

ナリク語の辞書作成の経過報告 NO.1

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—ナリク語の数学—

クレイグ・フォルカー

**A Lingmaam 1: A Ikakating wan a ling a Nalik
Nalik Dictionary Project 1: Nalik Mathematics**

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著者は、目下、パプア・ニュー・ギニアのニュー・アイルランドで使用されているナリク語の最初の辞書を作成中である。本稿では、その辞書に記載する数学用語について論じる。

Abstract

The first dictionary of the Nalik language of New Ireland, Papua New Guinea is currently being prepared. This first report of work in progress discusses Nalik mathematics terminology. Today most Naliks use English-Tok Pisin numbers, but there is also an indigenous counting system which uses a mixed base five and base ten system.

In the past there was also a sacred counting system used for ceremonial purposes. With

the introduction of vernacular education in Nalik, terms have been coined to express modern mathematical concepts.

1. Introduction

1.1. The Nalik language

The Nalik language is spoken on New Ireland, recorded in the Diamond Archipelago

languages of East New Britain. (see Map 1 Languages of New Ireland and eastern New

Britain). As Ross (1988) has shown, the New Ireland-Tolai languages most closely related to Nalik are the four languages to its north: Kara and Tigak on the New Ireland mainland, Tiang on Dyaul Island, and Lavongai (or Tungak) on Lavongai (or New Hanover) Island. These five languages are known as the Lavongai-Nalik language network.

There are four geographical dialects among the villages speaking Nalik proper: Southern East Coast, Northern East Coast, West Coast, and Laefu. Of the four the Northern East Coast dialect is most different from the other three, but there is only relatively minor variation among these geographical dialects. There is however considerable variation within each geographical dialect between speakers of different generations and with differing ties to traditional culture (see Volker 1994).

Between the villages which are clearly Kara and those which are clearly Nalik, there

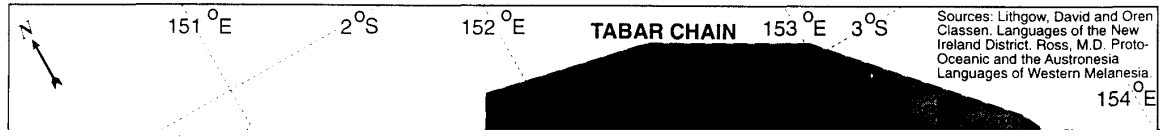
are the two west coast villages of Panemeka and Panagai and the east coast village of Lakuramau. While the speech of the eight hundred inhabitants of these villages is clearly closely related to Nalik, it is unintelligible to speakers of Nalik proper. Further research

1.2. The Nalik Dictionary Project.

Until recently Nalik has been poorly documented. Data from Nalik were included in several comparative works aimed at describing the relationships among various languages in the region, the most comprehensive of which was Ross (1988). Data from Nalik was also including in Lean's (1985) comparative description of Papua New Guinean counting systems. The first attempt at a comprehensive description of Nalik grammar,

established (see Figure 1 (Nalik orthography)), which was used in the first book published in the language (Sawala Nabandi (1991))

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1.3. Use of mathematical terms today

This first report of work in progress in the Nalik Dictionary Project discusses Nalik

mathematical terms and includes a glossary of their English and Tok Pisin equivalents. Many of these terms are no longer in general use, particularly among children and young adults. Instead, most speakers today use Tok Pisin numerals (which differ only slightly

not know any indigenous Nalik numbers above three. The main reason for this is that

Oceanic word for“hand”, it is still related to the concept of“hand”; *mit* means“hand” while *kavit* means“no”, so that *kavitmit* can be analysed literally as“no hand”. This reflects New Ireland body language in which counting begins with an open hand. ~~Beginning with the small finger, one finger is lowered for each number so that to~~

indicate “five” the hand is completely closed and there is literally “no hand”.

