk 'let him come!'; (u.a) huhu.aksap 'he smashed himself'; (u.e) lu.e lu.e i<sup>i</sup>ap 'it howled'; (u.ɔ) u.ɔk 'let him cook it!'; (u.o) tuhu.op 'he made it'.

When these vocoid glides are plotted on a vowel chart, eight different directions of glide may be described, some simple and some complex. They are with their symbolisations: up (**u**), up and forwards (**uf**), up and backwards (**ub**), forwards (**f**), down and forwards (**df**), down (**d**), down and backwards (**db**) and backwards (**b**). All the two-vocoid sequences in Group A glide in one of four directions: (**f**), (**uf**), (**u**) and (**ub**). All the two-vocoid sequences in Group B and all those occurring with two moras' timing glide in one of the four remaining directions (**df**), (**d**), (**db**) and (**b**). Figure A represents the direction of the glides. The solid line indicates those glides of Group A; the other glides are represented by the broken line.

Figure A



Various interpretations will be presented and evaluated in the following sections of the paper.

## 2. INTERPRETATION OF CONTRASTING SEQUENCES

It is observed above that all the members in Group B of one mora's timing with the exception of <sup>i</sup>i and <sup>u</sup>u contrast with identical sequences of two moras' timing. Since vowel length does not occur, one would not expect to find contrasts between <sup>i</sup>i and i.

Examples follow:

<sup>i</sup>ék 'look at them!' and sí.ep sí.ep 'kind of bird'; <sup>i</sup>á<sup>i</sup> 'they are speaking' and í.a<sup>i</sup> 'they are sleeping'; <sup>i</sup>ók 'he' and í.ók 'let him sleep!'; <sup>i</sup>óngo 'strike them!' and í.on 'you slept'; <sup>i</sup>ú 'this' and pí.u pí.u 'kind of bird'; <sup>u</sup>ósan 'where' and ú.on 'you cooked it'; <sup>u</sup>ókó 'cockatoo' and ú.ók



'let him cook it!'; <sup>u</sup>át 'chase it' and <sup>ú</sup>.at 'you are cooking it'; <sup>ú</sup>éke 'ghost' and lú.e lú.e <sup>i</sup>áp 'it is barking'; <sup>ú</sup>ígiliŋ 'kind of grass' and <sup>ú</sup>.in 'we cooked it'.

A summary of the data pertinent to the interpretation follows. The phone [u] occurs in all syllabic vocoid positions. The phone [<sup>u</sup>] occurs word initially and following syllabic vocoids. When it occurs word initially it is in Group B and when it occurs following a syllabic vocoid it is in Group A. Also pertinent is phone [b] which occurs intervocalically. Phone [<sup>u</sup>] is suspect as a variant of both phone [u] and phone [b].<sup>4</sup> In word initial position phone [<sup>u</sup>] contrasts with phone [u] in identical environments as in <sup>u</sup>át 'you chase it!' and <sup>ú</sup>.at 'you are cooking it'. In intervocalic positions it contrasts with phone [b] in identical environments as in h<sup>u</sup>ók 'let him spear it!' and h<sup>u</sup>ók 'only a fly'.

The writer suggests that phone [<sup>u</sup>] of Group B be combined with [b] to form phoneme /w/. The phone [<sup>u</sup>] of Group A may be combined with [u] to form phoneme /u/. By this interpretation two phonemes are created from four phones. If we were to combine the two [<sup>u</sup>] phones to form a phoneme, we would create three phonemes because of the contrasts of phones [<sup>u</sup>] with [u] and [b]. These phonemes would be: /u/ [u] occurs in all syllabic vocoid positions; /w/ [<sup>u</sup>] occurs word initially and following syllabic vocoids; /v/ [b] occurs intervocalically. The writer, therefore, prefers the first interpretation.

The interpretation of phoneme /y/ parallels that of phoneme /w/. The phonetic norm for phoneme /y/ is fricative and the distribution of its allophones follows: [<sup>i</sup>] occurs word initially and intervocalically; [z] occurs only in fluctuation with [<sup>i</sup>] word initially before /i/; [z<sup>i</sup>] occurs only in fluctuation with [<sup>i</sup>] word initially before /e/ and following voiced stops and nasals; [s<sup>i</sup>] occurs only in fluctuation with [<sup>i</sup>] following voiceless stops.

### 3. INTERPRETATION OF MUTUALLY EXCLUSIVE SEQUENCES

Applying the results of the above interpretation to the original patterns of vocoid clusters in Section 1 produces

the following changes: Patterns 1 and 5 no longer contain vocoid clusters; Pattern 3 becomes ( $c\acute{v}^v$ ) and so may be combined with Pattern 2; Pattern 8 becomes ( $\acute{v}^v.c\acute{v}$ ) and so also may be combined with Pattern 2. Thus the remaining patterns are: Pattern 2 ( $\acute{v}^v$ ), Pattern 4 ( $\acute{v}.v$ ) or ( $v.\acute{v}$ ), Pattern 6 ( $\acute{v}.v^v$ ) or ( $v.\acute{v}^v$ ), Pattern 7 ( $\acute{v}^v.v$ ) or ( $v^v.\acute{v}$ ) and Pattern 9 ( $\acute{v}^v.v^v$ ) or ( $v^v.\acute{v}^v$ ). Chart II is modified to the extent that the *ii* and *uu* sequences are omitted.

Under our consideration now are the vocoid sequences of Group A (namely,  $e^i$ ,  $e^u$ ,  $a^i$ ,  $\text{ɔ}^i$ ,  $o^i$ ,  $u^i$ ,  $a^e$ ,  $\text{ɔ}^e$ ,  $o^e$ ,  $a^o$ ,  $a^u$ ,  $\text{ɔ}^o$ ,  $\text{ɔ}^u$ ,  $o^u$ ) and the vocoid sequences of double mora timing (namely, *i.e*, *i.a*, *i.ɔ*, *i.o*, *i.u*, *e.a*, *e.ɔ*, *e.o*, *o.a*, *o.ɔ*, *u.a*, *u.e*, *u.ɔ*, *u.o*). It has already been noted in Figure A that all those sequences of a single mora's timing glide in one of four directions: (**f**), (**uf**), (**u**) or (**ub**); and those sequences of double mora timing glide (**b**), (**db**), (**d**) or (**df**).

3.1. Interpretation A is to consider as semi-consonants the final vocoid of sequences of single mora timing. Patterns 2 ( $\acute{v}^v$ ), 6 ( $\acute{v}.v^v$ ) or ( $v.\acute{v}^v$ ), 7 ( $\acute{v}$  or ( $v^v.\acute{v}^v$ ) would be affected. Under this interpretation [ $i$ ] would be symbolised as /y/, [ $e$ ] as /ɣ/, [ $o$ ] as /ø/ and [ $u$ ] as /w/.<sup>5</sup> Examples given for the patterns would be as follows: Pattern 2 /ɔøm/ 'variety of pandanus'; /gayk/ 'let him come!'; Pattern 6 /oayn/ 'we are working'; Pattern 7 /howok/ 'let him spear it!'; and Pattern 9 /howay/ 'they speared it'.

This interpretation considers all remaining vocoid sequences of one mora's timing to be composed of vowel plus semi-consonant and thus neatly identifies the syllable as consisting of a nucleus of one vowel and one timing unit. Thus it avoids the need to identify syllable boundaries between vowels since the only remaining sequences are of two moras' timing and consequently two syllables. Any phonemically written vowel sequence is automatically recognised as being two distinct units. This interpretation also recognises the unstressed quality of the second member of these vocoid clusters and its similarity to consonants in this regard.

This interpretation would lead to the introduction of four or more phoneme symbols. It would set up a class of semi-consonants thus forming three classes of phonemes: consonants, semi-consonants and vowels. Secondly, it would establish consonant-semi-consonant clusters within the syllable and thus establish a syllable type for which there is

no non-suspect pattern. Under this interpretation the following syllable types would be set up: V, VS, VC<sub>2</sub>, VSC<sub>2</sub>, C<sub>1</sub>V, C<sub>1</sub>VS, C<sub>1</sub>VC<sub>2</sub> and C VSC<sub>2</sub>. In these types V would represent any vowel, C<sub>1</sub> any consonant, S any semi-consonant and C<sub>2</sub> any voiceless stop or nasal.<sup>6</sup> Furthermore, a potential total of 60 different consonant-semi-consonant clusters would be introduced adding to the complication of the orthography.

3.2. Interpretation B is to consider vocoid clusters of one mora's timing as phonetically-complex unit phonemes. This interpretation is pleasing because there would be a parallelism between vowels and consonants, each having simple and complex phonemes.<sup>7</sup> Examples given for the patterns would be as follows: Pattern 2 /ɔ<sup>o</sup>m/ 'variety of pandanus', /g<sup>a</sup>k/ 'let him come!'; Pattern 6 /oa<sup>i</sup>n/ 'we are working'; Pattern 7 /hɔ<sup>u</sup>ɔk/ 'let him spear it!'; and Pattern 9 /hɔ<sup>u</sup>a<sup>i</sup>/ 'they speared it'. Both the complex vowel and complex consonant phonemes could be represented orthographically by writing their individual etic members. Thus /a<sup>i</sup>/, /a<sup>u</sup>/, etc. could be written as ai, au, etc. with no complications to the orthography.

The vocalic quality of these sequences is still maintained and the fact that stress does not occur on the final etic member is not violated. All one has to remember is that the second member in this group of sequences is non-syllabic.

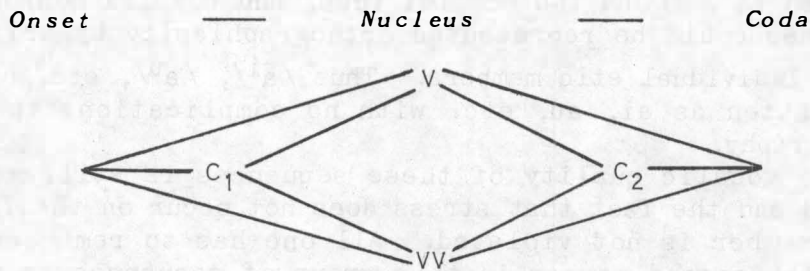
A further attraction would be that the number of syllable types set up by Interpretation A would be reduced by half; the four non-syllabic vocoids (i, e, o and u) would be incorporated into the preceding syllabic vocoid as a unit phoneme so that the four remaining patterns would be V, VC<sub>2</sub>, C<sub>1</sub>V and C<sub>1</sub>VC<sub>2</sub>. In these syllable types V would represent any vowel, C<sub>1</sub> and consonant and C<sub>2</sub> any voiceless stop or nasal.

This interpretation takes into account the significant features of the syllable inasmuch as both complex and simple vowel phonemes would consist of one mora's timing, one peak and one stress (on the initial member of a complex phoneme). Yet its obvious disadvantage would be the addition of fourteen vowel phonemes, yielding a total of twenty vowel phonemes. Although it avoids the difficulty of Interpretation A, it really does not have any advantages other than the fact that there are half as many syllable types. By

this interpretation the description of the phonemes becomes cumbersome.

**3.3.** Interpretation C is to consider the vocoid sequences of one mora's timing as complex nuclei and thus one syllable. The sequences of two moras' timing are considered as sequences of single nuclei and thus two syllables. The syllable is easily recognised since the direction of the glide coincides with the occurrence of one or two moras' timing (see Figure A and the discussion with it). The emic syllable in Selepet is defined as a single mora of timing with a simple or complex nucleus of one or two vowels comprising one peak, an optional consonant onset and an optional consonant coda. Figure B presents a schematic diagram of the syllable.

**Figure B**



The complex syllable nucleus is distinguished from a sequence of two single nuclei by the following factors:

(a) *Timing*: inasmuch as a complex nucleus is one mora and a sequence of two simple nuclei is two moras.

