

GLOTTAL STOP AND THE NASAL PREFIX IN TABARU AND OTHER NORTH HALMAHERAN LANGUAGES

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There has been very little discussion about glottal stop in the North Halmaheran languages except for that which is a reflex of *k in Proto-North-Halmahera (PNH). Furthermore, the derivational nasal prefix in these languages has been rather difficult to define because of its habit of appearing as a [g] when affixed to vowel initial roots. Using Tabaru as a starting point, this paper describes two specific phonological phenomena occurring in Tabaru, the glottal stop and the nasal prefix, and demonstrates the interaction between the two. Examination of the data from Tabaru and other North Halmaheran languages helps clarify the phonological shape of the nasal prefix. Based on these discussions, some implications for PNH glottal stop are brought to light.

1. INTRODUCTION

The purpose of this paper¹ is first, to describe the occurrence of glottal stop in the Tabaru language and offer several hypotheses which account for its existence and peculiar distribution. Secondly, to discuss the form the N- prefix takes in the North-Halmaheran languages.² Thirdly, to examine the glottal stop in the North Halmaheran languages (see Map 2) in light of the discussion of the N- prefix, and its implications for glottal stop in Proto-North-Halmahera.

The Tabaru Language is spoken on the island of Halmahera in the province of Maluku, Indonesia. It is one of the North Halmaheran Family, West Papuan Phylum languages. Previous research was done by Fortgens (1928) who produced a grammar sketch, folk tales and riddles. There had been no further work done in Tabaru until 1988, when my wife and I began field study of Tabaru. For a summary of previous work in other North Halmaheran Family languages, see Wimbish (1991).

In this paper, I use Galela as representative of PNH, in light of Wada (1980),³ who demonstrates the conservation of archaic sounds in Galela.⁴

2. TABARU GLOTTAL STOP

In light of our field work, the Tabaru glottal stop deserves further discussion. Fortgens (1928:306-8) claims that Tabaru has no glottal stop. His intention is to contrast the /k/ in some of the North Halmaheran languages with the /ʔ/ in others, all descending from a common PNH *k, as seen in his examples below:

<u>Tabaru</u>	<u>Sahu</u>	
uku	u'u	‘fire’
ngekomo	ngo'omo	‘road’
pokoro	po'olo	‘belly’
akeme	la'eme	‘meat’
<u>Tabaru</u>	<u>Modole</u>	
ngeweka	ngewe'a	‘woman’
riaka	lia'a	‘older sibling’
okere	o'ele	‘to drink’
kibiti	'ibiti	‘spit’

Furthermore, in his discussion of transition sounds found intervocalically, he says (Fortgens 1928:306-7), "In Tabaru all vowels are connected so that between a labial vowel and the following vowel, the transition [w] is heard...Between a palatal vowel and the following other vowel the transition sound [y] is heard...Between [a] and a following [e] a light [i] is heard." Some of his data I find to be the same as my own field data in which a predictable phonetic transition occurs, as follows:

[o ^w ámaka]	‘a table’
[bí ^y ono]	‘face’
[ma ⁱ éta]	‘a little’

However, others differ from my field data:

<u>Fortgens</u>	<u>Kotynski</u>	
o ^w ákere	[‘o ‘ákere]	‘water’
toni ^y ótaka	[toni‘ótaka]	‘I bring you’
pa ⁱ ése	[pa‘ése]	‘we take it’

Fortgens did not indicate any difference between the initial glottal stop and initial vowel except perhaps in one case (Fortgens 1928:321). He transcribed the word for ‘eye’ as *aako*, and states that speakers use an open ‘a’ sound in order to avoid saying what he transcribed as *ako* which is the Ternate word for ‘penis’. What he described is likely the difference between [ako] (Tabaru) and [‘ako] (Ternate).⁵ The difference between the words is a glottal stop.

In his discussion (Fortgens 1928) of glottal stop in other North Halmaheran languages (Modole, Sahu), Fortgens continually makes reference to the glottal stop as a reflex of what is /k/ in the other languages (Tobelo, Galela, Tabaru etc.). Since Tabaru has /k/ where Modole and Sahu have glottal stop, and since his interest was the historical relationship between the languages, he did not take note of the glottal stop which is not a reflex of PNH *k.

