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San Diego

Palauan Phonology and Morphology

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in Linguistics

by

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The dissertation of Marie Jo-Ann Flora is approved, and it is acceptable in quality and form for publication on microfilm:

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To the people of Palau

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Abstract of the Dissertation

Palauan Phonology and Morphology

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This study is an investigation of the major phonological processes of Palauan, an Austronesian language spoken in the Western Caroline Islands. The theoretical framework is that of generative phonology as formulated by Chomsky and Halle in The Sound Pattern of of English.

Chapter One introduces the underlying segments and deals with some of the low level phonetic rules which they undergo.

Chapter Two is a treatment of inflectional noun morphology. In it are presented the phonological rules needed to derive nouns which are inflected for possession.

Chapter Three deals with the inflectional morphology of verbs, primarily active transitive verbs. Often the various surface forms of a particular verb stem appear to be completely unrelated. An attempt is made here to relate these surface forms by positing abstract underlying forms for stems and affixes, and phonological rules which operate on them to produce the surface forms.

Chapter Four treats Palauan reduplication, a phenomenon which has gone unrecognized in earlier studies as a productive synchronic process. The operation of two major reduplication rules is demonstrated, and their interaction with other rules is discussed.

Chapter Five provides an opportunity to examine how certain groups of phonological rules, apparently unrelated to one another, have a functional unity and work together to achieve a common end. Two trends which have operated historically and continue to operate synchronically are discussed. An examination of these trends makes it possible to predict the direction in which the language appears to be moving.

CHAPTER ONE: Introduction

Background

The language under investigation in this study is Palauan. It is spoken by approximately 12,000 people in the Palau Islands, located among the Western Caroline Islands, about 500 miles east of the island of Mindanao, Philippines. Though little work has been done along historical and comparative lines, it is generally believed that Palauan should be classified as a member of the Western Austronesian division of the Austronesian language family.

Since 1900, a number of studies varying in scope and depth have been done on Palauan. The Walleser grammar (1911) and dictionary (1913) are the earliest known works, and are written in a traditional style. The Capell grammar (1949) is an overall sketch of the language done in conjunction with the Coordinated Investigation of Micronesian Anthropology. During the 1950's, the McManus dictionary was compiled. It is very comprehensive in nature and served as an invaluable aid in conducting the field work for this present study. Three phonemic analyses, Hsu (1960), Carlson (1968), and Flora (1969), have been done, the latter two being detailed and complete accounts of the taxonomic phonemes and their distribution throughout the language. Pätzold (1968) is a comprehensive account of Palauan structure, but its value is questionable since it was based on data taken solely from written sources, such as Walleser (1911) and (1913) and Capell (1949 . The first analysis done in the framework of generative phonology is Wilson (1972), a study of the phonology and syntax of verb affixes. We will be referring to this analysis often in our study. At the present time,

Josephs (1974), a reference grammar of Palauan, is in preparation at the Pacific and Asian Linguistics Institute, University of Hawaii. It will serve as an overall treatment of Palauan structure written primarily for the Palauan community.

Scope of the Study

The analysis presented here treats the major phonological processes which exist in Palauan. The theoretical framework in which the analysis is based is that of generative phonology as formulated by Chomsky and Halle (1968) in The Sound Pattern of English (SPE). Topics, such as global constraints, universal rule ordering hypotheses, which represent extensions or revisions of the standard SPE theory, are also considered when relevant to the data under discussion.

Chapter Two is a treatment of inflectional noun morphology. In it we present the phonological rules needed to derive nouns which are inflected for possession. Chapter Three deals with the inflectional morphology of verbs, primarily active transitive verbs. Often the various surface forms of a particular verb stem appear to be completely unrelated. We attempt here to relate these surface forms by positing abstract underlying forms for stems and affixes, and phonological rules which operate on them to produce the surface forms. In Chapter Four, we discuss Palauan reduplication, a phenomenon which has gone unrecognized in earlier studies as a productive synchronic process. We demonstrate the regular operation of two major reduplication rules and discuss their interation with the phonological rules which apply to unreduplicated forms; Chapter Five provides an opportunity to examine how certain groups of phonological rules, apparently

unrelated to one another, have a functional unity and work together to achieve a common end. We will discuss two trends which have operated historically and continue to operate synchronically. An examination of these trends enables us to make some predictions about the direction in which the language appears to be moving.

Source of Data

The major portion of the data upon which this study is based was collected by the author from August 1972 to March 1973 in the Palau Islands. Ten native speakers varying in age, occupation, education, and background contributed data in approximately four hundred hours of elicitation sessions. They are listed below with their approximate ages and places of residence:

Emiliano Adelbai	60	Koror
Rechucher Charlie Gibbons	78	Koror
Anastasia Madraisau	22	Koror
Ramona Polloi	28	Koror
Sylvia Tangelbad	32	Koror
Johanna Tellei	50	Melekeok
Lucinda Tellei	17	Koror and Melekeok
Ubal Tellei	50	Melekeok
Antonia Uro	19	Koror
Felix K. Yaoch	41	Koror

Previous to this field trip to Palau, approximately fifty hours of field work was conducted in 1971 with Victorio Uherbelau, of Angaur, who was residing in Los Angeles at the time.

Palauan displays some slight dialect variation which in general is not treated in this study. However, native speakers state that variation is so minor that it has little or no effect on mutual intelligibility. We found that the greatest differences exist between the old and young, and it is these that we discuss in some detail in Chapter Five.

Underlying Segments

The following are the systematic phonemes of Palauan and their distinctive features:

	b	t	k	?	d	s	m	ŋ	l	r	w	i	e	a	ə	o	u
Syllabic	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
Sonorant	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+
Consonantal	+	+	+	-	+	+	+	+	+	+	-	-	-	-	-	-	-
Continuant	-	-	-	-	+	+											
Strident					-	+											
Nasal							+	+	-	-							
Lateral									+	-							
Anterior	+	+	-	-	+	+	+	-	+	+							
Coronal	-	+	-	-	+	+	-	-	+	+							
High	-	-	+	-	-	-	-	+	-	-	+	+	-	-	-	-	+
Low	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-
Back	-	-	+	-	-	-	-	+	-	-	+	-	-	+	+	+	+
Round	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+
Voice	+	-	-	-	+	-	+	+	+	+	+	+	+	+	+	+	+
Tense												+	+	+	-	+	+

In subsequent chapters we will, of course, be discussing in detail the major phonological rules that these phonemes undergo. However, it will be helpful if, in this section, we make a few remarks about the consonant phonemes and give the low-level phonetic rules which they undergo. The vowel phonemes and their combinations will be discussed in Chapter Two.