(b) *Occurrence of stress*: whereas a complex nucleus can manifest stress only on the first of its members, a sequence of two simple nuclei may manifest stress on either of its members as in the following: (i.a) *liaku* 'tear it down!', *hórángiáksait* 'they are arguing'; (i.o) *giók* 'let him come down!', *sóliónge* 'at Soli'; (i.o) *kióngsap* 'it fell off', *isiówot* 'they cried'; (e.a) *héak* 'breath', *hóréákbe* 'I myself will cut it'; (e.o) *sówceop* 'it healed', *téteówot* 'they (dual) appeared'; (o.a) *óawot* 'they (dual) are doing it', *áhoáksai* 'they are fighting', (u.a) *uakne* 'stinging nettle', *túhuáksat* 'you are doing it to yourself'; (u.o) *úowot* 'they (dual) cooked it', *tónguówot* 'they (dual) helped him'.<sup>8</sup>

(c) *Internal membership*: the first member of a complex nucleus is never /i/, its second member never an /a/ or /o/; the first member of a sequence of two simple nuclei is never /a/ or /o/, the second member is never /u/ or /i/.

(d) *Direction of the glide*: the members of a complex nucleus glide (f), (uf), (u) or (ub); the members of a sequence of two simple nuclei glide (df), (d), (dh) or (b).

(e) *Number of syllable peaks*: the complex nucleus occurs with only one syllable peak while the sequence of two simple nuclei manifests two syllable peaks.

By this interpretation the following syllable types would be set up: V, VV, VC<sub>2</sub>, VVC<sub>2</sub>, C<sub>1</sub>V, C<sub>1</sub>VV, C<sub>1</sub>VC<sub>2</sub> and C<sub>1</sub>VVC<sub>2</sub>. See Figure B for the composite diagram. In recognising syllable division, however, one would first have to recognise complex nuclei. By illustration, the consonant vowel sequence CVVC may represent a single syllable with a complex nucleus as in /kaok/ CVVC 'white' or it may represent two syllables each with a simple nucleus as in /heak/ CV.VC 'breath'.

An important fact to remember is that in sequences of three or more vocoids the complex syllable nucleus has precedence in syllable formation. Thus if the sequence /aua/ should ever occur, one would know that the /u/ goes with the first /a/ to form a complex syllable nucleus and thus the syllable division would be between the /u/ and the second /a/ as [a<sup>u</sup>.a].

Since no more than two vocoids have been observed to occur in a complex nucleus, one may never expect to see a sequence such as /aei/ with two glides in the same direction. Correspondingly, since no more than two simple nuclei have been observed to occur consecutively, one may never expect to see a sequence such as /iea/ with two glides in the same direction. This correlates with the fact that only five patterns of vocoid clusters may occur, namely, Pattern 2 (v<sup>v</sup>), 4 (v<sup>v</sup>.v) or (v.v<sup>v</sup>), 6 (v<sup>v</sup>.v<sup>v</sup>) or (v.v<sup>v</sup>), 7 (v<sup>v</sup>.v) or (v<sup>v</sup>.v<sup>v</sup>) and 9 (v<sup>v</sup>.v<sup>v</sup>) or (v<sup>v</sup>.v<sup>v</sup>). One would therefore expect all sequences of three or more vocoids to exhibit a significant reversal in the glide direction in the middle of the overall glide. This reversal in direction identifies the syllable margins.

Examples of the syllable division follow: kapai.on 'in the village'; sowœ.op 'it healed'; doi.ok 'let him pull!'; gahai.aksap 'it peeled off'; gore.ai 'they are sewing'; ai.aksap 'he himself digs'; kepei.ai 'they are holding and tying'.

Interpretation C is the neatest and simplest of the three for the following reasons:

(a) It avoids the multiplicity of consonant-semi-consonant clusters within the syllable and the four semi-consonant phonemes necessitated by Interpretation A. Although the syllable nucleus is more complex than that proposed by Interpretation A, its margins are simpler and the syllable is easily defined in terms of timing and readily recognised by the directions of the vocoid glides.

(b) It avoids setting up the many complex vowel phonemes of Interpretation B which only serve to complicate the phonemic description.

(c) It best recognises the basic phonetic differences of the two types of vocoid sequences with regard to internal membership and direction of glide.

(d) It is the interpretation that most effectively relates the syllable to the stress group in the phonological hierarchy.

## Appendix I

### CONTRASTS OF VOCOID SEQUENCES AND COMPONENT MEMBERS

The following sets of multiple contrasts prove helpful in determining the individual identity and status of the glides with single-mora timing:

(1) (e), (e<sup>i</sup>) and (i)

mésele.an	'I dump it'
képe <sup>i</sup> .an	'I tie it'
tīgi.an	'I peel it'

(2) (e), (e<sup>u</sup>) and (u)

géne	'we (plural) will come down'
gé <sup>u</sup> na <sup>o</sup>	'man's name'
gólagúne	'we (plural) will stir it'

(3) (a), (a<sup>i</sup>) and (i)

kádi	'quickly'
ká <sup>i</sup> de	'kind of weed'
á <sup>i</sup>	'dig!'
í	'sleep!'

(4) (o), (o<sup>i</sup>) and (i)

hóp	'fly'
hó <sup>i</sup> p	'bow string'
ó <sup>i</sup>	'work'
í	'sleep!'

(5) (o), (o<sup>i</sup>) and (i)

tátbot	'you stay here!'
--------	------------------

- |      |                                     |                                |
|------|-------------------------------------|--------------------------------|
|      | tátbo <sup>i</sup> t                | 'we (dual) should have stayed' |
|      | tátbit                              | 'we (dual) stayed'             |
| (6)  | (u), (u <sup>i</sup> ) and (i)      |                                |
|      | kútne                               | 'my name'                      |
|      | kú <sup>i</sup> t                   | 'we hit it'                    |
|      | kítim                               | 'missing'                      |
| (7)  | (a), (a <sup>e</sup> ) and (e)      |                                |
|      | gákom                               | 'trap'                         |
|      | gá <sup>e</sup> k                   | 'let him come'                 |
|      | géksan                              | 'I saw you'                    |
| (8)  | (o), (o <sup>e</sup> ) and (e)      |                                |
|      | hódokom                             | 'along the ground'             |
|      | kódokdo <sup>e</sup> k              | 'with a whole one'             |
|      | nó <sup>e</sup> k                   | 'only me'                      |
|      | nék                                 | 'look at me!'                  |
| (9)  | (o), (o <sup>e</sup> ) and (e)      |                                |
|      | tómotje                             | 'rooting action of the pig'    |
|      | tó <sup>e</sup> n                   | 'in the water'                 |
|      | tétem                               | 'appearing'                    |
| (10) | (a), (a <sup>o</sup> ) and (o)      |                                |
|      | gán                                 | 'I came'                       |
|      | gá <sup>o</sup> n                   | 'you came'                     |
|      | ká <sup>o</sup> k                   | 'white'                        |
|      | kók <sup>i</sup> ap                 | 'it blistered and peeled'      |
| (11) | (a), (a <sup>u</sup> ) and (u)      |                                |
|      | kát                                 | 'put it!'                      |
|      | ká <sup>u</sup> t ká <sup>u</sup> t | 'kind of tree'                 |
|      | kútje                               | 'his name'                     |
| (12) | (o), (o <sup>o</sup> ) and (o)      |                                |
|      | gówoŋ gówoŋ                         | 'round, circular'              |



- |      |   |                         |
|------|---|-------------------------|
|      | sóh <sup>o</sup> wot                    | 'they tied it'          |
|      | bó <sup>o</sup> k <sup>i</sup> ap       | 'it broke'              |
|      | bók <sup>i</sup> ap                     | 'it died (of fire)'     |
| (13) | (o), (o <sup>u</sup> ) and (u)          |                         |
|      | -on                                     | 'at'                    |
|      | ɔ́ <sup>u</sup> n                       | 'now'                   |
|      | kó <sup>u</sup> n                       | 'kind of tree'          |
|      | kún                                     | 'say it!'               |
| (14) | (o), (o <sup>u</sup> ) and (u)          |                         |
|      | sóso                                    | 'dog'                   |
|      | só <sup>u</sup> só <sup>u</sup>         | 'blue bird of paradise' |
|      | hó <sup>u</sup> ŋe hó <sup>u</sup> ŋe   | 'exchange marriage'     |
|      | húnbero                                 | 'poor'                  |
| (15) | (a <sup>e</sup> ) and (a <sup>i</sup> ) |                         |
|      | gá <sup>e</sup> k                       | 'let him come'          |
|      | gáha <sup>i</sup> we                    | 'I will peel it'        |
| (16) | (a <sup>o</sup> ) and (a <sup>u</sup> ) |                         |
|      | ká <sup>o</sup> k                       | 'white'                 |
|      | ká <sup>u</sup> t ká <sup>u</sup> t     | 'kind of tree'          |
| (17) | (ɔ <sup>e</sup> ) and (ɔ <sup>i</sup> ) |                         |
|      | sówɔ <sup>e</sup> m                     | 'healing'               |
|      | gó <sup>i</sup> m                       | 'cutting'               |
| (18) | (ɔ <sup>o</sup> ) and (ɔ <sup>u</sup> ) |                         |
|      | ɔ́ <sup>o</sup> m                       | 'kind of tree'          |
|      | ɔ́ <sup>u</sup> n                       | 'now'                   |
| (19) | (ɔ <sup>e</sup> ) and (o <sup>e</sup> ) |                         |
|      | bóro <sup>e</sup> n                     | 'in the bush'           |
|      | tó <sup>e</sup> .                       | 'in the water'          |

(20) (a<sup>e</sup>) and (o<sup>e</sup>)táka<sup>ɛ</sup>k 'let him come'pílo<sup>ɛ</sup>k 'let it go'(21) (a<sup>u</sup>) and (o<sup>u</sup>)ká<sup>u</sup>t ká<sup>u</sup>t 'kind of tree'kó<sup>u</sup>n 'kind of bamboo'(22) (o<sup>u</sup>) and (o<sup>u</sup>)ó<sup>u</sup>n 'now'tó<sup>u</sup>ŋe 'his elder sister'(23) (a<sup>u</sup>) and (o<sup>u</sup>)sá<sup>u</sup> 'light it!'só<sup>u</sup> só<sup>u</sup> 'blue bird of paradise'(24) (o<sup>i</sup>) and (o<sup>e</sup>)tátbo<sup>i</sup>t 'we (dual) should have stayed'tó<sup>e</sup>n 'in the water'

## Appendix II

### GRAMMATICAL LIMITATIONS OF VOCOID SEQUENCES

The majority of Selepet vocoid sequences are formed by the combination of stems with suffixes. Grammatical limitations, therefore, play an important part in determining which sequences have been observed. By quickly surveying the syllable types as presented in Figure B and discussed in Section 3.3, one can readily see the possible sequences of vowels.

<i>Open syllable types to which suffixes may be added:</i>	<i>Vowel initial suffixial syllable types:</i>
(C)V	V(C)
(C)VV	VV(C)

Inasmuch as affixes constitute a closed class of morphemes, one would not expect to discover large numbers of suffixes. In Selepet, of the approximately 80 suffixes recorded, only 16 begin with a vocoid and these are listed below:

-on	2nd person (sing.) past tense
-op	3rd person (sing.) past tense
-owot	2, 3 person (dual) past tense
-an	1st person (sing.) present tense
-at	2nd person (sing.) present tense
-it or -a <sup>i</sup> t	1st person (dual) present tense
-in or -a <sup>i</sup> n	1st person (plural) present tense
-awot	2, 3 person (dual) present tense
-a <sup>i</sup>	2, 3 person (plural) present tense
-ak or -aho or -agi	reflexive pronoun
-on	'in, at'
-ok	'only'
-en	'into'

-oken	'close to'
-ebo	'out of'

It is important to note that the phoneme /u/ has not been observed to occur initially in suffixes. Consequently the sequences of vocoids which occur across morpheme boundaries are limited.