Having examined Fortgens’ statements on glottal stop in Tabaru let us consider further glottal stop data, as follows:

áre	‘spoiled’	ówa	‘good’
‘ámi	‘her’	‘óko	‘stand’
áme	‘kiss’	óko	‘seawards’
‘éna	‘it’	‘úru	‘mouth’
éla	‘thrust’	úru	‘garbage’
‘éte	‘grandpa’	‘úku	‘fire’
éta	‘divide’	úku	‘downwards’
‘íno	‘receive’		
íno	‘come here’		
‘ígono	‘coconut’		
ígoro	‘itch’		

The above examples of minimal pairs and contrast in analogous environments clearly establish the contrast between roots with initial glottal stops and those without. Examine now the following roots:

sa'áŋge	‘three’	mo'ótono	‘rotten’
saáka	‘silver’	moóroko	‘wash the mouth’
ga'áni	‘head lice’	ki'ópiki	‘sour’
caána	‘pants’	sióde	‘meat’
to'ótasa	‘angry’		
toólenge	‘dry wood’		

These examples of word-medial glottal and its absence are contrasts in analogous environments; no minimal pairs have yet been discovered word medially. Still, the above data would be enough to establish the glottal stop as a phoneme in Tabaru. However, I have reservations about positing a phonemic glottal stop. There are no phonemes in Tabaru which have the same distribution as glottal stop, viz.:

Syllable	Consonants	Glottal Stop
Penultimate + stress	+	+
Antepenultimate + stress	+	+
Penultimate - stress	+	-
Antepenultimate - stress	+	-
Ultimate	+	-

Figure 2. Onsets in Tabaru

Glottal stop occurs only in the onset of stressed syllables, while all phonemic consonants freely occur in all onset positions. Because of the irregularity in distribution above, and the predictability of the glottal stop, I believe the hypothesis of a phonemic glottal stop is suspect.

3. AN ALTERNATIVE APPROACH TO TABARU GLOTTAL STOP

Because of glottal stop's irregular distribution compared with consonants in Tabaru, as well as its predictability,⁶ it appears that the glottal stop is produced by a rule.⁷ Using the framework of CV phonology, I would like to (1) propose a rule to account for the placement of glottal stop in Tabaru, and (2) provide evidence to account for the contrasts seen in the above data.

3.1. Glottal Insertion Rule

Glottal stop placement in Tabaru is predicted by the following rule:

- A glottal stop is inserted before a stressed vowel in syllables without an onset.

The above rule accounts for Tabaru glottal stops as illustrated in the examples below:

<u>Word Initially</u>			
ákere	→	'ákere	‘water’
ése	→	'ése	‘to take’
ígono	→	'ígono	‘coconut’
ógu	→	'ógu	‘to cut’
úbutu	→	'úbutu	‘weeds’

Word Medially

paásana	→	pa'ásana	‘to beat’
peétoro	→	pe'étoro	‘narrow’
baéma	→	ba'éma	‘impolite’
kuárene	→	ku'árene	‘light (not heavy)’
kaíra	→	ka'íra	‘betel nut box’

This rule, however, is overly productive, for glottal stops do not, in fact, occur in some environments in which the structural descriptions for the rule are met, and the rule would thus produce forms such as the non-allowable examples below:

Word Initially

<u>Word Initially</u>		<u>expected form:</u>	<u>occurring form:</u>
ásini	→	**'ásini	ásini ‘float’
áko	→	**'áko	áko ‘eye’
íriki	→	**'íriki	íriki ‘choose’
óru	→	**'óru	óru ‘oar’
úsi	→	**'úsi	úsi ‘comb’

Word Medially

<u>Word Medially</u>		<u>expected form:</u>	<u>occurring form:</u>
sióde	→	**si'óde	sióde ‘meat’
saáka	→	**sa'áka	saáka ‘silver’
boóoto	→	**bo'óoto	boóoto ‘straight’
poóteke	→	**po'óteke	poóteke ‘shatter’
caána	→	**ca'ána	caána ‘pants’

To remedy this discrepancy, one must either modify the rule or modify the forms to which the rule applies. It is my contention that there is something lacking in our description of the underlying forms of these words above, and that a fuller description, discussed below, will block rule application in these cases, preempting glottal insertion.

3.2. Empty Consonants

The issue of empty consonants is raised in Marlett and Stemberger (1983) who argue for their existence in Seri (of Mexico). Part of their argument states that the rules which are sensitive to consonants can be maximized in their generality by positing the existence of empty consonants. I suggest that in Tabaru there is an empty consonant which blocks the application of the glottal stop insertion rule. Based on the framework of CV phonology (Clements and Keyser 1983), this consonant occurs on the skeletal tier only and the glottal stop insertion rule is sensitive to its presence in the same way it is to any other syllabic onset. Support for this analysis comes from both historical and dialectal data which we discuss below.