The terms used to count from six to nine are shown in Figure 2 (Numerals from six

to nine). These are based on five, using *ka-vizik* “it goes down” plus a number from one to four. Again this reflects New Ireland body language as these numbers are five plus one to four additional fingers being lowered.

6	<i>ka-vizik-saxei</i>	(it goes down-one)
7	<i>ka-vizik-uru (a)</i>	(it goes down-two)
8	<i>ka-vizik-tal</i>	(it goes down-paucal)

10	<i>sanaflu</i>	
20	<i>sanaflu va (ra) uru(a)</i>	(10×2)
30	<i>sanaflu va (ra) orol</i>	(10×3)
40	<i>(ka) sanaflu vara lavaat</i>	(10×4)
	<i>(dizanaflu vara lavaat for some speakers)</i>	
50	<i>ka zanaflu va vitmit</i>	(10×5)
60	<i>ka zanaflu va viziksaxei</i>	(10×(5+1))
70	<i>ka zanaflu va vizikuru</i>	(10×(5+2))

- (4) *ka zangaaf lu vara zuai ma xa wut pa-lok*
it ten REC squared and it come CAU-be.present
zangaaf lu vara zuai
ten REC squared
“one thousand”

Another use of *lok* is with numbers greater than one hundred that also include units and multiples of ten. Here *ka lok* “it is present” is added before the multiplier. e.g.,

it ten REC squared and it ten
va ru ma zaxei xa lok uru
REC two and one it present two
“two hundred twenty-one” (i.e., $((102 \times 2) + (10 \times 2) + 1)$)

The use of such long and cumbersome numbers is undoubtedly a contributory reason

because of events during a time in Nalik history when Fissoa was a dominant force in the area and many Fissoa families settled in other villages.

Figure 5: The sacred counting system. The numbers from one to ten are shown in Figure 5 (Sacred counting system).

provide details of numbers above ten. The numbers from one to ten are shown in Figure 5 (Sacred counting system).

1	<i>hihep</i>	6	<i>dipiran</i>
2	<i>kimbo</i>	7	<i>wira</i>
3	<i>yaangi</i>	8	<i>kalangga</i>
4	<i>kapkap</i>	9	<i>ikula</i>
5	<i>pakaraat</i>	10	<i>lavaatazaar</i>

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1	<i>saxe</i>	6	<i>isaxa</i>
2	<i>marua</i>	7	<i>sagurua</i>
3	<i>mangtal</i>	8	<i>singtal</i>
4	<i>mangfaat</i>	9	<i>singfaat</i>
5	<i>malima</i>	10	<i>sangaflu</i>

Figure 6. Abstract numerals

using a base five system. A base (*i-* or *si*) is followed by the last syllable of the abstract numerals for two to four. No living speakers seem to have knowledge of these abstract

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equivalent of ten kina. This dates from the practice in the colonial period of paying
members with one hundred one shilling (to do ten tops) coins arranged together.

- (9) *Azere braav-ing sin a xadio ?*
what long-NOM of ART bamboo
Ga nguw azaxei-ing be.
I measure.in.fathoms one-NOM only
“What’s the length of the bamboo ? ”
“I’ve measured it to be only one fathom long.”

Length can also be measured in terms of arm lengths, *mit*, e.g.,

- (10) *Naan a mit uru.*

“It’s two arms long.

Today *mit* has been suggested as an equivalent for “metre” in Nalik-medium schools, so that at least in a school context the example above could mean “It’s two metres long”.

(12) *A lus l-a biru Lamakot wan Madina*

ART measurement LOC-ART between L. OBL M.

q vi xa zangaaflu va-ru.

ART point 3 ten CAU-two

“The distance between Lamakot and Madina is twenty kilometres.”

Subtraction can be expressed by *wakpizin* “throw away”, e.g.,

- (14) *Orolavaat ka wakpizin uru ka va-balos uru.*
four 3 throw.away two 3 CAU-meet two
“Four subtract two equals two.”