## NOTES

1. The Selepet language is spoken by approximately 7000 people in and near the valley of the Pumune River on the northern mountain slopes of the Huon Peninsula, Finschhafen Subdistrict, Territory of New Guinea. A. Capell in his *A Linguistic Survey of the South-western Pacific* (South Pacific Technical Paper No. 136, Noumea, New Caledonia, 1962) has classified the language as "non-Melanesian". No further classification has yet been devised although it is known to be closely related to the neighbouring languages of Timbe and Komba and more distantly related to Bulum. Nine months were spent in the language area gathering the data upon which this paper is based. The dialect represented in this analysis is that of the Selepet speakers on the upper Pumune River near the Kabwum Patrol Post. The particular village of field work was Indum village - population 1200. A number of informants was used of whom two could be called principal informants: Puanare, an aid post orderly in his late thirties, and Kawinu, a teenage lad. This paper is based on more than 3000 dictionary entries and 100 typewritten pages of text material.

I am indebted to Dr Alan Healey for his suggestions in the presentation of this paper.

2. The segmental phonemes are /p/, /t/, /k/, /b/, /d/, /g/, /m/, /n/, /ŋ/, /w/, /y/, /s/, /h/, /l/ and /r/. The voiceless stops are aspirated in initial and intervocalic positions and unreleased in final position. The voiced stops are prenasalised. The phonemes /w/ and /h/ have variants [b] and [g] respectively occurring intervocalically. Non-phonemic stress accompanied by high pitch occurs in a predictable manner with primary stress occurring on the first syllable and secondary stress occurring on the following alternate syllables. In three and five syllable words the final secondary stress is optional. Grammatical perturbation of stress has been observed but does not yield any stress patterns which would provide additional information. Because the distinction between primary and secondary stress is not pertinent to the argument of this paper, the distinction is not made in the body of the paper. The following

stress patterns have been found in word stems of up to four syllables in length:

(a) Two-syllable words: primary stress (ˈ) occurs on the first syllable. séduk 'crazy'; páto 'big'; áwun 'pulse'.

(b) Three-syllable words: primary stress occurs on the first syllable and secondary stress (ˈ) occurs optionally on the third syllable. gálagàt or gálagat 'kind of tree'; émelòk or émelok 'before'; ɲéredèŋ or ɲéredeŋ 'locust'.

(c) Four-syllable words: primary stress occurs on the first syllable and secondary stress occurs on the third syllable. búbulèli 'butterfly'; méwelàki 'unfold it!'; kúlewòŋboŋ 'thunder cloud'.

3. Selepet does not manifest phonemic vowel length and when two like vowels come into conjunction they reduce. Phonemes /a/ and /o/ appear to function in this manner also, e.g. *yu-* 'this' plus *-on* 'at' yields *yuon* 'here'. However, *ya-* 'that' plus *-on* 'at' yields *yan* 'there'. Examples such as this could be multiplied. The sequences *ii* and *uu* in Chart II do not contradict this. Their interpretation will be presented in the course of this paper.

4. Pike, Kenneth L. *Phonemics: A Technique for Reducing Languages to Writing*. University of Michigan Press, Ann Arbor, 1947, p.70.

5. To avoid confusion, this interpretation would necessitate writing as /z/ and /v/ the phones [i] and [u] analysed under Section 2.

6. The syllable is more completely described under Interpretation C, Section 3.3.

7. The complex unit consonant phonemes are /b/, /d/ and /g/. They are prenasalised voiced stops which are interpreted as complex unit phonemes because there are no non-suspect consonant clusters occurring word initially.

8. Grammatical patterns, morphological limitations and perturbation of stress account for the lack in this data of stress occurring on the second member of sequences (i.e), (i.u), (e.o), (o.o), (u.e) and (u.o).

# A TENTATIVE STATEMENT OF THE PHONEMES OF YAGARIA

G. L. RENCK

## 1. INTRODUCTION

According to the 1966 census figures, the Yagaria language is spoken by 17,382 people in the area east and north of Mt Michael in the Eastern Highlands of New Guinea. They comprise all the population in the "Yagaria Census Division", and some of the population in the "Labogai Census Division", Lufa Subdistrict, E.H.D.<sup>1</sup>

The name "Yagaria" is generally unknown amongst the people themselves; it originates from the people living in the areas adjoining to the north, who call that area the "Yagaria" area, and consequently speak of the "Yagaria people", and "Yagaria language".

Since Yagaria consists of a number of different dialects, the speakers of Yagaria seldom refer to their language as a unit and, in fact, they have no name for the language as a whole. They usually refer to individual dialects, speaking of "the language of the people of X." (X. would then be the name of a village, a tribe, or a smaller area comprising several villages).

The name "Yagaria" for scientific classification was introduced by Dr S.A. Wurm, after his 1958-9 field survey of the Australian New Guinea Highlands languages. Yagaria, according to Wurm's classification<sup>2</sup>, belongs with its related languages Kamano, Keigana, Kanite, and Yate, to the Kamano-Yagaria-Keigana Subfamily of the Gende-Siane-Gahuku-Kamano-Fore Family, or East-Central Family<sup>3</sup>, of the East New Guinea Highlands Stock.

This paper is the result of study carried out over a period of about four years, during the course of the author's missionary duties at the Lutheran Mission station Rongo.

The author has stuck exclusively to the dialect spoken by the people of Movei (Kiseveloka), which is known as the

"Kiseveloka language" ([<sup>h</sup>kiseve<sup>h</sup>gloka <sup>h</sup>ke]), or "Filigano language" ([fi<sup>h</sup>g<sup>h</sup>ligano <sup>h</sup>ke]), since the area which comprises the eastern third of the Yagaria Census Division is known as the "Filigano" area amongst the people.

Over the four years, quite a number of informants from Kiseveloka were used. The most valuable information was obtained from Ulo, a young man between 25-30 years of age, who is working as an evangelist at the Lutheran Mission station Rongo.

## 2. INTERPRETATION

### 2.1. Syllable Patterns

The

CV [<sup>h</sup>bakisave] 'snake'

V (only word initially)

[<sup>h</sup>afɛpa] 'grass'

There is also a CVC syllable, in which the second consonant is the glottal stop:

[bogo<sup>h</sup>koʔ] 'only one'

VC syllables in which the closing consonant is a glottal stop, occur:

[<sup>h</sup>aʔyuva] 'women'

CC clusters occur where CVC or VC precede CV or CVC:

[<sup>h</sup>dots<sup>h</sup>na] 'food'

[<sup>h</sup>aʔyuva] 'women'

Since the closing consonant in CVC and VC is always the glottal stop, the first C of a CC cluster is always the glottal stop.

## 2.2. Interpretation of Consonants

### 2.21. Suspect Consonants

[y], which sometimes fluctuates to [dz] or [dʒ] (depending on the speaker), is interpreted as a consonant, and

[v], which sometimes fluctuates to [b] and even [w], is also interpreted as a consonant since both variations occur as consonants in the CV pattern:

[y] = c = [y]

[v] = c = [v]

[<sup>h</sup>yona] 'house'

[<sup>h</sup>ve] 'man, male'



[ˈhoya] 'garden, work'  
 [ˈavo] 'father'  
 [yaˈvana] 'stone'

## 2.22. Consonant Sequences

The consonant sequence [gl] is interpreted as a complex sound, since the only non-suspect consonant sequence is [ʔC], and since [gl] occurs always as belonging to one syllable only, and since [l] never occurs in isolation.

[gl] = C = [ɣl]  
 [ˈɣluna] 'axe'  
 [fuˈɣluna] 'peace'

*NOTE:* As [dz] and [dʒ] are only fluctuations of [y], depending on the individual speakers, they are complex sounds.

[dz] = C = [z]                      [dʒ] = C = [j]

## 2.23. Pre-glottalised Consonants

Pre-glottalisation may occur word medially with all consonants except the voiceless stops<sup>4</sup>, [g], [q], [m], [s], and [f].

Are the preglottalised consonants CC sequences or complex consonants?

In all cases, they could be interpreted as [ʔ] closing the preceding syllable, and [C] opening the following syllable.

On the other hand, two of those consonants, [b] and [d], may occur word medially only when preglottalised, whereas the rest may also occur word medially without pre-glottalisation.

[ˈdɛʔdaɛ] 'they ate'  
 [ˈaʔbaʔ] 'woman (subj.)'

*But:* [ˈdɔʔna] 'food'  
 [haˈnina] 'night, darkness'  
 [ˈyuʔyuna] 'species of wild fruit tree'  
 [ˈhoya] 'garden, work'  
 [noʔɣlaˈmiɛ] 'he is giving to us'  
 [ˈhaʔlotsʔna] 'light'  
 [nɛʔˈvaɛ] 'they are going'  
 [ˈɛvɛ] 'sugar cane'  
 [noʔhaˈvuɛ] 'I am hearing'  
 [dahapsiʔˈdiɛ] 'he told me'

Therefore, since the occurrence of [ʔb] and [ʔd] is in complementary distribution with the occurrence of their non-preglottalised counterparts, whereas that is not the case with the other preglottalised consonants, the best solution would be to interpret those two as complex phonetic units, and the others as CC sequences, belonging to different syllables.

[ʔb] = c = [ʔb]  
 [ʔd] = c = [ʔd]  
 [ʔv] = CC = [ʔv]  
 [ʔn] = CC = [ʔn]  
 [ʔgɪ] = CC = [ʔgɪ]  
 [ʔy] = CC = [ʔy]  
 [ʔh] = CC = [ʔh]

#### 2.24. Work Chart: Consonants

p	p·	ʔp	t	t·	ʔt	k	k·	ʔ
b		ʔb	d		ʔd	g		
ʔ		f						h
ʔ		v				ʒ		
			s					
m			n					

91

ʒ j

y

### 2.3. Interpretation of Vowels

#### 2.31. Suspect Vowels

[i] and [u] both are interpreted as vowels, since they occur as vowels in the CV pattern (in the nucleus of syllables).

[i] = v = [i]

[u] = v = [u]

[ʔanita] 'his hand'

[ʔkipana] 'door (opening)'

[buʔkiʔa] 'all'

[ʔfikul] 'mixed up, out of order'

## 2.32. Vowel Sequences

The following VV sequences occur:

	[ɛi]	[ai]			
[iɛ]		[aɛ]		[oɛ]	[uɛ]
[ia]	[ɛa]			[oa]	[ua]
[io]	[ɛo]	[ao]			[uo]
[iu]		[au]		[ou]	

Some of those sequences, [ɛi], [aɛ], [ai], [ao], [au], and [ou], behave differently from the rest:

(a) Stress always occurs on them as on a unit. (With the others, only one of the vowels of the sequence takes the stress.)

*Compare:* [ˈhɛi.na] 'after he went up...'  
[ˈdou.ɟlɛ.ɡa] 'my eye'

*with:* [a.ˈɡɛ.o] 'look! (pl.)'  
[ˈyu.a.pa] 'wooden plate, bowl'

(b) A third vowel may follow, which is never the case with the other sequences.

[ˈbɛi.o] 'sit!'  
[pa.ˈɡae.a] 'they'  
[no.ˈ?bou.ɛ] 'I am sitting'

That is, [ɛi], [aɛ], [ai], [ao], [au], and [ou] belong to one and the same syllable, whereas the other VV sequences belong to two different syllables.

