ON THE KUMAN "LIQUIDS"

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Highlands languages are well-known for the complexity of their "liquid" phonemes. Kuman, spoken by about sixty thousand people in the northern half of the Simbu Province, is no exception. Although the number of liquid phonemes in Kuman is fewer than in some languages to the west, alternations between them make the issue somewhat more complex. This paper examines these alternations, and attempts to make some historical statements on the Kuman liquids.[1]

1. PHONOLOGICAL AND GRAMMATICAL BACKGROUND

In this section, I give the necessary phonological and grammatical background which allows the discussion of the liquid alternations to proceed without unnecessary explanatory interruptions.

1.1 SEGMENTAL PHONOLOGY

Kuman has been analysed in the past (e.g., Trefry 1969, Nilles 1969) as having fourteen consonant and five vowel phonemes. The vowel phonemes /i e a o u/ are canonically lax [ɪ ɛ ɑ ɔ ʊ]. The consonant phonemes established by Trefry (1969) are shown below in Table 1. A general discussion of the allophones of the consonant phonemes is not relevant here. However, two phonemes require very brief mention: /gl/ is voiceless [kɬ] finally and before a voiceless consonant, and voiced [gl] elsewhere; while /n/ has a syllabic allophone [n̩] word-finally after a consonant, or word-medially between two consonants.

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1 Kuman belongs to the Central Family of the East New Guinea Highlands Stock (Wurm 1975). This paper is based partly on the work of Nilles (1969) and Trefry (1969), and partly on a short period of fieldwork in Kond village (a few kilometres west of Kundiawa) and work with Kuman-speakers in Port Moresby.

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TABLE 1 KUMAN CONSONANT PHONEMES (TREFRY 1969)

	Bilabial	Alveolar	Palatal	Velar
Voiceless Stops	p	t		k
Voiced Prenasalised Stops	b	d		g
Voiceless Fricative		s		
Voiced Nasals	m	n		
Flap		r		
Laterals		l		gl
Semivowels	w		y	

All consonants may occur word-medially, although the question of whether medial [t] manifests /t/ or some other phoneme is one of the problems raised in this paper. The only phonemes which may not occur word-initially are the three liquids /r l gl/. A number of phonemes may not occur word-finally; these are /p t s w y/ and possibly /l/. The four phonemes in which we are particularly interested in this paper, /t r l gl/, thus all have defective distributions.

1.2 THE GRAMMATICAL CONTEXT

Two major grammatical contexts in which liquids undergo alternation will be briefly examined here: suffixed possession and verbal suffixation.

1.2.1 POSSESSIVE MORPHOLOGY

One class of Kuman nouns requires the addition of a possessive suffix marking the person and number of the possessor (this in addition to the free pronoun preceding the noun); for example:

na ma-na	ene dra-n
I mother-my	*you mouth your:SG*
'My mother'	*'Your (sg.) mouth'*

Another class of nouns allows but does not require possessive suffixation; for example:

na bugla	or	na bugla-na
I pig		*I pig-my*
'My pig'		*'My pig'*

This distinction, though of considerable grammatical interest, is not relevant to the discussion; what is relevant is the shape of the suffixes themselves.

The possessive suffixes distinguish person only in the singular. All person and number distinctions are collapsed in the non-singular in a single suffix. The underlying forms of the suffixes are:

1 sg.	-na
2 sg.	-n
3 sg.	(see below)
Non-sg.	-no

The first and second singular and the non-singular suffixes are illustrated below (with the free pronoun omitted); parenthesised suffixes indicate that the noun belongs to the class which optionally suffixes pronominal forms.[2]

(1)

	mother	*back*	*tooth*	*throat*
1 sg.	ma-na	moko-na	sigi-na	nugu-na
2 sg.	ma-n	moku-n	sigi-n	nugu-i
Non-sg.	ma-no	moko-no	sigi-no	nugu-no
	father	*belly*	*buttocks*	*pig*
1 sg.	ni-na	dan-na	de-na	bugla(-na)
2 sg.	ne-n	dan-n	de-n	bugla(-n)
Non-sg.	ne-no	dan-no	de-no	bugla(-no)

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2 The change from /o/ to /u/ in the second singular of *'back'* is a regular change which takes place in this environment in /o/-final roots. The vowel changes in *'father'* are idiosyncratic. The geminate /n/ in *'belly'* is heard as long intervocalically, but the second singular form (underlying dan-n) shows nasal reduction in final position (surface /dan/).