Multiplication can be expressed by affixing the causative prefix *ca* and the

nominalising suffix *-ing* to the multiplier, with the multiplied number expressed as the direct object of this nominalised verb, e.g.,

- (15) *Va-ru-ing oral ka balis kaviziksaxei.*
CAU-two-TR three 3 become six
“Two times three is six.”

Division can be expressed by *vatavaraking* “distribute, share”, e.g.,

- (16) *Uru xa vatavarak-ing xaviziksaxei ka va-balos orol.*
two 3 distribute-TR six 3 CAU-meet three
“Six divided by two equals three.”

idioms, and derived forms follow the information given about the headword itself.

Appendix 1: List of Words and Their Derivatives

of spellings caused by phonologically predictable alteration: **f/v**, **f/p**, **r/t**, and **x/k**. In these cases the word is listed under the first of the pair with the second pronunciation listed as an alternative (i.e., **xapkap** and **kapkap** are listed together under **xapkap** with **kapkap** as an alternate spelling and pronunciation).

a a, the [TP wanpela]

azaxei (*NUMBER*) one, a [TP wanpela]

(*KA*) **balis** (*NO DO*) 1. become [TP kamap]; 2. equals [TP wokim] **Varuing**
oral ka balis kaviziksaxei. Two times three equals six.

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(A) **gbal** 1. half; 2. portion; [TP hap]

hihep (*SACRED NUMBER*) one [TP wanpela]

ikakating -> **kot**

ikula (*SACRED NUMBER*) nine [TP nain]

isaxa (*ABSTRACT NUMBER*) six [TP sikis]

kalangga (*SACRED NUMBER*) eight [TP et]

kakat -> **kot**

kavitmit ne/oplima se (*NUMBER*) five, group of five [TP faiv, faivpela samting wantaim] **kavitmit orol** three fives, fifteen; (**kavitmit** literally “no hand”; **oplima** from root *op-* “hand”)

(A) **Lavu** ancestral home in the interior jungle [TP ples tumbuna long bikbus] **a doring Lavu** ancestral speech, classical Nalik [TP tok tumbuna bilong ol Nalik]

(KA) **lok** (*NO DO*) to be present [TP i stap] **falok/palok** used in multiples of one hundred [TP hamas handret] **ka zangaafu vara zuai ma xa wut palok zangaafu vara zuai** two hundred

(A) **lus** arm length [TP han] **Naan a lus uru**. It's two arms long.

ma (*CONJUNCTION*) 1. and; 2. plus; [TP na] **Uru ma uru xa vabalos orolavaat**. Two plus two equals four.

malima (*ABSTRACT NUMBER*) five [TP faiv]

(A) **ngavav** fathom (the distance between a person's outstretched hands) [TP param]

a ngavav azaxei one fathom

oplima -> **kavitmit**

orol (*NUMBER*) **three** [TP tri]

faroling third [TP namba tri] . Same pattern used for all ordinal numbers: **fa-** + cardinal number + **-ing**

orolavaat (*NUMBER*) **four** [TP fo(pela)]

pakaraat (*SACRED NUMBER*) **five** [TP faiv]

(A) **piran/piraan** 1. great man, gentleman, leader [TP bikman]; 2. **Piran/Piraan** (*-NUM*) the Lord [TP Bikpela]

Dipiran (*-NUM*) 1. the Lord [TP Bikpela]; 2. **dipiran** (*SACRED NUMBER*) **six** [TP sikis]

(KA) **pizin** send (someone to do something) [TP salim (man long wokim samting)]

pizin a yai send someone to throw away sticks and branches (KA) **pukpizin/pakpizin** turn upside down [TP apim, kapsaitim] (KA) **wakpizin** 1. throw away, take away [TP tromwe, rausim] **Ga wakpizin a vanganing ka raksaat.**

FIGURE 1. The structure of the word 'pizin' in the Nalik language.