We begin with the stop series of consonants: /b t k ?/. The presence of the voiced consonant /b/ is a bit odd, since its voiceless counterpart /p/ does not exist in underlying representation. One would expect, from the point of view of markedness, that if the marked member of a pair, for example /b/, exists in the underlying representation, then the unmarked member, for example /p/, would also exist. The unusual state of affairs in Palauan is the result of a sound change from Proto-Austronesian (PAN) /*p/ to Palauan /w/, while PAN /*b/ remained /b/ in Palauan. It seems now that present-day Palauan /b/ is moving in the direction of becoming /p/, even though the majority of occurrences of /b/ are [b] on the surface. However, in combination with all consonants except /l/, /b/ becomes voiceless. For example:

1.	/badu/	'rock'	[bád]
	/duba/	'dynamite'	[dúb]
	/kbokb/	'wall'	[kpókp]
	/btu?/	'star'	[ptú?]
	/bduu/	'ball'	[pθúw] - [ptúw]
	/blai/	'house'	[blʌ́y]
	/m+ta?olb/	'to bathe'	[mətə?ólb]

To account for the devoicing of /b/ in certain clusters, we posit the following rule which will apply late in the derivation:

2. Labial Devoicing

$$\begin{bmatrix} C \\ -\text{nas} \\ +\text{ant} \\ -\text{cor} \end{bmatrix} \longrightarrow [-\text{voice}] \; / \; \overset{C}{[-\text{lat}]}$$

The phoneme /b/ becomes [p] in the environment of any consonant except /l/.

The stops /t k b/ are normally unaspirated. However, in final position /t/ and /k/ and the [p] allophone of /b/ become aspirated. For example:

3.	/tuba/	'spittle'	[túb]
	/ʔatu/	'smoke'	[ʔát^h]
	/dakt/	'fear'	[dákt^h]
	/keri/	'question'	[kér]
	/raki/	'age'	[rák^h]
	/latk/	'reminiscence'	[látk^h]
	/baru/	'blanket'	[bár]
	/ʔabu/	'ashes'	[ʔáb]
	/kbokb/	'wall'	[kpókp^h]

Thus we have the rule:

4. Aspiration

$$\begin{bmatrix} C \\ -\text{voice} \\ -\text{cont} \end{bmatrix} \longrightarrow [+\text{aspirated}] \; / \; \underline{\quad}\#$$

Obviously it must be ordered after Labial Devoicing, since /b/ must become voiceless in order to become aspirated.

The phoneme /k/ often becomes voiced in intervocalic position, as in:

5. /ŋikəl/ 'fish' [ŋígəl]

This tends to happen more often when the /k/ is followed by an unstressed vowel. However, there is a good deal of variation here, and voicing seems to occur rather randomly, whether the /k/ is followed by a stressed or unstressed vowel. We thus posit an optional rule:

6. Voicing (Opt)

$$\begin{bmatrix} C \\ -ant \\ -cor \end{bmatrix} \longrightarrow [+voice] \ / \ V\_\_V$$

/k/ becomes [g] between vowels.

Throughout subsequent chapters, aspiration of /t k b/ and voicing of /k/ will not be noted in our surface representations, since these rules are actually low-level phonetic rules and occur quite close to the surface. Our discussions throughout this study center on deeper phonological alternations, which hold more interest for the analysis. In other words, forms like:

7. /ʔatu/ 'smoke' [ʔátʰ]
   /raki/ 'age' [rákʰ]
   /ŋikəl/ 'fish' [ŋígəl]

will be written as [ʔát], [rák], [ŋíkəl].

Some remarks are in order regarding /ʔ/, glottal stop. There is some evidence to indicate that this phoneme has recently developed from a voiceless velar fricative /x/. In a 1911 sketch of Palauan structure, Walleser[1] notes that the sound written as ch, that is, present-day /ʔ/, is to be pronounced as a good German ch, as in the words Sache 'thing' and suchen 'to look for'. He goes on to say that Palauan children do not like to pronounce this sound and leave it out, and only adults pronounce it clearly. It is safe for us to assume that the children who left it out were actually replacing it with /ʔ/. We have been told that some older Palauans living in Angaur, the southernmost island, pronounce a voiceless velar fricative in words where glottal stop is the expected sound. Furthermore, there is evidence from an area of verb morphology which shows that /ʔ/ operates like a velar consonant. There is a series of rules that apply to the imperfective forms of verbs and result in the replacement of initial stem consonants by their corresponding homorganic nasals. Thus the labial consonant /b/ is replaced by the nasal [m], and the velar consonant /k/ is replaced by the nasal [ŋ]. The segment /ʔ/ is also replaced by [ŋ]. For example:

8. /balo?/ [omálə?]
   /kesi/ [məŋés]
   /ʔaus/ [məŋáws]

The intricacies of the phonological rules involved in this nasal replacement process are discussed in detail in Chapter Three. The

Footnotes for this chapter are on p. 22.

important point to be made here is that, in order to reflect the fact that /ʔ/ behaves like a velar consonant, we have assigned to it the same features as the other velar consonants, [-anterior] and [-coronal]. Ordinarily we do not consider the features [anterior] and [coronal] pertinent to glottal sounds. However if we take seriously the definitions of such features as given in SPE by Chomsky and Halle, this characterization of glottal stop does not seem at all unusual.

> Coronal sounds are produced with the blade of the tongue raised from its neutral position; non-coronal sounds are produced with the blade of the tongue in the neutral position. . . . Anterior sounds are produced with an obstruction that is located in front of the palato-alveolar region of the mouth; nonanterior sounds are produced without such an obstruction. (p. 304)

Glottal stop is produced with the blade of the tongue in the neutral position and without an obstruction located in front of the mouth. We can then refer to it as nonanterior and noncoronal.

Palauan has two underlying fricative phonemes /d/ and /s/. The /d/ phoneme is indeed [+continuant]. We have chosen to use the symbol d̲ rather than d̲ for the sake of convenience. On the surface, /d/ is usually realized as [d], which we write as [d]. But in initial clusters /d/ always becomes [θ], which we write as [θ]. For example:

9.	/duba+k/	'my dynamite'	[θpák]
	/d+m+akul/	'bury them'	[θmákl]
	/bduu/	'ball'	[pθúw]

Thus we have the rule:

10. Dental Devoicing

$$\begin{bmatrix} C \\ +ant \\ +cor \\ +cont \end{bmatrix} \longrightarrow [-voice] \; / \; \#\begin{Bmatrix} \_C \\ C\_ \end{Bmatrix}$$

The phoneme /d/ becomes voiceless in an initial consonant cluster.

Some speakers, besides devoicing /d/ in initial clusters, also make it noncontinuant, that is, [t]. For example:

11. /duba+k/ 'my dynamite' [tpák]

/bduu/ 'ball' [ptúw]

For these cases we posit an optional rules to follow Dental Devoicing:

12. $$\begin{bmatrix} C \\ +ant \\ +cor \\ +cont \\ -strid \end{bmatrix} \longrightarrow [-cont]$$

The segment [θ] changes to [t].

