

# AN ORTHOGRAPHIC DESIGN FOR WOLEAIAN

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The following discussion is concerned mainly with orthographic recommendations for Woleaian (WOL), but I hope it will also contribute to the solution of similar problems for neighbouring languages including Ulithian (ULI), Satawalese (STW), and Lamotrek, and more importantly, to the design of a unified orthography for all of the Yap Outer Islands. The present discussions will cover (1) some basic concepts of an orthography, (2) the sound system of WOL, (3) the proposed alphabet, and (4) the proposed spelling conventions. The last two constitute the proposed orthography of WOL.<sup>1</sup>

At the end of this paper, an appendix, is provided to briefly present the orthography adopted in Sohn (1975) and Sohn and Tawerilmang (1976) since the recommendations in this paper were made.

## 1. BASIC CONCEPTS

(1) Speech and writing. The people of Woleai need a standard way of writing that everyone can use since writing is very important in our use of language, especially in our modern society where living becomes more complex day by day. The main role of a writing system is to represent speech, thus enabling communication across time and space. Thus, speaking and hearing correspond respectively to writing and reading.

Three typical types of writing systems are in use in the world today. These are alphabets, ideographies, and syllabaries. Most of our familiar writing systems, including that of English, are alphabets. If a writing system uses symbols or letters, each of which directly corresponds to an individual sound, and not to a word or word meaning, it is called an alphabet. Thus, for example, k in the alphabet of Eng. represents a sound and not a meaning. If a writing system uses symbols or characters each of which directly corresponds to a word or word meaning, it is called ideographic. Thus, for example, the Chinese character 我 [wǒ] represents the meaning I. If a writing system uses symbols or letters each of which corresponds neither to an individual sound nor to a word, but to a syllable, it is called a syllabary. Thus, for example, the Japanese letter か represents the syllable [ka] which indicates neither one sound nor a meaning but a syllable consisting of a consonant and a vowel.

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Byron W. Bender, ed. *Studies in Micronesian Linguistics*, 215-236.  
*Pacific Linguistics*, C-80, 1984.

Ideographies have the grave disadvantage that there must be a great number of symbols, because every language has tens of thousands of words, and the users of such a writing system are subjected to a much heavier burden on their memories than are those whose languages are represented alphabetically. For example, a dictionary of Chinese includes more than 50,000 different symbols or characters. On the other hand, syllabaries are adequate only in such a language as Japanese where there are a relatively small number of different syllables. The number of syllables depends on the number of vowels and consonants and the type of syllable structure. For example, Jp. has only fifty-one basic letters representing all possible syllables in the language, because the number of vowels and consonants is very small and the syllable structure is of the form of a consonant only (C-type), a vowel only (V-type), or a consonant followed by a vowel (CV-type).

WOL has a syllable structure as simple as Jp., but has many more vowels and consonants. This fact makes it disadvantageous for Woleaians to have a syllabary. In fact, WOL was represented by various types of syllabaries in the past (Riesenberg and Kaneshiro 1960). These syllabaries apparently originated as ideographic pictures, but they were syllabaries in that the symbols thus created were used to represent any syllables of the same sound, regardless of the original meaning. It is important to note that in spite of their large number, the symbols given in Figure 26 in Riesenberg and Kaneshiro (278) are far from adequate to represent all WOL words and sentences correctly and unambiguously.

Alphabets have an advantage over the other systems, in that only a handful of letters are used to represent an infinite number of words and sentences in a language. Since the number is small (for example, Eng. has twenty-six basic letter symbols), it is easy to learn, write, and read the letters.

For this reason, we propose adopting an alphabetic writing system for the representation of the WOL language.

(2) Relation between sound and letter. An ideal alphabet writing system should serve not only for native speakers who already know the language but also for those who either partly know the language or want to learn or work on it. If an orthography is to be devised only for those who have native control of the language, we do not need any strict correspondence between sound and letter, because a loose correspondence can also give the ordinary speaker enough indication of what has been said so that he can supply the rest. In any language, a great deal can be omitted without a corresponding loss in the transmission of messages from one person to another. For example, if we use the traditional spelling *shuh* to mean both *mountain* and *basket* in spite of the difference in pronunciation, there is not much difficulty in the conveyance of messages, since native speakers would pronounce them correctly if given the context. However, for non-native speakers who want to learn a language or are in the process of learning, or even for those native speakers who are not mature in the language, a strict correspondence between sound and letter is important, for it will make language learning easier and faster if they can learn how to pronounce each written word and sentence correctly. Strict sound-letter correspondence is also desirable not only for the benefit of native speakers who are in the initial stage of reading, but also because writing has to be a correct representation of speech. We could devise a totally separate set of phonetic symbols instead of alphabetic letters as in English, but if the alphabetic letters can be used as phonetic symbols, as they are, nothing could be more efficient.

Furthermore, strict sound-letter correspondence will contribute to the economy of language users' efforts. Loose correspondence forces speakers to memorise spellings of individual words with much effort, because their pronunciation does not automatically provide correct spellings, as is obvious to users of Eng. Finally, strict sound-letter correspondence will lead easily to the standardisation of writing, since it provides native speakers with a norm in writing their language, i.e. the norm 'Follow your pronunciation'.

I consider an orthography to be ideal, then, if it is useful for both mature speakers and language learners, and if it is subject to easy learning and correct reading and writing. One basic requirement for such an orthography is that sound and letter must match as unambiguously as possible. The WOL orthography proposed here is devised with such objectives in mind.

## 2. THE WOL SOUND SYSTEM

The most important prerequisite for an orthographic device based on an alphabet is an intensive linguistic analysis in order to reveal the sound system of the language. A poor knowledge of a sound system often leads one to devise an orthography which contains too many or too few symbols on the one hand, and includes useless spelling conventions or misses important sounds on the other. The spelling proposed by Smith (1951), which is an alphabetic writing, is an example of an orthography based on a poorly analysed sound system, in which Smith sets up too many letters and poor spelling conventions.

My intensive analysis of WOL, with the help of Tony Tawerilmang from Woleai, has revealed that WOL has fifteen short and eleven long significant consonants, six short and eight long significant vowels, and two significant semi-vowels, significant in the sense that any interchange of them in words will necessarily be accompanied by a change in meaning of the words involved. For example, the replacement of [i] with [a] in [rix<sub>i</sub>] *run* and [rax<sub>i</sub>] *year* results in the change of meaning. (The square brackets mean the actual pronunciation of the forms. For the pronunciation of each symbol see the pages following. The small circle under a symbol indicates voicelessness of the sound.)