I illustrate below the skeletal and segmental tiers, along with the linking between them, for the form [sa'áŋe] ‘three’:

C V V C V	skeletal tier
s a á ŋ e	segmental tier

Assuming that penultimate stress is specified by a general metrical principle, then, according to the glottal rule, a glottal stop is inserted before a stressed vowel not preceded by a consonant (on the skeletal or segmental tier). This analysis produces the following correct derivations:

V C V			
á r e	→	'áre	'slice'

C V V C V			
s a á n g e	→	sa'á n g e	'three'

Let us now re-examine the cases which earlier appeared as exceptions to the rule. The proposal here is that an empty consonant (C) on the skeletal tier blocks the application of the glottal stop insertion rule and the correct surface form is derived:

C V C V			
á r e	→	áre	'spoiled'

C V C V C V			
s a á k a	→	saáka	'silver'

Thus the glottal stop cannot occur in the above forms because there is a consonant (C) where a glottal stop would have been inserted under the original (surface) representation. Further arguments for this proposal are found in two domains in which empirical data correlate with precisely the environments in which the glottal stop problem arises, i.e.:

- 1) the behavior of /w/ deletion in the Adu dialect of Tabaru
- 2) data from a related language (Galela glottal stop and consonants) reflecting historical change

3.2.1. Evidence from /w/ deletion in Tabaru-Adu

There are two dialects of Tabaru, Tabaru-Nyeku and Tabaru-Adu. In the Adu dialect of Tabaru, there is a diachronic rule which deletes /w/ in all environments.⁸ One would expect that if a /w/ is deleted on a stressed syllable, application of the glottal insertion rule would produce a glottal stop in that position. This, however, is not the case either word initially or word medially. A glottal stop is never inserted as the onset of the syllable whose /w/ onset has been deleted, as illustrated by the following examples:

<u>Nyeku Dialect</u>		<u>Adu Dialect</u>		
		expected form:	actual form:	
wékata	→	**'ékata	ékata	'wife'
wóa	→	**'óa	óa	'house'
ngewéka	→	**nge'éka	ngeéka	'woman'
diwíwiri	→	**di'íiri	diíiri	'drone'

From the above examples we see that when the Adu dialect deletes the consonant /w/, it is not completely lost. On the segmental tier there is deletion, but there is some remnant left which blocks the application of the glottal stop insertion rule. I suggest that the C on the skeletal tier is not deleted and it blocks the application of the glottal insertion rule. This accounts for the derivation of the forms which actually occurs.

Furthermore, I would like to propose that the same phenomenon occurred where consonants (those that are reflexes of consonants in PNH) which are present in other North Halmaheran languages have been lost in Tabaru through historical process, as seen in section 3.2.2.

3.2.2. Evidence from Galela

The glottal stop in Galela, according to Shelden (1989:78), is rule governed. He says:

“The glottal stop is not phonemic in Galela. It occurs intervocalically when the second vowel is stressed. A weak glottal stop occurs before stressed initial vowels.”

This rule is similar to the Tabaru glottal stop rule. Both Galela and Tabaru glottal stop insertion are exemplified below.

<u>Word-Initial Insertions</u>			
<u>Tabaru</u>		<u>Galela</u>	
[ʼákere]	‘water’	[ʼáke]	‘water’
[ʼéte]	‘grandfather’	[ʼéte]	‘grandfather’
[ʼígono]	‘coconut’	[ʼígo]	‘coconut’
[ʼódomo]	‘to eat’	[ʼóDo]	‘to eat’
[ʼúku]	‘fire’	[ʼúku]	‘fire’

<u>Word-Medial Insertions</u>			
<u>Tabaru</u>		<u>Galela</u>	
[paʼásana]	‘beat’	[biʼáu]	‘to decay’
[peʼétoro]	‘narrow’	[kaʼéli]	‘diligent’
[toʼíngo]	‘long time’	[haʼíbu]	‘scold’
[kiʼópiki]	‘sour’	[boʼóta]	‘octopus’
[kaʼúgete]	‘vine type’	[guʼúpu]	‘fly’

In Tabaru, as we have seen in 3.1 above, there are exceptions to the application of the glottal stop insertion rule (if seen from a non-CV phonology viewpoint). They are illustrated as follows (along with their Galela cognates):