The phoneme /s/ becomes palatal before high front vowels. For example:

13. /sils/ 'day' [šíls]

/ksid/ 'name of tree' [kšíd]

The rule is as follows:

14. Palatalization

$$\begin{bmatrix} C \\ +cont \\ +strid \end{bmatrix} \longrightarrow [-ant] \; / \; \_\_ \; \begin{bmatrix} V \\ +high \\ -back \end{bmatrix}$$

The phoneme /s/ becomes [š] before /i/.

However, both in underlying and surface representations, we will use the symbol [s] and will not indicate palatalization.

One of the most curious characteristics about the phonemic inventory of Palauan lies in the nasal series. The language has only /m/ and /ŋ/, but no /n/. That is, the nasal that is most expected from the point of view of markedness is missing. This state of affairs is the result of a historical rule that changed PAN /*n/ to Palauan /l/. We will have a good deal more to say on this subject in Chapters Three and Five, and so we only mention it briefly here.

There are a few examples of surface [n] which can be derived from an underlying /ŋ/ which assimilates to a following dental consonant. For example:

15.	/maraŋd/	'coral'	[maránd]
	/iuŋs/	'island'	[yúns]
	/b+l+uŋut/	'curled'	[blúnt]

Thus we have the rule:

16. Velar Nasal Assimilation

$$\begin{bmatrix} C \\ +nas \\ -ant \\ -cor \end{bmatrix} \rightarrow \begin{bmatrix} +ant \\ +cor \end{bmatrix} \; / \; \_\_ \; \begin{bmatrix} C \\ -son \\ +ant \\ +cor \end{bmatrix}$$

The phoneme /ŋ/ becomes [n] before a nonsonorant dental consonant.

The nasal phonemes /m/ and /ŋ/ and the liquids /l/ and /r/ are subject to a syllabification rule when they occur in word initial position before another consonant. For example:

17. /lkes/ 'sandbar' [l̥kés]
/l+m+aŋəl/ 'to cry' [l̥máŋəl]
/rutaŋəl/ 'anvil' [r̥táŋəl]
/r+m+usu/ 'inject them' [r̥mús]
/m+tuku/ 'cut it!' [m̥túk]
/ŋduul/ 'clam' [n̥dúwl]
/ŋ+m+ata?/ 'wash them' [ŋ̥máta?]

The rule may be written as follows:

18. Sonorant Syllabification

$$\begin{bmatrix} C \\ +\text{cons} \\ +\text{son} \end{bmatrix}_i \longrightarrow [+\text{syllabic}] \;/\; \#\_\_C_j$$

Constraint: $C_i \neq C_j$

A liquid or nasal becomes syllabic in initial position before another consonant if that consonant is not identical to the liquid or nasal in question.

We add the constraint for the following reason. There are occurrences of double /l/ and double /r/ in initial position, and no syllabification takes place. For example:

19. [llóməs] 'light'
[llátk] 'remembered'
[rrəŋék] 'my bashfulness'
[rrús] 'injected'

A geminate /l/ is pronounced like a long [l]. When /r/, which is normally pronounced as an alveolar flap, is geminate, it is pronounced as a trill. Geminate /l/ occurs in medial and final

position also. For example:

20. [dillék] 'my ship'

[dyáll] 'ship'

Geminate /r/ occurs in medial position as well as initial. For example:

21. [dərrír] 'their mother'

[kərrúk] 'chicken'

The language has one underlying semivowel /w/, which has a limited distribution. Most surface [w]'s can be derived from underlying /u/'s or /m/'s as we will show in Chapters Two and Three. But there are a few words in which we must posit /w/ in word final position following a consonant. For example:

22. /o+?adw/ 'scissors' [o?ádw]

/?əsə?osw/ 'covering of coconut blossom' [?əsə?ósw]

/m+kuokw/ 'carry to chest' [məŋwókw] (imperfective)

/m+b+?erw/ 'turn over' [omə?érw] (imperfective)

/m+b+dasw/ 'think' [omdásw] (imperfective)

An analysis of the prefixes found in these forms will be given in later chapters. The important thing to notice here is the position of the /w/'s. They cannot be represented as underlying /u/ for the following reason. There is a productive rule, which will be discussed in detail in Chapter Two, which deletes unstressed word final vowels. Take for example:

23.	/keri/	'question'	[kér]
	/keri+k/	'my question'	[karík]
	/mada/	'eye'	[mád]
	/mada+k/	'my eye'	[mədák]
	/badu/	'rock'	[bád]
	/badu+k/	'my rock'	[bəduk]

If the words in (22) were to be represented with final /u/'s, there would be no way of distinguishing them from words like /badu/ [bad] 'rock', where the final /u/ is deleted. And so we represent the words in (22) with a final /w/. An alternative method for handling these forms would be to represent them with a final /u/ and mark them to undergo a minor rule of gliding which would apply before the rule which deletes final unstressed vowels. This may be more economical since it would eliminate the introduction of a segment /w/ for the sake of a handful of words. However, it calls for the positing of a rule which is unmotivated by any other data in the language.

Consonant Clusters

One of the most striking things about Palauan consonants is the manner in which they combine to form two-consonant clusters in word initial and word final positions. Some of these clusters are the result of historical vowel deletion processes. For example:

24.	PAN		Palauan
	*takut	'fear'	[dákt]
	*bituhon	'star'	[ptú?]

Some are the result of synchronic vowel deletion processes. For example:

25. /tuba+k/ 'my spittle' [tpák]

/m+tabud/ 'to peel' [mətápt]

Some are the result of infixation processes which insert a consonant to the right of an initial stem consonant. For example:

26. /kesi/ 'to scrape'

/k+l+esi/ 'scraped' [klés]

/tat/ 'to tear'

/t+m+at/ perfective [tmát]

Whatever the causes of cluster formation may be, it is clear that the language tolerates some very unusual clusters. Take for example the following:

27. Initial position

tp	/tuba+k/	'my spittle'	[tpák]
kp	/kbokb/	'wall'	[kpókp]
θp	/duba+k/	'my dynamite'	[θpák] - [tpák]
sp	/subad+l/	'announcement'	[spádəl]
pt	/btu?/	'star'	[ptú?]
pk	/buku+l/	'its corner'	[pkúl]
sk	/skorəs/	'stick'	[skórəs]
ps	/b+sibis/	'drill'	[psíps]
ks	/ksid/	'kind of tree'	[ksíd]
tm	/t+m+at/	'to tear (perfective)'	[tmát]
km	/k+m+al/	'very'	[kmál]
θm	/d+m+akul/	'to bury (perfective)'	[θmákl] - [tmákl]

sm	/s+m+ilok/	'to launder (perfective)'	[smílək]
pŋ	/buŋa+k/	'my flower'	[pŋák]
tŋ	/tŋakl/	'peace offering'	[tŋákl]
θŋ	/duŋod/	'tatoo needle'	[θŋód] - [tŋód]
sŋ	/sŋorə?/	'kind of bird'	[sŋórə?]
bl	/blai/	'house'	[bláy]
kl	/k+l+esi/	'scraped'	[klés]
ml	/mlai/	'canoe'	[mláy]
ll	/l+l+atk/	'remembered'	[llátk]
rr	/r+l+eŋod/	'tied'	[rréŋəd]

