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by

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THE PHONEMES OF THE ADZERA LANGUAGE

K.G. HOLZKNECHT

0. INTRODUCTION

0.1. The Adzera[1] people live in the north-east part of New Guinea, in the vast Markham Valley. The Leron river, a tributary of the Markham, is approximately the border to the south-east, and the Gusap river, a tributary of the Ramu (or Guin in the Adzera language), the border of the north-west. The larger part of the people live in the flats of the valley, but some of the clans have also settled in the first grass-hills, bordering the valley, as well as the valleys of tributary rivers between the Leron and Gusap, e.g. the Jarus group, which lives in the Jafats, Maŋiaŋ and Mami river valleys.

0.2. According to the last census (1970) the population figure stands at 17,600. All of them speak <u>one</u> language[2], which differs only slightly in minor grammatical matters, but more in vocabulary in the various "district groups" (a term coined and used by K.E. Read: *Oceania*, Vol. 27 (1946), 2:98. The language spoken by the Kaiapit and Saŋaŋ district group is taken as the norm and is used for the data given here.

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[1] The word "Adzera" is a distortion of the word /a dzrəʔ / which means *inward, up country, up-stream.*

[2] H.A. Holzknecht, The Adzera Family of Languages, *KIVUNG*, Vol. 4 (1971), 3:171-174.

Holzknecht, K.G. "The Phonemes of the Adzera Language". In Holzknecht, K. and Phillips, D. editors, *Papers in New Guinea Linguistics No. 17*.
A-38:1-12. Pacific Linguistics, The Australian National University, 1973. DOI:*10.15144/PL-A38.1*

0.3. The late Reverend Fritz Oertel founded the Mission Station Kaiapit in 1918. He recorded the language and rendered it in a practical alphabet. The late Dr O. Dempwolff, professor at the University of Hamburg, Germany attempted an "Analysis of the Adzera language" in 1928-29 (handwritten manuscript in the Hamburg University Archives, Manuscript Book, No. 786) with the data then known. Unfortunately, through war action all the material of Reverend Fritz Oertel, who died in June 1938 - dictionary, grammar (?) and other collected linguistic material - was lost. In 1947 the writer found one copy of the printed Bible History (1925) and one copy of the Catechism (1925), together with the last copy of the First Primer (1925) in Adzera. With the help of many informants the language was learned and words collected. In 1949 I came upon a word list of about 400 words, typed by the late Reverend Fliehler. This list has the words grouped in subjects, like animals, plants, trees, food etc. The practical alphabet of Reverend Fritz Oertel was changed in some instances, e.g. the glottal stop taken up.

The present discription was undertaken first in German as part of the Language Course of the Bible Translators - Summer Institute of Linguistics[3] at Neukirchen, Kr.Moers, Germany, during the summer of 1962, and is now, after more study and investigation, redone in English[4].

1. CHART OF PHONEMES

1.1. *CONSONANTS*

Type of sound	Labial	Alveolar	Velar	Glottal
voiceless[5] stops	p	t ts (ɬ)	k	ʔ
prenasalized voiceless stops	^{m}p	^{n}t nts ($^{n}ɬ$)	^{ŋ}k	$^{ŋ}ʔ$
voiced stops	b	d dz (ʒ)	g	
prenasalised voiced stops	^{m}b	^{n}d ^{ndz}dz ($^{n}ʒ$)	^{ŋ}g	
voiced nasals	m	n	ŋ	

[3] I wish to express my gratitude and thanks to Mr Wilfried T. Zibell of the Summer Institute of Linguistics for his help and guidance in working this paper first.

[4] My thanks go to Dr E. Nida for his help in getting some of the sounds straight, during the Translators' Institute - August 1964. And Dr Healey and Dr D. Bee of the Summer Institute of Linguistics, Ukarumpa, New Guinea, for their very helpful suggestions in writing this paper.

[5] Aspiriation is quite pronounced in the so-called Adzera-group (Kaiapit-Saŋaŋ); less so in the Amari and Oŋaʔ groups; the least in the Jarus group.

Type of sound	Labial	Alveolar	Velar	Glottal
voiceless fricatives	f	s		h
vibrants		r		
semivowels	w		j = y	

1.2. *VOWELS*

	Non-Back	Back
High	i	u
	i:	
Non-High	a	o
	a:	o:

2. CONTRASTIVE FEATURES

2.1. *CONSONANTS*

Adzera consonant phonemes are divided into five contrastive groups: stops, nasals, fricatives, vibrants and semivowels.

The stops contrast in non-nasalized and prenasalized ones, in voiced and voiceless ones.

Stops and nasals contrast as to labial, alveolar and velar point of articulation. Voiceless non-nasalized and prenasalized stops have an additional contrast at the glottal point of articulation.

Fricatives and vibrants as to labial and alveolar and glottal point of articulation.

The semivowels contrast to labial and alveolar point of articulation.

2.2. *VOWELS*

Vowel phonemes contrast as to high and non-high positions, and horizontally as to non-back and back position.

High non-back and non-high vowels contrast further in long and short vowels.

2.3. *CONTRASTS IN IDENTICAL AND ANALOGOUS ENVIRONMENTS*

2.3.1. Consonants

/p/ + /b/	/papo/ (papo)	*sugar-can maggot*
	/babo/ (babo)	*quick, hasty*
	/paʔan/ (paʔan)	*to forbid s.th.*
	/baʔan/ (baʔan)	*to rise up* (in stomach)

/t/ + /d/	/taŋindan/ (taŋindan)	*to forgive, let have*
	/daŋindan/ (daŋindan)	*to knot into string*
/t/ + /s/	/iti?/ (iti?)	*bamboo knife*
	/isi?/ (isi?)	*small, little*
/t/ + /ts/	/tafan/ (tafan)	*his great grandfather*
	/tsafan/ (ȼafan)	*praise, to honour*
/ts/ + /dz/	/tsari?an/ (ȼari?an)	*to stir up, stir round*
	/dzaridan/ (ʒaridan)	*to sit crosslegged*
/k/ + /g/	/kaŋan/ (kaŋan)	*be ripe, very hard*
	/gaŋan/ (gaŋan)	*bark, skin*
/s/ + /ts/	/sa?/ (sa?)	*men's house*
	/tsa?/ (ȼa?)	*prop. hole where pigs lie*
/s/ + /dz/	/jas/ (jas)	*left*
	/jadz/ (jaʒ)	*oinment*
/n/ + /ŋ/	/ganaŋ/ (ganaŋ)	*banana, yam*
	/gaŋan/ (gaŋan)	*skin, bark*
/k/ + /?/	/imiŋk/ (imiŋk)	*dark*
	/imiŋ?/ (imiŋ?)	*it is, it lies* (there)
/mp/ + /p/	/impri?/ (impri?)	*he pulls, takes out*
	/ipri?/ (ipri?)	*is in labour*
	/mpapa ruan/ (mpapa ruan)	*to lean on*
	/papa/ (papa)	*light, not heavy*
/r/ + /d/	/rarodan/ (rarodan)	*to straighten*
	/darodan/ (darodan)	*to chase, drive off*
final final		
/?/ + vowel	/itsara/ of tsaradan	*to offer, sacrifice*
	/itsaara?/ of tsaara?an	*to be dry*

2.3.2. Vowels

/u/ + /o/	/nu?an/ (nu?an)	*cooked through, done*
	/no?an/ (no?an)	*to call*
	/nugu(n)/ (nugu(n))	*heart, breast*
	/nogo/ (nogo)	*that, in a distance*
/i/, /a/, /o/, /u/	/nigi/ (nigi)	*that, that one with you*
	/naga/ (naga)	*that, that one in far distance*
	/nogo/ (nogo)	*that, that one with him*
	/nugu(n)/ (nugu(n))	*heart, breast*
/i/ + /i:/	/tsipo/ (ȼipo)	*armlet, bracelet*
	/tsiipo?/ (ȼi:po?)	*taro beetle*

/a/ + /a:/	/ampi/ (ampi)	*many*
	/aampi/ (a:mpi)	*guest, visitor*
	/mama/ (mama)	*mountain*
	/maamaʔ/ (ma:maʔ)	*child*
/o/ + /o:/	/fofidan/ (fofidan)	*to be old*
	/foofi/ (fo:fi)	*bamboo flute*
	/osoda nan/ (osoda nan)	*to accuse, put suspicion on* s.b.
	/oosodan/(o:sodan)	*to command, order*

Length of vowel occurs quite frequently otherwise in verbs beginning with an /a-/ and the added prefixes /na-/, /ma-/, /a-/, /da-/ and their combinations /mada-/, /romə-/, /rona-/, /roda-/, /romada-/ e.g. /aridan/ *to shine, spear* gives /naari/ (na:ri) *shall shine, spear.*

3. DESCRIPTION OF PHONEMES WITH ILLUSTRATIONS

3.1. *CONSONANTS*

/p/	a voiceless labial stop	/pai/	*meat*
/mp/	a labial voiced nasal plus voiceless labial stop	/mpu(i)/	*water, river*
/b/	a voiced labial stop	/biʔ/	*blood*
/mb/	a labial voiced nasal plus voiced stop	/kasombi/	*smelling herb*
/t/	a voiceless alveolar stop	/totin/	*tree pulp*
/nt/	an alveolar voiced nasal plus voiceless alveolar stop	/ntuŋʔ/	*stalk, stump*
/d/	a voiced alveolar stop	/doŋ/	*bamboo drum*
/nd/	an alveolar voiced nasal plus voiced alveolar stop	/mimindan/	*to get dark*
/k/	a voiceless velar stop	/kits/	*string, threat*
/ŋk/	a velar voiced nasal plus voiceless velar stop	/gaŋkaŋ/	*shell*
/g/	a voiced velar stop	/gai/	*tree, wood*
/ŋg/	a velar voiced nasal plus voiced velar stop	/ruŋgan/	*himself*
/ʔ/	a voiceless glottal stop	/imaʔ/	*no*
/ŋʔ/	a voiced velar nasal plus glottal stop	/sisiŋʔ/	*news, message*
/ts/	a voiceless alveolar affricate stop	/tsaʔ/	*prop*
/nts/	a voiced alveolar nasal plus voiceless affricate stop	/ntsuf/	*pit, hole*
/dzaf/	a voiced alveolar affricate stop	/dzaf/	*fire*

/ndz/	a voiced alveolar nasal plus voiced alveolar affricate stop	/ndzaman/	*to bless, chart*
/m/	a voiced labial nasal	/mamo/	*cassowary*
/n/	a voiced alveolar nasal	/nidan/	*to speak*
/ŋ/	a voiced velar nasal	/ŋadan/	*to open wide* (mouth)
/f/	a voiceless labiodental frigative	/fain/	*a part, some*
/s/	a voiceless alveolar frigative	/sai/	*prairie grass*
/h/	a voiceless glottal frigative	/haha/	*jubilant cry*
/r/	a voiced alveolar rolled vibrant	/ratan/	*to fear*
/w/	a voiced high close back unrounded non-syllabic vocoid	/wap/	*forest*
/j=y/	a voiced high close front unrounded non-syllabic vocoid	/jaban/	*to go up*

3.2. *VOWELS*

/i/	a voiced high close front unrounded vowel	/gian/	*his cheek*
/u/	a voiced high close back unrounded vowel	/gum/	*work, garden*
/o/	a voiced close back rounded vowel	/nowai/	*mangotree and fruit*
/a/	a voiced low open central unrounded vowel	/garam/	*man, people*
/ii/	a voiced high close front unrounded vowel	/tsiipoˀ/	*Taro beetle*
/oo/	a voiced middle close back rounded long vowel	/foofi/	*bamboo flute*
/aa/	a voiced low open, central unrounded long vowel	/maamaˀ/	*child*

4. CONSTRUCTION OF SYLLABLES

Syllables in Adzera consist of an optional onset of one or two consonants, an obligatory nucleus (peak) of one or two vowels[6] and an optional coda of one consonant. (Word medial sequences of two consonants are mostly of the same type as the syllable onset.)

[6] There are a number of words, which contain a syllable nucleus of three vowels /poait/ *beautiful* /ofoail/, *quarrel*, etc.

$$\pm C_1 \pm C_2 \pm V_3 \pm V_4 \pm C_5$$

If C_2 is absent C_1 = any of the prenasalized or non-prenasalized voiced and voiceless stops, the nasals, frigatives, vibrants and semi vowels; except /ʔ/, /ŋʔ/ and /ŋg/.

If C_2 is /r/ C_1 = any consonant except /ʔ/, /ŋʔ/, /ndz/, /ŋg/, /n/, /w/, and /j=y/.

If C_2 is /w/ C_1 = any velar.

V_3 and V_4 may be any vowel, but the sequences /uu/, /ou/ and /uo/ do not occur. (Sequences /ii/, /oo/ and /aa/ are phonetically long vowels).

All of the 12 possible syllable types covered by this formula have been observed in both monosyllabic and polysyllabic words.

C_5 =

p	t	ts	k	ʔ
^{m}p	^{n}t	^{n}ts	^{ŋ}k	$^{ŋ}ʔ$
b		dz		
m	n		ŋ	
f	s			
	r			

The following types of syllable structure, therefore occur (v = vowel, C = consonant):

Type of Nucleus	Open Syllables	Closed Syllables
Simple Nucleus		
No Onset	V	VC
Simple Onset	CV	CVC
Complet Onset	CCV	CCVC
Complex Nucleus		
No Onset	VV VVV	VVC VVVC
Simple Onset	CCV CVVV	CVVC CVVVC
Complex Onset	CVV	CCVVC

5. DISTRIBUTION OF PHONEMES

5.1. *SINGLE CONSONANTS AS DESCRIBED ABOVE*

(Word initial, intervocalic and final).