sanaflu vara'uru twenty [TP tupela ten, twenti]

ka zanaflu vavitmit fifty [TP faifpela ten, fifti]

ka zanaflu vaviziksaxei sixty [TP sikspela ten, siksti]

ka zanaflu vaviziktal eighty [TP etpela ten, eti]

ka zanaflu vavizikuru seventy [TP sevenpela ten, seventi]

ka zanaflu vara zuai hundred [TP handert] **ka zanaflu vara zuai uru**

two hundred

saxa (*ABSTRACT NUMBER*) ten [TP ten]

saxe (*ABSTRACT NUMBER*) one [TP wan]

sigurua (*ABSTRACT NUMBER*) seven [TP seven]

singaafuvaluuru (*ABSTRACT NUMBER*) twenty [TP tupela ten]

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- (A) **vi** 1. point of land, long distance [TP poin] 2. (coined) kilometre [TP kilomita]
A lus la biru Lemakot wan Madina a vi xa zangaafu varu. The distance between Lemakot and Madina is twenty kilometres.
- (A) **viu** 1. dog [TP dok] 2. group of eight things [TP etpela samting i bung] **Ga roxin a yai a viu uru.** I have sixteen trees (two groups of eight).

a **azaxei**

abstract counting system (ancestral) a **ikakating sin a xulmu**

ancestral home **Lavu**

ancestral speech a **doring Lavu**

ancestor **xulmu**

and **ma**

arm, arm length **lus**

arrow **mbele**

become **balis**

cardinal numbers **malat**

centimetre **mbele**

classical Nalik a **doring Lavu**

come **wut**

count **kot**

counting **ikakating**

distance, great **vi**

distribute **fatavaraking**

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divide **fatavaraking**

dog. **viu**

eight **kalangga, kaviziktal (-> vizik), sintal, viu**

eighty **ka zanaflu vaviziktal (-> sanaaflu)**

equals **balis. fabalos. wut**

fathom **ngav. ngavav**

finger width **mbele**

fifty **ka zanaflu vavitmit (-> sanaaflu)**

five **kavitmit, malima, oplima, pakaraat**

four **mangfaat, orolavaat, xapkap**

forty **sanaflu varalavaat**

fractions **a ikakating pan a korovang, vang**

gentleman **piran**

go down **vizik**

great man **piran**

half **ghal**

hand **mit**

hundred **ka zanaflu vara zuai** (-> **sanaaflu**)

kilometre **vi**

kina: ten kina **falazing**

leader **piran**

length **braaving**

long **braaf**

Lord **Piran, Dipiran** (-> **piran**)

mathematics **katfaraxumuling**

meet **balos**

metre **mit**

ninety **ka zanaflu vavizikfaat** (-> **sanaaflu**)

numbers for counting abstractly **a doring ikakating**

numbers for counting items **a doring ikakating a zaan usfaa**

nine **ikula, singfaat, kavizikfaat** (-> **vizik**)

one **azaxei, hihep, sakare, saxe**

part **vang**

plus **ma**

point (of land) **vi**

(to be) present **lok**

portion **gbal**

read **kot**

sacred counting system **a ikakating sin a maimaai**

sago thatch **raba**

sago thatch section between one and two metres long **rabafaal**

second **faruing** (-> **uru**)

send (someone to do something) **pizin**

seven **kavizikuru** (-> **vizik**), **sigurua**, **wira**

seventy **ka zanaflu vavizikuru** (-> **sanaaflu**)

split (up) **fatarak**

~~take away~~ **wakpizin** (-> **pizin**)

ten **lavaatazaar, sanaafu, sangaafu**

the **a**

third **faroling** (-> **orol**)

thirty **sanaflu varaorol**

three **mangtal, orol, yaangi**

throw away **wakpizin** (-> **pizin**)

turn (upside down) **pukpizin** (-> **pizin**)