The third singular suffix varies considerably according to the phonological and grammatical context. The surface forms are presented in Table 2, and no attempt is made to complicate the presentation by a discussion of underlying forms. This variation

TABLE 2. THIRD PERSON SINGULAR POSSESSIVE ALLOMORPHS

	Root	Environment	Examples
-m	#CV#	V is not i.	ma-m *mother*
			mo-m *penis*
-ye	#Ci#		wi-ye *husband*
-Ø	#CCV#		dra-Ø *mouth*
-Ø	Polysyllabic	Final a or o.	koba-Ø *shoulder*
			moko-Ø *back*
-e -ye }	Polysyllabic	Final i.	sigi-e *tooth*
-o	Polysyllabic	Final u or uC.	nugu-o *throat*
			mabugl-o *forehead*
-e	Polysyllabic	Final C (not r), but	dan-e *belly*
		not uC.	kagl-e *leg*
-ie	Polysyllabic	Final r.	piur-ie *chest*

is most marked in the case of nouns obligatorily taking the suffix. All nouns which have optional suffixation take the third person singular suffix -mo bugla (-mo) *'pig,'* siragl (-mo) *'thing.'*

1.2.2 VERB MORPHOLOGY

Verbs are morphologically complex in Kuman, and this is not the place to discuss that morphology in any great detail. Suffixes to verbs mark tense, aspect, mood, person and number of the subject, switch-reference, and negation; vowel ablaut in the verb root correlates with certain person and number distinctions.

However, certain features of verbal suffixation which are relevant to the discussion of the liquid alternations need to be mentioned here. First, verbs are classified as belonging to one of three conjugations (V, R, or GL) according to the last phoneme of the root. This can be illustrated most clearly in the singular imperative

(marked by a suffix -o):

(2)

	Singular Imperative	Verb Stem	Conjugation
bring	yuo	yu-	V
hear	pro	pr-	R
plant	yaglo	yagl-	GL

Each conjugation-class conditions a number of morphophonemic changes in both root and affixes, some of which are the subject of this paper.

Second, the structure of the verb in two indicative tenses, aorist and future, needs to be examined briefly. The basic structure is Verb Root + Tense + Subject + Mood. The aorist is unmarked, while the future is marked by a suffix -agl. The indicative is marked by a suffix -ka, which voices (and prenasalises) to -ga when preceded by a voiced consonant.[3] The underlying forms of the subject suffixes are:

1 sg.	-Ø	(-i in aorist in V-conjugation)
2 sg.	-n	
3 sg.	-w	(-b in future)
1 du.	-bugl	
2&3 du.	-br	
1 pl.	-m	
2&3 pl.	-w	

The third singular and third plural suffix -w metathesises with the /k/ of the indicative suffix -ka; thus underlying yagl-w-ka *(plant-*3SG:AOR-INDIC) surfaces as yaglkwa *'he plants/planted'*. Verbs of the V-conjugation show a "thematic" /n/ in the future (cf. yunaglka *'I will bring'* for expected *yuaglka); this may be related to the nasalisation of the indicative marker -ka in some persons of the aorist (thus yu-w-ka *(bring-*3SG:AOR-INDIC) metathesises as yugwa and not as *yukwa).

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3 However, the rule devoicing /gl/ before a stop applies before the rule voicing the /k/ of -ka: thus a verb with suffixes -bugl-ka (IDU-INDIC) surfaces as [^{m}buk$\dagger$ka] and not *[^{m}bugl^{n}ga].

Third, vowel ablaut plays an important role in verbs. There is no need to discuss this in any great detail here, but the sample paradigms given below of the aorist indicative of the V-conjugation verb no- *'eat'* and the GL-conjugation verb mogl- *'be, stay'* illustrate the phenomenon:

(3)			
	1 sg.	neiga	moglka
	2 sg.	nenga	motnga
	3 sg.	nogwa	moglkwa
	1 du.	nobuglka	muglka
	2&3 du.	nebrika	miruka
	1 pl.	nomga	munga
	2&3 pl.	negwa	meglkwa

1.3 MORPHOPHONEMIC RULES

Apart from the morphophonemic rules which form the topic of this paper, two other rules require brief discussion here. First, an epenthetic /u/ is inserted between /b/ and an immediately following stop. Note the following underlying and surface representations of two forms of the verb no- *'eat'*; ignore the change in the stem vowel and the loss of /gl/:

(4) ni-n-agl-b-o ⟶ ninabo *'will he eat?'*
ni-n-agl-b-ka ⟶ ninabuka *'he will eat'*

Here, the third singular future suffix -b is followed by the mood markers -o (interrogative) and -ka (indicative); in the latter case, the combination of /b/ + stop requires epenthesis of /u/.