/p/ /pai/, *meat* /dapiŋ$^{?}$/, *saliva* /wap/, *forest*

/mp/ /mpu/, *water* /impa/, *he sits* /gamp/, *village*

/b/ /bi$^{?}$/, *blood* /iba/, *he came* /ifab/, *pig*

/mb/, - /kasombi/, *smelling herb* -

/t/ /tauf/, *stone* /tata$^{?}$/, *morning* /pit/, *G-string*

/nt/ /ntuf/, *noise* /dintut/, *Elefantiasis* /fadafint/, *termite*

/d/ /doŋ/, *bamboo drum* /dadaŋi/, *fern* -

/nd/, - /gando-gando/, *a specie of yam* -

/k/, /kits/, *string* /akaran/, *to write* /kawak/, *Leatherhead bird*

/ŋk/ /ŋkiaŋ$^{?}$an/, *be bitter* /gaŋkaŋ/, *skin, shell* /imiŋk/, *dark*

/g/ /gai/, *tree-wood* /gagiran/, *mend* -

/ŋg/, - /ruŋgan/, *himself* -

/$^{?}$/, - /gro$^{?}$an/, *to slip, fall* /muŋa$^{?}$/, *retribution*

/ŋ$^{?}$/, - /gafiŋ$^{?}$an/ *to press* /sisiŋ$^{?}$/, *news, message*

/ts/ /tsa$^{?}$/, *prop* /pitsia/, *a winged ant* /maŋits/, *famine* -

/nts/ /ntsuf/, *pit, hole* /ŋantsiaŋ/, *stunted* /ŋants/, *shield* -

/dz/ /dzaf/, *fire* /moadzip/, *path* /jidzudz/, *filled up*

/ndz/ /ndzadan/, *cover with* /indzam/, *blest* -

/m/ /mai$^{?}$/, *day* /jami/, *sterile, barren* /dziram/, *black cockatoo*

/n/ /nidan/, *to speak* /mana$^{?}$/, *outside* /maŋan/, *who? one*

/ŋ/ /ŋir/, *rafter* /gaŋaf/, *level, flat* /ganaŋ/, *banana, yam*

/f/ /fain/, *a part, some* /afa$^{?}$/, *sister-in-law* /wauf/, *wild kapok*

/s/ /sai/, *prairie grass* /sasa$^{?}$/, *empty* /opis/, *bean*

/h/ /hai/, *yes* /haha/, *jubilant cry* -

/r/ /raban/, *to hack, hoe* /rarub/, *Caurie shell* /ratar/, *old*

/w/ /wap/, *forest* /watsawits/, *hawk* -

/j=y/ /jaban/, *to go up* /jaja$^{?}$/, *slippery* -

5.2. *SYLLABLE INITIAL CONSONANT CLUSTERS*

5.2.1. C + r (Word initial and medial)

/pr/ /propan/, *to fall* /opras/, *deep, penetrating*

/mpr/ /mpris/, *grater* /impraˀ/, *he goes round*

/br/ /brofan/, *to snore* /nabrof/, *knife-spear*

/mbr/ /mbroˀ/, *material, vine* /imbras/, *to spread wide, free its branches*

/tr/ /trisan/, *be tough* /itrap/, *he clips off*

/ntr/ /ntrakan/, *to click o's tongue* /mintroa/, *figtree* and *fruit*

/tsr/ /tsrukan/, *to suck* /itsri/, *a tree*

/ntsr/ /ntsrukan/, *become loose* /intsruˀ/, *bears no fruit*

/dr/ /druŋan/, *full of leaves* /idra /, *he goes in a crowd*

/dzr/ /dzraˀ/, *up-stream* /idzrob/, *releases bow*

/kr/ /kras/, *dancing tune* /krikakrik/, *noise of gulping*

/ŋkr/ /ŋkraŋan/, *be hard, ripe* /aŋkrosan/, *to limp*

/gr/ /graŋ/, *stone blade of adze* /bigroˀagin/, *turn around*

/mr/ /mriˀ/, *dry, arid* /mrumriˀ/, *very soft* (fruit)

/ŋr/ /ŋroˀ/, *depression* /sisiŋriˀ/, *a tree*

/fr/ /frodzan/, *to bubble* /ifrip/, *he jerks*

/sr/ /sroakan/, *to crawl* /jasruˀ/, *a tree*

5.2.2. C + w (Word initial and medial)

/kw/ /kwarak/, *verandah* /kakwak/, *beardless*

/ŋkw/ /ŋkwafan/, *to breathe heavily* /gaŋkwai/, *a specie of yam*

/gw/ /gwasan/, *to overlook* /maragwaŋ/, *big, green lizard*

/ŋgw/ /ŋgwaŋan/, *to bark* /daŋgwaŋ/, *he would have barked*

/ŋw/ /ŋwaŋˀan/, *be crooked* /iŋwab/, *he howls* (dog for his master)

5.3.

Word medial consonant clusters, which can not readily be described as syllable initial (C_1, C_2), but rather as syllable final plus syllable initial C_5, C_1.

/ŋb/ /bajoŋbajoŋ/, *peel of bell* /baŋbaŋ'an/, *be wide*

/mw/ /gumwat/, *smoke signal*

/ŋw/ /ŋaraŋwaran/, *search thoroughly*

Distribution of consonants within the clusters can be summarized in the following chart.

Cluster Type	Distribution in Word		
	Initial	Medial	Final
NC_2	+	+	+
C_1r; NC_2r	+	+	
ŋw; ŋgw; ŋkw; kw; gw	+	+	
ŋ'		+	+
mw; ŋb; ŋw		+	
mbr	+	+	

N = all nasals; C_1 = all stops, frigatives and nasals except n. C_2 = voiceless and voiced stops.

5.4. *SINGLE VOWELS AS DESCRIBED ABOVE*

(Word initial, medial and final).

/i/ /ifut/, *potladdle* /antim/, *Adzeraladder* /bini/, *nice*

/o/ /okaf/, *fruit-hook* /odoro'/, *wood-beetle* /ogo/, *there in distance*

/u/ /uta'/, *empty* /utup/, *heap, great number* /idumpu/, *he splits*

/a/ /amoa/, *a banana* /antaf/, *men's string bag* /dampa/, *bow*

/i:/ - /tsiipo'/, *taro beetle* -

/o:/ /oosodan/ *order, command* /foofi/, *bamboo flute*

/a:/ /aampi/, *guest, visitor* /maama'/, *child* -

5.4.2. Vowel Clusters as Syllable Nucleus

/ia/ - /gian/, *his cheek* /dam|pia/, *strecher*

/io/ - /tsio'/, *thicket*

/oi/ - /poif|an/, *to wrap in leaves* /o|moi/, *bottle-gourd*

/oa/ - /foar/, *pole for carrying* /foa|ri|dan/, *to lay out with leaves*

/ui/ - /duiŋ/, *a smelling herb* /mpui/, *water, river*

/ua/ - /ruan/, *self, himself* -

/ai/, /aits-aits/, *news* /a|faif/, *cochroach* /gai/, *tree, wood*

/ao/, /ao/, *interj.: he!*

/au/, /aub/, *a tree* /tauf/, *stone* /pau/, *tobacco*

The following is a chart of consonants clusters. The vertical column represents the first consonant (C_1) and the horizontal represents the second consonant (C_2).

	p	t	k	b	d	g	f	s	ts	dz	h	r	m	n	ŋ	w	j=y	ʔ
p												+						
^{m}p												+						
t												+						
^{n}t												+						
k												+				+		
^{ŋ}k												+				+		
b												+						
^{m}b												+						
d												+						
^{n}d												+						
g												+				+		
^{ŋ}g												+				+		
f												+						
s												+						
ts												+						
^{n}ts												+						
dz												+						
^{n}dz												+						
h																		
r																		
m	+		+									+				+		
n		+		+				+		+								
ŋ			+	+		+						+				+		+
w																		
j=y																		
ʔ																		

MORPHOPHONEMICS OF THE ADZERA LANGUAGE

K.G. HOLZKNECHT

1. TERMS OF RELATIONSHIP AND BODY PARTS

Noun (N) stems rama- *father*, gudzu- *head* to it are added obligatory possessive suffixes:

-ŋʔ	1. pers. sing. and pl.	rama-ŋʔ	*my, our father*
-m	2. pers. sing. and pl.	rama-m	*your father*
-n	3. pers. sing. and pl.	rama-n	*his/her father their father*
-ŋʔ	1. pers. sing. and pl.	gudzu-ŋʔ	*my, our head*
-m	2. pers. sing. and pl.	gudzu-m	*your head*
-n	3. pers. sing. and pl.	gudzu-n	*his/her head their head*

2. POSSESSIVE SUFFIXES WITH OTHER NOUNS

N stems oŋar *house*, badzab *corpse*, bintip *chair, stool*, antim *ladder*, gai *tree*, biʔ *blood*, ampan *family*, ampoaŋ *wooden sword*.

a) After a word, which ends in a consonant, except alveolar and velar nasals and /ʔ/, we have the following set of suffixes:

-aŋʔ	1. pers. sing. and pl.	oŋaraŋʔ	*my, our house*
-am	2. pers. sing. and pl.	oŋaram	*your house*
-an	3. pers. sing. and pl.	oŋaran	*his/her/their house*

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badzabaŋʔ	badzabam	badzaban
bintipaŋʔ	bintipam	bintipan
antimaŋʔ	antimam	antiman

b) After a word, which ends in a vowel or alveolar, velar nasal or glottal we have the following set of suffixes:

gaŋʔ	1. pers. sing. and pl. :	gai gaŋʔ	*my, our tree*
gam	2. pers. sing. and pl. :	gai gam	*your tree*
gan	3. pers. sing. and pl. :	gai gan	*his/her/their tree*

biʔ gaŋʔ	biʔ gam	biʔ gan
ampoaŋ gaŋʔ	ampoaŋ gam	ampoaŋ gan
ampaŋ gaŋʔ	ampaŋ gam	ampaŋ gan

Alveolar nasal n assimilates if a velar voiced stop follows, see also 4.

3. THE COMPLETE POSSESSIVE PRONOUN SET

Takes the personal pronoun in front of the word, with which it stands:

dzi	oŋaraŋʔ	*my house*
ago ~ o	oŋaram	*your house*
-	oŋaran	*his/her house*
agi	oŋaraŋʔ	*our house* (incl.)
aga ~ agai	oŋaraŋʔ	*our house* (excl.)
agam	oŋaram	*your house*
-	oŋaran	*their house*

Parallel to this set go the other two - 1) the set for Relationship and Body Parts, and 2)b) the set after vowels and alveolar and velar nasals and the /ʔ/ glottal:

	-ŋʔ	-m	-n
and			
	gaŋʔ	gam	gan

Adzera has no separate form for the 3. pers. sing. and pl. of the personal pronoun. It uses instead auxilary words:

3. pers. sing.: araŋan *already known, as mentioned*

and 3. pers. pl. : ribigi *rib? igi = those ones*

Sometimes the word gan *his/her, their* is also used.
One can therefore see and hear:

gan oŋaran *his/her house*
their house

Plural can and must be signified only with the relationship terms. The plural-word rusa- takes the same suffixes as the set for relationship:

dzi	ramaŋ? rusaŋ?	*my fathers*
ago ~ o	ramam rusam	*your fathers*
-	raman rusan	*his/her fathers*
agi	ramaŋ? rusaŋ?	*our fathers* (incl.)
aga ~ agai	ramaŋ? rusaŋ?	*our fathers* (excl.)
agam	ramam rusam	*your fathers*
-	raman rusan	*their fathers*

There is also a short form: ruas, which is not declined, but is the same for all the persons. It expresses a more general - not blood-relation - plural:

raiŋ? ruas *my brethren* as address in the Christian congregation used.

Then also Napoa? ruas 'Napoa? (a person's name) *and those, who are with her'*.

This short form is also used to express a plural in the sense of *all the different....* e.g.

jafas ruas *all the different fish*

apo dzufan ruas *all the different birds*

4. NOUNS

nam *thing* > naŋ, if a voiced velar stop follows.
nan *talk* > naŋ, if a voiced velar stop follows.

Thus:

nam igi *that thing* > dzi naŋ gaŋ? *that my thing*

nan igi *that talk* > dzi naŋ gaŋ? *that my talk*

The context makes clear, which is meant.

For a few years though, there is more and more the tendency to change that and use the possessive pronoun suffix set as 2)a) given for nam *thing*.

Thus: namaŋʔ, namam, naman.

But it is not generally used yet. Therefore it is just mentioned here.

5. VERBS

The suffix of the participle -dan∼ *with* -an. -dan stand after vowel and the alveolar nasal n. Thus:

fofi-dan	*to become/be old*
foarin-dan	*to stir up*

After the other consonants and the /ʔ/ glottal stop stands -an. Thus:

tip-an	*to do, to repair*
kiraʔ-an	*to untie, loosen*

The -n of the participle suffix -dan∼ -an is dropped, if an object, particle, or a second verb follows:

naŋa gum	*to work*
isa funub	*to kill, murder*
oda badan	(take-come) *to bring*

The prefix of the present tense i-∼ j-. The prefix i- standing before an initial vowel of a verb-root changes to j-:

ba-dan	*to come*	i-ba	*he comes*
amos-an	*to touch*	j-amos	*he touches*

The prefix of the present tense i-> o- in the second person singular. The personal pronoun of the second person singular ago∼ o exercises strong pressure and assimilates the prefix i-> o-. Thus:

dzi ini *I said* > ago∼ o o-ni *you said*

Two verbs gadan *to eat* and fadan *to go* have the peculiarity, that they take an n phrase-ending in all the tenses, except the participle, where it is already. Thus:

i-rim nam da i-ga-n	*gave food and ate*
i-ni nan da i-fa-n	*said* (talk) *and went*

6. PRONOUNS

a) Personal Pronouns

ago 2. pers. sing. ~ o 2. pers. sing. Thus:

ago ~ o	o-juŋ aampi	*you pay a visit*
ago ~ o	rinuŋ gam	*your master, trading partner*

Third person singular and plural has no special personal pronoun in the language, as stated before (page 14). Auxiliary words are used instead. Araŋan for 3. pers. sing. and ribigi for 3. pers. pl.

First Person plural exclusive aga *we* ~ agai *we*. Thus:

aga itsaŋan ago	*we* (excl.) *saw you*
wani nan da agai	*speak to us* (excl.)

agai *we* (excl.) is used chiefly phrase ending.

b) Demonstrative Pronouns

The demonstrative pronoun nani *this* (near me), nigi *that, that one* (near you), nogo *that,* (near him), and naga *that, that one* (far away) ~ alternate with ani, igi, ogo, aga especially, if a nasal procedes.

c) Reflective Pronouns

The reflective pronouns have the same set of suffixes as the words, which end in a vowel, and have to correspond with the form of the personal pronoun. Thus:

ruŋgaŋ'	*myself*
ruŋgam	*yourself*
ruŋgan	*himself, herself*
ruŋgaŋ'	*ourselves*
ruŋgam	*yourselves*
ruŋgan	*themselves*

There is another set of forms with the same meaning, and the additional meaning of the reciprocal. This set has the suffixes as given under 2)a) for a word, which ends in a consonant. Thus:

ruaŋ'	*myself*
ruam	*yourself*
ruan	*himself, herself*
ruaŋ'	*ourselves, to one another*
ruam	*yourselves, to one another*
ruan	*themselves, to one another*

This set of forms is also mostly used in reflexive verbs.