There are many non-significant sounds also, non-significant in the sense that they have no power to change meanings even if they were interchanged. Their differences, entirely automatic, are caused by their sound environments. For example, in [rix<sub>i</sub>], exchange of the two sounds [i] and [i̥], even if it were made, would not bring about any change in the meaning of the word. Their difference is quite automatic, [i̥] appearing at word-final position and [i] between consonants or at word-initial position. Such non-significant sounds as [i] and [i̥] are grouped into a significant sound /i/ for orthographic purposes. The significant sounds are technically called 'phonemes' and are transcribed in slashes.

### (1) WOL Consonants

WOL consonant phonemes are either single or double. The fifteen single consonants of WOL are classified as follows according to manner and place of articulation:

manner of articulation			place of articulation				
voice	mode	tongue shape	lips	lip-teeth	teeth-gum	hard palate	soft palate
voiceless	stop	plain	/p/		/t/	/c/	/k/
	fricative	plain		/f/	/s/		/x/
		pulled back	/ɸ/				
		curled back				/ʒ/	
voiced	nasal	plain	/m/		/n/		/ŋ/
		pulled back	/ṁ/				
	flap	plain			/l/		

The phonemes /p/, /t/, /c/, and /k/ are voiceless unaspirated stop consonants, pronounced approximately as p, t, ch, and k in the Eng. words 'spy', 'strong', 'matches', and 'sky' respectively. Single /c/ and /k/ occur only in loanwords. The phonemes /f/, /s/, and /x/ are voiceless fricative consonants, pronounced like f, s, and ch in Eng. 'five' and 'sun' and Ger. ich I, respectively. /x/ is voiced between two voiced vowels.

The phoneme /ɸ/ is also a voiceless fricative consonant, produced as if one were blowing a candle while putting the tongue backward. Between two voiced vowels, it tends to be voiced. /ʒ/ is another voiceless fricative, produced in the same way as the initial sound of Eng. 'shepherd' but with the tongue curled backward. /r/ which is a voiced fricative pronounced with the same tongue position as /ʒ/. It is similar to the initial sound of Eng. 'read' except that for WOL /r/ the tongue is curled backward. While /ʒ/ has a noticeable hissing sound, produced by squeezing the air through a narrow slit between the tongue tip and the palate, /r/ lacks such hissing because there is a wide groove between the tongue tip and the palate which allows the air to flow out freely.

The phonemes /m/, /n/, and /ŋ/ have the same sound quality as the Eng. sounds. Simple /n/ occurs only in loanwords. /ṁ/ is pronounced in the same way as /m/ but with the tongue pulled back. WOL /l/ is a flap sound more or less like the r in British 'very'. /l/ is pronounced with much less pressure than in the case of /t/. Although /l/ is not a lateral sound in WOL, it corresponds to the lateral /l/ in neighbouring languages including Ulithian. It is for this reason that the symbol /l/ is used to represent the sound.

Observe the following words in which the consonants discussed above are italicised. The examples are given in both phonemic and phonetic transcriptions. The wedge (v) under a symbol indicates voicing.

/paapaa/	[paapa]	to count
/metai/	[metai]	my eyes
/ici/	[ici]	one (from Jp.)
/kacitoo/	[kacito]	movie (from Jp.)
/yaafi/	[yaafi]	fire
/silei/	[silei]	my mother
/iixe/	[iixe]	fish
/wexare/	[wexare]	root
/taapu/	[taapu]	taboo
/tapeeye/	[tapeeye]	follow him
/šoo/	[šo]	copra
/rixi/	[rixi]	to run
/yaremate/	[yaremate]	person
/sensei/	[sensei]	teacher (from Jp.)
/ŋii/	[ŋi]	tooth
/maale/	[maale]	man
/yaaolo/	[yaaolo]	sun

There are eleven double consonants as shown below.

manner of articulation			place of articulation				
voice	mode	tongue shape	lips	lip-teeth	teeth-gum	hard palate	soft palate
voiceless	stop	plain	/pp/		/tt/	/cc/	/kk/
		pulled back	/p̥p̥/				
	fricative	plain		/ff/	/ss/		
voiced	nasal	plain	/mm/		/nn/		/ŋŋ/
		pulled back	/m̥m̥/				

All double consonants and their corresponding simple consonants share the same sound qualities except that double ones are stronger and longer than their simple counterparts. /p̥p̥/ is the only consonant which does not have a simple counterpart /p̥/ but corresponds instead to /p/. It is not only stronger and longer than /p/, but it is also different in that it is a stop sound while /p/ is a fricative. On the other hand, the five simple consonants /p, x, š, r, l/ do not have corresponding double consonants. When /c/, /k/, and /n/ occur in native words, they are always pronounced as double consonants. Observe the following examples in which double consonants are italicised.

/ppiye/	[ppiɛ]	sand
/ttiri/	[ttiri]	fast
/ccaa/	[cca]	blood
/kkaŋi/	[kkaŋi]	sharp
/ppeše/	[ppeʃe]	white
/ffaxe/	[ffaxe]	to cough
/ssaapu/	[ssaapu]	fishing kit
/mmate/	[mmate]	to awake
/punno/	[punno]	heart
/ŋŋawe/	[ŋŋawe]	bad
/mmuto/	[mmuto]	to vomit

A double consonant is slightly weakened if it occurs in word-initial position and is followed by a vowel and a second occurrence of the same double consonant. For instance, /mmommoŋoo/ *to be eating* is pronounced as [mommoŋo] and /kkekkepatə/ *to be barking* as [kekkepatɛ].

## (2) WOL Vowels

WOL vowel phonemes are either single or double. The six single vowels of WOL may be arranged according to tongue height, tongue frontness or backness, and lip shape, as follows:

tongue	front	central		back
	(flat lips)	(plain lips)	(round lips)	(round lips)
high	/i/		/u/	/u/
mid	/e/			/o/
low		/a/		

The phoneme /i/ is similar to a short variety of Eng. 'ee' as in *meet*, /e/ to Eng. 'e' in *bed*, /a/ to Eng. 'a' as in *park*, /u/ to German *ü* in *müssen*, /u/ to the short variety of Eng. 'oo' in *pool*, and /o/ to Eng. 'o' in short, /e/ is pronounced with slight lip rounding when it occurs before a round vowel, e.g. /iteu/ [iteu] *who?*.