Similarly, an epenthetic /i/ is inserted between /r/ and an immediately following consonant. Note again the same tenses and moods as in example (4), this time in the non-first person dual:

(5) ni-n-agl-br-o ⟶ ninabro *'will you/they (du.) eat?'*
ni-n-agl-br-ka ⟶ ninabrika *'you/they (du.) will eat'*

I favour epenthesis rather than deletion of an underlying /i/ (and /u/ in the preceding case) since there appears to be no motivation to delete /i/ or /u/ before /o/ in this environment.

With this background, we now turn to an examination of the morphophonemic alternations involving the liquids in Kuman.

2. LIQUID ALTERNATIONS

In this section, the various morphophonemic alternations involving a liquid will be presented and illustrated. Discussion of these alternations in their historical context will be postponed until section 3.

2.1 ALTERNATIONS INVOLVING /t/

Consider the two sets of possessive paradigms given below, and compare them with the data given above in (1) and in Table 2:

(6)

	leg	*bone*	*forehead*	*thing*
1 sg.	kat-na	yobut-na	mabut-na	sirat(-na)
2 sg.	kat-n	yobut-n	mabut-n	sirat(-n)
3 sg.	kagl-e	yobugl-o	mabugl-o	siragl(-mo)
Non-sg.	kat-no	yobut-no	mabut-no	sirat(-no)

(7)

	head	*chest*	*navel*
1 sg.	bit-na	piut-na	kobut-na
2 sg.	bit-n	piut-n	kobut-n
3 sg.	br-e	piur-ie	kobr-ie
Non-sg.	bit-no	kobut-no	piut-no

The forms in (6) show an alternation between noun-final /gl/ and /t/, while those in (7) show a similar alternation between /r/ and /t/. In each case, the change from liquid to stop occurs immediately before /n/.

The same process occurs in verbs. Examine the singular forms of the aorist and future indicative of the V-conjugation verb yu- *'bring'*, the R-conjugation verb pr- *'hear'*, and the GL-conjugation verb yagl- *'plant'*:

(8)	*bring*	*hear*	*plant*
Aorist 1 sg.	yuiga	prika	yaglka
2 sg.	yunga	pitnga	yatnga
3 sg.	yugwa	prukwa	yaglkwa
Future 1 sg.	yunaglka	praglka	yaraglka
2 sg.	yunatnga	pratnga	yaratnga
3 sg.	yunabuka	prabuka	yarabuka

In the second singular aorist of both R- and GL-conjugation verbs, root-final /r/ and /gl/ change to /t/ when followed by the second singular subject suffix -n: thus underlying yagl-n-ka becomes yatnga *'you plant(ed)'*. In the future of all conjugations, the /gl/ of the future suffix -agl changes to /t/ before this same subject suffix -n: thus underlying yu-n-agl-n-ka becomes yunatnga *'you will bring'*.

All of these data suggest the following rule:

(9) $\left\{\begin{matrix} gl \\ r \end{matrix}\right\} \longrightarrow t \quad / \_\_\_\_\_ n.$

2.2 /gl/-DISSIMILATION

The data in (8) above also show a case of dissimilation of /gl/ to /r/. Examine the future paradigms in (8). Ignoring for the moment the loss of /gl/ in the third singular, it will be seen that root-final /gl/ changes to /r/ before the future suffix -agl: i.e., underlying yagl-agl-Ø-ka becomes yaraglka *'I will plant'*. This strongly suggests a dissimilatory rule like the following:

(10) gl $\longrightarrow$ f / _____Vgl.

Whether in fact rule (10) is general in its application, or whether it applies only in this particular grammatical context, is a question for further research. My suspicions, however, are that it is a general rule: I have not elicited any words which contain two occurrences of /gl/ separated only by a vowel, while a cursory examination of Nilles' (1969) dictionary suggests that this may well be a regular phonotactic restriction in Kuman. For the moment, then, we leave rule (10) as a general rule, bearing in mind that future research may show that it is grammatically restricted.

2.3. /gl/-LOSS

As has been noted in passing once or twice, /gl/ is lost in some contexts. Consider first the future tense, which has the structure Root + agl + Subject + Mood. In the data below, the underlying forms of the subject suffixes are given in the left hand column, while the right hand column shows the future paradigm of the verb pr- *'hear'*.