28. Final position

tp	/bəkə+tbotb/	'eloquent'	[bəkətpótp]
kp	/kbokb/	'wall'	[kpókp]
sp	/m+?isib/	'to scoop (middle)'	[mə?ísp]
lb	/m+tə?olb/	'to wash (middle)'	[mətə?ólb]
kt	/dakt/	'fear'	[dákt]
nt	/b+l+u ut/	'curled'	[blúnt]
lt	/eolt/	'wind'	[ɛ́ólt]
pk	/m+b+kobuk/	'to peel off'	[omkópk]
tk	/m+latk/	'remember (middle)'	[məlátk]
sk	/bsisk/	'small ant'	[psísk]
mk	/m+tamik/	'to shave (middle)'	[mətamk]

lk	/malk/	'chicken'	[málk]
pθ	/m+tabud/	'to peel (middle)'	[mətápθ] - [mətápt]
md	/iumd/	'moss'	[yúmd]
nd	/məraŋd/	'coral'	[məránd]
ld	/lild/	'kind of plant'	[líld]
ps	/b+sibis/	'drill'	[psíps]
ks	/b+l+uks/	'swollen'	[blúks]
ns	/iuŋs/	'island'	[yúns]
ls	/sils/	'day'	[síls]
tm	/m+timotim/	'to syphon (middle)'	[mətmótm]
km	/ka+dikm/	'right hand'	[kadíkm]
θm	/m+ridim/	'to cut fruit (middle)'	[məríθm] -[mərítm]
sm	/m+rasim/	'to sew (middle)'	[mərásm]
lm	/ralm/	'water'	[rálm]
bl	/m+ʔabil/	'carry under arm (middle)'	[məʔábl]
kl	/tabak+l/	'to be patched'	[təbákl]
ml	/m+amul/	'to cut grass (middle)'	[məŋáml]
ll	/diall/	'ship'	[dyáll]

This is a rather exhaustive list of those clusters which occur in initial and final position on the surface. We have already discussed the low-level phonetic rules that adjust voicing for /b/

and /d/ and cause assimilation in /ŋ/. The rules which cause consonants to come together in clusters, such as High Vowel Deletion, as well as the arrangement of morphemes in words, will, of course, be discussed in later chapters.

One of the interesting facts about initial clusters is that although the language tolerates highly marked clusters, it does not allow certain initial homorganic clusters. When homorganic consonants are brought together, some means are taken to break up the cluster. In the case of dental clusters, usually of the consonant-liquid type, schwa epenthesis takes place. For example, when the past participle marker /-l-/ is infixed to the immediate right of an initial stem consonant, we get the following forms:

29.	/balo?/	'to shoot'	
	/b+l+alo?/	'shot'	[blálə?]
	/k+l+esi/	'scraped'	[klés]
	/tabak/	'to patch'	
	/t+l+abak/	'patched'	[təlábək]
	/subad/	'to announce'	
	/s+l+ubad/	'announced'	[səlúbəd]
	/dasa?/	'to carve'	
	/d+l+asa?/	'carved'	[dəlásə?]

Consonant-liquid dental clusters are not permitted in final position either. For example, when the future participle marker /-l/ is suffixed to a stem ending in a consonant, we find the following forms:

30. /tabak/ 'to patch'

/tabak+l/ 'to be patched' [təbákl]

/kidib/ 'to gather'

/kidib+l/ 'to be gathered' [kidíbl]

/le?ot/ 'to tie'

/le?ot+l/ 'to be tied' [lə?ótəl]

/tabud/ 'to peel'

/tabud+l/ 'to be peeled' [təbúdəl]

Notice that when a dental consonant precedes the /-l/ a schwa intervenes. To account for this we posit the rule:

31. Dental Schwa Epenthesis

$$\emptyset \longrightarrow \overset{V}{[-\text{tense}]} \; / \; \begin{bmatrix} C \\ -\text{son} \\ +\text{ant} \\ +\text{cor} \end{bmatrix} \_\_ \begin{bmatrix} C \\ +\text{son} \\ -\text{nas} \\ +\text{ant} \\ -\text{cor} \end{bmatrix}$$

We write the rule without reference to word boundaries because the epenthesis appears to take place within words also. Consider the forms of the underlying stem /badul/ 'to root out':

32. /m+badul [+IMP] 'imperfective' [omádəl]

/b+m+adul+ii/ 'perfective' [mədəlíy]

We are concerned here only with the underlined portion of the stems. The arrangement of morphemes in the underlying representation and the phonological rules which operate on them will, of course, be discussed in subsequent chapters. At this time, we need only mention the existence of a rule which deletes unstressed high back vowels (High

Vowel Deletion, Chapter Two (44)). It operates, for example, in:

33.	/tuba/	'spittle'	[túb]
	/tuba+k/	'my spittle'	[tpák]

This rule regularly deletes the /u/ in /badul/ when it is unstressed. However, on the surface, we find a schwa where the /u/ used to be. Presumably, Dental Schwa Epenthesis is operating here as well as in initial and final clusters.

There is one last schwa epenthesis process we wish to discuss. It takes place in word final position before a pause if the word ends in a consonant cluster or in two consonants separated by a schwa. For example:

34.	/dakt/	'fear'	[dákta]
	/malk/	'chicken'	[málka]
	/ŋalak/	'child'	[ŋálaka]
	/ʔusam/	'beard'	[ʔúsama]

The rule may be written as follows:

35. Phrase Final Schwa Epenthesis

$$\emptyset \longrightarrow \overset{V}{[\text{-tense}]} \;/\; C(a)C\_\_\_\|$$

Since this epenthesis is completely predictable and since it occurs in a very limited environment, we do not represent the schwa in the surface phonetic forms that we cite throughout this study.

Sequences of two consonants are found in medial position as well as initial and final. In theory those combinations of

consonants which occur in initial and final position may also occur in medial position, though not all such combinations are present in our data. The same phonetic rules which apply to initial and final clusters apply to combinations of two consonants in medial position.

Footnotes to Chapter One

[1]Salvator Walleser, Grammatik der Palausprache (Berlin: Mitteilung des Seminars für Orientalische Sprachen an der Königlichen Friedrich-Wilhelms Universität, XIV, 1911).