Simple vowels are pronounced as voiceless when they occur in word-final position after a consonant or semivowel, e.g. /maate/ [maate] *eyes*. The only exception is words of the shape (C)V (optional simple consonant + obligatory vowel) in which case no devoicing occurs, e.g. /me/ [me] *and*, /xo/ [xo] *you*, and /pe/ [pe] *will*, all of which are function words. Except for /a/, all the simple vowels may occur in word-final position. The voiceless /e/, i.e. [ɛ], is pronounced with slight lip rounding when it occurs after a round vowel, e.g. /tute/ [tute] *neck*.

Although native speakers are reluctant to spell word-final voiceless vowels, these vowels are significant in distinguishing words with different meanings. For instance, the two members in each of the following pairs are pronounced differently. Their meanings are different too, indicating that they are distinct words.

a.	/peeši/	[peeš <sup>h</sup> ]	hotness
	/peeše/	[peeš <sup>ɛ</sup> ]	lime
b.	/xúúsú/	[xúús <sup>ɥ</sup> ]	louse
	/xúúse/	[xúús <sup>ɛ</sup> ]	octopus
c.	/laamu/	[laam <sup>ɥ</sup> ]	mosquito
	/laamo/	[laam <sup>ɔ</sup> ]	lagoon
d.	/xaccú/	[xacc <sup>ɥ</sup> ]	good
	/xacce/	[xacc <sup>ɛ</sup> ]	fish smell
e.	/metaxi/	[metax <sup>h</sup> ]	pain
	/metaxú/	[metax <sup>ɥ</sup> ]	fear
f.	/laaŋi/	[laaŋ <sup>h</sup> ]	sky
	/laaŋo/	[laaŋ <sup>ɔ</sup> ]	house fly

Word-final voiceless vowels are also significant in that they affect the sound quality of the preceding vowel. For instance, the a's and e's preceding a final round voiceless vowel (i.e. [ɔ], [ɥ], [y]) are pronounced with the lips quite rounded, as illustrated by the rounded a [ɔ] or rounded e [ɛ] in each word below:

/malo/	[mɔlɔ]	to hide
/mešaro/	[mešɔrɔ]	dirt
/ssexú/	[ssæx <sup>ɥ</sup> ]	full
/ppeiú/	[ppæi <sup>ɥ</sup> ]	dirt
/lewemu/	[lewæm <sup>ɥ</sup> ]	your tongue

Voiceless word-final vowels are sensitive to the sound environment. If a word follows them closely in the same phrase, they become voiced. In the following expressions, notice the italicised symbols which are voiced vowels.

/i <sup>h</sup> me kkaa/	[i <sup>h</sup> me kka]	these houses
/rixi laxo/	[rixi lax <sup>ɔ</sup> ]	to run away
/punno xaccú/	[punno xacc <sup>ɥ</sup> ]	good heart
/xotɔɔto laa/	[xotɔɔto la]	that crack
/pušo xemase/	[pušo xemase]	very stupid
/yalúsulú yaape/	[yalúsulú yaape]	ghost of Yap

There are eight double vowels in WOL which may be arranged as follows:

tongue	front	central		back
	(flat lips)	(plain lips)	(round lips)	(round lips)
high	/ii/		/úú/	/uu/
mid	/ee/		/əə/	/oo/
low		/aa/		/ɔɔ/

A double vowel is about twice as long as a simple vowel. Notice in the above table that there are two double vowels, /əə/ and /ɔɔ/ which do not correspond to any simple vowel phonemes. These two double vowels were historically each a sequence of two different simple vowels, but in modern WOL, they are simply long vowels. /əə/ is similar to French *oeu* in *coeur heart*, pronounced with the lips rounded. It is the sound made by simultaneous pronunciation of /ee/ and /oo/. /ɔɔ/ is similar to Eng. 'aw' in *law*. All the other double

vowels are simply lengthened varieties of the corresponding simple ones. While simple vowels in word-final position are devoiced after a consonant or semivowel, double vowels are slightly shortened, with voicing retained, in the same position. Thus, in the following examples, word-final (short) voiced vowels which occur after a consonant or semivowel are actually 'allophones' of double vowels.

/iiyaa/	[iiya]	where?
/leelixuu/	[leeliɣu]	a taro sp.
/yaai/	[yaaɪ]	mine
/lɔtɔtɔ/	[lɔtɔtɔ]	to chew
/læleæ/	[læleæ]	to fill with liquid
/tuulɔŋo/	[tuulɔŋ]	to dive in
/pootɪ/	[pootɪ]	nose
/lɔɔlɔɔ/	[lɔɔlɔɔ]	wavy

## (3) WOL semivowels

There are two semivowels, /w/ and /y/. They are glides in that the tongue starts at a position slightly higher than for /u/ and /i/, respectively, and approaches the position for the vowel that immediately follows. /w/ and /y/ are phonemes in that they serve to differentiate meanings, as shown in the following minimal pairs.

/waaɪ/	[waaɪ]	my canoe
/yaaɪ/	[yaaɪ]	mine
/woɔ/	[wo]	bunch
/yoo/	[yo]	to sneak

## (4) Phoneme alternations

While there are non-significant (allophonic) variations in sounds, as between [i] and [i̥], there are also alternations between phonemes. As in allophonic variations, phoneme alternations are caused in many cases by the sound environment in which they occur. In what follows, let us briefly observe such phoneme alternations in WOL.

As already stated, the five simple consonants /p/, /x/, /ʃ/, /r/, and /l/ do not have corresponding double consonants. If, for some grammatical purpose such as the formation of the progressive form of a verb, these consonants are doubled, a doubled /p/ becomes /pp/, doubled /x/ becomes /kk/, doubled /s/ and /r/ both become /cc/, and doubled /l/ becomes /nn/, as illustrated below.