(11)

		Subject Suffixes	*hear*
Future	1 sg.	-Ø	praglka
	2 sg.	-n	pratnga
	3 sg.	-b	prabuka
	1 du.	-bugl	prabuglka
	2&3 du.	-br	prabrika
	1 pl.	-m	pramga
	2&3 pl.	-w	preglkwa

Now examine an aorist paradigm of a GL-conjugation verb; the verb in (12) is mogl- *'be, stay'*:

(12)

		Subject Suffixes	*be, stay*
Aorist	1 sg.	-Ø	moglka
	2 sg.	-n	motnga
	3 sg.	-w	moglkwa
	1 du.	-bugl	muglka
	2&3 du.	-br	miruka
	1 pl.	-m	munga
	2&3 pl.	-w	meglkwa

Both of these sets of data show loss of /gl/ in certain contexts; the data in (12) also show other changes, including loss of /b/ and qualitative changes in the vowel of the root, neither of which will concern us here. It appears that the conditioning environment for the loss of /gl/ is an immediately following prenasalised biblabial stop or biblabial nasal; that is, a rule like (13) seems indicated:

(13) gl → Ø / ___ $\left\{\begin{matrix} b \\ m \end{matrix}\right\}$.

Additional evidence for the validity of this rule appears in examples (4) and (5) above.

However, it appears that rule (13) is not a general rule in the language. Clusters of /gl/ + /b/ and /gl/ + /m/ occur both in verb forms like ninaiglba *'they might eat'*, ninaglba *'I might eat'*, and ninaiglmo *'will they eat?'*, as well as in lexical items like kuglmekoba *'kind of owl'*. In these verb forms, however, the suffixes -ba and -mo are tense/aspect or mood suffixes, not person-of-subject suffixes. It thus appears that rule (13) is restricted in scope, such that the environment of the rule refers only to /b/- or /m/-initial subject suffixes. That is, the rule should be rewritten as (14):

(14) gl → Ø / ___ $\left\{\begin{matrix} b \\ m \end{matrix}\right\}$, where b and m are initial consonants of a subject-suffix.

2.4 DEVELARISATION OF /gl/

Verbs of the V- and R-conjugations allow us to postulate a set of imperative suffixes -o *'singular'*, -iro 'dual', and -io *'plural'*. For example:

(15)

	bring	*hear*
singular	yuo	pro
dual	yuiro	priro
plural	yuio	prio

The corresponding imperative forms for GL-conjugation verbs are as follows:

(16)

	plant
singular	yaglo
dual	yaltro ~ yagltro
plural	yalo

Let us concentrate first on the plural form. It is clear from the form yalo (from underlying yagl-io) that the combination of root-final /gl/ + suffix-initial /i/ produces the simple lateral /l/; i.e.:

(17) gl + i → l.

I have no examples in my data of the sequence /gl/ + /i/, although Nilles (1969) has twelve such cases (out of a total of 314 intervocalic cases of /gl/). It may be that /gl/ is not, or was not, permitted to occur before /i/; it may also be that this sequence occurring across a morpheme-boundary underwent rule (17), possibly through the intermediate stage of palatalisation (i.e., gl + i → λ + i → λ → l). Possible evidence in support of this hypothesis comes from the distribution of /l/. Only forty cases of intervocalic /l/ occur in Nilles' (1969) dictionary, but in none of these cases does /l/ occur before /i/. It may well be, then, that rule (17) is a general rule in the language.

Let us return now to the dual imperative form in (16) above. Informants vary in the pronunciation of this form; I have heard (a) both a voiceless velar lateral and a voiceless simple lateral, and immediately following the lateral, (b) a voiceless dental stop, a voiceless dental fricative, and a voiceless dental affricate. It appears that rule (17) applies here to the underlying form yagl-iro, producing an intermediate form **yal-ro. This combination of /l/ + /r/, however, then gives rise to /t/-epenthesis, and this epenthetic /t/ then conditions devoicing of the /l/. However, since the commonest voiceless lateral allophone is [kɬ], reinterpretation of the /l/ as /gl/ seems to have occurred with at least some speakers.

2.5 SUMMARY OF RULES

The rules established in this section are repeated here for convenience:

(9) $\left\{\begin{matrix} gl \\ r \end{matrix}\right\} \longrightarrow t \quad / \quad \_\_\_\_ \; n.$

(10) $gl \longrightarrow r \quad / \quad \_\_\_\_ Vgl.$

(14) $gl \longrightarrow \emptyset \quad / \quad \_\_\_\_ \left\{\begin{matrix} b \\ m \end{matrix}\right\}$, where b and m are initial consonants of a subject-suffix.

(17) $gl + i \longrightarrow l.$

3. DISCUSSION

An examination of the liquid alternations presented in the previous section leads to a number of discussion points concerning the status and historical development of the Kuman liquids.