CHAPTER TWO: Noun Morphology

Introduction

This chapter deals with the inflectional morphology of nouns and the phonological processes which they undergo. Since possession of nouns by means of suffixation is the most widespread of morphological processes in nouns and the most interesting in terms of phonological rules, we devote the entire chapter to it.[1]

Noun Possession

In Palauan, a noun may be inflected for possession by the addition of a suffix to its stem. These possessive suffixes are the only suffixes added to nouns. For the purpose of our discussion, nouns may be conveniently divided into three groups. The first group includes inalienably possessed nouns, that is, those which never occur without a possessive suffix. Most of these nouns are terms for body parts and kinship, though not all body part and kinship terms are inalienably possessed. The second group includes nouns which never occur with possessive suffixes. In this case, possession is denoted by means of a possessive phrase following the noun. The third group includes alienably possessed nouns, that is, those which can occur with or without a possessive suffix. It is this last group that we will be concerned with in the discussion which follows.

Footnotes for this chapter are on p. 72.

There are seven possessive suffixes in Palauan indicating first, second, and third person singular, first person plural inclusive and exclusive, second and third person plural. Inclusive forms include the person or persons being addressed. Exclusive forms exclude them. Below is a selection of alienably possessed nouns:

1. Pattern 1

dákt	'fear'
dəkték	'my fear'
dəktém	'your (sg) fear'
dəktél	'his, her, its fear'
dəktéd	'our (incl) fear'
dəktám	'our (excl) fear'
dəktíw	'your (pl) fear'
dəktír	'their fear'

2. Pattern 2

bád	'rock'
bədúk	'my rock'
bədúm	'your (sg) rock'
bədúl	'his, her, its rock'
bədúd	'our (incl) rock'
bədəmám	'our (excl) rock'
bədəmíw	'your (pl) rock'
bədərír	'their rock'

3. Pattern 3

kér	'question'
kərík	'my question'
kərím	'your (sg) question'
kəríl	'his, her, its question'
kəríd	'our (incl) question'
kərəmám	'our (excl) question'
kərəmíw	'your (pl) question'
kərrír	'their question'

4. Pattern 4

mád	'eyes'
mədák	'my eyes'
mədám	'your (sg) eyes'
mədál	'his, her, its eyes'
mədád	'our (incl) eyes'
mədəmám	'our (excl) eyes'
mədəmíw	'your (pl) eyes'
mədərír	'their eyes'

These four paradigms are representative of the majority of alienably possessed nouns and they exemplify regular patterns. There are a number of questions we might ask about such data. First, what are the underlying forms of the possessive suffixes? If we consider the first four inflected forms of each paradigm, this question is easily answered. The suffixes are:

5. -k 'my'
   -m 'your (sg)'
   -l 'his, her, its'
   -d 'our (incl)'

If we consider the last three inflected forms of each paradigm, we notice some variety. Pattern 1 shows the following suffixes:

6. -am 'our (excl)'
   -iw 'your (pl)'
   -ir 'their'

Patterns 2 to 4 show the following:

7. -mam 'our (excl)'
   -miw 'your (pl)'
   -rir 'their'

This contrast between the presence and absence of an initial consonant in the suffix suggests a structural difference between Pattern 1 and Patterns 2, 3, and 4.

A second question that we might ask is the following: what is the source of the vowels which immediately precede the possessive suffixes? If we consider the first four inflected forms in Patterns 1 to 4, we see that each paradigm shows a different vowel preceding the suffix:

8.

Pattern	1	2	3	4
	e	u	i	a

It is clear that these vowels are to be associated with the stems

rather than with the suffixes. Otherwise it would be necessary to posit four sets of suffixes differing only in their vowels. For example:

9.

Pattern	1	2	3	4
	-ek	-uk	-ik	-ak
	-em	-um	-im	-am
	-el	-ul	-il	-al
	-ed	-ud	-id	-ad

Such an analysis is obviously lacking in insight since the final consonant is easily segmentable from the preceding vowel.

There are at least two possible ways of analyzing these four pre-suffixal vowels. First, they might be thematic vowels which are inserted between the stem and the suffix of inflected forms. In this case it would be necessary either to mark each item as to the particular thematic vowel it takes or to find some way of predicting the quality of the thematic vowel on the basis of phonological information found in the stem. Second, the pre-suffixal vowels might be stem final vowels which appearsonly in suffixed forms and are deleted in word final position. In fact, we have chosen both analyses, the first for forms of Pattern 1, and the second for forms of Patterns 2, 3, and 4. It is the latter that we will discuss first for the sake of clarity of presentation.

Our analysis of the forms of Patterns 2, 3, and 4 states that the pre-suffixal vowels are stem final vowels which appear only when followed by a suffix and are deleted when in word final

position. In other words, we are claiming that in the underlying representation, there are forms which terminate in CV# and that these forms terminate in C# on the surface. There is in fact a surface phonetic constraint in the language which prohibits words from ending in a single unstressed vowel. That is, there are no words which, on the surface, have a final unstressed single vowel. Thus, a final vowel deletion rule such as (10) would certainly be in keeping with the surface phonetic constraints of the language.

10. Final Vowel Deletion

$$\overset{V}{[\text{-stress}]} \longrightarrow \emptyset \;/\; \_\_\#$$

There is evidence from verb morphology that supports the hypothesis that there are vowel final forms in the underlying representation. The Palauan transitive verb has a perfective form which takes a set of suffixes that denote direct object of the verb. One of these suffixes, the third person singular, is /-r/. This suffix is always preceded by one of the same three vowels which appear before possessive suffixes in words of Patterns 2 to 4. However, the pre-suffixal vowel does not appear on unsuffixed forms of the same verb stems. In other words, if we consider the pre-suffixal vowel as belonging to the verb stem in the underlying representation, we can say that when no suffix is present, and the vowel is in word final position, the Final Vowel Deletion rule (10) is operating. Consider the following data:

11.

Imperfective	Perfective	
məɲáb	ʔobúr	'spread ashes'
mərús	rusúr	'give injection'
oməkbəʔés	məkbəʔəsúr	'clean'
məɲés	kosír	'scrape'
oməkbúʔ	məkbəʔír	'marry'
oməkdíd	məkdidír	'fix or build a bridge'
məlúb	tubár	'spit'
omaʔár	məʔərár	'pay'

It should be pointed out here that there are several morphophonemic processes involved in the derivations of the examples in (11) that affect prefixes, initial stem consonants, and vowel quality. These processes will be treated in Chapter Three, where we discuss in detail the formation of verbs and the phonological rules which operate on them. For the purpose of our present discussion, it is necessary only to focus attention on the final part of each word, and to recognize the fact that the imperfective forms in (11) have no final vowels, while the perfective forms show vowels to the immediate left of the suffix /-r/. For example:

12.

məɲábØ	ʔobúr
mərúsØ	rusúr
oməkbəʔésØ	məkbəʔəsúr
məɲésØ	kosír
oməkbúʔØ	məkbəʔír

This fact becomes more interesting when we consider these same stems as they are inflected as nouns for possession. We have maintained the order of (11):

13.