/puxaa/	[puxa]	boil it: /ppup̥puxaa/
	[p̥up̥puxa]	be boiling it
/xan̥i/	[xan̥i]	eat it: /kkekk̥an̥iye/
	[kkekk̥an̥iye]	be eating it
/ʃaal̥u/	[ʃaal̥u]	water: /ccecc̥al̥uwe/
	[ccecc̥al̥uwe]	fill it with water
/raan̥e/	[raan̥e]	yellow powder: /ccecc̥an̥e/
	[ccecc̥an̥e]	apply yellow powder
/l̥ut̥t̥/	[l̥ut̥t̥]	to jump: /nn̥ut̥t̥/
	[nn̥ut̥t̥]	to be jumping

In contrast to these grammatically conditioned alternations, there are consonant alternations which are phonologically conditioned. For instance, /mann̥u/ [mann̥u] bird of results from /mal̥u/ bird + /li/ of with the deletion of the vowel /u/ before a morpheme boundary and between /l/'s. With the deletion of /u/, two /l/'s are automatically changed to /nn/. Also it is clear that /u/



causes the following vowel /i/ to be changed to /ú/ before it is deleted, hence /mannú/. Thus, we can say that /malú-li/ is the base form from which /mannú/ is derived. Base forms will be preceded by an asterisk in what follows e.g. \*malú-li *bird of*. Observe the following examples.

\*xala-la /xanne/ [xannɔ] *his food*

\*tapo-li-šúú-lapa /tapocčúlapə/ [tapocčúlapə] *tip of the backbone*

Notice in the second example that, with the deletion of i, the consonants l and s are collapsed to /cc/. In the same way, l + r = /cc/, l + t = /tt/, and l + s = /ss/. Vowel deletions will be discussed shortly under vowel alternations.

Rather extensive phoneme alternations may be observed in vowels. For instance, the word which means 'name' is phonemically represented in three different ways, /iite/, /ite/, and /ita/. The form /iite/ shows up when the word is pronounced without any modifying element following. The form /ite/ appears in three different environments: (i) before a modifying word, as in /ite xaccú/ *good name*; (ii) before a suffix whose initial vowel is high, as in /itei/ *my name*; and (iii) before a suffix whose initial vowel is /a/, as in /itemami/ *our (excl.) name*. The form /ita/ appears in all other environment not mentioned above, as in /itale/ *his name*. Since the different realisations of the word 'name' are due to sound environments such as neighbouring vowels, the word boundary, and the presence or absence of a modifying word, we can easily imagine that there is a base form for each word which is free from environmental influence, and that the different forms associated with each word are predictable from the base form in terms of their sound environments. For instance, suppose we set up /ita/ as the base form for 'name'. Then /iite/ and /ite/ are derivable from the base form \*ita by means of a few general phonological rules which will be given shortly. We cannot adopt /iite/, /ite/, or any other form as the base form, because none of them can explain the derivation of the other forms.

Technical details aside, the following simple procedures may be used to obtain base form vowels of WOL words.

- a. If there is an alternation between /a/ and other vowels, choose /a/ as the base form vowel. For instance, between /e/ and /a/ in /itei/ *my name* and /itale/ *his name*, /a/ should be the base form vowel, hence \*ita *name*.
- b. If a long first vowel of an independently pronounced word, e.g. /iite/ *name*, alternates with the corresponding short vowel contained in a larger word, e.g. /itale/ *his name*, the short vowel should be taken for the base form, e.g. \*ita *name*. If a long vowel does not have a short alternate vowel, the long one is the base form vowel. For instance, in /pooti/ *nose* and /pootile/ *his nose*, the first vowel is consistently long, hence \*pooti *nose*.
- c. While a voiced final vowel of a content word is represented as long in both base and phonemic form, e.g. \*waa /waa/ *canoe*, a voiced final vowel of a function word of (C)V type is represented as short, e.g. \*i /i/ *I*, \*xo /xo/ *you*, \*ye /ye/ *he, she, it*, and \*ne /ne/ *and*. This is because a final vowel of a content word is slightly longer than that of a function word even when pronounced in isolation, and the former is definitely lengthened when followed by some other element, e.g. [waaɔ] *his canoe*, but the latter remains always short, whatever environment it may occur in.
- d. If there is no phoneme alternation, base form vowels should be based on the pronunciation, e.g. \*yase /yaase/ [yaasɔ] *liver*, \*yalúsú /yalúsú/ [yalúsú] *ghost*, and \*taai /taai/ [taai] *no longer*.

- e. Many words and parts of words do not allow any element to be attached after them, preventing us from observing the alternation of final voiceless vowels. The general rule in such cases is simply to set up the voiced counterparts of the voiceless vowels for the base forms. Thus, for instance, the base forms of /ʒaxú/ [ʒaxú] *just*, /xaanú/ [xaanú] *I*, /mu/ [mú] *your*, and /li/ [li] *of* are respectively \*ʒaxú, \*xaanú, \*mu, and \*li. One exception to this rule is that the base form vowel of a final /e/ [e] is a, e.g. \*la /le/ [le] *his*. This exception is based not only on historical and comparative evidence but on the fact that all other final a's are realised as /e/ anyway.

Once base forms for all WOL morphemes are determined, the following major phonological rules, among others, will derive the phonemic vowels from base form vowels. None of the following rules applies to base forms of (C)V type.

- (a) A simple word-final a becomes /o/ after o, oo, or u + consonant.

Examples: \*punna /punno/ [punno] *heart*  
 \*punna xaccú /punno xaccú/ [punno xaccú] *good heart*

- (b) In all the other environments, a simple word-final a becomes /e/.

Examples: \*mata /maate/ [maate] *eye*  
 \*mata xaccú /mate xaccú/ [mate xaccú] *good eye*

- (c) A simple word-final i becomes /ú/ after ú, and /u/ after u.

Examples: \*yalúú-li /yalúúúú/ [yalúúúú] *ghost of*  
 \*meŋaaxu-li Tonii /meŋaaxulu tonii/ [meŋaaxulu tonii] *Tony's clothes*

- (d) The first simple vowel of a base form becomes doubled (or lengthened) when there is no modifier following and when both of the following conditions are met:

- i. The base form must consist of only two simple vowels, with one or two simple consonants or semivowels. Thus, the first vowels of \*punna *heart*, \*falúwa *island*, \*pee *divination*, do not undergo doubling.
- ii. The base form must be used as a noun. For instance, the first vowels of the verb \*úúú *to drink* and the adverb \*ʒaxú *just* do not undergo doubling.

Examples: \*fau /faaú/ [faaú] *stone*  
 \*ita /iite/ [iite] *name*  
 \*úwa /úúwe/ [úúwe] *neck*  
 \*mata /maate/ [maate] *eye*

- (e) A simple a becomes /e/ between high vowels. This rule applies across word boundaries as long as the word boundary is not accompanied by a breath pause.