ORDER OF POSITION OF AFFIXES

3		2		1		Verb-Root			1	
ro-	'durative'	boŋ-	'present-perfect'	i-	'realis'	-gari-	*to weed*	-dan	participle after vowels and alveolar nasal -dan	
roŋʔ-	'durative realis'	ma-	'potential'	a-	'hortative I'	-taŋin-	*to give*	-dan		
				na-	'hortative II'	-saŋʔ-	*to correct*	-an		
				boŋʔa-	'future'	-ram-	*to measure*	-an		
				wa-	'imperative'					
				da-	'conjunctive'					
						gari-dan			after consonants and glottal -an	
						taŋin-dan				
						saŋʔ-an				
						ram-an				

N E G A T I O N

4		3		2		1		Verb-Root		1	2
ro-	'durative'	wa-	'negation'	boŋ-	'present perfect'	i-	'realis'	-gari-	*to weed*	-dan 'participle'	o
						na-	'hortative II'	-taŋin-	*to give*	-an	
						da-	'conjunctive'	-saŋ?-	*to correspond with*	(see remark on previous page)	
						boŋ-	'perfect-present'	-ram-	*to measure*		
						ma-	'imperative'				ma?
						anuŋ?	'negation of realis and participle'				o

A SYNOPSIS OF VERB FORMS IN ADZERA

K.G. HOLZKNECHT

gari	verb root in compound verbs: iba-gari written without a hyphen.
nam gari	*the weed* (the pulled-out weeds).
i-gari	prefix for actual, real event in the past or present "modus realitatis".
igari gum mai?-mai?	*he weeds, has weeded daily, oftentimes.*
i-gari i	i particle of assent, assurance, consent, confirmation: yes, already.
sanab idzidziwan araŋan garam Saŋaŋ igari i.	*The road is clean. The Saŋaŋ people have already cleaned it.*
i-gari a	a particle, implies contradiction or a strong assertion: yet, however, nevertheless (where is my sharp knife, which they should not take weeding?).
jo ifan igari gin a.	*They took it away and are weeding nevertheless.*
i-gari wa	wa particle of the accomplished fact; perfect, used to make it clear, that it is in the past: already done.
da gum mpupan ogo? igari wa.	*What is with the field full of weed? It is weeded already.*
baŋin idaum, igari gum wa.	*His hand is well, he has already weeded.*

Holzknecht, K.G. "A Synopsis of Verb Forms in Adzera". In Holzknecht, K. and Phillips, D. editors, *Papers in New Guinea Linguistics No. 17*.
A-38:21-28. Pacific Linguistics, The Australian National University, 1973. DOI:*10.15144/PL-A38.21*

o-gari. — The same forms for the 2. pers. sing.

ago o igari = ogari

ogari i, ogari a, ogari wa

ogari sanab ogo sib? — *Did you clean that road finish?*

But: 2. pers. pl.

agam igari.

boŋ-i-gari. — boŋ- prefix of a *just now, but just* finished event:

perfect-present: *just now, but just.*

sagat aga igari gan araŋan ogo wa, da dzi boŋigari gaŋ?. — *That woman has weeded hers long ago, and just now I have finished mine.*

baŋin mais ogo imiŋ? biŋan ogo da boŋigari gum. — *He had a sore hand for a very long time and just now he has weeded.*

boŋ-i-gari i. — i particle as before: *yes, just now, but now.*

gum igi idzidziwan wasi. — *That field is quite clean. Of course,*

ania?, boŋigari i. — *they but just have weeded it.*

Nam gari ropisia. — *The weeds are still fresh. Yes,*

boŋigari i. — *they have weeded it just now.*

boŋ-i-gari wa. — *just now, very recently, but finished weeded.*

anuŋ? igari guman o, mai? ogo dzi itsaŋan. a?a?, boŋigari wa. — *He hasn't weeded his field, I saw it yesterday. No, he finished weeding only very recently.*

boŋ-ma-gari. — ma- potential prefix: *probably, likely but just now.*

magari araŋan ogo da rodzidziwan. a?a?, boŋmagari. — *It is probably weeded a while ago and still clean.*

No, it is likely but just now weeded.

a-gari. — a- prefix of the hortative I; it marks a citation, summons to 1. and 3. pers. sing. and pl. The execution is expected to commence right in the near future.

ruŋgan agari muŋa? igi da agi nafan. — *He himself shall weed that part, then we go.*

If there are more verbs used, than the second verb is often in the hortative I form.

apo maran ta?an nawa? ampa mpui.
Living animals shall come forth and live in the water.

udzuf maŋan da dzi natip aba.
In a year I come back again.

na-gari.
na- prefix of hortative II. The execution of the order or commission can be of longer duration of time: *shall, will, may.*

dzi nagari?
May, shall I weed?

agi nagari.
Let us weed.

na-gari i.
i as before.

o mararai i garidan, oni fada mpuŋa rintai aga raiji? dzi nagari i.
Are you perhaps tired of weeding and would you rather go to wrap the bananas? I will weed alright

na-gari ama?.
ama? particle: *let, may.*

A: ini fada garida gum da dzi impi? rut.
He said, that he would go to work in the garden, so I scolded him.

B: maragab nagari ama?.
Let him do it.

wa-gari.
wa- prefix of imperative, 2. pers. sing. and pl.

wagari aŋo.
Just weed (without knife).

agam wagari marafain aga raiji.
You (pl.) *weed the other side over there first.*

wa-gari a.
a as before.

a dzi boŋ?agari gaŋ? gumaŋ??
How can I work our field?

wagari a, dzi siŋan ani wama? o.
Weed nevertheless, I have this spear not for nothing.

boŋ?a-gari.
boŋ?a- prefix for the future.

aga nampai, aga boŋ?agari gaŋ? gumaŋ?.
We (excl.) *will stay, we shall work in our garden.*

boŋ?a-gari i.
i as before.

anuŋ? ini gum wampup in o. boŋ?agari i.
This is not an old field for them yet. They surely will weed it still.

ma-gari.
ma-prefix. ma- has potential function. An event may probably, come true in the future. The translation has to use the subjunctive mood.

sagat magari gum.	*The woman is probably weeding.*
magari sanab ogo wa.	*They may have weeded, may have cleaned the road already.*
ma-gari i.	ma- i *probably, likely yes.*
sagat guman impup santan.	*The field of the woman is very overgrown.*
magari i.	*Probably she will weed it.*
ma-gari a.	ma- a *probably inspite of.*
sagat igiŋʔ rinin anuŋʔ fada gum o.	*The woman is sick, can't go to the garden.*
magari a.	*Probably she will weed it inspite of that.*
ma-na-gari.	The 'potential' prefix combined with the prefix for hortative II: *probably will.*
sagat ijab mamai, gan guman impup sib.	*The woman goes up the mountain, her field there is overgrown.*
managari.	*She probably will weed it.*
da-gari.	Prefix da- has an 'irreal' function. It combines notion of the event with the idea of not to be real. Our translations must make use of the imperfect subjunctive, resp. pluperfect: *had.*
o ruŋgam dagari.	*Would you have weeded it yourself.*
impai aŋo, dagari gum.	*She is sitting around, would she only weed.*
da-gari amaʔ.	amaʔ as before. *Yet, nevertheless.*
o dagari amaʔ.	*Well weed, then.* or: *If you only would weed.*
garam dagari sanab igi amaʔ.	*If only the people would weed/clean the road* (one can't walk).
da-gari a.	a as before. *(The garden of the other is so nice, mine does not bear, thought the weeding wouldn't help.)*
dzi dagari a.	*If I would only have weeded it.*
ma-da-gari.	'potential' prefix ma- combined with the prefix da-, which has an 'irreal' function.

dzi madagari o gam igi.	*I nearly would have yours weeded.*
dzi baŋiŋʔ dariʔ da dzi madagari gum.	*Would my hand be well, I would have weeded the field.*
soda ragigum da madagari.	*If he would be industrious he would have weeded.*
ma-da-gari wa.	wa particle as before.
aniaʔ, gamiʔ biŋan ogo da madagari wa.	*As said, that plenty rain, otherwise we would have weeded it finished already.*
ma-da-gari a.	a as before.
aga imunti sanab sib in da madagari a.	*We hindered him, otherwise he would have weeded nevertheless.*
ro-gari.	ro- prefix. The function is 'durative'. The event is connected with the idea of duration, which can be combined with all the other prefixes and suffixes.
garam irunt ifan i apo da sagat rogari gum.	*The men ran to get prey and the women are still weeding/still weed.*
intsup gum ogo sibʔ aʔaʔ, rogari.	*Is that field finished weeded? No, they still weed.*
ro-gari i.	i as before. *(They shall not stop to weed yet.)*
rogari i.	*They are still weeding though.*
ro-gari a.	a as before. *(I said they should stop immediately, now if I catch them still in the field....)*
wafan, rogari a.	*Just go, they are yet weeding.*
ro-i-gari.	Prefix of durative as above ro-gari but the realis prefix i- is not suppressed if the 'igari' is stressed in contrast to other activities. In actual use by the natives speaker it seems, that this prefix is used for the singular. The prefix for the plural is: roŋʔ-.

roŋ?-i-gari. Like ro-i-gari durative realis. Around Kaiapit and Saŋaŋ the people say that this is the only possible form and that roigari is wrong.

ro-na-gari. Durative hortative II.

wani araŋan, maŋits marut maragab.
ronagari raiji.
Tell him, the poor guy will get hungry. He shall yet still weed.

ro-na-gari ama?. ama? as before.

aga ontapa i maragab sinuŋ? gum i a??
ronagari ama?.
Why should we call him away from his work? Let him still work.

ro-ma-gari. Durative potential.

aga ifaŋ? gin araŋan ogo.
romagari gum.
We waited for her for a long time. She may still be weeding.

ro-ma-gari i. i as before.

ro-ma-gari a. a as before.

ro-ma-gari wa. wa as before.

ro-da-gari. Durative subjunctive.

rodagari gum ani da agi dani rut.
If she still would weed here, then we could tell her right away.

ro-ma-da-gari. Durative potential subjunctive.

finiŋ gan rodampai da romadagari gum igi.
If his wife would be still living she most likely would still weed that field.

ro-boŋ?a-gari. Durative future.

(Till we arrive at the field she will have left it.)

a?a?, roboŋ?agari.
No, she will still weed.

wa-gari o. Negation, combines the conception of negation with that of the irreality: *does not weed.*

araga ragitsimpan biŋan, wagari gum pas o.
He is very lazy, he doesn't work a bit.
(-toŋ maran garidan).

wa-na-gari o. Negation of hortative II.

dzi boŋʔani da wanagari o. *Even, if I say it she will not weed.*

wa-da-gari o. Negation of subjunctive.
o dani muŋʔ i miŋʔagin *If you would have said that before,*
da aga wadagari o. *that you would like to keep it, we wouldn't have weeded it.*

wa-boŋ-i-gari o. Negation of perfect-present.
araŋan waboŋigari gum igi o. *She hasn't weeded that field here just now.*

ro-wa-gari o. Negation of durative.
aroani da gum igi impup intiŋ. *Now the field here overgrows for*
rowagari o. *good. They don't weed it anymore.*

ro-wa-da-gari o. Negation of durative subjunctive.
baŋiŋ gan manuf araŋan wa, *Her hand is apparently well already*
da rowadagari o. *otherwise she wouldn't weed.*

ma-gari maʔ. Negation of imperative.
o magari maʔ. *Don't weed.*
agam magari maʔ. *Don't weed!* (pl.)
Only for 2. person.

ro-ma-gari maʔ. Negation of durative imperative.
wataŋin rai. goboʔ isasus *Let it be! The sun is hot, don't*
da agam romagari maʔ. *weed anymore.*

anuŋʔ igari o. Negation of realis.
garam igi anuŋʔ igari gum o. *That man does not weed/has not weeded.*

gari-dan. Suffix -dan - after consonants and glottal stop -an - added to the root of the verb forms the participle.

oni garida gum igi da goboʔʔ *Do you want to weed that field to-day?*

maamaʔ garidan. *The weeding boys.*

dzi ini gum aga garidan ogo. *I mean the field, which we* (excl.) *did then.*

Sagat garidan, da garam iba gamp. *When the women still weeded, the men came to the village.*

ro-gari-dan. Durative participle.
dzi iba imiŋʔ i sanab gum ogo *When I came along the field road,*
da dzi itsaŋan sagat rogaridan. *I saw the woman still weeding.*

araŋan ini da sagat rogarida gum gobo? biŋan ogo.

He said it, and the women still weed during the hot sun.

boŋ-gari-dan.

Prefix of the participle perfect.

sanab garam boŋgaridan igi itsaara? aŋo.

The road, which the people weeded, cleaned just now is wholly dry.

wa-gari-dan o.

Negation of particle.

gum igi impup intiŋ, agi wagaridan o.

That field is altogether overgrown, let's not weed it.

iba gum ani mpadan aŋo, wagaridan o.

He came to the field to sit around, not to work.

anuŋ? gari-dan o.

Another form for the negation of the participle.

dzi runta? anuŋ? nida garidan o.

Alone I would not like to weed.

ro-gari-dan o.

Negation of durative participle.

gum wajo fi da agi rogaridan aroani o.

This isn't a field, that we should continue to weed.

Holzknecht, K.G. "A Synopsis of Verb Forms in Adzera". In Holzknecht, K. and Phillips, D. editors, *Papers in New Guinea Linguistics No. 17.* **A-38:21-28**. Pacific Linguistics, The Australian National University, 1973. DOI:*10.15144/PL-A38.21*

THE INFLUENCE OF ENGLISH ON A TRIBAL ALPHABET

OR

THE PHONEME OR THE ALLOPHONE?

DONALD J. PHILLIPS

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0. INTRODUCTION

During 1969 and 1970 psycholinguistic tests were conducted on new literates in the Wahgi community of New Guinea[F.1.] These were run in order to establish the degree of influence which English and Pidgin English were having on the Wahgi semi-literate: whether education in these languages had changed the basic phonemic responses of the Wahgi to his own language, and whether it had introduced new ones. As a result of the tests it was hoped that certain facts would be established from which the most suitable alphabet in which to produce literature for the literate Wahgi speaker could be devised.[F.2.]

Since 1963 my wife and I had been engaged in linguistic and translation work in the Wahgi area, and had produced a number of technical papers about the language. One such paper was the Phoneme paper which described the etic and emic areas of sound in the language, and noted that by a process of contrast and distribution analysis the sum of 23 phonemes had been arrived at. These phonemes consisted of 6 vowels and 17 consonants.

From this basic analysis we developed an alphabet of 23 symbols, and subsequently printed literature in the language using this alphabet. The informants used to assist with this analysis were primarily illiterate, and our attempts to teach them and others to read and write with this alphabet proved successful.

During 1969 certain factors forced our attention to focus on the emerging group of literates arising from the joint effort of administration and mission schools. These were being taught to read and write in English, and also became literate in Pidgin English. A survey of this situation indicated that 3,283 students were daily attending class under the instruction of 98 teachers, see Table 1.

TABLE 1

A detailed list of the schools, students, and teachers in the Wahgi Valley area (i.e. Minj sub-district) as of 1969.

LOCATION	SCHOOLS RUN BY MISSION/ADMINISTRATION	TEACHERS INDIGENE/EUROPEAN		PUPILS
Minj	+	3	1	110
Nondugl	+	5	1	231
Kukmil	+	3	-	138
Kerewil	+	4	-	123
Kimil	+	3	-	100
Tombil	+	1	2	60
Minj	RC	6	3	321
Ambang	RC	7	1	241
Fatima	RC	6	10	479
Milip	RC	2	-	71
Nondugl	RC	4	1	182
Banz	RC	5	3	282
Mondemil	Swiss	3	1	130
Sigmil	Swiss	3	2	196
Kugark	Swiss	1	4	201
Kudjip	Nazarene	2	5	157
Banz	Lutheran	5	-	240
Pukamil	Lutheran	1	-	21
		64	34	3283

From discussions with some of these teachers it was deduced that three to four thousand students had already passed through their schools and were now living in and around the language area. This newly literate section of the society, which we shall estimate to be 7,000 persons, formed therefore an immediate literate public for the literature which we or others might produce.