<u>Word-Initial Exceptions</u>		
<u>Tabaru</u>	<u>Galela</u>	
[ásini]	[Dási]	‘float’
[áko]	[láko]	‘eye’
[íriki]	[híri]	‘choose’
[óru]	[hóru]	‘oar’
[úsi]	[wúsi]	‘comb’

Word-Medial Exceptions

<u>Tabaru</u>	<u>Galela</u>	
[sióde]	[sihóde]	‘meat’
[saáka]	[saláka]	‘silver’
[boóoto]	[bolówo]	‘straight’
[poóteke]	[polóte]	‘shatter’
[caána]	[calána]	‘pants’

We see above, that in Tabaru, the forms that appear to be exceptions to the glottal-stop insertion rule have consonants in their Galela cognates which have been lost through historical processes. Assuming the CV model, the Galela forms have a consonant on both the segmental and the skeletal tiers where the Tabaru cognates of those words have a consonant on the skeletal tier only. The rule-generated glottal stop which would be expected in Tabaru does not appear. This is because the structural description for rule application is not met. There is a consonant on the skeletal tier which blocks the application of the glottal-stop insertion rule, as seen in the following:

<u>Tabaru</u>	<u>Galela</u>	
V C V	V C V	
[‘u k u]	[‘u k u]	‘fire’
 C V C V	 C V C V	
[u k u]	[h u k u]	‘downward’

The proposal of an empty consonant will allow us to account for all glottal stops in Tabaru in terms of a simple rule. Apparent exceptions are accounted for on theoretical grounds supported by historical evidence. The retention of the C on the skeletal (CV) tier accounts for those forms in which the glottal stop does not appear.

4. THE N- PREFIX IN THE NORTH HALMAHERAN LANGUAGES

In this section I will mention briefly the function of the N- prefix in the North Halmaheran languages, then discuss its form, giving special attention to vowel-initial roots. Below it will be shown that it is the surface form of N- prefix when affixed to these vowel-initial roots which provides evidence for a glottal-stop rule in PNH.

4.1. The Function of the N- prefix

Van der Veen (1915:104-6) in his discussion of North Halmaheran affixation says N- is a derivational prefix which:

- 1) changes the transitivity of a verb
- 2) derives nouns from verbs

The above statements are attested to in the literature, verified in Loloda (van Baarda 1904:344-6, 364-6), Galela (van Baarda 1908:18-29, 99-106), Tabaru (Fortgens 1928:373-4, 401-4 and Kotynski 1988:187), Tobelo (Huetting 1936:320-23), Sahu (Visser and Voorhoeve 1987:20-22); and Pagu (Wimbish 1991:30-32).

4.2. The Form of the N- Prefix

The nasal prefix in the North Halmaheran languages, although agreed upon as to its grammatical function, has as yet to be defined as to its phonological shape. The addition of the N- prefix creates a number of phonological changes at morphemic boundaries. As described by van der Veen (1915:105), the N- prefix has the following effect on consonant-initial roots:⁹

N- + k	→	g
N- + c	→	j
N- + t	→	d
N- + p, f	→	b
N- + h, w	→	.ng
N- + D	→	n

Kern (1891:520-2) suggested that the N- prefix is a velar nasal. However, the resulting forms which the vowel-initial roots took were a puzzle to van der Veen (1915:106). He says that although a velar nasal is added to vowel-initial roots, what usually appears phonetically is a [g]:

Possibly Professor Kern's hypothesis is correct that the [g] comes from an earlier [ng]. It remains remarkable, however that [g] is much more frequent with vowel-initial words than [ng].

I would like to propose an analysis similar to that of Kern, that the form of the affix is as follows: the prefix consists of the features [+voice] [+nasal] [+velar]. This proposal together with the glottal stop insertion rule explains why the N- prefix appears at times as an [ng] and at others as a [g]. It is important to remember that the glottal-stop insertion rule applies before the N- prefix is added. As seen below, Tabaru empty consonant-initial roots take a velar nasal:

		C	V	C	V	C	V	
[+nasal]	+		o	m	a	s	a	→ ngomasa 'to breathe, breath'
[+voice]								
[+velar]								

However, in the case of a root beginning with a glottal stop or consonant, the following changes occur:

[+nasal]	+	'idu	→	gidu	'to sleep, sleep'
[+voice]					
[+velar]					
[+nasal]	+	wokusu ¹⁰	→	bo-bokusu ¹¹	'to poison, poison'
[+voice]					
[+velar]					
[+nasal]	+	temo	→	demo	'to speak, word'
[+voice]					
[+velar]					
[+nasal]	+	kurutu	→	gurutu	'to be far, distance'
[+voice]					
[+velar]					
[+nasal]	+	peoto	→	beoto	'tap wine, new wine'
[+voice]					
[+velar]					

The addition of the N- prefix to both consonant and vowel-initial roots is one simple process.