Examples: \*itai /itei/ [itei] *my name*  
 \*raxiraxi /raxirexi/ [raxirexi] *to line up*  
 \*malú kkaíla /malú kkeile/ [malúkkeile] *strong man*  
 \*xaaú ŋalii /xaaú ŋelii/ [xaaúŋeli] *to say to him*  
 \*i manjimaŋi /i menjimenj/ [imenjimenj] *I think*

- (f) When the simple vowel *a* occurs before a low vowel (i.e. /a/ or / /), it becomes /e/. This rule operates from right to left (Sohn 1971).

Examples: \*mata-i /metai/ [metai] *my eyes*  
 \*marama /merame/ [merame] *moon*  
 \*xamooa /xemooawe/ [xemooawe] *erase it*

- (g) Before a morpheme (i.e. minimal meaningful unit) boundary, a simple vowel drops obligatorily between two identical consonants and optionally between *l* and a teeth-gum or palatal consonant.

Examples: \*malu-li /mannu/ [mannu] *bird of*  
 \*sila-la /sinne/ [sinne] *his mother*  
 \*lima-malu /limmelu/ [limmelu] *five animate objects*  
 \*tama-li-tama-i /temattamai/ [temattamai] *my grandfather*  
 \*yau-li-rale /yauccale/ [yauccale] *weather*  
 \*tapo-li-suu /tapoccu/ [tapoccu] *bone tip*

- (h) Before the third person plural possessive suffix \*ra /re/, a simple vowel is always lengthened and, moreover, if the vowel is preceded by a high vowel, it goes to /ee/, not /aa/.

Examples: \*yawa-ra /yewaare/ [yewaare] *their mouths*  
 \*upa-ra /upeere/ [upeere] *their chests*  
 \*lewe-ra /leweere/ [leweere] *their tongues*  
 \*sila-ra /sileere/ [sileere] *their mother*

Phoneme alternation is also observable in semivowels. There are certain morphemes which in their initial position have /w/ in one environment, /y/ in another, and zero in the third, without any change in meaning. This alternation is perfectly predictable, given the base forms of the meaning units and the environments in which they occur. That is, /w/ appears if the preceding vowel is round, /y/ appears if the preceding vowel is unrounded, and nothing appears if the preceding vowel is the same simple vowel as the following one. For instance, the base form of the unit meaning *me* is \*ai and that of the unit meaning *it* is \*a. The base form \*ai *me* corresponds to the four alternant forms /wei/, /wai/, /yei/, and /yai/. The base form \*a *it* corresponds to /we/, /ye/, and /a/. The /w/-/y/-zero alternation is due to the environments stated just above. The alternation /e/-/a/ is due to the environments mentioned with regard to vowel alternations. Examples follow.

\*xamasuruu-ai /xemasuruuwei/ [xemasuruuwei] *make me sleep*  
 \*xamooo-ai /xamooowai/ [xamooowai] *feed me*  
 \*wari-ai /wariyei/ [wariyei] *see me*  
 \*xulaa-ai /xulaayai/ [xulaayai] *know me*  
 \*xasuu-a /xasuuwe/ [xasuuwe] *build it*  
 \*lii-a /liiye/ [liiye] *kill it*  
 \*nuluwa-a /nuluwaa/ [nuluwaa] *wash it*

### 3. THE PROPOSED WOL ALPHABET

An orthography has two aspects, paradigmatic (systematic) and syntagmatic (combinatorial). The two aspects correspond respectively to sound systems and sound combinations. The paradigmatic aspect, to be discussed in this section, is associated with a set of graphic symbols or letters, whereas the syntagmatic aspect, which will be taken up in Section 4, is associated with spellings or spelling conventions.

(1) The following alphabetic and other relevant symbols are proposed.

### Consonants

simple	alphabetic symbols	double	alphabetic symbols
/p/	p	/pp/	pp
/t/	t	/tt/	tt
/c/	c	/cc/	cc
/k/	k	/kk/	kk
/f/	f	/ff/	ff
/s/	s	/ss/	ss
/x/	h	/mm/	mm
/p̄/	b	/nn/	nn
/š/	sh	/ŋŋ/	nng
/r/	r	/mm/	mmw
/m/	m		
/n/	n		
/ŋ/	ng		
/m̄/	mw		
/l/	l		

### Vowels

simple	alphabetic symbols	double	alphabetic symbols
/i/	i	/ii/	ii
/e/	e	/ee/	ee
/a/	a	/aa/	aa
/u/	iu	/uu/	uu
/o/	o	/oo/	oo
		/eo/	eo
		/iu/	iu
		/ao/	ao

### Semivowels

/w/	w
/y/	y

### Other symbols

- . period
- , comma
- ? question mark
- ! exclamation mark
- () parentheses
- " " or ' ' quotation marks
- hyphen

Arabic numerals are used to indicate numbers.

Mathematical symbols like +, -, and ÷ are used.

Capital letters are used for the first letters in sentences and proper nouns.

(2) All the symbols given above are borrowed from the alphabetic and other symbols used in writing Eng. By borrowing them from Eng., time and labour will

be saved in learning to read and write, not only due to our familiarity with them but also due to their simplicity in comparison with other alphabets existing in the present-day world. Furthermore, adoption of the letters from the Eng. alphabet allows us to use machines for the graphic representation of Eng., including typewriters.

The letters of the Eng. alphabet, however, do not provide all the symbols required by the significant WOL sounds. In order to get around such a situation, it is a common practice to use two letters to indicate other sounds, or to introduce some kind of superscript such as ('), ("), and (̄). The former we call digraphs and the latter, diacritic marks. In general, learning to discriminate digraphs (consisting of two existing symbols) is easier than learning to discriminate diacritics which are entirely new symbols, since digraphs are mnemonically much better. Moreover, digraphs are easier to type than diacritics. One serious drawback of digraphs, however, is that ambiguities may occur as in Eng. *ph* (haphazard) vs. *photo*). If such ambiguities are suppressed, digraphs are preferred. In WOL, it is proposed not to include diacritic marks. Digraphs are allowed to the extent that they do not bring in ambiguity. The digraphs are *iu*, *iu*, *eo*, *ao*, *sh*, *mw*, *mmw*, *ng*, and *nng*. The reasons for proposing these symbols are summarised below. Throughout this section, asterisked morphemes or words represent spellings.