Nevertheless in presenting our books to members of this literate group we met with disinterest, ridicule, and an inability on their part to read them without real difficulty.

The educated Wahgi's natural desire to improve himself, and his consequent tendency to consider his own language to be inferior to English, was taken into account, but these factors did not explain his difficulty with the alphabet used for his own language.

The problems were restricted to those areas where firstly the Wahgi exhibited two phonemes in an area occupied by only one in English and Pidgin English, for instance: Wahgi has both a dental nasal /n̪/ and

alveolar nasal /n/, while English and Pidgin English have only the alveolar nasal; Wahgi has both a /k/ phoneme and a velar lateral phoneme /ɬ/, whereas the other languages have only the /k/ phoneme; secondly, where there was not a one to one correspondence between English and Pidgin English and Wahgi phonemes which did occur, for instance English and Pidgin English exhibit the cluster of phonemes /m/ and /b/ in the words 'number' and 'Namba', whereas Wahgi exhibits a corresponding complex phoneme /mb/ in the same area of the word - /embe/ *same*. By definition a complex phoneme consists of two or more segments which in this case act as a unit to the native mind[1] (Pike pp. 128-138). Wahgi has both /m/ and /p/ (p) (b), but no contrast between (p) and (b). The contrast is between /mb/ and /p/. This second point was added to when it was observed that a divergence in the symbolization used for phones which were similar in Wahgi and both in English and Pidgin English caused difficulties. For instance, the phoneme /t/ has both (t) and (r) allophones, but only the symbol 'r' had been used to symbolize it, this was because this was the most frequent allophone. The arbitrary decision to symbolize the phoneme as /t/ rather than as /r/ was made because of the linguist's desire to preserve an appearance of symmetry in the obstruent chart. The new literates reacted against the symbol 'r' when they perceived the phone (t), and preferred to use the symbol 't' in those locations. Thirdly, difficulties were observed where digraphs had been used for phonemes where no suitable single symbol was available.

The following list indicates the respective symbolization chosen for the 23 Wahgi phonemes.

TABLE 2

The first alphabet listed beside the respective phonemes.

PHONEME	ALPHABET SYMBOL	
/mb/	'b'	
/p/	'p'	
/nd/	'd'	
/t/	'r'	
/ŋg/	'g'	
/k/	'k'	
/ndz/	'j'	
/s/	's'	
/m/	'm'	
/n/	'ny'	
/n/	'n'	
/ŋ/	'ng'	
/l/	'l'	dental lateral.

TABLE 2 (continued)

PHONEME	ALPHABET SYMBOL	
/l/	'l'	medially,
	'lt'	in final position. Alveolar lateral.
/ɬ/	'll'	velar lateral.
/w/	'w'	
/y/	'y'	
/i/	'ii'	
/ɪ/	'i'	(I) is equivalent to Pike (ɪ).
/e/	'e'	
/a/	'a'	
/u/	'u'	
/o/	'o'	

This list indicates that prenasalized obstruents were being treated as complex phonemes, and that the Wahgi was expected to respond to, 'b', 'd', 'g' and 'j' by uttering a prenasalized obstruent of the correct phonic quality according to its distribution. By use of the symbol 'r' we indicated that we expected the Wahgi to utter a (t) in response to this symbol when the distribution of the phoneme determined it and to utter (r̃), (R̃) and (ř) respectively. Accordingly the Wahgi was expected to respond to the digraphs 'ny', 'll', and 'ii' and 'ng' but uttering a single phone.

These expectations were realized when we were able to instruct illiterates and some literates in actual literacy classes, but the uninfluenced literate section of the community responded in a way other than as we had expected them to.

Research therefore, was centred in those areas which have greatest concern. These areas are entitled as follows:

A. Low Function Contrasts - in general covering those areas where Wahgi has two phonemes to the single English phoneme;

B. Diverse Symbolization of one Phoneme - this area deals with the lack of isomorphic correspondence of phonemes between the languages, and the awareness of the allophone;

C. Digraphical Symbolization.

1. LOW FUNCTION CONTRASTS

Contracts between /i/ and /ɪ/, /n̲/ and /n/, /ɲ/ and /k/.

The Trubetzkoy-Bloomfield contrast-distribution type of analysis used to resolve the phonemes of the Wahgi language was a reasonably systematic and rigid method, but it gave little opportunity for a study of the functional load which the phonemic contrasts carried. For instance it is possible to establish by minimal word pairs that a phonemic contrast exists between /i/ and /ɪ/ (see list of minimal word pairs which follows - Table 3), but these same pairs show that for the most part the words used in the contrast come from different word classes. This being so it means that these words would very seldom occur in identical environments in conversation.

The concept of the phoneme is based on the principle that it is a functional unit within the system of a language. Consequently it must function on the paradigmatic axis at the utterance level, and not simply as a phonic segment which might be contrasted with another phonic segment if the contexts in which they occur are isolated and reduced to word level. If one reduces the contexts in this way one changes a syntagmatic relationship into a paradigmatic one, or makes a function which is relevant to the Process, relevant to the System.[2] (Dinneen p. 337). For instance the words used to establish the /i/ and /ɪ/ contrast might also stand syntagmatically related to each other:

/ka kip kɪp enɪm/	*The hawk is charred.*
bird hawk charred	
/ka kip pu ka mɪm mim/	*The hawk is in the nest.*
bird hawk go bird nest is	
/e̲ɪm n̲ɪm n̲im/	*He spoke to you.*
he you spoke	

By ignoring the contexts and merely comparing these words on the word level we can contrast the segments paradigmatically. But in actual language context this is almost impossible. This might also be applied to the other phonemes in question in this section.

TABLE 3

A list of minimal pairs which were used to establish the phonemic contrast between certain phonemes which has later been considered to be a low function contrast.

PHONEME	MINIMAL PAIR	TRANSLATION	WORD CLASS
/i/	/nim/	*he spoke before*	Verb
/ɪ/	/nɪm/	*you*	Pronoun
/i/	/kip/	*hawk*	Noun
/ɪ/	/kɪp/	*charred*	Verb specifier
/i/	/mim/	*he is*	Verb
/ɪ/	/mɪm/	*nest*	Noun
/i/	/sim/	*it is*	Verb (used of inanimate subjects)
/ɪ/	/sɪm/	*he took*	Verb (used with animate subjects)
/i/	/pim/	*he knew before*	Verb
/ɪ/	/pɪm/	*he knew*	Verb
/i/	/nim/	*he spoke before*	Verb
/ɪ/	/nɪm/	*he spoke*	Verb
/n̲/	/kone̲/	*hungry*	Verb Specifier
/n/	/kone/	*rain*	Noun
/n̲/	/kon̲/	*cheek*	Noun
/n/	/kon/	*bag*	Noun
/n̲/	/ene̲/	*sun*	Noun
/n/	/ene/	*he works*	Verb
/n̲/	/en̲ɪm/	*you all*	Pronoun
/n/	/enɪm/	*they worked*	Verb
/n̲/	/kan̲ɪm/	*he sees*	Verb
/n/	/kanɪm/	*they see*	Verb
/k/	/aka/	*sweet potato*	Noun
/ǃ/	/aǃa/	*mistake*	Verb specifier
/k/	/kek/	*scare*	Verb specifier
/ǃ/	/keǃ/	*send*	Verb
/k/	/nok/	*cold*	Verb specifier
/ǃ/	/noǃ/	*water*	Noun
/k/	/mbok/	*fall* (of animate subjects)	Verb specifier
/ǃ/	/mboǃ/	*ripe* (of inanimate subjects)	Verb specifier

These are all the minimal pairs discovered in the language to date which contrast the phonemes in question.

The psycholinguistic tests indicated that on the one hand when contrastive symbolization was used to represent these phonemes (/i/ and /ɪ/, /ŋ/ and /n/, /k/ and /ɨ/) there was no consistency of response by the Wahgi to that symbolization, but rather that the Wahgi was confused in his response, for instance he would write either 'niim' or 'nim' for (nim). On the other hand no ambiguity was experienced when contrastive symbolization was not used, for instance, when only 'nim' was used for both /nim/ and /nɪm/ he responded correctly according to context. The following statistics taken from Section 7 illustrate these points:

When /ŋ/ was symbolized as 'ny' and as 'n' the following percentages in the Flash Card tests (see section 7.1.) were recorded.

FLASH CARD TESTS	WORD INITIAL	WORD MEDIAL	WORD FINAL
as 'ny'	17/27	23/27	13/24
as 'n'	63/63	63/63	62/63

NOTE: 17/27 means - 17 correct occurrences out of 27 occurrences.

The dictation tests indicated that the students used no contrastive symbolization to distinguish /ŋ/ and /n/, while the Reading tests revealed that when /ŋ/ was symbolized as 'ny' and 'n' the following statistics occurred:

READING TESTS	WORD INITIAL	WORD MEDIAL	WORD FINAL
as 'ny'	21/26	13/20	14/60
as 'n'	100%	100%	100%

These statistics reveal that the symbol 'ny' is unsuitable for reasons which I will discuss under Problem area C, Section 4, but they also indicate that the symbol 'n' is fully acceptable when it is used to symbolize /n/.

Following are the statistics for both /i/ and /ɪ/, and /ɨ/ and /k/.

FLASH CARD TESTS	WORD MEDIAL	WORD FINAL
/i/ as 'i'	62/72	45/45
as 'ii'	24/30	25/27
/ɨ/ as 'k'	65/68	55/57
as 'k̲'	11/11	11/11
as 'ƙ'	3/3	3/3
/k/ as 'k'	No actual test but observations indicate 100% acceptance.	

DICTATION TEST	WORD MEDIAL	WORD FINAL
/ɨ/ written as 'k'	44 times	84 times
written as 'g'	36 times	3 times
/i/ written as 'i'	47 times	53 times
written as 'ii'	1 time	7 times

READING TESTS	WORD MEDIAL	WORD FINAL
/i/ as 'ii'	92/97	38/46
as 'i'	184/204	141/165

NOTE: with respect to Reading Tests the figure 92/97 means 92 correct responses out of 97 responses, etc.

/ɨ/ - as the results of these tests for /ɨ/ are too numerous to add here, the reader is referred to Section 7.3. "Results of the Reading Tests" to view the statistics and symbols used.

As a result of these statistics it is postulated that some phonemic contrasts within the language carry a low function load, while others carry a high function load. Those carrying the low function load may be established only at the word level, and only at that level by comparing words of diverse word classes. Albeit, a few cases might be observed at a higher level, that is within the same Word Classes. The members of these contrasts, therefore, are not established phonemes in the light of the present synchronic stage of the analysis, but might represent a diachronic metamorphosis: a phonemic contrast developing in the language, or one which is fading away. To support this argument it is noted that /n̲/ and /n/ are used in a mutually exclusive distribution in the following way:

/n̲/ before /i/, /ɨ/ and /e/ in word initial position.

/n/ before /a/, /u/ and /o/ in word initial position.

/n̲/ before /ɨ/ and /e/ in word medial position.

/n/ before /ɨ/, /e/, /a/, /u/ and /o/ word medially.

Likewise the vowels /i/ and /ɨ/ are used in a partial mutually exclusive distribution:

/i/ occurs in word medial and final position.

/ɨ/ occurs only in word medial position.

Further to this, these two vowels are used interchangeably in certain words:

Either (sinambiɨe) or (sɨnambiɨe) *They both took.*

Either (ninambiɨe) or (nɨnambiɨe) *They both spoke.*

The consonants /k/ and /ǃ/ are also used in a partially mutual exclusive distribution:

/k/ in all word positions.

/ǃ/ only in word medial and final positions.

The conclusion which may be drawn from these facts, therefore is that the contrast between these phones has not been conclusively proven, and that contrastive symbolization in the orthography is not required.

It is felt that the Prague and Bloomfieldian type of analysis used to arrive at the original phonemes of Wahgi, and consequently their symbolization in the orthography, by not taking note of degrees of function, as described here, and the relevance of minimal pairs from within a word class, tends to ferret out all the phonic contrasts establishable within the language, and consequently to overload the language with signalling entities. Context, as noted by Martinet (Martinet p. 266) and (Lions pp. 81-84)[3], must play an important part in establishing the status of contrasts. To simplify the task of searching for parallel contrasts I suggest the following two procedures: firstly and primarily that minimal word pairs used in establishing a phonemic contrast be required to come from the same word class; and secondly that 12 to 20 such pairs at least, be sought to prove the status of the contrast.

Two further points concerning these entities must be considered before this part of the discussion is complete: first of all whether these segments constitute different phonemes or allophones of the same phoneme; and secondly the influence of the national languages on the final decision as to their status in the orthography.

Since the contrasts occurring between these pairs of phones have been shown to be of low functional value within the system of the language, can they be considered to be allophones of the same phoneme? Such an allophonic relationship can not properly be established on the word level, for minimal contrasts of words devoid of their linguistic context can establish them as phonemes. But on the phrase and the clause level, of phonological analysis, a detailed description of the contexts in which these entities occur would establish that they never occur in identical environments, that is except for the contrast established between (i) and (ɪ) between two verbs, one indicating the Completive Aspect, the other the Absolute Completive Aspect. But even in these cases certain Temporal Phrases co-occurring in the text would prove the context to be less than minimal. Further, these forms of the Verb, in these Aspects, are often used interchangeably that is -

either /yek nim/ *before he spoke* or /yek nɪm/ *before he spoke* *he spoke*

This serves to support the point being made here, that the value of the contrast is of a secondary nature.

The tonal analysis of Wahgi supports this contention. But for the occurrence of one pair of multisyllabic verbs which have identical tone patterns, it would be possible to say that /ɪ/ occurs with the low toneme, and /i/ never with a low toneme.

The second point discussed here must have a strong bearing on the consideration of these entities from a sociolinguistic standing. Luzbetak recognized the need for a modified alphabet when one considered the growing number of Pidgin English and English speakers of the area. Statements by Don Laycock, Stephen Wurm, and Geoffrey Smith supporting the argument that Pidgin English will develop into the national language of New Guinea, and pointing out that when there is government recognition of such development it 'could mean education in Pidgin in primary schools, (and) expansion of literacy in Pidgin...'[4], demonstrate the importance of national tongues and future development. If it is possible to predict diachronic developments within languages, and in particular in Wahgi, although I am not propounding that such predictions are possible, then because of the prestige of the national tongue it would seem possible that change would be in favour of the national tongue, rather than away from it. Such changes in the vocabulary of the language are occurring continuously, but they have also been noticed to be occurring in the phonology of the language. For instance the lack of consonant clusters in word initial position is now under attack. Such words as 'store' and 'stone' have been assimilated into the language as vocabulary items, but whereas members of the older generation pronounce them as (sɪto) and (sɪton), some members of the younger generation are able to say (sto) and (ston). Other developments might be quoted.

Where, therefore, the status of certain segments which might be interpreted as either different phonemes or allophones of the one phoneme is open to question, and those segments if interpreted as phonemes would mean two phonemes in areas where the national tongue has only one, it would seem wise and practical to interpret them as allophones.