Supporting this hypothesis is the fact that those other sequences always have some kind of a consonant (transition consonant) between them, which is sometimes more, sometimes less audible, sometimes almost inaudible, depending on the speaker.

Those transition consonants are:

[v] (or rather [b]), if the preceding vowel is a rounded vowel;

[y], if the preceding vowel is a non-rounded vowel.

That means, by phonetic definition, those vowel sequences would be:

			[ui] = [ubi]
[is] = [iye]		[oε] = [obe]	[uε] = [ube]
[ia] = [iya]	[sa] = [sya]	[oa] = [oba]	[ua] = [uba]
[io] = [iyo]	[so] = [syo]		[uo] = [ubo]
[iu] = [iyu]			

Since those transition consonants are predictable, and, according to the syllable pattern which the language apparently demands, have to be there, even if at times they are completely inaudible, they are phonemically irrelevant, and will be left out of this paper.

One more observation proves valuable for the interpretation:

In the sequences with transition consonants, the preceding vowel is in point of articulation always higher than the following one, or of the same height as the following one.

In the sequences without transition consonants, which sequences also constitute a stress unit, the preceding vowel is in point of articulation always lower than the following one.

This gives us the following interpretation:

Vowel sequences high-high, high-mid, high-low, mid-mid, mid-low are VV sequences.

			[ui]=VV=[ui]
[is]=VV=[is]		[oε]=VV=[oε]	[uε]=VV=[uε]
[ia]=VV=[ia]	[sa]=VV=[sa]	[oa]=VV=[oa]	[ua]=VV=[ua]
[io]=VV=[io]	[so]=VV=[so]		[uo]=VV=[uo]
[iu]=VV=[iu]			

[no'sis] 'he is speaking'  
 ['sia?] 'hut'  
 [a'mio] 'give him!'  
 ['kiuva] 'species of tree'  
 ['ksa a<sup>o</sup>?dis] 'he called'  
 [ts'ɟlso] 'throw away! (pl.)'  
 [no?'oε] 'I am coming'  
 [hoε'sis] 'it is bad'  
 ['kuimana] 'species of snake (small, black)'  
 [u'gus] 'I shall go'  
 ['yuapa] 'wooden plate, bowl'  
 [hu'o] 'speak!'

Vowel sequences low-mid, low-high, mid-high are glides.

[ɛi] = v = [ɛ<sup>i</sup>]      [ai] = v = [a<sup>i</sup>]

[aɛ] = v = [a<sup>ɛ</sup>]

[ao] = v = [a<sup>o</sup>]

[au] = v = [a<sup>u</sup>]      [ou] = v = [o<sup>u</sup>]

[ʼɛ<sup>i</sup>gava] 'new'

[ʼa<sup>i</sup>pa] 'beginning, cause, essence'

[ʼa<sup>ɛ</sup>pa] 'beginning, cause, essence'

[ʼa<sup>ɛ</sup>] 'mountain'

[ʼka<sup>o</sup>ko] 'service'

[ʼka<sup>u</sup>ko] 'service'

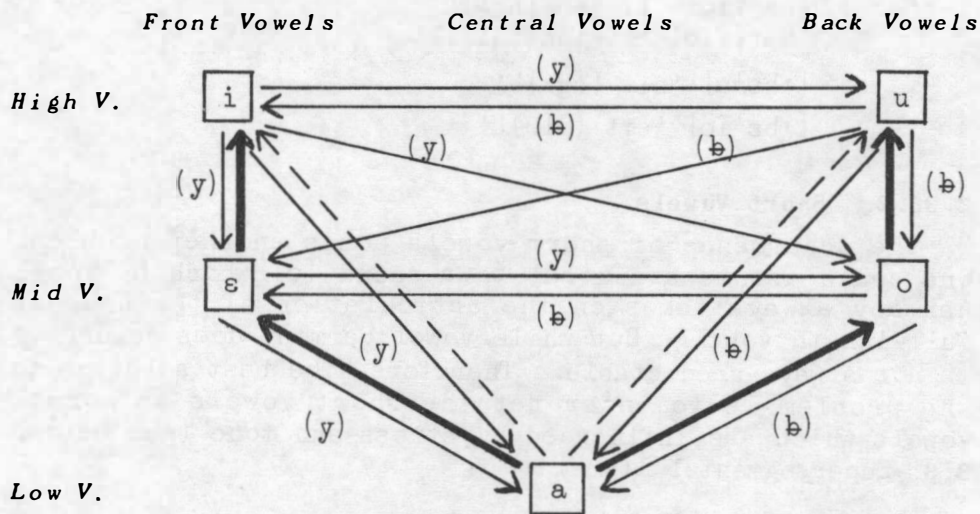
[noʼbo<sup>u</sup>ne] 'we are sitting, living'

If another vowel follows after a glide, then a VV sequence occurs, as if the vowel just followed after the second member of the glide.

[aʼga<sup>ɛ</sup>a] 'he, she'

[ʼhe<sup>i</sup>o] 'go up! ascend!'

The difference between glides and vowel sequences may be seen in the following diagram:



Vowel sequences (VV):

Glides (V):

*NOTE:* Broken lines are fluctuations of heavy lines. Consonants in ( ) brackets indicate the transition consonants of the VV sequences.

It will be noted from the above (p.25) matrix that glides always rise from a lower to a higher point of articulation, whereas vowel sequences either alternate on the horizontal plane, or else fall from a higher to a lower point of articulation.

## 2.33. Problems of Vowel Interpretation

### 2.33.1. Lengthened Vowels

One problem is posed by the occurrence of lengthened vowels [i.] and [ɛ<sup>i</sup>.] in certain instances (plural number, imperative).

There are two possible interpretations of those occurrences:

$$(a) [i.] = v = [i.] \qquad [ɛ<sup>i</sup>.] = v = [ɛ<sup>i</sup>.]$$

Then the lengthened vowel could be explained as being caused by stress and tone (see 3.3. Suprasegmental Items).

$$(b) [i.] = vv = [ii] \qquad [ɛ<sup>i</sup>.] = vv = [ɛ<sup>i</sup>ii]$$

Then it would be a vowel sequence with transition consonant [y] in between.

In view of the practical orthography, the second interpretation is preferable.

[ha'vio] 'listen (sg.)!'

[ha'viio] 'listen (pl.)!'

[·bɛ<sup>i</sup>o] 'sit (sg.)!'

[·bɛ<sup>i</sup>io] 'sit (pl.)!'

### 2.33.2. Short Vowels

The occurrence of short vowels poses another problem. One could assume a neutral š·wa sound [ə] which by vowel harmony always takes on the articulation of the nearest full-length vowel. But while vowel harmony does occur, it is not always predictable. Therefore, the best solution to the problem is to interpret the short vowels as normal vowels which are influenced by stress and tone (see below, 3.3. Supersegmental Items).

## 2.34. Work Chart: Vowels

i				u
	ɛ <sup>i</sup>		o <sup>u</sup>	
ɛ		a <sup>i</sup>	a <sup>u</sup>	o
	a <sup>ɛ</sup>		a <sup>o</sup>	
æ				ɔ
		a		

## 3. DESCRIPTION OF PHONEMES

### 3.1. Consonants

/p/ Voiceless bilabial unaspirated stop with submembers [p], [p·], and [ʔp].

[p] Voiceless bilabial unaspirated stop occurring word initially, and word medially intervocally.

[p·] Voiceless bilabial unaspirated lengthened stop fluctuating with [p] in word medial position.

[ʔp] Voiceless bilabial unaspirated preglottalised stop fluctuating with [p] in word medial position.

(Regarding the occurrence of [p·] and [ʔp], cf. Note 4.)

Since [p], [p·], and [ʔp] occur in fluctuation with no contrast, they are submembers of one phoneme.

[ʔpsna] /ʔpsna/ 'special kind of arrow'

[ʔigopa] /ʔigopa/ 'ground'

[ʔps no'sis] /ʔps no'sis/ 'he is bowing down'

[ʔnipiʔ] /ʔnipiʔ/ 'in the water'

[ʔkspi/ʔksʔpi/ʔksʔɛpi/ʔks·i] /ʔgspi/ 'their language'

[nopa'mus/noʔpa'mus/noʔa·pa'mus/nop·a'mus] /nopa'mus/ 'I am giving them'

/b/ Voiced bilabial stop with submembers [b] and [ʔb].

[b] Voiced bilabial stop occurring word initially.

[ʔb] Voiced bilabial preglottalised stop occurring word medially between vowels.

Since [b] occurs only word initially and [ʔb] never occurs word initially, their distribution is mutually exclusive and they are therefore submembers of one phoneme.

- [ʔba] /ʔba/ 'sweet potato'
- [ʔbakisavɛ] /ʔbakisavɛ/ 'snake'
- [ʔbaɣlomɛ] /ʔbaɣlomɛ/ 'a kind of love charm'
- [noʔboʔɣloɛ] /noboʔɣloɛ/ 'I am putting'
- [ʔaʔbaʔdɛ] /ʔabads/ 'girl'
- [ʔkaʔbɛʔ] /ʔgabsʔ/ 'deserted, uninhabited'

Since [p] and [b] contrast in identical and analogous environments, they are separate phonemes.

- [ʔpsna] /ʔpsna/ 'special kind of arrow'
- [ʔbɛna] /ʔbɛna/ 'debt'
- [ʔpage] /ʔpage/ 'word, news, talk from or about them'
- [ʔbagsʔ] /ʔbagsʔ/ 'sweet potato vines for planting'

/t/ Voiceless alveolar unaspirated stop with submembers [t], [t.], and [ʔt].

- [t] Voiceless alveolar unaspirated stop occurring word initially, and word medially between vowels.
- [t.] Voiceless alveolar unaspirated lengthened stop fluctuating with [t] in word medial position.
- [ʔt] Voiceless alveolar unaspirated preglottalised stop fluctuating with [t] in word medial position.

(Regarding the occurrence of [t.] and [ʔt], cf. Note 4.)  
 Since [t], [t.], and [ʔt] occur in fluctuation with no contrast, they are submembers of one phoneme.

- [taʔga<sup>ɛ</sup>a] /taʔga<sup>ɛ</sup>a/ 'they (dl.)'
- [toʔɣlo] /toʔɣlo/ 'throw away'
- [ʔtaʔu] /ʔtaʔu/ 'uterus' (animals only)
- [tɛʔtɛ noʔsisɛ] /tɛʔtɛ noʔsisɛ/ 'he is shivering, afraid'
- [noʔtoʔɣloɛ/noʔtoʔɣloɛ/noʔoʔtoʔɣloɛ/not.oʔɣloɛ]  
 /noʔtoʔɣloɛ/ 'I am throwing away'
- [ʔigati/ʔigaʔti/ʔigaʔaʔti/ʔigat.i] /ʔigati/ 'he went, and they (dl.)...'

/d/ Voiced alveolar stop with submembers [d] and [ʔd].



- [d] Voiced alveolar stop occurring word initially.  
 [ʔd] Voiced alveolar preglottalised stop occurring word medially between vowels.

Since [d] occurs only word initially and [ʔd] never occurs word initially, their distribution is mutually exclusive and they are therefore submembers of one phoneme.

- [ˈdskana] /ˈdskana/ 'needle'  
 [ˈdo] /ˈdo/ 'eat!'  
 [ˈbaʔdɛ] /ˈbads/ 'boy'  
 [huˈʔdiɛ] /huˈdis/ 'he said'

Since [t] and [d] contrast in identical environments, they are separate phonemes.

- [taˈgɑːa] /taˈgɑːa/ 'they' (dl.)  
 [daˈgɑːa] /daˈgɑːa/ 'I'  
 [ɛˈɟlina toˈʔdiɛ] /ɛˈɟlina toˈdis/ 'she bore (child)'  
 [ɛˈɟlina doˈʔdiɛ] /ɛˈɟlina doˈdis/ 'she (he) took and ate'

Some preliminary remarks should be made about /k/ and /g/.