Unpossessed	Possessed	
ʔáb	ʔəbúl	'ashes'
ʔorús	ʔorsúl	'needle'
ʔés	ʔəsúl	'newness'
ʔoŋés	ʔoŋəsíl	'scraper'
bú?	bəʔíl	'spouse'
díd	dídíl	'bridge'
túb	tpál	'spittle'
ʔár	ʔərál	'price'

Once again, we point out that phonological processes having to do with vowel quality and deletion, and consonant assimilation will be discussed shortly. The important fact to notice here is that when the same stem is inflected as a possessed noun as well as a perfective verb, it shows the same pre-suffixal vowel in both forms.

We suggest the following then as the underlying forms of the stems in (11) and (13):

14.

/ʔabu/	'ashes'
/rusu/	'needle'
/ʔesu/	'newness'
/kesi/	'scraper'
/buʔi/	'spouse'

/didi/ 'bridge'

/tuba/ 'spittle'

/ʔara/ 'price'

The strongest evidence for positing final vowels in the underlying representation of stems such as those in (14) comes from an examination of the stress rule. We present this rule below:

15. Stress Assignment

$$V \longrightarrow [+\text{stress}] \; / \; \_\_C_0 \langle VC_0 \rangle \;] \; \#_{\langle \text{stem} \rangle}$$

In unsuffixed forms, stress the penultimate stem vowel. In suffixed forms, stress the rightmost vowel. When there is no penultimate stem vowel, that is, in the case of a monosyllabic stem, stress the only available vowel.

To illustrate the operation of this rule, we present below some data from the verb system of Palauan. We have listed some surface forms of underlying /CVCVC/ verb stems. The affixes found on these surface forms and the phonological rules affecting vowel quality and vowel epenthesis will be discussed in later sections. For the time being, we are interested mainly in the placement of stress. For each example, we give the underlying stem, followed by the present middle, the present middle inchoative, and the future participle[2], in that order:

16. 'to patch' /tabak/

	/m+tabak/	[mətábək]
	/m+tabak+a/	[mətəbəká]
	/tabak+l/	[təbákl]
'to tie'	/le?ot/	
	/m+le?ot/	[məlé?ət]
	/m+le?ot+a/	[mələ?ətá]
	/le?ot+l/	[lə?ótəl]
'to halve'	/doba?/	
	/m+doba?/	[mədóbə?]
	/m+doba?+a/	[mədəbə?á]
	/doba?+l/	[dəbá?əl]
'to shave'	/tamik/	
	/m+tamik/	[mətámk]
	/m+tamik+a/	[mətəmká]
	/tamik+l/	[təmíkl]

These examples are representative of a vast number of underlying /CVCVC/ stems, and so they can be relied upon for information regarding stress assignment. Notice that the unsuffixed forms, that is, the present middle forms, are stressed on the penultimate stem vowels. Whereas the suffixed forms, that is, the present middle inchoative and future participle forms, are stressed on the rightmost vowels. In the case of the present middle inchoative, the rightmost vowel is a suffix vowel, while in the future participle, the rightmost vowel is a stem vowel.

Let us return now to our discussion of the noun system in order to demonstrate how the stress rule operates on the forms for which we have posited stem final vowels in the underlying representation. Take, for example, the following forms:

17.	/badu/	[bád]	'rock'
		[bədúl]	'his rock'
		[bədəmám]	'our (excl) rock'
	/keri/	[kér]	'question'
		[kərí1]	'his question'
		[kərəmám]	'our (excl) question'
	/mada/	[mád]	'eyes'
		[mədá1]	'his eyes'
		[mədəmám]	'our (excl) eyes'

If we are correct in positing final vowels in the stems of the examples in (17), then our stress rule works very nicely. The unsuffixed forms are stressed on the penultimate vowel, whereas the suffixed forms are stressed on the rightmost vowel.

Even in forms longer than one or two syllables, the stress is assigned as we have stated in (15). For example:

18.	/?litə?utu/	[?əlitə?út]	'weakness'
		[?əlitə?ətúl]	'his weakness'
	/dibuku/	[mədibúk]	'tie knots (middle)'
		[dipkúr]	'tie knots (perfective)'

Thus we have shown through various types of evidence that it is correct to posit vowel final stems in underlying representation. These stems, when unsuffixed, are regularly stressed on the penultimate vowel, in which case the final vowel is deleted. When a suffix is added, the stem final vowel is retained, and in cases where it is the rightmost vowel in the suffixed form, it receives the stress and retains its full quality.

Now that we have sufficiently motivated the underlying forms for words of Patterns 2 to 4, it is necessary to do so for words of Pattern 1. It is our position that the pre-suffixal vowel [e] which appears in the first four inflected forms of the Pattern 1 paradigm is not a stem final vowel as are the pre-suffixal vowels of the other paradigms. One of the reasons for holding this position is the fact that the pre-suffixal vowel [e] is completely predictable. In other words, it is possible to determine on the basis of phonological information found in the unpossessed form of a stem, whether or not its possessed form will contain the vowel [e] to the left of the suffix. That is, we can predict which words will be inflected according to Pattern 1, and which will not. However, given a form that will not be inflected according to Pattern 1, it is not possible to predict which of the other three patterns it falls into.

A noun will be inflected according to Pattern 1 if its unpossessed form ends in one of the following shapes:

19. V́CC# stressed vowel followed by two consonants

V́GC# stressed vowel followed by a glide followed by a consonant

V́CəC# stressed vowel followed by two consonants separated by the lax vowel schwa

There are no exceptions to this principle. Below are some examples which illustrate it. The morphophonemic alternations of vowels and diphthongs will be discussed later.

20. V́CC#

málk	'chicken'	dákt	'fear'
məlkék		dəkték	
məlkém		dəktém	
məlkél		dəktél	
məlkéd		dəktéd	
məlkám		dəktám	
məlkíw		dəktíw	
məlkír		dəktír	

21. VGC#

sáwr	'shoelace'	ŋáqk	'flute'
surék		ŋokék	
surém		ŋokém	
surél		ŋokél	
suréd		ŋokéd	
surám		ŋokám	

surí́w	ŋokí́w
surí́r	ŋokí́r

22. V́CəC#

ŋáləkˈ	'child'	llómˈəs	'light, idea'
ŋələkék		llaməsék	
ŋələkém		llaməsém	
ŋələkél		llaməsél	
ŋələkéd		llaməséd	
ŋələkám		llaməsám	
ŋələkíw		llaməsíw	
ŋələkír		llaməsír	

It is interesting to note that even some loan words ending in one of these patterns will be inflected as Pattern 1 forms. For example:

23. V́CC#

bikáks	'pickaxe'
bikəksék	
bikəksém	
bikəksél	
bikəkséd	
bikəksám	
bikəksíw	
bikəksír	