Under Research Area A, Low Function Contrasts, I have attempted to show how the method of analysis used to arrive at the phonemes of the language was unable to indicate the degree of function a phonemic contrast carried in this language. Under Research B, Diverse Symbolization of One Phoneme, I discuss how that method also failed to indicate

the degree of response which the informant might have to a phoneme in different areas of the word.

2. RESEARCH AREA B

The previous method of analysis used to discover the phonemes ruled that should the consonant cluster (mb) occur in word initial, medial, and final positions, but that that language only exhibits nonsuspect clusters (According to Pike, phonic clusters such as (ph), (ts), (mb), (tw), (ʔy) are suspect of being either one or more phonemes, but that clusters such as (km), (nb), (st) etc. are clearly a cluster of two consonant phonemes.) (Pike p. 131)[5] in word medial and or final positions, then on the basis of (mb) occurring in a word position where no nonsuspect cluster occurs, the cluster should be interpreted as a complex phoneme throughout the word. Wahgi has nonsuspect consonant clusters in word medial position, but not in word initial and final positions.

The word, (koɬs) *star* with the word final consonant cluster (ɬs) does occur, and may prove to be a consonant cluster of the nonsuspect type, but because the segments are homoganic, and fricativized, and (s) may be considered as an off glide of (ɬ), it is here interpreted as a complex segment, an allophone of the dental lateral (l). The alveolar lateral flap phoneme /ɾ/ allophone ($\overset{v}{(ɬ}\overset{h}{t}$) is described as an alveolar lateral retroflex flap, with voiceless alveolar aspirated stop release, and is interpreted as a complex segment. It occurs in word final position. ($\overset{v}{(be ɬ}\overset{h}{t}$) *read.*

Nonsuspect Clusters: moɬmŋe (moɬ̣mŋe) *They remain.....*

Suspect consonant clusters occur in all three word positions:

Suspect Clusters:	(mba)	*but*	(ŋga)	*name*
	(embe)	*same*	(ensin)	*hair*
	(amp^h)	*woman*	(ont^h)	*tree*

and unprenasalized clusters such as:

(tsimp^h)	*leg*	(katsim)	*waste*
(k^{w}on)	*bag*	(geɣt^h)	*read*

Therefore the correct interpretation of the suspect clusters, according to the theory of structural pressure used, was to interpret the consonants of these clusters as acting as one complex phoneme wherever they occurred.

The Psycholinguistic tests (see Section 7) indicated that in word initial position the informants responded to the complex phonemes: /mb/, /ndz/, /nd/, and /ŋg/ as one unit of sound, that is as complex phonemes, but that in word medial and final positions he was able to perceive up to two articulated segments.

In word initial position (mb) was heard as (^{m}b) or even as (b), but elsewhere in the word it was perceived as two segments (m) and (b), or (m) and (p), as were also the other complex phonemes.

When orthographical symbolization was used to symbolize both prenasalization and the obstruent segment in word initial position, the result was that the informant demonstrated his inability to pronounce the complex phoneme correctly. With such words as /mba/ *but*, and /ndop/ *fire* symbolized as 'mba' and 'ndop', the informant inserted a vowel between the nasal and the obstruent and pronounced (maba) and (nadop^{h}). On the other hand when such words as these were symbolized as 'ba' and 'dop' there was a high degree of accurate response, the informant pronouncing such words as (mba) and (ndop^{h}).

The following statistics, taken from Section 7, support these facts:

Complex Phonemes in word initial position. (See Section 5, for a description of the tests).

FLASH CARD TESTS			DICTATION TESTS	READING TESTS
Symbol used				
/ndz/	j	42/42	used 103 times	103/110
	ns	6/42	not used	zero response
	nj	10/38	not used	2 correct responses
/mb/	b	77/81	used 61 times	134/142
	mp	6/42	not used	2 correct responses
	mb	11/42	used 2 times	2 correct responses
/nd/	d	9/9	used 123 times	44/46
	nd	21/42	used once	2 correct responses
	nt	9/42	not used	not tested

/ŋg/ This phoneme was not tested, and its interpretation is therefore based on the other prenasalized complex phonemes.

In word medial and final positions the informant showed a marked preference for symbolization which represented both the prenasalization and the obstruent, and also a symbolization which indicated that the obstruent was voiced in both of these positions.

Statistics for these Phonemes in Medial position:

		FLASH CARD TESTS	DICTATION TESTS	READING TESTS
/ndz/	j	53/54	used 10 times	153/166
	ns	27/28	used 8 times	151/160
	nj	60/63	used 91 times	92/114
			other clusters used 35 times	
/mb/	b	37/45	used 15 times	163/204
	mp	42/42	used 6 times	6 correct responses
	mb	43/45	used 74 times	86/105
/nd/	d	45/45	used 8 times	36/39
	nt	42/42	used 10 times	9 correct responses
	nd	45/45	used 100 times	166/176

Statistics for these phonemes in Final position:

		FLASH CARD TESTS	DICTATION TESTS	READING TESTS
Symbol used				
/ndz/	j	53/89	used 6 times	46/103
	ns	44/47	used 108 times	131/167
	nj	42/47	used 245 times	77/95
/mb/	b	34/45	not used	175/237
	mp	26/27	used 96 times	66/77
	mb	26/29	used 211 times	81/93
/nd/	d	29/45	used 10 times	13/19
	nt	34/39	used 73 times	16/20
	nd	39/42	used 358 times	no test

From this evidence it can be concluded that the informant preferred a single unprenasalized symbol in word initial position, and a prenasalised symbol consisting of two segments in word medial and final positions. It can further be concluded that he showed a preference for a voiced obstruent symbol in all three positions.

The following diagram uses the phonemes /mb/ as an example of all the prenasalized Wahgi phonemes, and compares the preferred symbolization evidenced in the tests with that used both in English and Pidgin English:

Phoneme /mb/: allophones-word initial (mb) medial (mb) final (mp^h) positions

Preferred symbolization:	b	mb	mb
English language symbols:	b	mb/mp	mb/mp
Pidgin English symbols:	b	mb/mp	/m

The question arises therefore as to whether the varied response of the literate Wahgi to the complex phonemes is also indicative of the illiterate informant's response, or whether the new influence of English and Pidgin English, as taught in the schools to the literate Wahgis, has developed new phonemic responses, so that now the literate Wahgis can perceive, in certain areas of the word, the several segments of the complex phonemes?

Arguing in favour that these responses also represent those of the illiterate Wahgi I would note that English does have word initial consonant clusters, as found in the words *tree, spy, crime, brew,* etc., but this pattern has not influenced the literate Wahgi into perceiving both segments of Wahgi complex phonemes in word initial position. Added to this is the point that when the literate Wahgi pronounces such English words as *store,* and *stone,* he tends to give them the Wahgi pronunciation of the Pidgin English words *ston* and *sto,* that is by inserting a vowel between the 's' and the 't': (sIto)(sIton).

If my conclusions are correct, and the literate's responses also indicate the illiterate's responses, and are not those of subjects merely influenced by English and Pidgin English, then it may be said that the procedures used to arrive at the original interpretation of the complex phonemes are insufficient, and fail to indicate the speaker's perception of the phoneme as it occurs in diverse parts of the word.

Hjelmslev insisted that only paradigmatic relationships be regarded in discovering the relevant relations in a system[6]. (Hjelmslev p.74, Dinneen p. 337). These tests give support to this argument. In order to assert that phonetically similar phones are allophones of the one phoneme, although they occur in different areas of the word, is to state an arbitrary assumption which may result in correct, but sometimes, also incorrect results.

This whole question is important for the following reasons: the original orthography chosen for the language represented the complex phonemes with the obstruent segment of the cluster: /mb/ was symbolized as 'b' in all its distribution etc. The result was only partial failure in obtaining fluency in reading: that is some students read 'b' as (b) and (p), rather than as (mb) and (mp). If the symbol 'mb' had been used in all word positions the tests indicate that the texts produced would

have been completely unintelligible to the people because of such symbols occurring in word initial position.

If, on the other hand, English and Pidgin English have developed new phonemic responses in the literate Wahgi, then wherever indigenes are being educated in these languages, such psycholinguistic testing procedures as indicated in this paper, should play a major role in determining new alphabets for the indigenous language of those areas, or in modifying the old alphabets.

Referring once again to the paradigmatic and syntagmatic axes within the system of language the following assertions are noted. The evidence presented here suggests that only the paradigmatic relationship is reliable for establishing what is and what is not a phonemic contrast, that is, what is the mentalistic response of the indigenous speaker to the phones of his language, or putting it another way, what are the ideal phones used by the speaker to indicate the sound-image in his mind.

Taking /mb/ once again as a representative of the complex phonemes, it is evident from the tests, that the Wahgi perceives this phoneme in two ways: initially as (^{m}b), elsewhere as (m) and (b). The phonological description of Wahgi; (Phillips p. 22)[7] indicates that in word initial position (mb) and (mp) occur, in word medial position both occur again, while in word final position (mp^{h}), and (mp) (mp$_{\flat}$) occur. Therefore the Wahgi's perception of this phoneme is not an accurate or even near accurate phonic portrayal.

The general Trubetzkoy approach to establishing phonemes necessitates that contrasts must be capable of producing intellectual distinctions, and that where no such contrasts can be established the phonically similar forms be treated as either facultative phonic variants, or combinatory variants. (Trub. Intro. pp. 7-10)[8]. Consequently the paradigmatically phonetically similar phones, referred to above, would be interpreted as facultative variants, while the syntagmatically phonetically similar phones would be seen as combinatory variants.

This procedure includes the syntagmatic axis which Hjelmslev later rejected, and which the psycholinguistic tests applied to subjects in the Wahgi language have shown to be insufficient for interpreting certain phonic material.

The following questions must be answered: if the data collected represents the subconscious phonemic (by this I mean - the psychological reality to the speaker) responses of the Wahgi to the phonic substance of his language, then does he in fact have two prenasalised bilabial stop phonemes, irrespective of whether these two phonetically related

units are contrastable or not? secondly: if this interpretation of the facts is incorrect, does the Wahgi have a single phoneme of this type in his subconsciousness, or at the form level of his language, but that this form entity, /mb/, having the phonic distribution described above, is responded to at the allophone level rather than at the phoneme level, or at the diallophone level? (Hammarstrom p, 12)[9] defines phones as 'the smallest, or shortest, segments which are produced by the speaker, single or in sequences, to contribute to forming spoken words (or lexes) and which the hearer identifies, among other things, when he understands a word (a lex).' He defines allophones in the following way: 'Phones having definite relevant "positions", or, said in another way, a definite distribution, and differing among themselves only through free (point 2 above) and facultative (point 3-5 above) variation form a set called allophones.'

Applying these definitions to the discussion in hand it is noted that /mb/ has allophones as follows: word initially (mb) (mp), medially (mb) (mp), finally (mp^h) ($mp^ə$) ($m\overset{\neq}{p}$) (the presence of ($m\overset{\neq}{p}$) is doubted by myself, but has been heard by other linguists. Stratifying the relations within the allophones it is noted that word initially the allophone ($^m b$) is exhibited by the diallophones (mb) (mp), word medially the allophone (mb) is exhibited by the diallophones (mp) (mb), word finally the allophone (mp^h) is exhibited by the diallophones (mp^h) ($mp^ə$) (mp). Further descriptions of the genetic, gennemic, and energemic aspects of these phones would reveal other stratas such as triallophones and tetrallophones etc. (Hammarstrom p. 6)[10], from such data it would be possible to establish that the allophone ($^m b$) differs from the allophone (mb) by onset features, by degrees of length over the sequence, and by emphasis given to each segment of the sequence.

If the Wahgi is responding to the phoneme at the noncontrastable allophonic level, then the orthographic representation of the phonemes should also symbolize this level and not that of the phoneme level.

Statistics from the tests have already been quoted to substantiate this line of argument with respect to the prenasalized obstruents, but the following statistics indicate that this is the case also with the phonemes /t/ and /l/.

Statistics for the phoneme /l/, as it occurs in medial position.

		FLASH CARD TESTS		DICTATION TESTS		READING TESTS	
Symbol used		Sth	Nth	Sth	Nth	Sth	Nth
/l/	l	99/106	7/9	used 123	used 10		
	lt	19/45	3/3	used 6	not used	Ø	3 correct
	ld	13/24	-	used 23	not used	44/73	10/17
	lr	8/19	0/6			25/53	6/24
	ll	22/22	5/6				
	r			used 3	not used		

Statistics for the phoneme /l/ as it occurs in final position.

		FLASH CARD TESTS		DICTATION TESTS		READING TESTS	
Symbol used		Sth	Nth	Sth	Nth	Sth	Nth
/l/	l	3/22	1/6	used 26	used 3		
	lt	63/68	5/6	used 12	used 2	13/17	-
	ld	45/59	5/9	used 18	not used	3/5	-
	lr	27/56	1/6	not used	not used	9/13	-
	ll	12/19	4/5	not used	not used		
other digraphs used				9 times	not used		

Statistics for the phoneme /t/ in word initial position.

		FLASH CARD TESTS	DICTATION TESTS	READING TESTS
Symbol used				
/t/	r	not tested	4/14	14/78
	t	not tested	10/14	100% correct

Statistics for the phoneme /t/ in word medial position.

		FLASH CARD TESTS	DICTATION TESTS	READING TESTS
Symbol used				
/t/	t	not tested	12/14 after na-	after C 100% correct
	r	not tested	2/14 after na-	100% correct except after na-, then 10/20

An over-all summation of the tests demonstrates that the literate Wahgi perceives the alveolar lateral flap /l/ phoneme as a single segment in word medial position, and as two segments in word final position. They also indicate that for the phoneme /t/ the Wahgi perceives 't' in word initial position, and word medially after the negative prefix na-, and as the second member of a cluster (see Section 7), but word medially elsewhere and word finally as 'r'. In other words the Wahgi is responding to allophonic differences.

The phonological description describes the alveolar lateral flap phoneme /l/ as having seven phonic variants. These are subgrouped into allophones and diallophones in the following way: the allophone ($\overset{v}{ɬ}$) occurs in word medial position and has the diallophones (ɬ)($\overset{y}{ɬ}$) ($\overset{y}{l}$); the allophone ($\overset{v}{ɬ}t^h$) occurs in word final position and has the diallophones ($\overset{v}{l}t^h$) ($\overset{v}{ɬ}t\tilde{R}$) ($\overset{v}{ɬ}\tilde{R}$) ($\overset{y}{ɬ}d$).

The phonological description further describes the phoneme /t/ as having seven phonic variants. These are subgrouped into allophones and diallophones in the following way: the allophone (t)with the diallophones (t)(d)(t^{γ}) and (t^{w}); the allophone ($\overset{y}{r}$) with the diallophones ($\tilde{r}$) ($\overset{y}{r}$) ($\tilde{R}$). (See phonological description p. 9 for details of distribution of these diallophones.) The diallophones attributed to the allophone ($\overset{y}{r}$) might be redistributed accordingly: the allophone ($\overset{y}{r}$) having diallophones ($\overset{y}{r}$) ($\tilde{r}$); the allophone ($\tilde{R}$) having the diallophones ($\tilde{R}$) ($\tilde{r}$).