4.2.1. Languages where the N- prefix becomes either [ng] or [g] on vowel-initial roots

In his work on Tabaru, Fortgens (1928:373-4, 401-4) simply listed pairs of words and their affixed forms, noting that some of the vowel-initial forms take [g] and some take [ng]. He did not posit underlying forms, nor did he posit rules to account for this difference.

However, in light of recent data, the reason for this phenomena is more apparent. As we have seen above, the N- prefix added to empty consonant-initial roots in Tabaru is [ng].

N- + [aeme]	→	[nga-ngaeme]	‘to lick, tongue’
N- + [eluku]	→	[ngeluku]	‘to lie, lie’
N- + [irana]	→	[ngirana]	‘to heap, a heap’
N- + [omasa]	→	[ngomasa]	‘to breathe, breath’
N- + [uru]	→	[nguru]	‘to get wood, go get wood’

In the case of Tabaru vowel-initial roots, the glottal stop insertion rule applies, followed by the affixation of the N- prefix which produces a surface form [g] as seen below:

N- + ['ari]	→	[gari]	‘to cry, cry for’
N- + ['ese]	→	[gese]	‘to take, take for’
N- + ['isene]	→	[(si)gisene]	‘to hear, listen’
N- + ['orese]	→	[gorese]	‘to shout, shout for’
N- + ['utuku]	→	[gutuku]	‘to pick, pick for’

In his analysis of Tobelo, Hueting (1936:321) states that the root words which begin with vowels become [g] when the N- prefix is added. However, in examining his dictionary (Hueting 1908) we find that there are thirty-one vowel-initial roots which become [g] initial when the N- prefix is added, but there are also at least twenty-two vowel-initial roots which become [ng] with the addition of the N- prefix. Compare the following examples:

N- + aiki	→	ngaiki	‘to take, release’
N- + eluku	→	nge-ngeluku	‘to lie, a dummy’
N- + idu	→	ngidu	‘to sleep, nap’
N- + ogoro	→	ngogoro	‘to stop, dry season’
N- + uru	→	nguru	‘to cut, cut for oneself’
N- + ahoko	→	gahoko	‘to call, request’
N- + ehe	→	gehe	‘to rub, rub off’
N- + iete	→	giete	‘to laugh, laughed at’
N- + omanga	→	gomanga	‘to be full’
N- + uiti	→	go-guitu	‘to scoop, a scoop’

The above data call for further investigation into the phonetics of the Tobelo language.¹²

4.2.2. Languages where the N- becomes [g] on vowel-initial roots

In the languages of Galela, Pagu, Loloda, Ternate, and Tidore, the N- becomes [g] when affixed to their vowel-initial roots.

Wimbish (1991:30-32) states that in Pagu, in all but a very few cases, the N- prefix surfaces as a [g] on vowel-initial roots. Those which don't appear as [g] appear as an [ng]. Loloda apparently has the same situation, as reported by van Baarda (1904:344).

Assuming in Galela that the glottal insertion rule applies before the addition of the N- prefix, we would expect the result to be a [g] on vowel-initial roots. Van Baarda (1908:22, 100) states that a [g] is in fact what we find, as exemplified below:

N- + ['ari]	→	gari	'to cry, crying'
N- + ['eto]	→	geto	'to count, count for'
N- + ['ise]	→	gise	'to hear, listen'
N- + ['oko]	→	goko	'to stand, steep'
N- + ['utu]	→	gutu	'to pick, pick for'

As of yet there is no grammar of Ternate¹³ describing the N- prefix. By examining Fortgens' (1917) Ternate wordlist however, we can observe the N- prefix usage. The following examples illustrate the addition of the N- prefix to Ternate vowel-initial roots:

N- + ahu	→	gahu	'to grow, growth'
N- + era	→	gera	'cook, cook for'
N- + ise	→	gise	'hear, listen to'
N- + ofi	→	gofi	'clean, to clean'
N- + uhi	→	guhi	'flow, flood'

By analogy (when compared with the Galela), the above data suggest the existence of a glottal stop insertion rule in Ternate.

I do not have access to sufficient Tidore data to give examples of the N- prefix, however, Voorhoeve (1985:4, 21) states that the affixation of the N- prefix to vowel-initial roots in Tidore produces a [g].