[k] occurs word initially and word medially, whereas [g] and [ɟ] only occur word medially in mutually exclusive distribution.

- [ˈkɛ] /ˈgɛ/ 'word, language, speech'  
 [kaˈnaʔa] /gaˈnaʔa/ 'time'  
 [ˈsokona] /ˈsokona/ 'good'  
 [ˈsɟɛ] /ˈsɟɛ/ 'banana'  
 [boˈɟo] /boˈgo/ 'one'

In fast speech, however, word initial [k] utterance medially between vowels changes to [g] or [ɟ] (depending on the vowel environment, see below).

- [ˈhoya kaˈnaʔa] > [ˈhoya ɟaˈnaʔa] /ˈhoya gaˈna a/ 'time of work'  
 [ˈhoya ˈkɛ] > [ˈhoya ˈgɛ] /ˈhoya ˈgɛ/ 'talk about work, working instructions'  
 [kamiˈʔdiɛ] /gamiˈdis/ 'he gave you'  
 [ˈɛvɛ kamiˈʔdiɛ] > [ˈɛvɛ ɟamiˈʔdiɛ] /ˈɛvɛ ɟamiˈdis/ 'he gave you sugar cane'  
 [ɛˈɟlina kamiˈʔdiɛ] [ɛˈɟlina ɟamiˈʔdiɛ] /ɛˈɟlina ɟamiˈdis/ 'he took, and gave you'

There is no contrast between [k] and [g] or [g̊] word initially, but there is medially.

[a'gsta] /a'gsta/ 'his ear'  
[a'ksta] /a'ksta/ 'his back'

Furthermore<sup>5</sup>, [g] in word medial position sometimes changes to [k], which indicates that those sounds are more closely related to each other than their bilabial and alveolar counterparts are to each other.

[ʔigopa] /ʔigopa/ 'ground'  
[ha'nina/ha'niʔ] /ha'nina/ha'niʔ/ 'night, darkness'  
[-gɛva] /-gɛva/ 'big, large, great' (suff.)  
[igo'pagsva] /igo'pagsva/ 'large ground'  
[ha'nikɛva] /ha'nikɛva/ 'great darkness'

In view of all that, there are two possible analyses:

- (a) /k/ [k] initial and medial  
/g/ [g] medial  
[g̊] medial
- (b) /k/ [k] medial  
/g/ [k] initial  
[g] medial  
[g̊] medial

For this paper, the second analysis has been chosen, since the change of word initial [k] to [g] or [g̊] in utterance medial position speaks for combining word initial [k] with the /g/ phoneme.

/k/ Voiceless velar unaspirated stop with submembers [k] and [k̊].

[k] Voiceless velar unaspirated stop occurring word medially between vowels.

[k̊] Voiceless velar unaspirated lengthened stop occurring in fluctuation with [k].

(Regarding the occurrence of [k̊], cf. Note 4.)

Since [k] and [k̊] occur in fluctuation with no contrast, they are submembers of one phoneme.

[ʔsokona/ʔsoko] /ʔsokona/ʔsoko/ 'good, well'

[ka'naʔluka] /ga'naʔluka/ 'your wife'

[noka'mus/nok̊.a'mus] /noka'mus/ 'I am giving to you'

/g/ Velar consonant with submembers [k], [g], and [g].

[k] Voiceless velar unaspirated stop occurring word initially.

[g] Voiced velar fricative occurring word medially with either [a] or [o] preceding, and at the same time either of those two vowels following, and occurring in fluctuation with word initial [k] utterance medially in the same vowel environment.

[g] Voiced velar stop occurring word medially intervocally in other vowel environments, and occurring in fluctuation with word initial [k] utterance medially in such vowel environments.

[k], [g], and [g] in isolation occur in the following mutually exclusive distribution: [k] only word initially, [g] only word medially preceded and followed by either [a] or [o], and [g] never occurs in any of those environments, and utterance medially [g] and [g] occur in fluctuation with word initial [k] with no contrast. Thus [k], [g] and [g] are submembers of one phoneme.

[·kɛ] /·gɛ/ 'word, language, speech'

[·kaʔbɛʔ] /·gabɛʔ/ 'deserted, uninhabited'

[kaʔɣla] /gaʔɣla/ 'dog'

[kaʔyaɣle] /gaʔyaɣle/ 'pig'

[·kaʔlips] /·gaʔlips/ 'peanut' (introduced word)

[kaʔveʔda] /gaʔveda/ 'rope'

[yaʔga] /yaʔga/ 'animal'

[boʔgo] /boʔgo/ 'one'

[agoʔdiɛ] /agoʔdiɛ/ 'he saw'

[·hoga] /·hoga/ 'left hand, left side'

[·age] /·age/ 'news, report'

[·ɛga] /·ɛga/ 'yesterday, tomorrow'

[kaʔgmi] /gaʔgmi/ 'goods, cargo'

[bɛʔɣɛʔ] /bɛʔɣɛʔ/ 'quick, fast'

[·ɛge] /·ɛge/ 'banana'

[kaʔliʔdiɛ] /gaʔliʔdiɛ/ 'he planted'

[·ba kaʔliʔdiɛ] > [·ba gaʔliʔdiɛ] /·ba gaʔliʔdiɛ/ 'he planted sweet potatoes'

[·ɛve kaʔliʔdiɛ] > [·ɛve gaʔliʔdiɛ] /·ɛve gaʔliʔdiɛ/ 'he planted sugar cane'

Since word medial [k] contrasts in identical and similar environments with [g] and in similar environments

with [g], they belong to different phonemes.

[a'gsta] /a'gsta/ 'his ear'

[a'ksta] /a'ksta/ 'his back'

[hu'gis] /hu'gis/ 'he will speak'

[bu'ki'a] /bu'ki'a/ 'all'

[bo'go] /bo'go/ 'one'

[bogo'ko?] /bogo'ko?/ 'only one, just one'

NOTE: [g] tends to become [ɣ] when [ɣl] precedes:

[ɣla'ga<sup>ɛ</sup>a] instead of [ɣla'ga<sup>ɛ</sup>a] /ɣla'ga<sup>ɛ</sup>a/ 'we' (pl.)

[no?ɣlaga've<sup>i</sup>ɛ] instead of [no?ɣlaga've<sup>i</sup>ɛ]

/no?ɣlaga've<sup>i</sup>ɛ/ 'he is leading us'

/ʔ/ [ʔ] Voiceless glottal stop occurring word medially (intervocally, and as first consonant of a CC sequence), and word finally.

Since [ʔ] contrasts in identical environments with its own absence, it is a phoneme.

[ʔyopi] /ʔyopi/ 'their house'

[ʔyopiʔ] /ʔyopiʔ/ 'in the house'

[da'mio] /da'mio/ 'give (sg.) me!'

[da'miʔo] /da'miʔo/ 'give (dl.) me!'

[no?ʔoɛ] /no?ʔoɛ/ 'I am coming'

[no?ʔoʔɛ] /no?ʔoʔɛ/ 'we (dl.) are coming'

[ʔyo] /ʔyo/ 'valuables' (boar's tusks etc.)

[ʔyona/yoʔ] /ʔyona/yoʔ/ 'house'

[ha'nina] /ha'nina/ 'night, darkness'

[ha'niʔna] /ha'niʔna/ 'things belonging to the darkness, things of the darkness'

[ho<sup>u</sup> hu'ʔdis] /ho<sup>u</sup> hu'dis/ 'it became dry'

[ho<sup>u?</sup> hu'ʔdis] /ho<sup>u?</sup> hu'dis/ 'he was sad'

/f/ Voiceless fricative consonant with submembers [f] and [ɸ].

[f] Voiceless labiodental fricative occurring word initially and medially between vowels.

[ɸ] Voiceless bilabial fricative occurring in free fluctuation with [f].

Since [f] and [ɸ] occur in free fluctuation with no contrast, they are submembers of one phoneme.

[ʔfsva/ɸɸba/ɸɸva] /ʔfsva/ 'pitpit'

[ʔfs/ɸɸs] /ʔfs/ 'not working, lazy'

[ʼafɛpa/ʼapɛpa] /ʼafɛpa/ 'grass'  
 [ʼsɛfo/ʼsɛpɔ] /ʼsɛfo/ 'betelnut'  
 [nofiʼɟliɛ/nopiʼɟliɛ] /nofiʼɟliɛ/ 'he is dying'

Since [p] and [f] contrast in identical environments, they are separate phonemes.

[ʼpɛ<sup>i</sup>pa] /ʼpɛ<sup>i</sup>pa/ 'their bowels'  
 [ʼfɛ<sup>i</sup>pa] /ʼfɛ<sup>i</sup>pa/ 'bad'

/v/ Voiced fricative consonant with submembers [v] and [b].

[v] Voiced labiodental fricative occurring word initially and medially.

[b] Voiced bilabial fricative occurring in free fluctuation with [v].

Since [v] and [b] occur in free fluctuation with no contrast, they are submembers of one phoneme.

[ʼvatoʔ/ʼbatoʔ] /ʼvatoʔ/ 'separated, by itself'  
 [vaʼyavɛna/ʼbaʼyabɛna] /vaʼyavɛna/ 'special kind of arrow'

[ʼvɛ/ʼbɛ] /ʼvɛ/ 'man, male'

[vɛʼsɛ/bɛʼsɛ] /vɛʼsɛ/ 'careful'

[ʼyava/ʼyaba] /ʼyava/ 'tree'

[haʼvanaʔa/haʼbanaʔa] /haʼvanaʔa/ 'small'

[kaʼhɛ<sup>i</sup>ʔ aʔvɛ<sup>i</sup>o/kaʼhɛ<sup>i</sup>ʔ aʔbɛ<sup>i</sup>o] /gaʼhɛ<sup>i</sup>ʔ aʔvɛ<sup>i</sup>o/ 'don't be angry!'

Since [b] and [v] contrast in identical environments, they are separate phonemes.

[bɛ<sup>i</sup>ʔdiɛ] /bɛ<sup>i</sup>ʔdiɛ/ 'he lives, lived'

[vɛ<sup>i</sup>ʔdiɛ] /vɛ<sup>i</sup>ʔdiɛ/ 'it (tree) died off'

Since [f] and [v] contrast in identical environments, they are separate phonemes.

[ʼfɛ] /ʼfɛ/ 'not working, lazy'

[ʼvɛ] /ʼvɛ/ 'man, male'

[fɛ<sup>i</sup>ʔdiɛ] /fɛ<sup>i</sup>ʔdiɛ/ 'he planted (seeds)'

[vɛ<sup>i</sup>ʔdiɛ] /vɛ<sup>i</sup>ʔdiɛ/ 'it (tree) died off'

/h/ [h] Voiceless glottal fricative occurring word initially and medially.

[ʼha] /ʼha/ 'mushroom'

[haʼgana] /haʼgana/ 'tasty, pleasant'

[haʼgɛ] /haʼgɛ/ 'ash-salt'

[aʔha'ns] /aʔha'ns/ 'it is not at hand'  
 [ta'haps<sup>i</sup>o] /ta'haps<sup>i</sup>o/ 'tell them (dl.)!'  
 [noʔha'vus] /noʔha'vus/ 'I am hearing'  
 [h<sup>i</sup>meti] /h<sup>i</sup>meti/ 'now, today'

Since [ʔ] and [h] contrast in similar environments, they are separate phonemes.

[aʔ'ans] /aʔ'ans/ 'you are not coming'  
 [aʔha'ns] /aʔha'ns/ 'it is not at hand'

/s/ [s] Voiceless alveolar grooved fricative occurring word initially and medially between vowels.