The following list of allophones of all prenasalized obstruents and the phonemes /l/ and /t/, together with the preferred symbolisation preferred by the Wahgi as indicated in the tests, reveal an extremely close association of allophone and symbol.

Diagram of certain Phonemes with allophones, and the Preferred Symbolization indicated as a result of the tests:

PHONEME	ALLOPHONES			SYMBOLISATION		
	ini	med	fin	ini	med	fin
/mb/	(^{m}b)	(mb)	(mp^{h})	b	mb	mb
/nd/	(^{n}d)	(nd)	(nt^{h})	d	nd	nd
/ndz/	($\underline{^{n}dz}$)	(ndz)	($\underline{ns}$)	j	nj	nj
/ŋg/	(ŋg)			g		
/l/		($\overset{v}{ɬ}$)	($\overset{v}{ɬ}t^h$)		l	lt
/t/	(t)	($\overset{y}{r}$) (t)	($\tilde{R}$)	t	r/t	r

The preceding line of argument substantiates the hypothesis put forward here concerning the Wahgi's unconscious response more to the allophonic level than to the phonemic level with respect to certain phonemes, but the force of the argument is limited to word initial and word medial positions for prenasalised obstruents. It does not really answer why the Wahgi prefers the above voiced indicating symbolisation for allophones which are voiceless in character in word final position. The statistics quoted previously (pp. 41 - 42) supporting the above preferred symbolisation for prenasalized obstruents demonstrates that the Flash Card Tests revealed that the Wahgi would respond to either the voiced or voiceless indicating symbols, in word final position, for instance, either 'mb' or 'mp'. The Reading Tests revealed a similar result. But the Dictation Test, in which a far greater number of students were tested, revealed a definite preference for the voiced indicating symbolization, for instance 'mb' in this final position. There is no ready answer to this problem.[F.3].

The equivalent phonetic cluster in English is both phonetically voiceless and alsohas symbolization indicating the same; the English word *plump* (plʌmp^{h}). The English symbols 'mb' occurring in word final position have the phonetic equivalent of (m), as seen in the word *plumb*. The phonetic segments (mp^{h}) do not occur in Pidgin English in word final position, only the segment (m). It can be concluded therefore that neither English nor Pidgin English are exerting influence on the Wahgi's choice of symbolisation in this case.

Basing my thoughts on the preferred symbolization for the prenasalized obstruents as demonstrated throughout the tests, I would put forward the following hypothesis: the Wahgi is responding to the allophonic level of Wahgi phonology, but he shows a conclusive bias for perceiving just two of the three or more possible allophones attributable to a phoneme. One of these allophones occurs word initially, the other word medially and finally.

3. C. DIGRAPHICAL SYMBOLIZATION

The digraph as an alternate form of symbolization in the place of a single symbol was turned to whenever a single symbol was not available. For instance Wahgi evidently had two phonemes in the high frontal region: /i/ and /ɪ/; two nasal phonemes in the dental alveolar region: /n̪/ and /n/. The symbol 'i' was used to indicate /ɪ/, while the symbol 'ii' was used to indicate /i/. The digraph was used for /i/ firstly because its occurrence in word final position often was stressed and therefore nonphonemically lengthened ('mi:')*I am*; secondly because

English often used a double symbol to represent the same sound: 'ee' as used in the word *feet*, 'ea' as used in the word *beat*, etc. The symbolization 'ee' was considered, but rejected because Wahgi both exhibited such a cluster, as in the word se-ee *place*, and also because of the basic phonic correspondence signalled by symbols in the Wahgi alphabet. The symbol 'n' was used to indicate the alveolar /n/, while the digraph 'ny' was used to symbolize /n̲/. Initially the symbol 'n̈' was suggested for /n̲/ but rejected because of printing difficulties. 'ny' was chosen because the dentalization of the nasal tended to give to the segment a palatalized auditory appearance, such as indicated by the symbol 'y'. It was also chosen because it would facilitate easier typing on the average typewriter.

The occurrence of three lateral phonemes in the Southern dialect caused acute problems in the choice of suitable alphabetical symbols. The auditory properties of the dental lateral most closely approximated those of the English alveolar lateral, so the dental lateral was symbolized by the 'l' plus 't^{h}', consequently the symbol 'lt' was used. The velar lateral was the most difficult phoneme to symbolize. Because this phoneme had the allophone (k$\overset{\cdot}{\text{l}}$), the 'kl' symbol was the first symbolization used, but this was later rejected when evidence demonstrated a dialectical overlap between the Northern alveolar lateral flap phoneme, and the Southern velar lateral fricative. Principles and procedures by which I worked necessitated that the alphabet, if possible, be made suitable for the entire language. The advantages of this approach: such as one printing all literature; the unifying effect of such an alphabet, etc. are self evident. Consequently a neutral symbol, the symbol 'll' was chosen. This symbol was already in use in English: in the word *tell* (although there was no correspondence between the phonic properties indicated in the two languages); and Luzbetak had suggested the symbol in a previous work (Luzbetak p. 13)[11]. My first impressions were that it was a suitably neutral symbol which might bridge the gap between the two dialects.

The digraph 'ng' was chosen for the velar nasal /ŋ/ because English used this symbol for an identical phoneme: in the word *sing*.

The following diagram demonstrates certain preferences of the Wahgi for symbols as revealed in the various tests, to symbolize phonemes which had previously been symbolized by digraphs.

SYMBOLS CHOSEN BY THE WAHGI FOR PHONEMES WHICH HAD PREVIOUSLY BEEN SYMBOLIZED WITH DIGRAPHS

PHONEME	SYMBOL	FLASH CARD			READING			DICTATION		
		ini	med	fin	ini	med	fin	ini	med	fin
/i/	i	not occur	62/72	45/45		184/204	141/165		47/70	53/74
	ii	not occur	24/30	25/27		92/97	38/46		1/70	7/74
	e								22/70	8/74
/n/	n	63/63	63/63	62/63	100%	100%	100%	100%	100%	100%
	ny	17/27	23/27	13/24	18/23	13/20	14/60	no occurrence		
/ŋ/	ng				5/100	15/100	5/100	6/31	2/5	2/5
	n							25/31	3/5	3/5

		Sth		Nth		Sth		Nth		Sth	
		med	fin	med	fin	med	fin	med	fin	med	fin
/l/	ll	0/11	3/33	3/3	8/9	0/50	5/60/				
	kl	2/33	9/19	1/3	zero						
	gl	5/11	4/11	0/3	0/3	13/19	13/44	8/26	9/15		
	k	65/68	55/57	0/12	0/9	80/81	168/168	zero	zero	44/81	84/100
	c					50/56	118/120				
	k	11/11	11/11	0/3	0/3						
	l					33/37	37/120	zero	36/36		
	g					30/45	145/168			38/81	3/100
	t	7/11	20/33	3/3	8/9	23/34	89/121	43/45	135/136		
/l/	l	99/106	3/22	7/9	1/6					123/156	26/135
	lt	19/45	62/68	3/3	5/6		13/17			6/156	22/135
	ll	22/22	12/19	5/6	4/5						
	r										44/135
	digraph										39/135

These statistics show that the symbol 'i' is preferred in all tests for the phoneme /i/, but that recognition of the digraph 'ii' as the phoneme /i/ is not out of the question. My experience in literacy work in the language, however, indicated that there was a low degree of consistency in the use of 'ii' in writing, and in its recognition in texts. The Reading figure for 'i' 47/70 and 53/74 is accounted for by dialect differences. This also accounts for the high occurrence of 'e' 22/70.

The new literates had little alternative but to write the symbol 'n' for the dental phoneme /n̲/, however, the tests indicated that the use of 'n' for both nasal phonemes /n/ and /n̲/ was unproblematic. The tests also showed that the use of the digraph 'ny' caused recognition difficulties, particularly in word final position. In this position the Wahgi wanted to sound the 'y' symbol of the cluster as in the English word *any*.

The use of the digraph 'ng' for the velar nasal phoneme /ŋ/ proved totally unsatisfactory. The Wahgi continually pronounced it as either (n) plus (g), or simply as (n). But since both English and Pidgin English use this digraph, the practical considerations of conforming to those alphabets dictates that it must also be used in the Wahgi alphabet, otherwise the symbol /ŋ/ is the most suitable.

The tests demonstrated that the digraph for the velar lateral was unacceptable in both medial and final positions, and that in the Southern dialect 'k', 'c', or 'g', in that order, were the preferred symbolization. However, because of the dialect overlap with respect to this phoneme it was necessary to discover a symbol which when used would call forth the response of the Northern alveolar lateral flap phoneme /ɭ/ from the people of the northern dialect, and the velar lateral phoneme /l̲/ from the people of the southern dialect. The only symbol proved to fulfil these requirements was the symbol 'ɬ' or 'ɬ'. That is the lateral symbol with either a hyphen or equals symbol passing through it.

The need to avoid a symbol which indicated either the velar or alveolar places of articulation is reasonably self evident, but why 'ɬ' should be more successful than other symbols such as 'l̲' is difficult to ascertain. Possibly the symbol 'l' to the Southern Wahgi indicates primarily the alveolar region, whereas 'ɬ' enables him to conclude that the velar region is, in some way, being indicated.

This symbol proved to be problematic, however, when it was observed that its hand written form was very similar to the hand written 't' symbol as now taught in New Guinea's schools. The 'ɬ' symbol was usually written as ɬ while the 't' symbol was taught as ⊢ . This

problem was solved by writing the lateral symbol with a double stroke, or equals sign, passing through it, as in the following symbol 'ŧ' This solution proved satisfactory.

Finally the digraph used for the phoneme /l/ in word final position proved to be highly satisfactory, with the digraph 'lt' being the most satisfactory symbol. In word medial position the overall choice was for a single symbol, with a general preference for the symbol 'l'. But some notable exceptions should be noticed. In the dictation tests the symbol 'r' was the main choice for this phoneme in word final position, while in the Flash Card tests the digraph 'll' was an alternative choice to 'l'. It must also be borne in mind that in New Guinea the articulated response to the English and Pidgin English symbol 'r' is either the trilled or flapped phone. To the Wahgi, therefore, the sensed double articulation of the lateral in word final position, might easily be accommodated by the symbol 'r'. Further to this, some dialects represented in the Tests exhibit the phoneme /r/ as a dialectical variant of the lateral /l/ in word final position. These points might account for the high frequency of occurrence of the symbol 'r' in word final position. Because the symbol 'r' is already being used for the /t-r/ phoneme as it occurs in certain locations, it is unable to be used for the /l/ phoneme. Equally the total absence of 'll' in the dictation tests results is sufficient evidence to presume that its use for /l/ in word medial position would not be complied with by the Wahgi. Further, the symbol 'll' in word medial position often caused the enunciation of the word final allophone (lt).

4. SOME CONCLUSIONS

What has been the influence of English and or Pidgin English alphabetization of the Wahgi's choice on symbols for his alphabet? Firstly it should be noted that where a digraphical symbolization had been chosen for a sound: the phoneme or the allophone, which he perceived as a single segment, the digraph was rejected. The English and Pidgin English symbol 'ng' for the phoneme /ŋ/ is the most obvious example; the use of the symbols 'mb', 'nd', 'nj', in word initial position and their rejection in that position is another example. The use of the digraph 'gl', which has been a common form of symbolization used by Europeans in New Guinea for the velar lateral, also proved unsatisfactory.

It can be concluded therefore that education in either English or Pidgin English had not prepared the Wahgi for the use of digraphs in his

own language for sounds which he perceived as a single segment. Since the subjects chosen to act in the tests represent reasonably well educated students - relative to New Guinea - it can be presumed that it would be incorrect to conclude that because a student can use these digraphs in English or Pidgin English texts he can also use them in his own language. It would appear that the student has been able to gain, from an education in English and/or Pidgin English, an appreciation of the general English phonic quality signalled by the letters of the alphabet, and that he prefers to equate these with how he perceives his own phonemes or allophones. He is not prepared to view a symbol in an abstract way, that is, he will not view the symbol 'll' as the representation of the velar lateral fricative merely because the educationalist presents it to him in this way. For him the symbol 'll' stands for a double segment occurring in the general dental and alveolar regions of the mouth. Similarly he will not accept the idea that because the Wahgi language has the phoneme /t/ that it should be given a single symbol to represent it in the alphabet. Pike says, and I quote, "A basic phonemic assumption in linguistics is that the easiest alphabet for an illiterate native to learn to read is a phonemic one - one significant sound to each symbol, and one symbol to each significant sound. It is assumed that the essential feature of learning to read is to form a conscious or unconscious connection between an acoustic symbol and a written one. This can most readily be done when there is a one to one correspondence between spoken and written symbol. Every departure from this ideal slows down the learning process - although there is available no test to determine the amount of such interference.'[12] Pike's underlined part above limits the above statement to the illiterate, but I feel that the following facts should be borne in mind: a) the subjects chosen to undergo the tests would be considered to be semi-literate by the average Australian standard of literateness; b) the subjects chosen for the tests were newly literate in a language other than their own; c) the subjects chosen for the tests were in effect illiterate in their own language.

By point (a) above I mean that the student's speed of reading, and his comprehension of what he reads, because of the language difficulty, would be relatively low when compared with the Australian schoolboy of similar age. By point (b) I mean that a student newly literate in a language other than his own does not produce normal phonemic responses equated with the symbols written in the test, but rather produces an approximation of what he has been taught to say. His response is further modified by interference from his own language, his ability to

remember what it is he should be saying, and his ability to handle the new and other difficult pronunciation of the new language. By point (c) I mean that since little translation work into this language has been done by others apart from myself, and my own work had not come to the attention of the students in question, it is a justifiable assumption to believe that these students had read no literature in their own language.

With these three points as a background I think that Pike's statement might be studied in the light of what the tests have shown: The tests have shown that the idea of an isomorphic correspondence between phoneme and symbol needs to be modified to an isomorphic correspondence between, on the one hand, certain phonemes and symbols, and on the other, certain allophones and symbols. Concerning departures from Pike's ideal slowing down the process of learning to read, these tests have shown that sometimes the reverse of this is the truth: that is where a one to one correspondence was maintained the readers were retarded in their ability to read the text.

English and Pidgin English, therefore, have given to the Wahgi an awareness of the general English and Pidgin English phonic qualities which symbols stand for. Now, acutely aware of some of his own allophones, he equates the most likely available symbols to those allophones. The resultant alphabet is highly usable and satisfactory to the Wahgi, although it does not fulfil the ideal of the linguist.

Professor Hammarström has pointed out that as the Wahgi literate identifies more closely with English and Pidgin English, he may reject the unusual symbol 'ɬ', chosen for the velar lateral fricative, in preference for the more acceptable symbol 'll' or some other symbol used in English or Pidgin English. My own observations indicate that the Wahgi of the Southern dialect, will use the symbol 'k' for the velar lateral, and the Wahgi of the Northern dialect, will use either 'lt' or 'r' for that dialect's variant of the velar lateral. Nevertheless for some time to come speakers of both dialects will respond to the symbol 'ɬ' with the diaphoneme of their respective dialects.