24. V́GC#

báeb	'pipe'
bebék	
bebém	
bebél	
bebéd	
bebám	
bebíw	
bebír	

25. V́CəC#

tébəl	'table'
təbəlék	
təbəlém	
təbəlél	
təbəléd	
təbəlám	
təbəlíw	
təbəlír	

Another reason for treating the pre-suffixal vowel of Pattern 1 differently from those of Patterns 2 to 4 lies in a consideration of the last three forms in the paradigms, the first plural exclusive and the second and third persons plural. In Pattern 1 forms, neither the vowel [e] nor a reduced form of it are present before these plural suffixes, whereas in Patterns 2 to 4, the stem final vowel is present in reduced form, the vowel schwa, before the suffixes. Furthermore, the three suffixes [-mam], [-miw], and [-rir] are

altered in Pattern 1 forms by having their initial consonants deleted. If we assume that the vowel [e] is thematic and is not present in these three plural forms, then the underlying forms of the stems terminate in consonants. For example:

26.	[dákt]	'fear'	/dakt/
	[sáwr]	'shoelace'	/saur/
	[ŋálək]	'child'	/ŋaləkˀ/

It is not unreasonable to assume that when such stems are followed by a consonant initial suffix that is longer than a single segment, the suffix initial consonant is deleted. Perhaps this is done in order to avoid a heavy concentration of consonants at the morpheme boundary. We will return to a discussion of this consonant deletion process when we discuss the object pronoun suffixes that appear on perfective verb forms, since the same process seems to be operating there.

Let us now consider some verb stems whose surface unsuffixed forms terminate in the patterns given in (19). Once again, we want to call attention to the manner in which the stem terminates and to leave discussion of morphophonemic alternations of initial stem consonants and stem vowels to a later section.

27.			Imperfective	
	/tamik/	'to shave'	[məlámk]	V́CC#
	/saur/	'to tie a shoelace'	[məsáwr]	V́CC#
	/dasaˀ/	'to chop'	[məlásəˀ]	V́CəC#

The stems of such verbs can be used to form instrumental nouns by removing the [mə-] prefix from the present imperfective form and replacing it with the instrumental prefix [o-]. For example:

28. olámk 'razor'
    osáwr 'something to tie with'
    olásə? 'axe'

These instrumental nouns may be inflected for possession. Since these stems end in the patterns of (19), we are able to predict the presence of the pre-suffixal vowel [e]. Thus the nouns are inflected as follows:

29. olámk 'razor'
    oləmkék
    oləmkém
    oləmkél
    oləmkéd
    oləmkám
    oləmkíw
    oləmkír
30. osáwr 'something to tie with'
    osurék
    osurém
    osurél
    osuréd
    osurám
    osuríw
    osurír

31. olásə? 'axe'

olasə?ék

olasə?ém

olasə?él

olasə?éd

olasə?ám

olasə?íw

olasə?ír

When vowel final verb stems are inflected as instrumental nouns, it is the stem final vowel which appears before the suffix. For example.

32. /rusu/ 'give injection'

orús 'needle'

orsúk

orsúm

orsúl

orsúd

orsəmám

orsəmíw

orsərír

33. /kesi/ 'scrape'

oŋés 'scraper'

oŋəsík

oŋəsím

oŋəsíl

oŋəsíd

oŋəsəmám

oŋəsəmíw

oŋəsərír

If we consider how the stress rule operates on the unsuffixed forms of words like (31), that is, surface [CV́CəC#] forms, it will become clear that the pre-suffixal vowel [e] must be analyzed as a thematic vowel and not a stem final vowel. Recall that unsuffixed forms receive penultimate stress according to the stress rule as formulated in (15). There is a good deal of evidence showing that the reduced vowel schwa which appears in surface unsuffixed forms of the shape [CV́CəC#] is derived from an underlying full vowel. In most cases we are able to determine what that underlying vowel actually is. Take for example the stem of (31). We know that the underlying representation of it is /dasa?/ from looking at various derived forms, as we did with similar stems in (16).

34.	Present middle	[mədásə?]	/m+dasa?/
	Present imperf.	[məlásə?]	/m+dasa?/ [+IMP]
	Future part.	[dəsá?əl]	/dasa?+l/[3]

Given the underlying stem /dasa?/, the stress rule works perfectly. Unsuffixed forms, such as the present middle and imperfective, receive stress on the penultimate vowel. Suffixed forms, such as the future participle, receive stress on the rightmost vowel. Unstressed vowels then reduce to schwa by a rule discussed later in this chapter.

The stress rule works just as well for the forms of (31), the instrumental nouns derived from the stem /dasa?/, if we assume

that the pre-suffixal vowel [e] is thematic and not part of the stem.

35.	[olásə?]	'axe'	/o+dasa?/ [+IMP]
	[olɔsə?ék]	'my axe'	/o+dasa?+e+k/ [+IMP]

For the sake of argument, let us assume for the moment that the pre-suffixal vowel [e] is not thematic, but part of the underlying stem. The underlying representation of (35) would then be:

36.	/o+dasa?e/	'axe'
	/o+dasa?e+k/	'my axe'

Application of the stress rule would result in the following:

37.	o+dasá?e	'axe'
	o+dasa?é+k	'my axe'

Though the stress placement is correct for the suffixed form, it is not correct for the unsuffixed form. We cannot argue that perhaps the rule deleting final unstressed vowels (10) precedes the stress assignment rule, thus insuring that stress appears on the proper syllable. For example:

38.	/o+dasa?e/	'axe'
	o+dasa?	Final Vowel Deletion
	o+dásа?	Stress Assignment

This ordering would not work for stems of Patterns 2 to 4 for which we have strong evidence for positing final vowels. Consider what would happen to a polysyllabic form such as the second example in (18) if the ordering in (38) were adopted:

39.	[mədíbúk]	'tie knots (present middle)'
	/mɨdibuku/	
	mɨdibuk	Final Vowel Deletion
	mɨdíbuk	Stress Assignment
	.	Other rules
	.	
	.	
	*[mədípk]	

Stress is assigned incorrectly, and it becomes clear that the final vowel of a stem like /dibuku/ must be present when the stress rule is applied.

On the basis of this and previous evidence discussed, we adopt the following analysis. Forms of Pattern 1 are consonant final. When inflected for possession, a thematic vowel [e] is inserted between the final consonant of the stem and any suffix which is a single consonant. Forms of Patterns 2 to 4 are vowel final. In the cases where no suffix is present, the stem final vowel is deleted.

Vowel Deletion and Vowel Reduction

We turn now to a consideration of phonological rules affecting single unstressed vowels. Our discussion will be based primarily within the domain of nouns and their possessed forms, though the rules under consideration are applicable throughout the language.