First, it is clear that the "traditional" phonemic analysis, as presented in Table 1 above, is in need of revision. What has previously been established as /t/ does not contrast with any of the three liquids: the liquids occur non-initially, while [t] occurs only initially and in non-initial environments as a result of rule (9) or of the epenthesis rule discussed in relation to (16) above. It seems most logical to assign [r] and [t] to the same phoneme /t/, with the [t]-like allophones occurring initially and before /n/ and the [r]-like allophones occurring in other non-initial positions. There are several reasons for assigning [t] to the same phoneme as [r] rather than to the same phoneme as one of the other two liquids. First, /l/ is rare and, as we shall see later, may well be a borrowed phoneme. Second, /gl/ participates in a number of alternations other than the shift to [t], which would considerably complicate any statement of allophonic distribution. Further, this solution allows us to conflate two of the rules established earlier as a single rule; (9) and (10) may now be rewritten as the single rule (18):

(18) $gl \longrightarrow t \quad / \_\_\_\_ \left\{ \begin{matrix} n \\ Vgl \end{matrix} \right\}$.

Finally, there is comparative evidence from within the Central Family to support the view that [t] and [r] belong to the same phoneme: The neighbouring and closely related Waghi language has a phoneme /t/ with [t]-like allophones initially and before /n/ and [r]-like allophones elsewhere (Phillips 1976:15).

We now turn to a consideration of the historical status of the two remaining liquids /gl/ and /l/. We have seen already that /l/ is rare in Kuman: Nilles' (1969) dictionary shows over three hundred occurrences of intervocalic /gl/ as compared with only forty such occurrences of /l/. We have also seen that a combination of velar

lateral followed by high front vowel produces a simple lateral and loss of the vowel (rule (17)). These two factors suggest that Kuman [l] may either be solely the result of one or more morphophonemic rules like (17), or be the result, in at least some of its occurrences, of borrowing from neighbouring languages.

Two neighbouring languages also have "problematical" liquids. Salt-Yui (Irwin 1974:4ff) has two liquids, /l/ and /r/, which are both lost when they occur immediately before a consonant: compare a similar rule in Kuman, rule (14), where /gl/ is lost before certain consonants in certain contexts.

Waghi (Phillips 1976:17-18) has three liquid phonemes: dental /l̪/, alveolar /l/, and velar /l̤/. The alveolar /l/ is rare, however, and in the Danga dialect "the alveolar lateral is the dialectal variant of [both] the Kuma [dialect] alveolar and velar lateral phonemes" (Phillips 1976:18). The Wahgi case in particular is reminiscent of the Kuman situation: a rare lateral, corresponding to Kuman /l/, which in at least some dialects does not contrast with the velar lateral.

The laterals of the Central Family require further research. It seems to me, however, that Pre-Kuman can be reconstructed as having only one lateral, the velar /gl/, and that modern Kuman /l/ is the product of ongoing morphophonemic processes and, possibly, borrowing. The confusion between alveolar and velar lateral in the dual imperative of GL-conjugation verbs discussed in relation to (16) above is further evidence for this hypothesis.

4. A PROBLEM

Inconclusive as this treatment of the Kuman liquids has been, three obligatorily possessed nouns produce even further problems for the treatment of liquid alternations. The relevant paradigms are shown below (with both r and t written to keep these forms comparable with others given earlier in the paper):

(19)	*brother*	*sister*	*daughter*
1 sg.	agira	abara	abra
2 sg.	agitn	abatn	abutn
3 sg.	agigle	abauglo	abuglo
Non-sg.	agiro	abaro	abro

The second singular forms are consistent with either root-final /gl/ or [r] (i.e., /t/); the third singular forms, however, are consistent only with root-final /gl/, and it would seem that the underlying forms are /gl/-final. The problem arises in the first singular and the non-singular, and this problem is illustrated in (20):

(20)		Underlying	Expected	Actual
brother	1 sg.	agigl-na	*agitna	agira
	Non-sg.	agigl-no	*agitno	agiro
sister	1 sg.	abagl-na	*abatna	abara
	Non-sg.	abagl-no	*abatno	abaro
daughter	1 sg.	abgl-na	*abutna	abra
	Non-sg.	abgl-no	*abutno	abro

In each case, the /n/ of the suffixes -na '*1 sg.*' and -no '*non-sg.*' has been lost, but only <u>after</u> the application of rule (18). That is, underlying final /gl/ has first become /t/ before the /n/ of the suffix; that /n/ has then been lost, leaving /t/ in a prevocalic position, where it is realised as [r]. Hopefully, comparative work will establish some solution to this problem.

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