5. THE TESTS

A series of psycholinguistic tests were conducted in the Wahgi area during 1969, and a further set of tests were conducted in 197[illegible], f.4.

The tests consisted of three stages: a set of (185) flash cards which exampled the various problem areas; a set of (58) words which we asked the informants to write as dictated to them; and a set of short texts which we had the informants read on to tape recordings. (See appendage 5 for the materials used).

Certain restrictions were imposed on those being tested: we insisted that they should not have been influenced in any way by any of the books which we had published in their language, or by the alphabet which we were using; that they receive no instruction prior to the tests; and that they have completed or be attending grade 5-6 at school.

The scheme of testing which was followed was first to present the dictation test to a massed class, or individual who may not be attending school at that time, then to select from the class, on the advice of the teacher, some of the brighter students who would sit for the flash card and reading tests. The results of the dictation test were simply noted and assessed. The informant was marked either right or wrong for his response to the flash card test, or the incorrect response which he gave was noted. In the flash card test the student was given a period of approximately 5 seconds to respond to the word presented. He generally required much less than this. In assessing the recordings of the reading tests we looked only for the student's ability to respond to certain symbolization used in the texts. The symbolization being investigated has been underlined in the texts in appendage 5, but was not underlined in the original texts used.

242 students were used in the Dictation tests; and 58 students were used for both the Flash Card and Reading tests.

The proposed alphabet arrived at as a result of these tests indicates the present day subconscious phonemic responses of the Wahgi to the sounds of his own language as seen in the symbols which we placed before him.

5.1. *THE PROPOSED ALPHABET* as a result of the tests.

	WORD POSITION		
PHONEME	ini	med	fin
/mb/	b	mb	mb
/p/	p	p	p
/nd/	d	nd	nd
/t/	t	r/t	r
/ŋg/	g	g	
/k/	k	k	k
/ndz/	j	nj	nj
/s/	s	s	s
/m/	m	m	m
/n/	n	n	n
/n/	n	n	n
/ŋ/	ng	ng	ng
/l/		l	l
/l/		l	lt
/ɬ/		ɬ(ɬ)	ɬ(ɬ)
/w/	w	w	
/y/	y	y	
/i/		i	i
/ɪ/		i	i
/e/	e	e	e
/a/	a	a	a
/u/	u	u	u
/o/	o	o	o

5.2. *A BRIEF SUMMARY OF ALL THE TESTS*

This summary indicates the dominant choices made by the students in all three types of tests.

	FLASH CARDS			DICTATION			READING		
	ini	med	fin	ini	med	fin	ini	med	fin
/ndz/	j	nj ns j	nj ns	j	nj	nj	j	nj	nj
/mb/	b	mb mp	mb mp	b	mb	mb	b	mb	mb
/nd/	d	nd nt d	nd nt	d	nd	nd	d	nd	nd

5.2. (continued)

	FLASH CARDS			DICTATION			READING		
	ini	med	fin	ini	med	fin	ini	med	fin
/n̲/	n	n	n	n	n	n	n	n	n
/ŋg/				g	g				
/t/					nat			nat	
/i/					i	i		i	i
Both Dialects									
/ǃ/		ɬ			k/l	k/l		ɬ	ɬ
/l/		l	lt		l	r		lr	lt
		ll						lt	
Clusters									
/ǃmb/ either		ɬmb			/ɬt/ either lt				
					+				
		ɬb			/ɬmb/kb				
					+				
		lmb			/ɬmŋ/km				
					+				
		lb			/nŋ/ng				
/ǃmŋ/		ɬming							

Where no definite choice was made the results have not been indicated here.

It should be borne in mind when considering the tests that not all the students mentioned sat for all the words and texts used, but that extra words and new texts in different alphabets, were added to the series as new problem areas were discovered. For instance when we began testing, the problem associated with /ǃ/ was realised, but because of the dialect problem, considered to be unsolvable. However as the tests progressed it was observed that the /ǃ/ was one of the major areas of difficulty and that it should be investigated thoroughly. Subsequently several extra texts were added to the series which, beside testing certain other symbols, were in the main used to test symbols for this phoneme.

The results of the tests therefore indicate the overall response of the students throughout the period of testing.

In appendage 7 the areas of the highest frequency of response to the symbols used have been circled in order to aid the reader of this paper.

6. MATERIALS USED IN THE TESTS

6.1. *WORDS USED IN THE FLASH CARD TESTS*

/ndz/	nju	*name*	punjin	*we went*	kenj	*matter*
	njel	*another*	anja	*outside*	kanj	*I saw*
	njek	*mark*			pinj	*I knew*
	nson	*name*	kansip	*star*	kens	*matter*
	nse	*where*	wansip	*wander*	kans	*I saw*
	nsi	*cold*			pins	*I knew*
	ju	*name*	pujin	*we went*	kej	*matter*
	jek	*mark*			kaj	*I saw*
					pij	*I knew*
					aj	*do*
/mb/	mbek	*as*	embe	*as*	amb	*womam*
	mbu	*thought*	ambuk	*girl*	akamb	*people*
	mbil	*full*				
	mpa	*but*	ampuk	*girl*	amp	*woman*
	mpi	*cold*	ompun	*heavy*		
	mpuk	*book*	empe	*as*		
	bok	*fall*	ebe	*as*	ab	*womam*
Others	with /mb/ mokmbe	*be*			pakilmbe	*place*
	ambikmbe	*held*	pilmbe	*know*	pilbe	*know*
	ambikbe	*hold*	pakilbe	*place*	mokbe	*place*
/nd/	ndom	*he said*	wonda	*he will come*	ond	*tree*
	ndum	*try*			bond	*wrote*
	ndok	*frog*			pund	*I went*
	ntok	*frog*	ente	*a*	ont	*tree*
	nto	*hit*	ontum	*his tree*		
	ntop	*fire*	puntum	*shape*		
	dop	*fire*	woda	*he will come*	od	*tree*

/ŋg/	golum gal	*reed*	nagǫk	*not die*		
	gak	*cook*	nagak	*not cook*		
	gelt	*read*				
	ga nel	*tear*				
	gok	*die*				
/n̲/	nim	*you*	kone tom	*rain*	kin	*us*
	nyim	*you*	konye tom	*rain*	kiny	*us*
/ǃ/			aklamb	*people*	nokl	*water*
			noklum	*water*	ambukl	*girl*
			pulum	*root*	nol	*water*
					al	*east*
			a‡amb	*people*	no‡	*water*
			no‡um	*water*	bo‡	*bed*
			a‡te	*west*		
			a‡e	*east*		
			mo‡mbe	*be*		
			ambi‡mbe	*hold*		
			mo‡mnge	*be*		
			aglamb	*people*	nogl	*water*
			boglum	*bridge*	ambugl	*girl*
			ak̲amb	*people*	nagok̲	*not die*
			nok̲um	*water*	bok̲	*bed*
			axamb	*people*	kex	*send*
			bexum	*bridge*	nox	*water*
			allamb	*people*	kell	*send*
			nollum	*water*	noll	*water*
			mullum	*egg*	ambull	*girl*
			gollum	*die*	gall	*cook*
			pullum	*root*		
			akamb	*people*	kek	*send*
			nokum	*water*	nok	*water*
			pokum	*root*	ambuk	*girl*
					nagak	*not cook*

			gak	*cook*
	aɨ̆amb	*people*	noɨ̆	*water*
	aʌamb	*people*	noʌ	*water*
	agamb	*people*	nog	*water*
			gog	*die*
			ambug	*girl*
			nagag	*not die*
	acamb	*people*	noc	*water*
			ambuc	*girl*
			nagoc	*not die*
			gac	*cook*
/l/	gollum	*reed*	gell	*read*
	pullum	*root*	ga nell	*tear*
	pultum	*root*	ga nelt	*tear*
	goltum gal	*reed*	gelt	*read*
	puldum	*root*	ga neld	*tear*
	golum gal	*reed*	geld	*read*
	pulum	*root*	gel	*read*
	golum gal	*reed*	ga nel	*tear*
	golrum	*reed*	gelr	*read*
	pulrum	*root*	ga nelr	*tear*
			belr	*read*
			gel	*read*
			bel	*read*

6.2. *WORDS USED IN THE DICTATION TESTS*

/n/	nɪm	*you*		
	ene	*sun*		
	mokɪne	*food*		
	kɪn	*us*		
/ndz/	kɪnjɪn	*us*	pɪns	*I knew*
	punjɪn	*we go*	kans	*I saw*
	nju	*a name*	ans	*matter*
	kenj	*matter*	anja	*outside*

	tomlns	*post*
	njlmbll	*place*

/mb/	amb	*woman*
	omb	*sugar*
	mba	*but*
	mbok	*fall*
	embe	*as*
	nombuḷ	*we eat*

/nd/	ndop	*fire*	tonda	*I will hit*	ond	*wood*
	ndonum	*burning*	ende	*a*	tond	*I hit*
			wonda	*he will come*		

/i/	yi	*man*	mi	*I am*	pimamni	*many*
	mim	*he is*	nipim	*he said*		

/l/	ŋgel	*read*	pulum	*root*
	ŋgolum	*reed*	m̀belndll	*read*
	mbel	*read*	ga nel	*tear*

/ḷ/	noḷ	*water*	aḷamb	*people*	ŋgaḷ	*cook*
	ŋgaḷe	*cook*	kuḷaḷ	*a place*	ŋal	*child*

/ŋ/	kuḷaŋ	*spear*	ŋaŋ	*young man*
	ŋaḷ	*child*	aŋanan	*my brother*

/t/	natonam	*do not hit*

/ŋg/	naŋgal	*do not cook*
	naŋgor	*I am not dying*
	ŋgor	*I am dying*

Clusters used

moḷmbe	*he is*	konŋan	*work*
paklimbe	*place*	moḷmŋe	*they are*
moḷmbiḷ	*they are*		

6.3. *THE TEXTS USED IN THE READING TESTS*

(The underlined letter in all tests except Test 9 indicate the letter being tested, in test 9 it indicates both the letter being tested and the symbol i.e. underlined lateral 'l'.)

Text 1. This text does not contrast i/ii, n/ny, and uses 't' word initially.

Ju elim angip yi l2 pela wi tonge, elim mom kone wojip. Wominge, yi tall ni eri kone yem yem allab mojip kone ni kem. Kellbe, "Na er kere, enim pu kipe kes kubullang moram allab el er ori keram.

Pi enim punam el apull eri abill si punam.
Yap pore pore mokine na, kon na, ku moni na, na sinam.
Kon tuall edi eri sib, sib, er si punam.
Punabe, allab pede mollub, 'enim ele nawonam. Kin enim yu napisamin', pa nijip ken, enim 'Kell punamin', ni enam.
Erib, sib tol kibak ni mokil sekellib, kell punam.
Ebe enabe, allab buse pilib, 'Ju angip kem yi ya ele, 'Ma', ni enim', ni pisam, pa nipim.
Ninge, enim enim pu ori allab mojip kone kangip to ninam.
Nib, kipe kes pore pore kubullang mom allab er sekellib, kes erim allab kopungum ka wei ngob, er ka ejip.

Text 2. This text uses the original alphabet used. That is it uses contrastive symbolization for all phonemes, but does not use prenasalization.

Ju ala ebe nyim, "Ya opii kunum allab el allab na bell miim? Na bu se pis. Allab make rojip kunum ngall pu ngall jel keny ebe nyijip, 'Kiny enyim keny gising rojin ba, enyim gol naesim. Naenabe, kiny enim keny ga ejin ba, enyim kiny ga naejip'. Nyijip bell el, ya allab ebe miim. Jon allab noll pangim yii wom. Mokinye beres na noll dongal namom ba, enim, 'Jon kiipe', pa nyijip. Na yii ngall ya wob, noll na mokinye nod ba, enyim mollub, 'Yii el mokine dang no numan wile pum yii. ku rakis siirangjip allab na yap kes erangjip allab se nom yii miim.

Text 3. This text uses the alphabet of text 1, but introduces the use of prenasalization of obstruents in medial and final positions.

Se nonjino. Enim allamp ken kilal nagoram. Allamp wo enim ngans eri to goram. Yap jel naenam. Ju elim ngans to gollmbe, minman dopang kera, paim el, na mung ni enim ngont. Pilimp, elim ken kilal goram. Kai winu pimamni kes mim ba, endi ende pu tai pundan el punde, Ju elim

aure nandom. Enim bu se pilimp, 'kai winu el yap kisi, kinjin yap wei mimin,' ni pil kilal nagosim. Enim peng enjin pimamni kes borum ba, Ju elim gelt kanim.

Text 4. This text uses the alphabet of text 3, but replaces 'nt', 'mp', 'ns' with 'nd', 'mb', 'nj'.

Yi nom ende ku moni pimamni sem. Senge, kunum kunum kon konull ka eri erangim. Ermbe, mokine ka eri pimamni kes norangim. No mom kone elim gar dallming ya mallang yap nasem yi ende mom. Mom yi el elim nganjim kanj pimamni kes tom. Tom yi el, elim kangum Enj. Elim mollmbe, 'yi nom mokine bollang boi ni mene pum en aper nonal', ni er mom en, tu pende womb, elim kisingamb pen to nonjip. Enim angam angam kanimb moram. Morambe, anganjip yi ende yap kes er nim ken, enim mollumb, ''Nim embe naendil, 'pa ninambe, elim, 'Na kaimb gar', pa ni mim ken, elim endan yap el enim aure ninam,' pa nim.

Text 5. This text uses the alphabet of text 4, but replaces 'll' with 'c'.

Yi ende mocmbe, Ju mokine nondil, pa. Ninge, Ju pu elim gar gakring pu bocang ame ni mom. Mocnge, ambe ende moc pim en, elim pu ambuc mom kone embe nim, Nim pu aka gac, a nim. Ninge, ambuc pu ac garing aka gam. Gacmbe, aka tu amb tua ngom. Amb en noc aip si Ju ngom. Ju elim noc el na aka pende si yi ende ngom. Ngombe, elip elip tap to nonjic. Nombuc, Ju embe nim, 'Na pi kec wuc punal, pa nim'.

Text 6. This text uses the alphabet of text 4 but replaces 'll' with 'g'.

Agamb make to monjip kone ambug tag tuage mog mbug, wi to kawa ni embe ninjig, Nim manim ka wei. Nim ngag ka wei kangig nom. Nombe, elim kimbug ka wei sim, pa nim. Ninge, agamb mogumb, Nim Yi ka. Nim agamb bug bag ngonun. Agamb yem yem wug ag pore nim kangum ambug si mine kesim. Nim yi wugma wei min pa ninjip. Ni pore nim kunum el yi nom en agamb enim enim gar yem kem.

Text 7. This text uses the alphabet of text 4, but replaces 'll' with 'k'.