[sa'mo] /sa'mo/ 'cooking pot'  
 [s<sup>i</sup>fo] /s<sup>i</sup>fo/ 'betelnut'  
 [d<sup>s</sup>sava] /d<sup>s</sup>sava/ 'species of shrub' (Pidgin: tanget)  
 [s<sup>i</sup>da] /s<sup>i</sup>da/ 'bracelet'  
 [no'sus] /no'sus/ 'I am saying'  
 [d<sup>s</sup>'sus] /d<sup>s</sup>'sus/ 'I want to eat, shall eat'

Since [h] and [s] contrast in identical environments, they are separate phonemes.

[h<sup>i</sup>o] /h<sup>i</sup>o/ 'ascend!'  
 [s<sup>i</sup>o] /s<sup>i</sup>o/ 'hang it up!'

/m/ [m] Voiced bilabial nasal occurring word initially, and medially between vowels.

[ma] /ma/ 'this'  
 [maŋloʔ] /maŋloʔ/ 'here'  
 [m<sup>s</sup>a] /m<sup>s</sup>a/ 'meat'  
 [muʔa] /muʔa/ 'egg'  
 [mu'paʔa] /mu'paʔa/ 'roof'  
 [na'ma] /na'ma/ 'bird, sacred flute'  
 [da'mota noʔ's<sup>i</sup>ɛ] /da'mota noʔ's<sup>i</sup>ɛ/ 'I am afraid'  
 [pami'ʔdis] /pami'ʔdis/ 'he gave them'

Since [b] and [m] contrast in identical environments, they are different phonemes.

[ba] /ba/ 'sweet potato'  
 [ma] /ma/ 'this'

/n/ [n] Voiced alveolar nasal occurring word initially and medially.

[ˈnaŋlisana] /ˈnaŋlisana/ 'sorcery'  
 [ˈnina] /ˈnina/ 'water'  
 [ˈno<sup>u</sup>ʔa] /ˈno<sup>u</sup>ʔa/ 'her husband'  
 [noˈsis] /noˈsis/ 'he is speaking'  
 [ˈdoteʔna] /ˈdoteʔna/ 'food'

/ŋl/ [ŋl] Voiced heterorganic affricate, consisting of velar stop followed by alveolar lateral, occurring word initially and medially.

*NOTE:* Vowels following [ŋl], are pronounced with tongue still in position for alveolar lateral [l].

[ˈŋluna] /ˈŋluna/ 'axe'  
 [ˈŋlusa] /ˈŋlusa/ 'blessing'  
 [ˈŋlunika] /ˈŋlunika/ 'curse'  
 [ˈŋluŋloga] /ˈŋluŋloga/ 'anywhere, somewhere else'  
 [ŋloˈŋle] /ŋloˈŋle/ 'two'  
 [ˈhaŋlotsʔna] /ˈhaŋlotsʔna/ 'light'  
 [noʔŋlaˈmis] /noʔŋlaˈmis/ 'he is giving us'  
 [haˈŋli] /haˈŋli/ 'fire'

Since [ŋ] and [g] contrast with [ŋl] in identical environments, they belong to separate phonemes.

[boˈŋo] /boˈŋo/ 'one'  
 [boˈŋlo] /boˈŋlo/ 'put it (down)!'  
 [haˈŋe] /haˈŋe/ 'ash-salt'  
 [haˈŋle] /haˈŋle/ 'he (bird) is flying up'

/y/ Voiced alveolar-alveopalatal consonant with submembers [y], [z], and [j].

[y] Voiced alveopalatal continuant occurring word initially and medially.

[z] Voiced alveolar homorganic affricate, occurring in free fluctuation with [y].

[j] Voiced heterorganic affricate, consisting of alveolar stop followed by alveopalatal grooved fricative, occurring in free fluctuation with [y].

Since [y], [z], and [j] occur in free fluctuation with no contrast, they are submembers of one phoneme.

[yaˈvana/zəˈvana/ʃaˈvana] /yaˈvana/ 'stone'  
 [yeˈge/zɛˈge/ʃɛˈge] /yeˈge/ 'sun, day'

- [·hoya/·hoʒa/·hoʒa] /·hoya/ 'garden, work'  
 [·yuʔyuna/·zuʔzuna/·juʔʒuna] /·yuʔyuna/ 'species of  
 wild fruit tree'  
 [·haʔye huʔdis/·haʔze huʔdis/·haʔʒe huʔdis] /·haʔye  
 huʔdis/ 'he was greedy for s. th.'

### 3.2. Vowels

/i/ [i] Voiced high close unrounded front vocoid occurring  
 word initially, medially, and finally.

- [·itɛnɛ] /·itɛnɛ/ 'old woman'  
 [·kina] /·gina/ 'path, road'  
 [haʔɣli] /haʔɣli/ 'fire'  
 [·kumati] /·gumati/ 'our village'

/ɛ/ [ɛ] Voiced mid open unrounded front vocoid occurring  
 word initially, medially, and finally.

- [·ɛga] /·ɛga/ 'yesterday, tomorrow'  
 [·hɛnaga] /·hɛnaga/ 'later'  
 [·ɛvɛ] /·ɛvɛ/ 'sugar cane'  
 [·fɛni] /·fɛni/ 'eel'

Since [i] and [ɛ] contrast in identical environ-  
 ments, they are separate phonemes.

- [·iʔda<sup>ɛ</sup>] /·ida<sup>ɛ</sup>/ 'they went'  
 [·ɛʔda<sup>ɛ</sup>] /·ɛda<sup>ɛ</sup>/ 'they came'  
 [fiʔɣliʔda<sup>ɛ</sup>] /fiʔɣliʔda<sup>ɛ</sup>/ 'they died'  
 [fɛʔɣlɛʔda<sup>ɛ</sup>] /fɛʔɣlɛʔda<sup>ɛ</sup>/ 'they washed'

/ɛ<sup>i</sup>/ [ɛ<sup>i</sup>] Voiced mid open unrounded front vocoid gliding to  
 high close unrounded front vocoid, occurring word  
 initially, medially, and finally.

- [·ɛ<sup>i</sup>gava] /·ɛ<sup>i</sup>gava/ 'new'  
 [·fɛ<sup>i</sup>pana/·fɛ<sup>i</sup>pa] /·fɛ<sup>i</sup>pana/·fɛ<sup>i</sup>pa/ 'bad'  
 [·kɛ<sup>i</sup>] /·gɛ<sup>i</sup>/ 'moon'

Since [ɛ] and [ɛ<sup>i</sup>] contrast in identical environments,  
 they are separate phonemes.

- [·ɛʔda<sup>ɛ</sup>] /·ɛda<sup>ɛ</sup>/ 'they came'  
 [·ɛ<sup>i</sup>ʔda<sup>ɛ</sup>] /·ɛ<sup>i</sup>da<sup>ɛ</sup>/ 'they made, shaped'  
 [·kɛ] /·gɛ/ 'word, language'  
 [·kɛ<sup>i</sup>] /·gɛ<sup>i</sup>/ 'moon'



Since [i] and [ɛ<sup>i</sup>] contrast in identical environments, they are separate phonemes.

[iʔda<sup>ɛ</sup>] /'ida<sup>ɛ</sup>/ 'they went'  
 [ɛ<sup>i</sup>ʔda<sup>ɛ</sup>] /'ɛ<sup>i</sup>da<sup>ɛ</sup>/ 'they made, shaped'  
 ['bina] /'bina/ 'price'  
 ['bɛ<sup>i</sup>na] /'bɛ<sup>i</sup>na/ 'he lived, and...'

*NOTE:* There are, however, incidences of fluctuation between [i] and [ɛ<sup>i</sup>]:

[na'hiʔda/na'hs<sup>i</sup>ʔda] /na'hida/ 'when they said so'

/u/ [u] Voiced high close rounded back vocoid occurring word initially, medially, and finally.

['utsna] /'utsna/ 'evening, afternoon'  
 [fu'ɟluna] /fu'ɟluna/ 'peace'  
 ['havu] /'havu/ 'bow'  
 ['kuna] /'guna/ 'netbag'

• /o/ [o] Voiced mid close rounded back vocoid occurring word initially, medially, and finally.

['oɟliva] /'oɟliva/ 'flying fox'  
 ['kona] /'gona/ 'bamboo'  
 [ɛ'no] /ɛ'no/ 'come (sg.)!'

Since [u] and [o] contrast in identical environments, they are separate phonemes.

['kuna] /'guna/ 'netbag'  
 ['kona] /'gona/ 'bamboo'  
 [no'sus] /no'sus/ 'I am saying, speaking'  
 [no'sos] /no'sos/ 'I am hitting'

/o<sup>u</sup>/ [o<sup>u</sup>] Voiced mid close rounded back vocoid gliding to high close rounded back, occurring word initially, medially, and finally.

['o<sup>u</sup>pa] /'o<sup>u</sup>pa/ 'short'  
 ['no<sup>u</sup>ʔa] /'no<sup>u</sup>ʔa/ 'her husband'  
 ['ho<sup>u</sup>] /'ho<sup>u</sup>/ 'dry'

Since [o] and [o<sup>u</sup>] contrast in identical and analogous environments, they are separate phonemes.

['oɟlega] /'oɟlega/ 'the day before yesterday, or:  
 the day after tomorrow'  
 ['o<sup>u</sup>ɟlega] /'o<sup>u</sup>ɟlega/ 'his eye'

[ˈkɔnə] /ˈgɔnə/ 'bamboo'  
 [ˈkoʊnɛ ˈkoʊnɛ] /ˈgoʊnɛ ˈgoʊnɛ/ 'fugitive'

Since [u] and [oʊ] contrast in identical and analogous environments, they are separate phonemes.

[ˈuka] /ˈuka/ 'you went, and...'  
 [ˈoʊka] /ˈoʊka/ 'petition'  
 [noʔˈunɛ] /noʔˈunɛ/ 'we are going'  
 [noʔˈoʊnɛ] /noʔˈoʊnɛ/ 'we are making, shaping'  
 [ˈkuna] /ˈguna/ 'netbag'  
 [ˈkoʊnɛ ˈkoʊnɛ] /ˈgoʊnɛ ˈgoʊnɛ/ 'fugitive'

*NOTE:* There are, however, incidences of fluctuation between [u] and [oʊ].

[naˈhuna/naˈhoʊna] /naˈhuna/ 'when he said so...'  
 [ˈsumɛta/ˈsoʊmɛta] /ˈsumɛta/ 'kunai grass'

/a/ [a] Voiced low open unrounded central vocoid occurring word initially, medially, and finally.

[ˈana] /ˈana/ 'woman'  
 [ˈavɛtɔga] /ˈavɛtɔga/ 'below'  
 [kaˈnaʔa] /gaˈnaʔa/ 'time'

/a<sup>ɛ</sup>/ Voiced unrounded central-front vowel with submembers [a<sup>ɛ</sup>], [a<sup>i</sup>], and [æ].

[a<sup>ɛ</sup>] Voiced low open unrounded central vocoid gliding to mid open unrounded front, occurring word initially, medially, and finally.

[a<sup>i</sup>] Voiced low open unrounded central vocoid gliding to high close unrounded front, occurring in free fluctuation with [a<sup>ɛ</sup>].

[æ] Voiced low close unrounded front vocoid occurring word finally in fluctuation with [a<sup>ɛ</sup>] and [a<sup>i</sup>].

Since [a<sup>ɛ</sup>], [a<sup>i</sup>], and [æ] occur in fluctuation with no contrast, they are submembers of one phoneme.