The digraph *iu* for /ú/ (as in \**faiu* /faú/ *stone*) is introduced to distinguish the vowel from /i/ and /u/. The fact that the phonetic quality of /ú/ is ambivalent between those of /i/ and /u/ justifies the composition of the digraph. An alternative might be to set up *u* for /ú/ and *wu* for /u/, since it is more economical in terms of time, space, and labour in reading and writing to assign complex symbols to those sounds like /u/ which occur rarely, and simple symbols to frequently appearing sounds like /ú/. Another supporting reason for this alternative might be that the original /u/ of the Oceanic languages corresponds to WOL /ú/, whereas WOL /u/ is a later development. This alternative is not adopted, however, because then \**mwu* would be ambiguous between \**m-wu* /mu/ and \**mw-u* /mú/. Actually, /mu/ does not occur in WOL while /mú/ does (e.g. /múccú/ *to complete*), which would allow us to establish a convention to the effect that, in such sequences, *w* always goes with *u*. Even in that case, writing /mu/ *your* as \**mwwu* would look very inelegant.

Both *eo* and *ao* (as in \**leoleo* /lœœ/ *fill with liquid* and \**laolao* /lœœ/ *wavy*) represent single long vowels. There is no short counterpart of either. The use of two vowel symbols is justified by the fact that they are long. Selection of the composite symbols *a* and *o* for *ao* and *e* and *o* for *eo* is motivated by the fact that the sound represented by *eo* is pronounced with the tongue in a position intermediate between that for *e* and that for *o*, while the sound represented by *ao* is pronounced with the tongue low as for *a*, but with the lips rounded as for *o*. *Eo* and *ao*, wherever they appear, are each pronounced in only one way, and therefore there is no ambiguity. The WOL sound pattern does not permit sequences *e* and *o*, or *a* and *o*, without an intervening consonant or semi-vowel.

An alternative might be to reverse the letters as in *oa* instead of *ao* and *oe* instead of *eo*. This has to be decided upon during the upcoming orthography meeting.

The choice of the symbol *sh* is motivated by tradition as well as by similarity to the sound *sh* in the Eng. word 'shoes'. However, there are other alternatives that are equally plausible. It is strongly recommended that we use the same symbols for all the dialects of the Outer Islands so far as the sounds represented by *sh* and *cc* (or *c*) are concerned, because the interisland pronunciation differences are quite regular and predictable as shown below in:

## Alternative spellings

WOL	ULI	Satawal
[ʒ]	[c]	[r]
[cc]	[cc]	[cc]
([c])		

I	II	III	IV	V	VI	VII
sh	sh	sh	sh	c	ch	ch
cc	cc	c	ch	cc	cch	ch
(c)						cc

As already mentioned, WOL /c/ occurs only in loanwords. The decision has to be made at the orthography meeting.

Mw which is pronounced with the tongue back approaching the velum is distinguished from plain m. Tradition favours the digraph, too.

As regards ng, our alphabet follows tradition, because the alternative is commonly understood as indicating a non-nasal sound and sometimes people use g for the sound represented by h (as in \*laho to go).

Double sounds related to the above digraphs are represented by doubling the first symbol, as in iiu, mmw, and nng.

Besides the above digraphs, selection of simple symbols has also been given careful attention, particularly the following:

h. According to tradition, both h and g have been used for the same sound. Sometimes, one person may use both indiscriminately. The reason for proposing h is simply that the sound is fricative and basically voiceless, although it becomes voiced between two voiced vowels.

b and bb. The sound represented by b /p/ is basically a voiceless fricative, but it becomes voiced between voiced vowels. While this sound is a fricative, its long counterpart, bb /pp/ is a stop. There are several other alternative spellings to consider:

	Short	Long
1.	b	
2.	pw	pw
3.	fw	ppw
4.	bw	ffw
		bbw

Choice of b and bb is motivated by simplicity.

1. Although the sound is more or less like a flap [r] as already mentioned, we adopted the symbol l in view of the fact that the sound corresponds to [l] in the neighbouring languages and there is a separate sound, the resonant [r], to which the symbol r is more appropriately assigned.

#### 4. SPELLING CONVENTIONS

##### (1) Basic principles.

The next consideration is how to spell WOL words and sentences by means of the abovementioned alphabetic letters. In the first place, we have to decide in what manner sounds and letters are to be matched in actual words. There may be several alternatives.

One is to write down words in letters corresponding to their actual pronunciation. Since, for instance, the word for 'name' is pronounced as [iite], this phonetic transcription would be used as the spelling for the word. This type of writing may be called the phonetic spelling. However, phonetic spelling would require the writer spelling in this way to pay an inordinate amount of attention to purely automatic allophonic variations which may be predicted from the sound environment in which they occur.

A second alternative is to spell words in letters corresponding to their phonemic representation. Since, for instance, the word for 'name' is represented phonemically as /iite/, the sequence \*iite would be used as the spelling. In the same way, *my name* is \*itei, *his name* \*itale, and *our (excl.) names* \*itemami. This type of spelling convention may be called phonemic spelling.

A third alternative is to write down words in letters corresponding to their base form representation. For instance, the word for 'name' would be represented as \*ita. In the same way, *my name* would be \*itai, *his name* \*itala and *our (excl.) names* \*itamami. As we have seen, base forms of words are set up by reducing any sounds caused by environments to their source sounds, that is, to those sounds which would be pronounced if no sound environment were present. This type of writing may be called base form spelling.

Other alternatives include combinations of the above three types of spelling, which will not be discussed here. Let us compare the phonemic and base form spellings to observe their merits and shortcomings.

As we saw in the examples just above, phonemic spelling is more faithful to actual pronunciation than base form spelling is. On the other hand, base form spelling is very neat in that, in general, one morpheme may be spelled in only one way, which is not the case with phonemic spelling. One of the most serious drawbacks of the latter system is that there must be two or three or more spellings for a great many WOL morphemes. Our example *name* must be spelled as three different ways, \*iite, \*ite, and \*ita in spite of the fact that the differences are entirely predictable from the sound environment. The causative prefix must also have two different spellings, he- and ha- although the first variant may be derived from the second by the a-raising that is conditioned by a low vowel in the following syllable.