Yi tak wonjik. Wombuk, embe ninjik, "Akamb kombo, pisam. Kil yek ak pu akamb ken embe ninjik, 'Enim ala yi amb kukang naroya. Kisi moka. Yem yem akamb, wuk ak pa mim akamb embe moram', pa ni pa ninjik. Nimbik, pi ak mene sekekmbik, ya wonjik, Wombuk enim ken embe ninambik, 'Enim akamb kukang naronam,' pa ninjik. Ni pore ninjik, yi tak kek wuk mene punjik.

Text 8. This text uses the alphabet of text 4, but replaces 'll' with 'ɬ', and uses 't' medially after na-.

Yi taɬ wonjiɬ, embe ninjiɬ, Aɬamb komb9, pisam. Kil yek aɬ pu aɬamb ken embe ninjiɬ, Enim ala yi amb kuɬang natoya. Kisi moɬ. Yem yem aɬamb, wuɬ aɬ pa nim atamb embe moram, pa ni embe ninjiɬ. Nimbiɬ, pi aɬ mene sekeɬmbiɬ, ya wonjiɬ. Wombuɬ, enim ken embe ninambiɬ, Enim aɬamb kuɬang natonam, pa ninjiɬ. Ni pore ninjiɬ, yi taɬ keɬ wuɬ mene punjiɬ.

Text 9. This text uses the alphabet of text 4, but replaces 'll' with 'l'. This underlined symbol is the symbol tested in this text.

Alamb make to monjip kone ambul tal tuale molmbul, wi to kawa ni embe ninjil, Nim manim ka wei. Nim ngal ka wei kangil nom. Nombe, elim kumbul ka wei sim, pa nim. Ninge, alamb molumb, Nim yi wulma wei min, pa ninjip. Ni pore nim kunum el yi nom en alamb enim enim gar yem kem.

Text 10. This text uses the basic alphabet of text 4, but replaces 'll' with 'x', and introduces the symbols d-, n-, r-, and -lt-, naru-, and -j, -x, and uses no prenasalization.

Yi tax mojix, ede kangum Ej, ede Pultum. Moxbux, dei ede pu runabix, pa nijix ba, yi ede, Ej kin ebe nim, Ma, dei ede ru narudil, pa, Pultum kin ebe nim dei rudil, kaj kin, na popux si elip ronal, pa nim. Yi tax yu el pilbix, kex pujix.

Text 11. This text uses the basic alphabet of text 4, but replaces 'll' with 'gl', and introduces the symbols: nd-, nj-, mb-, and -ld-, -gl-, and -gl, -l, -nd.

Ndok na ngunj kone ende moglmbugl embe ninjigl. Ndok moglmbe, Nim ond puldum kaninmo ma? a nim. Ngunj molmbe, Ond puldum nje sim? a nim. Ndok moglmbe, yemto mande sim puldum, pa nim, ngunj moglmbe, pil el na kanj pa nagl pa ndon? ndok moglmbe. Ond puldum el kamb walpe gar ende sim. Kil pu kanambigl, pa nim.

Text 12. This text uses the basic alphabet of text 4, but replaces 'll' with 'l', and introduces the symbols: nt-, ns-, mp-, and -lr-, -nt-, -mp-, -ns-, -l-, and -l, -lr.

Kil ntansil pore yu pulrum el napinsil, mpa, ampim yu pulrum pinsip. Pinsip wo kin yu pulrum tan to ninsip. Pi pisil. Pinsip amp pi nse mim? Pi wulte amp ente mim. Molmpe, yek nim yu alamp empe tan tonota pum. Aling nsisas wonta kin pore pulrum pisamin.

Text 13. This text uses the basic alphabet of text 4, but replaces 'll' with 'ɬ' (that is lateral plus the hyphen passing through it), and uses the 't' symbol shaped as 'ŧ'.

Yi ɬaɬ monjiɬ, ende kangum Enji, ende Pulum. Moɬmbuɬŧŧ, dei ende puɬunambuɬ, pa ninjiɬ ba, yi ende, Enj ken embe nim, Ma, dei ende ɬu naɬundil, pa, Pulum ken embe nim, Nim dei ɬundil, Kanj ken, na popuɬ si elip tonal pa nim. Yi ŧal yu el pilmbiɬ, keɬ punjiɬ.

7. RESULTS OF TESTS

7.1. *RESULTS OF FLASH CARD TESTS*

Phoneme	Symbol	Symbol used and Position in Word		
		ini	med	fin
/ndz/	nj	10/38	60/63	42/47
	ns	6/42	27/28	44/47
	j	42/42	53/54	53/89
/mb/	mb	11/42	43/45	26/29
	mp	6/42	42/42	26/27
	b	77/81	37/45	34/45
/nd/	nd	21/42	45/45	39/42
	nt	9/42	42/42	34/39
	d	9/9	45/45	29/45

		Sth. Dia.		Nth. Dia.	
		med	fin	med	fin
/!/	k	65/68	55/57	0/12	0/9
	kl	2/33	9/19	1/3	
	g	4/8	43/47		3/12
	c	17/19	5/8	1/3	1/3
	l		4/9		3/3
	ɬ	7/11	20/33	3/3	8/9
	gl	5/11	4/11	0/3	0/3
	k	11/11	11/11	0/3	0/3
	x	7/7	5/7	0/3	0/3

7.1. (continued)

Phoneme	Symbol	Sth. Dia. med	Sth. Dia. fin	Nth. Dia. med	Nth. Dia. fin
/ɭ/	ll	0/11	3/33	3/3	8/9
	K	3/3	3/3	3/3	3/3
	ʌ	0/2	0/3	1/3	1/3

Position of Occurrence

		Sth Dia. med	Sth Dia. fin	Nth. Dia. med	Nth. Dia. fin
/l/	l	99/106	3/22	7/9	1/6
	lt	19/45	62/68	3/3	5/6
	ld	13/24	45/59		5/9
	lr	8/19	27/56	0/6	1/6
	ll	22/22	12/19	5/6	4/5
		ini	med	fin	
/n̲/	n	63/63	63/63	62/63	
	ny	17/27	23/27	13/24	

Clusters

		med
/ɭmb/	ɬmb	21/25
	ɬb	24/24
	lmb	24/24
	lb	24/28
/ɭmŋ/	ɬmng	0/10
	ɬming	4/4

Vowels

		med	fin
/i/	i	62/72	45/45
	ii	24/30	25/27

7.2. *RESULTS OF DICTATION TESTS*

Phoneme	Position	Symbol used and the number of times used	
/mb/	Initial	b (61), mb 2	
	Medial	b 15, mb (74), mp 6, m 1	
	Final	mb (211), mp 96	
/nd/	Initial	d (123), nd 1, t 4	
	Medial	d 8, nd (100), nt 10	
	Final	d 10, nd (358), nt 73, n 1, ns 1	
/ŋg/	Initial	g (100%)	
	Medial	g (40), ng 1	
	Medially after na- (negative prefix)	g (20), ng 2	
/ndz/	Initial	j (103), g 2, z 4, d 8, s 6, t 3	
	Medial	j 10, nj (91), ns 8, nd 3, nz 1, nt 13, ng 18	
	Final	j 6, nj (245), ns 108, z 2, nt 5, nz 5, njs 6, nc 1, ng 4, s 7	
/n/	In all positions written as n .		
/ŋ/	Initial	ng 6, n (25)	
	Medial	ng 2, n (3), g 1	
	Final	ng 2, n (3)	
/t/	Initial	r 4, t (10)	
	Medially after na- (negative prefix)	t 12 , r 2	
/ǃ/	Medial	g 36, k (44), l 1	Sthn dialect
		g 4, k 2, l (6), r 2	Nthn "
		g (5), k (5)	Over 25y
	Final	g 3, k (84), l 6, gk 1, cl 2, c 4	
		g 1, k 4, l (8), le 1	Nthn dialect
		k (9), l 1, gk ,	Over 25y

7.2. (continued)

Phoneme	Position	Symbol used and the number of times used	
/l/	Medial	l (123), r 3, ld 23, lt 6, rd 1	Sthn dialect
		l (10),	Nthn dialect
	Final	l 26, r (43), ld (28), lt (22)	Sthn dialect
		t 3, ln 2, rd 3	
		rt 2, rl 1, rn 1	
		k 2,	
		l ɔ, r8, lt 2	Nthn dialect
/i/	Medial	i (47), e 22, (dialect), ii 1	
	Final	i (53), e 8, (dialect), ii 7, ee 6	
Clusters Investigated			
/lnd/	Medial	rnd 3, rd 2, ld 4, nd 1	Sthn dialect
		ld 2, lt 1, lj 1, nd 2	Nthn dialect
/lt/	Medial	lt (7), kt 3, l 9, k 3	Sthn dialect
		lt 1, ld 3, l 4, nd 1	Nthn dialect
/lmb/	Medial	kmb 3, kimb 3, kamb 1 lmb 1	Sthn dialect
		kb (12), lb 3, sb 1	
		lb 1	Nthn dialect
		gmb 1, lmb 1, kb 1, lb 1	Over 25y
/lmŋ/	Medial	km (7), kim 1, kn 1, nm 2, knm 1	Sthn dialect
		ln 1,	
		lm 1,	Nthn dialect
		km 1, gmng 1, lm 1	Over 25y
/kismb/	Medial	ksb 1, kesb 2, kelb 1, klb 1	Sthn dialect
		seb 1, lmb 1,	
		klmb 2, gsb 1, klb	Over 25y
/nŋ/	Medial	ng (14), nn 5, nk 1, n 12, g 2	Sthn dialect
		ng 3, nn 1, ngn 2, n 1	Over 25y

7.3. *RESULTS OF THE READING TESTS*

Phoneme	Symbol and Position	Articulated Response	25 years	Sth Dia.	Nth Dia.
/ndz/	nj-	nVnj	1	6	
		Ø	1		
		Vnj		5	1
		nj		4	1
		nje			1
		ne			1
	-nj-	nj		92/114	
	-nj	nj		77/95	
	j-	s	3		
		j		103/110	10
		nj	6	21	1
		Ø	1	5	
		nd		1	
		n		1	
	-j	ns	26		
		s	10		
		wron	10		
		l	2		
		nd	1		
		n	1		
	-j-	nj	153/156		
	-ns-	nj	7	151/160	20
		s	3	11	2
		Ø	1	3	2
	-ns	ns		131/167	
	ns-	n	2		
		nans	1		
		Ø	2	1	
		send		1	
		nVs	5	3	
		s		3	
/nd/	nt-	nVC	11	10	6
		nd		4	1
		nV			1
		Vn			1
		Ø			1

7.3. (continued)

Phoneme	Symbol and Position	Articulated Response	25 years	Sth Dia.	Nth Dia.
	-nt-	nd	5	9	
		ø	1		
	-nt	nt	16/20		
	-nd	no test			
	nd-	nVd	6	1	
		nVnd	3	20	6
		nV	3	4	2
		nd	1	2	5
		nok		6	
		ø		2	
		ndVn		2	
	-nd-	nd		166/176	
	-d	nt		13/19	
	d-	nd	9	44/46	12
		end		4	
	-d-	nd		36/39	
	b-	mb		134/142	
/mb/	mb-	mV	2	6	6
	-b-	mb		163/204	
	mb-	mb		2	
	-b	m		175/237	
	mb-	ø	1		1
	mb-	amb			1
	-mb	mb	81/93		
	mp-	mb	2	6	
		mV		3	4
	-mp	mp	4	66/77	8
	-mp-	mb	5	6	9
		mVC	2	3	
		mV			1
		ø			1
	lmp	l	2	3	
		p		1	1
	-mb-	mb		86/105	
		n			
/n/	n	all positions total		total	total

7.3. (continued)

Phoneme	Symbol and Position	Articulated Response	25 years	Sth Dia.	Nth Dia.
/n/	-ny-			13/20	
	-ny			14/60	
	ny-			21/26	
/nat-/	nar	t	2	21	3
		r		3	3
		ø	1	2	
		nd		3	
/t/	t-		100%	100%	
	r-	t	10	14	
		ø	2	26	
		r		26	12
	nat-	t		6	11
/!/	Velar Lateral	-ɬ-	(50)	(23) !	(43)
		l	1	12	1
		ø	2		1
		r		1	
	naɬ	ɬ	4	4	
	-ɬ	ɬ	137	89 !	135
		l	9+! 18	31 k	1
		p	3 + 2	1	
		ø	6		
	-l-	ɬ	(11)	33	
		l	2	(36) !	(22)
	-l-	ø	8	4	
	-l	ɬ	(32)	37 !	(36)
		l	11	(70)	
		ø	7	8	
		p	3	4	
		s		1	
	-x-	ɬ	5	5	2
		s		2	
		ks		1	
		k			1
		l		1	1
	-x	ɬ	(22)	(52)	8
		ø	5	10	

7.3. (continued)

Phoneme	Symbol and Position	Articulated Response	25 years	Sth Dia.	Nth Dia.
		s	24	1	
		ks	18	3	
		r	1		
		l	4	(12)	
	-l	ɬ	1	5	! 2
		!	2	13	! 4
		ø	1		
	-l-	ɬ		1	1
		l	2	3	2
		lr		3	! 4
	-gl-	gel	3		
		l	6	13	6
		g-l	2	5	12
		kl		1	! 8
		ø	3		
	-gl	ɬ	7	13	! 9
		l	2	15	
		g-l	1	3	
		gel	1		g! 5
		p		2	
		ø	2	1	no 1
	-c-	!		50/56	
	-c	!		118/120	
	-g-	!/k		30/45	
	-g	!/k		145/168	
	-ll-	l-l		50/50	
	-ll	lal		55/60	
	-k-	!/k		80/81	
	-k	!/k		168/168	
/l/ Alveolar lateral flap.	-lr-	ɾ	3	25	6
		lr	3	13	7
		l	2	3	4
		lt		6	6
		ø		6	2
	-lt-	l	1		! 3
		lt	2	1	1
		ø		1	

7.3. (continued)

Phoneme	Symbol and Position	Articulated Response	25 years	Sth Dia.	Nth Dia.
	-lt	i̯		13/17	
	-ld-	i̯	9	29	10
		l-d	22	23	6
		ø	5	6	1
	-ld	i̯		12	9
		ø		3	2
		l		7	5
		g-l			1
/i/	-i-	i		184/204	
	-i	i		141/165	
	-ii	i		38/46	
	-ii-	i		92/97	

NOTES

1. The Wahgi language is spoken by approximately 50,000 people who live in and around the central section of the Wahgi Valley of the Western Highlands of New Guinea. My wife and I, under the auspices of the Summer Institute of Linguistics, have worked amongst the Wahgi people since 1963.

2. I would like to express my appreciation for the valued advice given to me by Dr Alan Healey during the period of the tests.

3. The Wahgi's response to an underlying form, and its relationship to the historical reconstruction of a proto form of the language, may hold the answer to this problem. This issue will be discussed more fully in a paper to appear, which compares Wahgi with its related languages.

4. The second series of Tests, run in 1970, was financed with monies from the Research Fund of the Summer Institute of Linguistics.

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7. PHILLIPS, p. 22.
8. TRUBETZKOY, pp. 7-10.
9. HAMMARSTROM, p. 12.
10. HAMMARSTROM, p. 6.
11. LUZBETAK, p. 13.
12. PIKE, p. 87.