4.2.3. Languages where the N- becomes [ng] on vowel-initial roots

The Sahu and possibly the Modole languages are those in which the N- prefix becomes a [ng] when added to vowel-initial roots. The glottal stop is not rule governed in Sahu, but rather phonemic (Visser and Voorhoeve 1987:12, 16). The addition of the N- prefix on vowel-initial roots produces an [ng], not [g] as in the case of Galela, because Sahu has no glottal-stop insertion rule.¹⁴ This is exemplified below:

agara	→	nga-ngagara ¹⁵	'to breathe, breath'
ele	→	ngo-ngele	'to stride, stride'
iranga	→	ngi-ngiranga	'to lose, exiled one'
oele	→	ngo-ngoele	'to dry, drying mat'
u'u	→	ngu'u	'fire, burned object'

To summarize, in the North Halmaheran languages the N- prefix appears as a [g] when it occurs on roots which begin with either a phonemic glottal stop or a rule-generated phonetic glottal stop. In the cases where the roots are either vowel initial with no rule-generated glottal stop, or empty-consonant initial, the N- prefix appears as an [ng]. In the case of voiceless consonant-initial roots, the addition of the N- prefix produces voicing of the initial consonant of the root.

5. GLOTTAL STOP IN THE NORTH HALMAHERAN LANGUAGES

Below I discuss glottal stop in the North Halmaheran languages and the interaction between the glottal stop and the N- prefix. This interaction, among other evidence, suggests the existence of a glottal-stop insertion rule in PNH.

5.1. Tabaru-Tobelo

As seen above, the Tabaru language has a phonetic glottal stop. In 4.2.1. above, the phonetic glottal stop in the root word in Tabaru produces the [g] when the N- prefix is applied. An [ng] is produced when there is no glottal stop. There is not yet enough data available to clearly define the Tobelo glottal stop, however, the way in which the N- prefix surfaces in Tobelo vowel-initial roots is similar to that of Tabaru, indicating the possibility of a similar glottal-stop insertion rule as well as empty-consonant-initial roots.

5.2. Sahu-Modole

We will discuss the Sahu and Modole languages under the same heading here because in both languages the /ʔ/ is a reflex of PNH *k (Fortgens 1928:306-8).

As I investigated glottal-stop in the North Halmaheran languages, Sahu especially intrigued me. When comparing both vowel-initial and glottal-stop-initial roots in Sahu with their cognates in Galela, I began to see certain historical developments within Sahu. Both vowel-initial roots and glottal-stop-initial roots in Sahu have at least two PNH sources. In some cases the Sahu glottal stop is a reflex of PNH *k, and in others it results from a probable PNH glottal-stop rule which applies to PNH vowel-initial roots. The vowel-initial roots in Sahu originate from both vowel-initial roots in PNH as well as consonant-initial roots in PNH. Let us examine them below.

5.2.1. Vowel-initial roots in Sahu

Before discussing glottal stop-initial roots in Sahu, it is helpful to examine their contrasting vowel-initial roots. In Sahu the PNH *h has been lost, leaving a vowel-initial root as seen in the examples below:

<u>Galela</u>	<u>Sahu</u>	
[hate]	[ate]	‘tree’
[hele] ¹⁶	[ele]	‘stride’
[hisa]	[isa]	‘landward’
[hoko]	[o'o]	‘seaward’
[hutu]	[utu]	‘hair’

Another source of Sahu vowel-initial roots are words in which other North Halmaheran languages have an initial phonetic glottal stop. They are phonemically vowel initial and I assume here that the proto-form was also vowel initial. Since Sahu has no glottal insertion rule, the Sahu forms are vowel initial:

<u>Galela</u>	<u>Sahu</u>	
['ami]	[ami]	‘hers’
['ete]	[ete]	‘grandfather’
['igo]	[igono]	‘coconut’
['oDomo]	[oromo]	‘eat’
['uku]	[u'u]	‘fire’

5.2.2. Glottal Stop-Initial Roots

The Sahu /ʔ/ as a reflex of PNH *k has long been noted (Fortgens 1928:306-7). The data below exemplify this:

<u>Galela</u>	<u>Sahu</u>	
['uku]	[u'u]	‘fire’
[bako]	[ba'olo]	‘trap’
[katu]	['atu]	‘thatch’
[kolano]	['olana]	‘sultan’
[lako]	[la'o]	‘eye’

The PNH *k is not, however the only source of Sahu glottal stop. Some PNH vowel-initial roots became glottal-stop-initial roots as illustrated below:

<u>Galela</u>	<u>Sahu</u>	
['ari]	['aɖi]	‘cry’
['ese]	['ese]	‘rub’
['ise]	['isene]	‘hear’
['oto]	['oto]	‘cut’
['usa]	['usa]	‘hand of bananas’

So it is seen that there are words which are vowel initial in Galela (remembering that for purposes of this paper it is representative of PNH), whose cognate forms in Sahu are also vowel initial. There are also vowel-initial roots in Galela whose cognate forms are glottal-stop initial in Sahu. This is evidence that the vowel-initial roots in PNH took two directions in Sahu, that is, some became vowel-initial roots and others became glottal-stop-initial roots. As seen above in 4.2.3, the N- prefix appears as an [ng] on vowel-initial roots in Sahu. Below, however, we see that N- prefix has a surface form of [g] on glottal-stop-initial roots:

N- + 'ate	→	(ga)gate	‘caught, hook’
N- + 'elo	→	geto	‘partition, curtain’
N- + 'isene	→	(gi)gisene	‘hear, sound’
N- + 'oro	→	goro-goro	‘take, raft’
N- + 'uci	→	guci	‘descend, used’

5.2.3. Modole

It is likely that in Modole the N- prefix plus vowel-initial root results in an [ng] as it does in Sahu. What is unclear is whether there is a word-initial glottal stop in Modole which is not a reflex of PNH *k, as there is in Sahu.

5.3. Galela-Loloda¹⁷-Pagu-Ternate-Tidore-West Makian

In each of these languages, the N- prefix becomes a [g] when affixed to vowel-initial root. If we compare this to the Tabaru-Tobelo and Sahu sections above, and what we know of Galela and Tabaru glottal insertion, by analogy we may conclude that these languages also have a glottal-stop insertion rule. This needs to be verified in those languages in which clear phonetic data has not yet come to light.

In his field work report of West Makian, Voorhoeve (1982:8) says, "Word-initial vowels are often preceded by a weak glottal stop which does not seem to have phonemic status as it alternates freely with its absence." There appears to be no N- prefix in West Makian (Voorhoeve 1982:41), so here we lack the evidence for glottal stop that the N- provides us in the other North Halmaheran languages.

6. PNH GLOTTAL STOP

Based on the above data, I would like to suggest a glottal stop insertion rule in PNH:

- **Insert glottal stop before vowel-initial roots where that vowel is stressed.**

The Galela and Tabaru glottal-stop insertion rules, the Sahu glottal-stop-initial roots plus the N- prefix resulting in [g], as well as the number of languages whose vowel-initial roots become [g] with the affixation of the N- prefix, are evidence for a PNH glottal-stop insertion rule. This is because both in Tabaru and Galela the ['] is rule-generated. By analogy, the N- prefix becoming [g] on vowel-initial roots in the other languages indicates the likelihood of the presence of a glottal stop, and thus a glottal-stop rule. This also provides an explanation to Kern's questioning why a nasal prefix often appears as a [g] when added to vowel-initial roots. Furthermore, a rule-generated glottal stop is a probable source of the glottal-stop-initial roots in Sahu which descend from PNH vowel-initial roots (as opposed to those descended from PNH *k).

7. CONCLUSION

I have demonstrated that the Tabaru language has a phonetic glottal stop, and that this glottal stop is rule governed. Tabaru has empty consonants in some words which block the application of the glottal-stop insertion rule. In Tabaru the presence of this glottal stop is dependent upon the absence of empty consonants.¹⁸ These Tabaru empty consonants are reflexes of PNH consonants.

I also discussed the N- prefix in the North Halmaheran languages describing briefly its function and form. The surface form of the N- prefix on vowel-initial roots is dependent upon a glottal stop insertion rule in some languages, and phonemic glottal stop in others. The surface form of the N- prefix with relation to glottal stop is identical in both Sahu and Tabaru. In both, N- becomes [g] when it is added to glottal-stop-initial words. In both Tabaru and Sahu if there is no glottal stop word initially, the surface form of N- prefix is [ng].¹⁹

Finally, I discussed the glottal stop in relation to the N- prefix in the North Halmaheran languages which provides evidence for a PNH glottal-stop insertion rule.