In general, a writing system need not reflect what native speakers can predict by general phonological rules (c.f. Lester 1974:141). This is tantamount to saying that a writing system should be a base form spelling, in which one morpheme is represented only by one spelling. Even Eng., in spite of so many irregular correspondences between sound and letter, has adopted an extensive degree of base form spelling (e.g. Chomsky and Halle 1968:48). Compare the two types of spelling below and notice how the actual practice follows the base forms.

rough pronunciation	phonemic spelling	base form spelling
[pats]	pats	pats
[boyz]	boyz	boys
[aksiz]	axiz	axes
[peintid]	peintid	painted
[workt]	workt	worked
[pleid]	pleid	played
[politik]	politik	politic
[politishen]	politishian	politician

The one-morpheme one-spelling principle of the base form spelling has the following advantages among others.

(a) Reading and writing for meaning will be greatly facilitated, since one-morpheme one-shape contributes to quick word-recognition as well as to quick memorisation of spellings. This applies both to native speakers and to language learners. Observe the 'plural' suffix -s in the above Eng. examples. It has three different pronunciations [s], [z], and [ɪz], yet all of them are spelled the same way, i.e. s. As it is spelled in only one way, it allows a more rapid translation from spelling to meaning and vice versa than would spelling it in three different ways, say, s, z, and ɪz. One might say that this kind of one-morpheme one-shape spelling is a hindrance to those who are in the initial stages of learning to read. However, there is no evidence that such a system is a barrier to learning to read, even in the initial stages. Once a few simple general rules of pronunciation are observed, together with instructions as to how each letter is to be pronounced, it will be easy for the reader to pronounce each word correctly. Moreover, the ultimate goal of reading is not rapid pronunciation but quick recognition of meanings of words and sentences, to which one-morpheme one-spelling definitely contributes, since such a system will maintain a close correspondence between morphemes and their orthographic representations.

(b) The one-morpheme one-spelling principle will contribute to the simplicity of dictionaries. Instead of listing different forms of one word as two, three, or four separate entries, we need list only one form, and the rules of predictable pronunciations can be given in a few lines at the beginning of the dictionary. It would be pointless and clumsy for the orthography to indicate such predictable forms and include them in the dictionary as separate entries.

(c) Furthermore, in many cases the base form spelling allows different dialects to have the same or very similar spellings in spite of considerable differences in pronunciation. Predictable sound changes are in many cases limited to certain dialects and not to others. If such predictable sounds are not represented in spellings, the same spellings can be used for many dialectally different words. For example, observe the difference in phonemic representation in the following words:

ULI	WOL		Spelling
/maram/	/merame/	<i>moon</i>	marama
/maramal/	/maremali/	<i>moon of</i>	maramali

If we spell /e/ in WOL dialect as a in view of the predictability of /e/ from a, the same spelling can be used for both ULI and WOL dialects in spite of the difference in pronunciation. One important consequence of this is that speakers of one dialect can read texts written in the other dialect easily because they recognise many words which are spelled the same way in spite of different pronunciations. This situation exists in many other languages, including Eng. and Chinese. For example, Eng. is spoken in many different parts of the world, and speakers from one place, say Texas, may not at first understand easily the Eng. spoken by a farmer in New Zealand. In spite of that, written Eng. is easily understood by everyone. What this implies is that if the Administration of Yap District were to make written announcements, say, in the ULI dialect, then the Woleaian and Satawalese people would have no difficulty in reading them because of the many words spelled in the same way as in their own dialect.



Word boundaries will be marked by spaces. What constitutes a word for spelling purposes is determined by the sound patterns and grammatical structures of WOL (see Sohn 1975 for details). However, traditional practices will also have to be taken into account so far as options are allowed. In principle, each content or function word with or without affixes is considered a spelling unit, as shown below.

\*Paangali yaremata nge re ccapara be re laho teramiya.  
/paangali yaremata ŋe re ccepare pe re laxo teramiye/  
*Everybody believes that he will go to heaven.*

\*Semaliu maliumwashoho ye liia me lanni ruumwu wee yaala.  
/semaliu maliumaʃoxo ye liiye me lanni ruumu wee yaale/  
*A thief killed him in his room.*

If two or more geographical or social dialects have different pronunciations for the same meaning, two cases may arise. First, the pronunciations may not be related at all, as in the use of WOL \*ranga and Faraulep taiho for *turmeric*. Second, the pronunciations are so related that the general phonological rules we mentioned are able to reduce them to the same spelling, then they are automatically spelled the same way as in the case of ULI /maram/ and WOL /merame/ both as \*marama *moon*. If they cannot be reduced to the same spelling, they have to be spelled differently:

Eastern WOL \*peleehisi *blanket*  
Western WOL \*pelaihiti "

Which dialect of the Outer Islands is to be used for 'standard' or 'official' purposes should be decided by the speakers of the dialects taking into consideration political structure, geographical locations, population, etc.

## (2) Examples.

In view of the advantages discussed above, I propose that the WOL spelling conventions follow, in principle, the base form spelling. Relegating some other spelling-related conventions to the appendix, let us observe some examples of base form spellings below.

pronunciation	glosses	phonemic representation	proposed spelling
[tʊwɛ]	<i>neck</i>	/tʊwɛ/	iuwa
[tʊwɛi]	<i>my neck</i>	/tʊwɛi/	iuwai
[tʊwɛlɛ]	<i>his neck</i>	/tʊwɛlɛ/	iuwala
[walʊwɛlɛ]	<i>plant</i>	/walʊwɛlɛ/	waliuwalu
[iteilaxɔ]	<i>I don't go.</i>	/i tei laxo/	l tai laho.
[yetailaxɔ]	<i>He doesn't go.</i>	/ye tai laxo/	Ye tai laho.
[merame]	<i>moon</i>	/merame/	marama
[maremalɪ]	<i>moon of</i>	/maremalɪ/	maramali
[tepaŋi]	<i>help him</i>	/tepaŋii/	tapangii
[xetapetape]	<i>to help</i>	/xetapetape/	hatapatapa
[xatɛ]	<i>make (him) climb</i>	/xatɛɛ/	hateo
[xemɔwɛ]	<i>erase it</i>	/xemɔwɛ/	hamaoa
[punnɔ]	<i>heart</i>	/punnɔ/	bunna
[punnalɛ]	<i>his heart</i>	/punnalɛ/	bunnala
[kkʊ]	<i>finger nail</i>	/kkʊ/	kkiu
[kkʊ]	<i>my fingernail</i>	/kkʊʊ/	kkiui
[kkutu]	<i>my spit</i>	/kkutuu/	kkutui
[meŋaaxuly]	<i>clothes of</i>	/meŋaaxulu/	mengaahuli