twenty **sanaflu vara'uru, singaafuvaru**

two **kimbo, maurua, uru**

wisdom **xapkap**

wrapper **falazing**

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bikman **piran**

Bikpela **Piran, Dipiran** (-> **piran**)

brukim **fatarak. fatavarakinø**

bung **balos**

dabolim **faruing** (-> **uru**)

dok **viu**

et (pela) **kalangga, kaviziktal** (-> **vizik**), **sintal, viu**

faiv **kavitmit, malima, oplima, pakaraat**

fifti **ka zanaflu vavitmit** (-> **sanaaflu**)

fo **mangfaat, orolavaat, xapkap**

foti **sanaflu varalavaat**

go daun **vizik**

han **lus, mit**

kamap **balis**

kapsaitim **pukpizin** (-> **pizin**)

karamap **falazing**

kaunim **kot, ikakating**

kaunim bilong ol maimai **a ikakating sin a maimaai**

kaunim bilong ol tumbuna **a ikakating sin a xulmu**

kilomita **vi**

kina, tenpela **falazing**

long **braaf, braaving**

mita **mit**

na **ma**

~~paip ikula singfaat kavizikfaat (-> vizil)~~

nainti **ka zanaflu vavizikfaat** (-> **sanaaflu**)

(ol) namba **ikakating vakating**

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namba tri **faroling** (-> **orol**)

param **ngav, ngavav**

pinga **mbele**

poin **vi**

rausim **wakpizin** (-> **pizin**)

ritim **kot**

saksak **raba**

saksak: lip saksak **rabafaal**

save **xapkap**

salim (man long wokim samting) **pizin**

sentimita **mbele**

~~nyan kapizilena / > risik / cimuna muna~~

ten lavaataazar, sanaafu, sangaafu

tirti sanaflu varaorol

tri mangtal, orol, yaangi

tromwe wakpizin (-> pizin)

tu kimbo, maurua, uru

tumbuna xulmu; ples tumbuna Lavu; tok tumbuna a doring Lavu

twenti sanaflu vara'uru. singaafuvaaru

wan sakare, saxe

wok namba katfaraxumuling

wokim balis, fabalos, wut

Appendices

Appendix 1 Abbreviations and explanations used in the glossary

(<i>NON-COUNT</i>)	noncountable noun. Nouns not marked (<i>NON-COUNT</i>) can be counted.
(<i>NO DO</i>)	cannot have a direct object (intransitive). Verbs without (<i>NO DO</i>) can have a direct object (they are transitive). Many verbs can have a direct object if an <i>-ing</i> ending is added.
(<i>NOM</i>)	noun formed from a verb (nominalised)
(<i>-NUM</i>)	inalienable, uses possessive forms with <i>-nago</i> , <i>-num</i> , <i>-na</i> , etc. Nouns not marked (<i>-NUM</i>) are alienable and use separate possessive words such as <i>surago</i> , <i>sunum</i> , <i>sina</i> , etc.
<i>POC</i>	Proto Oceanic
<i>SE</i>	Southern East Coast Dialect
<i>TP</i>	Tok Pisin
(<i>YOUTH</i>)	the way younger persons speak
->	go to, see

Appendix 2. Abbreviations used in the text

<i>ART</i>	article
<i>CAU</i>	causative
<i>DUR</i>	durative
<i>LOC</i>	locative
<i>NOM</i>	nominaliser
<i>NTM</i>	nonterm grammatical relation
<i>OP</i>	oblique grammatical relation

<i>POSS</i>	inalienable possessive
<i>REC</i>	reciprocal

3	third person
-	syllable division

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Note/A Doring sin a Piran

this study, particularly by Nalik speakers, are most welcome. Please write to:

pan a doring angkare. Yaak ka roxin a zanun doring di raksaat famumut o yaak gu rexa pan a doring a ling a bina, ka vit ga varaal pana arit. Adu gu na lis a doring surago, ka doxo marazaat mase. Lis akula:

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