NOTES

1. I would like to express my appreciation to the University of Pattimura under whose auspices this research was conducted. Many thanks also go to my colleagues in SIL Maluku for their helpful comments on drafts of this paper, especially Mark Taber, Russ Loski and my wife, Janet Kotynski. Field work for this paper was carried out between December, 1989 and May, 1992. An earlier version of this paper was presented at the Second International Maluku Research Conference held at the University of Hawaii at Manoa from July 29 to August 1, 1992. Special thanks to Jan Perry for help with manuscript preparation.
2. The North Halmaheran languages are a group of ten closely related West Papuan languages. The languages are Galela, Sahu, Tabaru, Ternate, Tobelo, Pagu, Modole, Loloda, West Makian and Tidore. The words used as examples are taken from the following:

Galela	van Baarda (1895)
Modole	Ellen (1916a)
Pagu	Ellen (1916b)
Sahu	Visser and Voorhoeve (1987)
Tabaru	Kotynski (1994)
Ternate	Fortgens (1917)
Tobelo	Hueting (1908)

3. Wada (1980:498) states that one of the purposes of his paper is to “show that the most conservative consonant forms are preserved in present day Galelan words...” He further states (Wada 1980:508), “On the whole, Galela preserves well the old sounds... Accordingly, Galela word forms may show fairly well those of PNH by suffixing the apocoped consonants of -CV₃.”

4. List of abbreviations:

*	proto forms
**	unacceptable forms
'	glottal stop
ó	acute accent over vowels indicates stress
ɓ	implosive voiced bilabial stop
ɗ	implosive voiced alveolar stop
c	tʃ, voiceless alveopalatal affricate
D	Galela dental voiced stop
j	dʒ, voiced alveopalatal affricate
L	Tobelo palatal lateral
N-	nasal prefix
ŋ	ŋ, velar nasal
PNH	Proto-North-Halmahera

5. I have done some testing on this among Tabaru speakers. The Tabaru people are aware of the Ternate word for ‘penis’. My data compares with Fortgens as follows:

<u>Fortgens:</u>	<u>Kotynski</u>		
ako	[ʼako]	‘penis’	Ternate
aako	[ako]	‘eye’	Tabaru

6. Note also the historical reasons discussed in subsequent paragraphs.

7. This implies that it is the absence, rather than the presence of the glottal stop, which is the marked form.
8. This is true in its most extreme form as found in Borona, Pasalulu and Togereba Tua. In some villages, such as Goin and Sangaji Adu, there is only partial deletion of /w/. It is not yet clear if this is environmentally sensitive or idiosyncratic.
9. Here the /k/ also represents what is reflexed as a /ʔ/ in Sahu, and the /D/ represents what is reflexed as /L/ in Tobelo, /j/ in Loloda, /d/ in Tabaru, /D/ in Galela, and /y/ in Pagu.
10. The change we see here is further evidence for Wada's (1980:505) claim that PNH *P-1 shifts to Tabaru /w/, assuming the existence of a PNH nasal prefix.
11. This is a reduplicated form. Some words which take an N- prefix occur only as reduplicated forms.
12. Based on the above statements concerning the N- prefix, and the Tabaru, Galela and Sahu data, by analogy we can conjecture that vowel-initial roots in Tobelo either have or had both glottal-stop-initial roots and vowel-initial roots.
13. Watuseke (1991) does have a grammatical description of Ternate, but this aspect of the language is not covered.
14. The addition of an N- prefix to a glottal-stop-initial root produces the same results as when added to the Galela roots preceded by a phonetic glottal stop, a /g/. This is analogous to the way that the prefix N- + /k/ produces a /g/ in the other North Halmaheran languages. The following Sahu examples illustrate this:

'arese	→	garese	'white, whiteness'
'elo	→	gelo	'to partition, partition'
'isene	→	gi-gisene	'to hear, what is heard'
'ofi	→	gofi	'clean, the cleaning'
'uisi	→	guisi	'to drip, the dripping'

15. Visser and Voorhoeve (1987:22) state that frequently the N- prefix in Sahu is accompanied by reduplication as in many of these examples.
16. This word occurs both in Ternate and Galela. The Ternate and Sahu words are close semantically, but the Galela has shifted to mean 'to slip' (van Baarda 1895:175).
17. Van Baarda (1904:330) mentions a glottal stop in Loloda, however, this glottal stop occurs where Galela has /h/.
18. It is my suspicion that Tobelo has the same glottal insertion rule as Tabaru, and that its application is blocked by empty consonants in the same way. This is based upon the fact that in Tobelo too, the N- prefix surfaces as both [g] and [ng].
19. The difference is that in Sahu the glottal stop is phonemic and in Tabaru it is phonetic (from the point of view of CV phonology).

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