[ˈa<sup>ɛ</sup>pa/ˈa<sup>i</sup>pa] /ˈa<sup>ɛ</sup>pa/ 'beginning, essence, cause, owner of s.th.'  
 [da<sup>ɛ</sup>ɡliˈʔdiɛ/da<sup>i</sup>ɡliˈʔdiɛ] /da<sup>ɛ</sup>ɡliˈdiɛ/ 'he showed me'  
 [haˈviʔda<sup>ɛ</sup>/haˈviʔdæ] /haˈvida<sup>ɛ</sup>/ 'they heard'  
 [ˈa<sup>ɛ</sup>/ˈa<sup>i</sup>/æ] /ˈa<sup>ɛ</sup>/ 'mountain'

Since [a] and [a<sup>ɛ</sup>] contrast in identical environments,

they are separate phonemes.

[ˈapa] /ˈapa/ 'older brother'

[ˈa<sup>ɛ</sup>pa/ˈa<sup>i</sup>pa] /ˈa<sup>ɛ</sup>pa/ 'beginning, cause, essence, owner'

Since [ɛ] and [a<sup>ɛ</sup>] contrast in identical environments, they are separate phonemes.

[ˈkɛ] /ˈgɛ/ 'word, language, speech'

[ˈka<sup>ɛ</sup>/ˈka<sup>i</sup>/ˈkæ] /ˈga<sup>ɛ</sup>/ 'apron'

[ˈhɛ<sup>?</sup>da<sup>ɛ</sup>/ˈhɛ<sup>?</sup>dæ] /ˈhɛda<sup>ɛ</sup>/ 'they hit'

[ˈha<sup>ɛ?</sup>da<sup>ɛ</sup>/ˈha<sup>i?</sup>dæ] /ˈha<sup>ɛ</sup>da<sup>ɛ</sup>/ 'they slept'

*NOTE:* There are instances of fluctuation between [ɛ<sup>i</sup>] and [a<sup>i</sup>], especially word initially.

[ˈɛ<sup>i</sup>gava/ˈa<sup>i</sup>gava] /ˈɛ<sup>i</sup>gava/ 'new'

[ˈbɛ<sup>i</sup>o/ˈba<sup>i</sup>o] /ˈbɛ<sup>i</sup>o/ 'sit (sg.)!'

/a<sup>o</sup>/ Voiced central-back vowel with submembers [a<sup>o</sup>], [a<sup>u</sup>], [ɔ].

[a<sup>o</sup>] Voiced low open unrounded central vocoid gliding to mid close rounded back, occurring word initially, medially, and finally.

[a<sup>u</sup>] Voiced low open unrounded central vocoid gliding to high close rounded back vocoid, occurring in free fluctuation with [a<sup>o</sup>].

[ɔ] Voiced low close rounded back vocoid occurring word finally in fluctuation with [a<sup>o</sup>] and [a<sup>u</sup>].

Since [a<sup>o</sup>], [a<sup>u</sup>], and [ɔ] occur in fluctuation with no contrast, they are submembers of one phoneme.

[a<sup>o</sup>ˈ?diɛ/a<sup>u</sup>ˈ?diɛ] /a<sup>o</sup>ˈdiɛ/ 'he trod, stepped'

[ha<sup>o</sup>ˈ?diɛ/ha<sup>u</sup>ˈ?diɛ] /ha<sup>o</sup>ˈdiɛ/ 'he slept'

[daˈha<sup>?</sup>ba<sup>o</sup>/daˈha<sup>?</sup>bɔ] /daˈhaba<sup>o</sup>/ 'help me!'

Since [a] and [a<sup>o</sup>] contrast in identical environments, they are separate phonemes.

[ˈaka] /ˈaka/ 'your wife'

[ˈa<sup>o</sup>ka] /ˈa<sup>o</sup>ka/ 'you stepped, and...'

Since [o] and [a<sup>o</sup>] contrast in identical environments, they are separate phonemes.

[hoˈ?diɛ] /hoˈdiɛ/ 'he hit'

[ha<sup>o</sup>ˈ?diɛ] /ha<sup>o</sup>ˈdiɛ/ 'he slept'

[ˈkɔnə] /ˈgɔnə/ 'bamboo'  
 [ˈkɑːnə] /ˈgɑːnə/ 'he cooked, and...'

*NOTE:* There are incidences of fluctuation between [o<sup>u</sup>] and [a<sup>u</sup>], especially word initially.

[ˈo<sup>u</sup>gɛgɛsə / ˈa<sup>u</sup>gɛgɛsə] / ˈo<sup>u</sup>gɛgɛsə/ 'big, great'  
 [ˈso<sup>u</sup>vɛ / ˈsa<sup>u</sup>vɛ] / ˈso<sup>u</sup>vɛ/ 'chief'

### 3.3. Suprasegmental Items

#### 3.31. Tone

Although there are intonation patterns in Yagaria, not all tonal phenomena can be explained by intonation. There are three tones:

low [ˋ], mid [ˊ], and high [ˈ].

But tone is not emic, since it is mainly, if not altogether, influenced by stress, and no contrast is found except where there is also contrast in stress and the vowel length.

For the sake of simplicity, tones have not been indicated in the phonetic transcription in the rest of this paper.

#### 3.32. Stress

There are four degrees of stress, which for the sake of simplicity have not been indicated in the phonetic transcription in the rest of this paper. (Only the main word stress has been indicated by [ˈ] / ˈ/.) The degrees of stress intensity will be indicated by [ˈ], [ˈˈ], [ˈˈˈ], and [ˈˈˈˈ], in this paragraph. Stress is emic, since contrasts in analogous environments occur. There are three emic stress units.

/°/ [ˈ] Completely reduced stress. on reduced syllables.  
 Vowel: Very short, sometimes almost inaudible.  
 Tone: Low [ˋ]. Occurring word initially and medially.

*NOTE:* Word medial occurrence is mainly caused by morphophonemic factors: occurrence of [ˈˈ] prefixes preceding stem-initial [ˈ] syllables.

[ˈhɑːˈˈnɔːˈˈnɔːˈˈdɪˈˈɛ] / ˈhɑnɔːˈdis/ 'it is (was) available, at hand'

[ˈɔlɑːˈˈfɑːˈˈpɛˈˈdɪˈˈɛ] / ˈɔlafɑpɛˈˈdis/ 'he told you (pl.)'

[ˈbɛˈˈɔlɛˈˈgɛ] / ˈbɛ ˈɔlɛˈgɛ/ 'quick'

[<sup>I</sup>nō<sup>?</sup>hà<sup>III</sup>vū<sup>I</sup>è] /no<sup>?</sup>ha'vus/ 'I am listening,  
hearing'  
[<sup>I</sup>hà<sup>III</sup>gī] /°ha'gī/ 'fire'

/#/ [<sup>I</sup>] Non-stress, on normal non-stress syllables. Vowel of normal length. Tone: low [<sup>`</sup>], sometimes mid [<sup>-</sup>]. Occurring word initially, medially, and finally.

[<sup>III</sup>hā<sup>I</sup>gīō<sup>I</sup>tē<sup>?</sup>nā] /'ha'gīōtē'na/ 'light'

[<sup>III</sup>hà<sup>I</sup>gī] /'ha'gī/ 'arrow'

[<sup>I</sup>nō<sup>?</sup>bō<sup>III</sup>gīō<sup>I</sup>è] /no<sup>?</sup>bo'gīō/ 'I am putting'

Since [<sup>I</sup>] and [<sup>I</sup>] contrast in analogous environments, they are different emic stress units.

[<sup>I</sup>hā<sup>I</sup>gō<sup>III</sup>dī<sup>I</sup>è] /hago'dis/ 'he was merciful'

[<sup>I</sup>hà<sup>I</sup>gō<sup>III</sup>dī<sup>I</sup>è] /°hago'dis/ 'he hollowed  
(chiselled) out'

*NOTE:* There is the possibility of a different analysis of the stress intensities [<sup>I</sup>] and [<sup>I</sup>], based on a different analysis of the vowels. If the short vowels were explained as separate phonemes, complementary distribution of [<sup>I</sup>] and [<sup>I</sup>] would be the result, and [<sup>I</sup>] and [<sup>I</sup>] would be submembers of one emic stress unit. But that would affect the practical orthography, necessitating the introduction of special characters or diacritics for the short vowels. (See 6. Practical Orthography.)

/·/ Stress, with submembers [<sup>III</sup>] and [<sup>I</sup>].

[<sup>III</sup>] Normal stress, on normal stress-syllables. Vowels of normal length. Tone: mid [<sup>-</sup>], sometimes low [<sup>`</sup>]. Occurring word initially, medially, and finally.

[<sup>III</sup>vā<sup>I</sup>tō<sup>?</sup>] /'vato<sup>?</sup>/ 'separated, by itself'

[<sup>I</sup>hà<sup>III</sup>gī] /°ha'gī/ 'fire'

[<sup>I</sup>hà<sup>III</sup>vī<sup>I</sup>ò] /ha'vio/ 'listen (sg.)!'

[<sup>I</sup>tē<sup>I</sup>gīè<sup>III</sup>sū<sup>I</sup>è] /°tē'gīè'sū/ 'I will throw away'

Since [<sup>I</sup>] and [<sup>III</sup>], and [<sup>I</sup>] and [<sup>III</sup>] contrast in analogous environments, they belong to different emic stress units.

[<sup>I</sup>hà<sup>III</sup>g<sup>I</sup>lī] /°ha'g<sup>I</sup>li/ 'fire'  
 [<sup>III</sup>hà<sup>I</sup>g<sup>I</sup>lī] /°ha'g<sup>I</sup>li/ 'arrow'  
 [<sup>I</sup>hà<sup>III</sup>nī<sup>?</sup>] /°ha'ni<sup>?</sup>/ 'night'  
 [<sup>III</sup>hā<sup>I</sup>nī] /°hani/ 'forehead, front'  
 [<sup>III</sup>tō<sup>I</sup>g<sup>I</sup>lō<sup>I</sup>nà] /°to'g<sup>I</sup>lona/ 'he placed s.b., and...'  
 [<sup>I</sup>tō<sup>III</sup>g<sup>I</sup>lō<sup>I</sup>nà] /°to'g<sup>I</sup>lona/ 'he threw away, and...'

[<sup>IV</sup>] Intense stress. Vowel: Extra long. Tone: High [<sup>ˈ</sup>]. Occurs only on syllables with [i.] and [ɛ<sup>ˈ</sup>.], which have been interpreted as VV sequences [ii] and [ɛ<sup>ˈ</sup>i]. It is apparently this sequence of two syllables which causes the intense stress.

[<sup>IV</sup>hīi<sup>II</sup>ò] /°hiio/ 'speak! say! do! (pl.)'

[<sup>I</sup>ɛ<sup>IV</sup>g<sup>I</sup>līi<sup>II</sup>ò] /°ɛ'g<sup>I</sup>liio/ 'take! (pl.)'

[<sup>IV</sup>bɛ<sup>ˈ</sup>i<sup>II</sup>ò] /°bɛ<sup>ˈ</sup>io/ 'sit! (pl.)'

[<sup>IV</sup>ii<sup>II</sup>ò] /°iio/ 'go! (pl.)'

Since [<sup>IV</sup>] occurs only with the VV sequences [ii] and [ɛ<sup>ˈ</sup>i], and [<sup>III</sup>] never occurs in that environment, their distribution is mutually exclusive and they are submembers of one emic stress unit.

[<sup>I</sup>ɛ<sup>III</sup>g<sup>I</sup>lī<sup>II</sup>ò] /°ɛ'g<sup>I</sup>lio/ 'take! (sg.)'

[<sup>I</sup>ɛ<sup>IV</sup>g<sup>I</sup>līi<sup>II</sup>ò] /°ɛ'g<sup>I</sup>liio/ 'take! (pl.)'