pronunciation	glosses	phonemic representation	proposed spelling
[peʃe]	<i>foot</i>	/peʃee/	peshee
[i]	<i>I</i>	/i/	i
[si]	<i>we (incl.)</i>	/si/	si
[xaanɣ]	<i>I (ind. form)</i>	/xaanɣ/	haangiu
[ʃe] (suffix)	<i>our (incl.)</i>	/ʃe/	sha
[re] (suffix)	<i>their</i>	/re/	ra
[yai] (suffix)	} <i>me</i>	/yai/	} ai
[yei] (suffix)		/yei/	
[wai] (suffix)		/wai/	
[wei] (suffix)		/wei/	
[ye] (suffix)	} <i>him, her, it</i>	/ye/	} a
[we] (suffix)		/we/	
[ ] (suffix)		/a/ (e.g.	
(e.g. [xula_] <i>know him</i> )		/xulaa/)	
[tapeeyɛ]	<i>follow him</i>	/tapeeye/	tabeea
[yaawɛ]	<i>mouth</i>	/yaawe/	yawa
[yewaare]	<i>their mouths</i>	/yewaare/	yawara
[siile]	<i>mother</i>	/siile/	silā
[silale]	<i>his mother</i>	/silale/	silala
[sileere]	<i>their mother</i>	/sileere/	silara
[limmelɔ]	<i>five animate objects</i>	/limmelɔ/	limamaliu
[imettamɔld]	<i>the chief's house</i>	/imettamɔld/	imwalitamwoliu
[wessilei]	<i>my mothers</i>	/wessilei/	welisilai
[weccapi]	<i>ancestors</i>	/weccapi/	welishapi
[yauccale]	<i>weather</i>	/yauccale/	yaiulirala

## APPENDIX

Following the general recommendations of the Yap Outer Islands Orthography Committee (Kuroiwa 1973), I adopted the following alphabet and spelling conventions for a reference grammar of Woleaian (Sohn 1975) and a Woleaian-English dictionary (Sohn and Tawerilmang 1976). For related discussions, see Sohn (1975:Chapter 2).

## (1) The WOL Alphabet

## Consonants

simple	alphabetic symbols	double	alphabetic symbols
/p/	p	/pp/	pp
/t/	t	/tt/	tt
/c/	ch	/cc/	ch
/k/	k	/kk/	k
/f/	f	/ff/	ff
/s/	s	/ss/	ss
/x/	g	/mm/	mm
/p̥/	b	/nn/	n
/š/	sh	/ŋŋ/	nng
/r/	r	/mw/	mmw
/m/	m		
/n/	n		
/ŋ/	ng		
/m̄/	mw		
/l/	l		

## Vowels

/i/	i	/ii/	ii
/e/	e	/ee/	ee
/a/	a	/aa/	aa
/ɨ/	iu	/iɨ/	iu
		/eɨ/	eo
/u/	u	/uu/	uu
/o/	o	/oo/	oo
		/co/	oa

## Semivowels

/w/	w
/y/	y

## (2) Spelling Conventions.

Almost all native speakers seem to prefer tradition and convenience to linguistic simplicity and clarity, at least at this stage of linguistic sophistication. This is quite understandable when we take into account the popular notion that writing systems are only for those who know the language. Some major conventions are as follows.

a. Final simple vowels which become voiceless in independent forms are not spelled. Thus, for instance, the following three words are to be spelled identically in spite of the differences in pronunciation.

[xaccɔ̄]	<i>good</i>	<i>gach</i>
[xaccɔ̄]	<i>tickle</i>	<i>gach</i>
[xaccɔ̄]	<i>fish smell</i>	<i>gach</i>

Moreover, in base form spelling, the third person singular object suffix would be represented as *a*, as in \*giulaa [xɔ̄la] *know it*, \*liia [liiyɔ̄] *kill it*, and \*gasiiua [xasɔ̄twɔ̄] *erect it*. In the spelling adopted, these words are represented as \*giula, \*liiy, and \*gasiiuw, respectively, thus entirely obscuring the formal identity of the grammatical morpheme.

b. The vowel lengthening that occurs in nouns of certain sound combinations is disregarded in spelling, as in [iitɔ̄] /iite/ *name it*.

c. Except for (a) and (b) above, all sounds are, in principle, spelled as they are pronounced, as in [itei] *my name itei*, [italɔ̄] *his name ital*, [peše] *foot peshe*, and [me] *and me*. However, if a word consists only of a double consonant followed by a voiceless vowel, that vowel is spelled, as in [ttɔ̄] *to close tti*. Thus, spellings of [ttɔ̄] and [tti] *tea tti* are not distinguished.

d. The unit of spelling is the word, including compounds. Each word is preceded and followed by a space. If two words, one of which is a modifier, are phonologically close-knit and one cannot occur without the other, like a numeral and a classifier ([semalɔ̄] 'one animate object' \*semal), they form a compound.

## (3) Examples.

The examples given in Section 4 (2) are respelled as follows according to the conventions adopted.

\*iuw *neck*, \*iuwei *my neck*, \*iuwal *his neck*, \*waliuwel *plant*, \*l tei lag *I don't go*, \*Ye tai lag *He doesn't go*, \*meram *moon*, \*maremal *moon of*, \*tepangi *help him*, \*getapetap *to help*, \*gateo *make (him) climb*, \*gemoaw *erase it*, \*bun heart, \*bunal *his heart*, \*kiu *finger-nail*, \*kiu *my finger-nail*, \*kutu *my spit*, \*mengaagul *clothes of*, \*peshe *foot*, \*i I, \*si we (incl.), \*gaang I (ind. form), \*sh our (incl.), \*r their, \*yai, \*yei, \*wai, \*wei *me*, \*y, \*w, \*zero *him, her, it*, \*tabeey *follow him*, \*yaw *mouth*, \*yewaar *their mouths*, \*sil *mother*, \*silal *his mother*, \*sileer *their mother*, \*limmel 'five animate objects', \*imwettamwol *the chief's house*, \*wessilei *my mothers*, \*wechap *ancestors*, \*yaiuchal *weather*.

Since the spelling conventions we have adopted are not those of the base form spelling, we have included a base form after each headword in the Woleaian-English dictionary (Sohn and Tawerilmang 1976).

## NOTES

1. This paper is a revised version of the one originally prepared for the Yap Outer Islands Orthography Committee which met in Colonia, Yap, from December 26, 1972 through January 5, 1973. The participants and members of the Committee were:

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