[<sup>III</sup>bɛ<sup>ˈ</sup>i<sup>II</sup>ò] /°bɛ<sup>ˈ</sup>io/ 'sit. (sg.)'

[<sup>IV</sup>bɛ<sup>ˈ</sup>i<sup>II</sup>ò] /°bɛ<sup>ˈ</sup>io/ 'sit! (pl.)'

Each word has one, and only one, stress syllable.

#### 4. DISTRIBUTION

##### 4.1. Syllable Patterns

There are four syllable patterns:

V Occurring word initially and finally, and word medially only in very few instances.

CV Occurring word initially, medially, and finally.

CVC Occurring word initially, medially, and finally.

VC Occurring mainly word initially, and word medially and finally in very few instances.

#### 4.2. Phonemes

- V All vowels may occur in any position of the syllable in the word.
- CV All vowels may occur in any position of the syllable in the word.  
All consonants except /ʔ/ may occur in word initial position of the syllable, and all consonants, including /ʔ/, may occur in word medial and final position of the syllable.
- CVC All vowels may occur in any position of the syllable in the word.  
Preceding consonant, C<sub>1</sub>: All consonants, except /ʔ/, may occur in word initial position, and all consonants, including /ʔ/, may occur in word medial and final position.  
Syllable closing consonant, C<sub>2</sub>: Only /ʔ/ may occur in any position of the syllable in the word.
- VC All vowels may occur in any position of the syllable in the word.  
Of the consonants, only /ʔ/ may occur in any position of the syllable in the word.

### 5. MORPHOPHONEMICS

#### 5.1. Effects of Pre-glottalisation

As stated before (cf. p.21), preglottalisation may occur with all consonants except voiceless stops,<sup>6</sup> and [g], [g̊], [m], [s], and [f].

If in complex words, a glottal stop would have to occur preceding one of the above consonants (e.g. present progr. prefix /noʔ-/ or /nɛʔ-/, negation prefix /aʔ-/), the following changes take place:

/g/ becomes voiceless: /ʔ/ + /g/ > /k/.

/-gsva/ [-gsva] 'big, large, great' (suff.)

/ʔigopa/ [ʔigopa] 'ground'

/igoʔpagsva/ [igoʔpagsva] 'large ground'

/haʔnina/haʔniʔ/ [haʔnina/haʔniʔ] 'night, darkness'

/haʔniksva/ [haʔniksva] 'great darkness'

/m/ becomes a voiced stop: /ʔ/ + /m/ > /b/.

/ˈana/ˈa?/ [ˈana/ˈa?] 'woman, female'  
 /-ma?/ [-ma?] 'nominalizer, subject-indicator'  
 /ˈaba?/ [ˈa?ba?] 'woman' (subj.)

/s/ and /f/ cause the glottal stop to disappear:

/ʔ/ + /s/ > /s/.

/ˈss<sup>i</sup>o/ [ˈss<sup>i</sup>o] 'hang it up!'

/aˈss<sup>i</sup>o/ [aˈss<sup>i</sup>o] 'do not hang it up!'

/ʔ/ + /f/ > /f/.

/fiŋliˈdiɛ/ [fiŋliˈʔdiɛ] 'he died'

/afiŋliˈdiɛ/ [afiŋliˈʔdiɛ] 'he did not die'

## 5.2. Affix Allomorphs

/-nɛ/ > /-na/

The indicative 2nd person singular suffix /-nɛ/ changes to /-na/ preceding the change-of-subject-indicator suffix /-ga/.

/noʔˈans/ [noʔˈans] 'you are coming'

/noʔˈanagada/ [noʔˈanaga?da] 'you are coming, and I...'

/-ʔɛ/ > /-ʔa/

The indicative dual suffix /-ʔɛ/ changes to /-ʔa/ preceding:

the change-of-subject-indicator suffix /-ga/;

the nominalising suffix /-ma?/; and

the interrogation suffix /-vis/.

/nɛʔˈaʔɛ/ [nɛʔˈaʔɛ] 'you two are coming'

/nɛʔˈaʔagani/ [nɛʔˈaʔagani] 'you two are coming, and he...'

/nɛʔˈaʔama?/ [nɛʔˈaʔama?] 'you two who are coming'

/nɛʔˈaʔavis/ [nɛʔˈaʔavis] 'are you two coming?'

/m/ > /p/

/m/ changes to /p/ in the nominalising suffix /-ma?/ when a preceding /n/ is absorbed.

/ˈgɛ huˈdus/ [ˈkɛ huˈʔdus] 'I said the word'

/ˈgɛ huˈduma?/ [ˈkɛ huˈʔduma?] 'the word which I said'

/ˈgɛ huˈdans/ [ˈkɛ huˈʔdans] 'you said the word'

/ˈgɛ huˈdapa?/ [ˈkɛ huˈʔdapa?] 'the word which you said'

/ˈgɛ huˈduns/ [ˈkɛ huˈʔduns] 'we said the word'

/ˈgɛ huˈdupa?/ [ˈkɛ huˈʔdupa?] 'the word which we said'



/v/ > /p/

/v/ changes to /p/ in the interrogation suffix /-vis/ when a preceding /n/ is absorbed.

/hi'sus/ [hi'sus] 'I shall say it'

/hisu'vis/ [hisu'vis] 'shall I say it?'

/hi'suns/ [hi'suns] 'we shall say it'

/hisu'pis/ [hisu'pis] 'shall we say it?'

/v/ changes to /p/ in the locative suffix /-vi?/ when a preceding /?/ is absorbed.

/'hoya/ [/'hoya] 'garden'

/'hoyavi?/ [/'hoyavi?] 'in the garden'

/'nina/'ni?/ [/'nina/'ni?] 'water'

/'nipi?/ [/'nipi?] 'in the water'

/ɟl/ > /t/

/ɟl/ changes to /t/ in the locative suffix /-ɟlo?/ when a preceding /?/ is absorbed.

/'yava/ [/'yava] 'tree'

/'yavaɟlo?/ [/'yavaɟlo?] 'on (in) the tree'

/ya'vana/ya'va?/ [ya'vana/ya'va?] 'stone'

/ya'vato?/ [ya'vato?] 'on the stone'

### 5.3. Contraction of Vowels

Sometimes when two successive verb forms form a semantic unit, the two vowels at their junction are contracted, and the final vowel of the preceding verb is assimilated with the initial vowel of the verb following. Thus the two verbs unite to form one word. But since that word has two stresses, it is treated as two separate words in the phonemic spelling.

/'hs<sup>i</sup>da o'dus/ [/'hs<sup>i</sup>?da o'?'dus] > [/'hs<sup>i</sup>?do'?'dus] 'I came up here' (lit.: 'I ascended, and came')

/ɛ'ɟlina ɛ'sis/ [ɛ'ɟlina ɛ'sis] > [ɛ'ɟlins'sis] 'he shall bring' ('he shall take, and come')

/ɛ'ɟlika u'o/ [ɛ'ɟlika u'o] > [ɛ'ɟliku'o] 'take it away!' ('take it, and go!')

/ɛ'ɟlina i'sis/ [ɛ'ɟlina i'sis] > [ɛ'ɟlini'sis] 'he shall take it away' ('he shall take it, and go')

The same happens in the case of other words (nouns, adjectives, and non-conjugatable verb stems occurring with

another verb) with final /a/, which form a semantic unit with the verb following.

/,s<sup>i</sup>gava s<sup>i</sup>,diɛ/ [ˈs<sup>i</sup>gava s<sup>i</sup>,ʔdiɛ] > [ˈs<sup>i</sup>gavs<sup>i</sup>,ʔdiɛ] 'he woke up'

/,hstama s<sup>i</sup>,diɛ/ [ˈhstama s<sup>i</sup>,ʔdiɛ] > [ˈhstams<sup>i</sup>,ʔdiɛ] 'he divided out'

/da:mota s<sup>i</sup>,diɛ/ [daˈmota s<sup>i</sup>,ʔdiɛ] > [daˈmots<sup>i</sup>,ʔdiɛ] 'I was afraid'

## 6. PRACTICAL ORTHOGRAPHY

	PHONEMES			CHARACTERS USED IN PRACTICAL ALPHABET
/p/	[p]	[p·]	[ʔp]	p
/b/	[b]	[ʔb]		b
/t/	[t]	[t·]	[ʔt]	t
/d/	[d]	[ʔd]		d
/k/	[k]	[k·]		k
/g/	[k]	[g]	[g]	g
/ʔ/	[ʔ]			,
/f/	[f]	[p]		f
/v/	[v]	[b]		v
/h/	[h]			h
/s/	[s]			s
/m/	[m]			m
/n/	[n]			n
/ɟl/	[ɟl]			l
/y/	[y]	[ɟ]	[j]	y
/i/	[i]			i
/ɛ/	[ɛ]			e
/ɛ <sup>i</sup> /	[ɛ <sup>i</sup> ]			ei
/u/	[u]			u
/o/	[o]			o
/o <sup>u</sup> /	[o <sup>u</sup> ]			ou
/a/	[a]			a
/a <sup>ɛ</sup> /	[a <sup>ɛ</sup> ]	[a <sup>i</sup> ]	[æ]	ae
/a <sup>o</sup> /	[a <sup>o</sup> ]	[a <sup>u</sup> ]	[ɔ]	ao

Although stress isemic, it does not have to be written, and should not be written. The indication of stress in the

practical orthography would be beneficial for the non-indigenous reader only. For the indigenous, unsophisticated reader, the indication of suprasegmentals is usually more confusing than helpful, since he will probably pronounce the words correctly even without stress indicated.

It would be possible to show [I] in the spelling by indicating the short vowels in a special way (cf. p.41). But a different analysis of the vowels would be necessary for that, and also the introduction of special characters or diacritics for the short vowels, and/or the writing of consonant clusters to indicate transition vowels. But the latter especially would disturb the CVCV pattern, and that pattern seems so much the rule that literate indigenous speakers object very much to the writing of CC clusters. For that reason the practical alphabet has been set up as outlined above.

#### **7. ACKNOWLEDGEMENT**

The author would like to thank Dr S.A. Wurm of the Australian National University for initiating this paper, and for his advice on possible solutions of quite a number of the phonological problems of Yagaría.

## NOTES

1. Not included in this figure are the 760 or so Yagaria speaking inhabitants of the Yagusa area in the Keigana Census Division. The ancestors of these people are said to have migrated into this area from a village called Yagusa which was situated in the present-day Yagaria linguistic area.

2. S.A. Wurm, "The Linguistic Situation in the Highlands Districts of Papua and New Guinea", published in *Australian Territories*, vol.1, No.2, February 1961, pp.14-23.

3. S.A. Wurm, *Phonological Diversification in Australian New Guinea Highlands Languages*, Canberra, 1964, p.2.

4. The rule is that voiceless stops cannot occur pre-glottalised. If, therefore, for morphological reasons (e.g. negation prefix [aʔ-]), a glottal stop would have to occur with a voiceless stop, the glottal stop either disappears, or the voiceless stop is lengthened. Some speakers, however, tend to say the glottal stop in such cases with [p] and [t] (never with [k]), usually with a short transition vowel in between the glottal stop and the stop. Thus fluctuation between voiceless stops and their lengthened and/or preglottalised counterparts occurs.

[apa'mio/ap·a'mio/aʔa'pa'mio] /apa'mio/ 'don't give them!'  
[ato'ɟlo/at·o'ɟlo/aʔa-to'ɟlo] /ato'ɟlo/ 'don't throw away!'  
[aka'mue/ak·a'mue] /aka'mue/ 'I am not giving you'.

Since the preglottalised voiceless stops are only fluctuations of their non-preglottalised counterparts, they can be disregarded here.

5. For morphophonemic reasons: [ʔ] + [g] > [k].

6. cf. Note 4.