The first process we will discuss is that of vowel reduction. It should be obvious, given the various data in the preceding sections, that unstressed vowels in certain environments are subject to reduction to schwa. For example:

40.	/mada/	'eyes'	[mád]
	/mada+k/	'my eyes'	[mədák]
	/mada+mam/	'our eyes'	[mədəmám]
	/keri/	'question'	[kér]
	/keri+k/	'my question'	[kərík]
	/keri+mam/	'our question'	[kərəmám]
	/skorəs/	'stick'	[skórəs]
	/skorəs+e+k/	'my stick'	[skərəsék]
	/skorəs+mam/	'our stick'	[skərəsám]
	/ʔabu/	'ashes'	[ʔáb]
	/ʔabu+k/	'my ashes'	[ʔəbúk]
	/ʔabu+mam/	'our ashes'	[ʔəbəmám]

What are the specifics of the vowel reduction rule? First, only stem vowels are affected. The vowels of prefixes such as the instrumental morpheme (28-33) are not reduced to schwa, even though they are unstressed. For example:

41.	olámk	'razor'
	oləmkék	'my razor'
	olásəʔ	'axe'
	oləsəʔék	'my axe'

Second, the degree of applicability of the rule to stem vowels varies depending upon the quality of the vowel and its position in the stem. The unstressed stem vowels /a e o/, that it, nonhigh vowels, are regularly affected by the rule in all positions. The high vowels /i u/ are treated differently. Only those unstressed

high vowels that are stem final and followed by a suffix are reduced to schwa by the vowel reduction rule. For example:

42.	/keri+mam/	'our question'	[kərəmám]
	/ʔabu+mam/	'our ashes'	[ʔəbəmám]

However, the situation is different if the unstressed high vowel is flanked on both sides by stem consonants. In this position, the high back vowel is regularly deleted. For example:

43.	/buŋa/	'flower'	[búŋ]
	/buŋa+k/	'my flower'	[pŋák]
	/buŋa+mam/	'our flower'	[pŋəmám]
	/subad/	'announcement'	[súbəd]
	/subad+e+k/	'my announcement'	[spədék]
	/subad+mam/	'our announcement'	[spədám]
	/o+rusu/	'needle'	[orús]
	/o+rusu+k/	'my needle'	[orsúk]
	/o+rusu+mam/	'our needle'	[orsəmám]

This deletion rule may be formulated as follows:

44. High Vowel Deletion

$$\begin{bmatrix} V \\ +\text{back} \\ +\text{high} \\ -\text{stress} \end{bmatrix} \longrightarrow \emptyset \;/\; [\; X\; [+\text{cons}]\_\_[+\text{cons}]\; Y\;]$$

(X: stem; Y: stem)

When the high vowel [i] is flanked on both sides by stem consonants it behaves as the most stable of the vowels. Normally it is subject neither to deletion not reduction rules. For example:

45.	/diŋa/	'ears'	[díŋ]
	/diŋa+k/	'my ears'	[diŋák]
	/diŋa+mam/	'our ears'	[diŋəmám]
	/lild/	'a plant name'	[líld]
	/lild+e+k/	'my plant'	[lildék]
	/lild+mam/	'our plant'	[lildám]
	/?ilt/	'ointment'	[?ílt]
	/?ilt+e+k/	'my ointment'	[?ilték]
	/?ilt+mam/	'our ointment'	[?iltám]

However, there are a few examples to indicate that perhaps there is a trend toward deleting high front vowels as well as high back vowels.

46.	/o+sibu/	'pick'	[osíb]
	/o+sibu+k/	'my pick'	[ospúk]
	/o+sibu+mam/	'our pick'	[ospəmám]
	/?əbiŋəl/	'fishtrap'	[?əbíŋəl]
	/?əbiŋəl+e+k/	'my fishtrap'	[?əpŋəlék] - [?əbiŋəlék]
	/?əbiŋəl+mam/	'our fishtrap'	[?əpŋəlám] - [?əbiŋəlám]
	/?+l+itakil/	'song'	[?əlitákl]
	/?+l+itakil+e+k/	'my song'	[?əlitəklék]
	/?+l+itakil+mam/	'our song'	[?əlitəklám]
	/o+diŋəl/	'visit'	[odíŋəl]
	/o+diŋəl+e+k/	'my visit'	[oθŋəlék]
	/o+diŋəl+mam/	'our visit'	[oθŋəlám]

There are many more instances of high front vowels which do not delete than those which do. It seems correct then to formulate the High Vowel Deletion rule as we have in (44), so that it will apply regularly

only to high back vowels and to mark forms like those in (46) to exceptionally undergo this rule.

Let us summarize the facts at this point. The high back vowel, when unstressed and when flanked by two stem consonant, is regularly deleted by the High Vowel Deletion rule (44). A few high front vowels in this same environment are marked to exceptionally undergo this rule. Nonhigh stem vowels, when unstressed and when flanked by two consonants (they need not be stem consonants) are reduced regularly to schwa. Unstressed high stem vowel, when in stem final position and when flanked by two consonants, are also reduced to schwa. The Vowel Reduction rule may be formulated as follows:

47. Vowel Reduction (First Version)

$$\begin{bmatrix} V \\ -\text{stress} \\ +\text{stem} \\ \langle +\text{high} \rangle \end{bmatrix} \longrightarrow [-\text{tense}] \;/\; C\_\_\langle + \rangle\, C$$

Unstressed nonhigh stem vowels flanked by two consonants are reduced to schwa. Unstressed high stem vowels flanked by two consonants also reduce to schwa if a morpheme boundary is present between the vowel and the consonant to its right, that is, if the vowel is in final position.

Below we give some sample derivations which illustrate how the rules posited thus far operate:

48.		[bú ŋ]	[pŋák]	[pŋəmám]
		'flower'	'my flower'	'our flower'
		/buŋa/	/buŋa+k/	/buŋa+mam/
	Stress	búŋa	buŋá+k	buŋa+mám
	Final Vowel Deletion	bú ŋ	-	-
	High Vowel Deletion		bŋá+k	bŋa+mám
	Vowel Reduction	-	-	bŋə+mám
	Consonant Devoicing		pŋá+k	pŋə+mám
		[bú ŋ]	[pŋák]	[pŋəmám]

Sources for Schwa

Consider the following data:

49.	/bu?i/	'spouse'	[bú?]
	/bu?i+k/	'my spouse'	[bə?ík]
	/?usəm/	'beard'	[?úsəm]
	/?usəm+e+k/	'my beard'	[?əsəmék]
	/?uri/	'laughter'	[?úr]
	/?uri+k/	'my laughter'	[?ərík]
	/du?a/	'skill'	[dú?]
	/du?a+k/	'my skill'	[də?ák]

It appears that in these cases the high back vowel in unstressed position between two stem consonants has been reduced to schwa rather than deleted. In fact, deletion has taken place, and the schwas which appear in place of the deleted vowels are the result of an epenthesis rule. Notice that in each case a glottal stop

appears to the right or left of the underlying high back vowel. As a rule, this segment does not join with any consonant to form a consonant cluster. If through affixation or some phonological process such as vowel deletion, a glottal stop appears adjacent to a consonant, a schwa is inserted between them. For example, there is a verbal affix /-l-/ which is inserted to the right of an initial stem consonant to form the past participle of the verb. When the initial consonant is glottal stop, a schwa appears between it and the /-l-/ infix.

50.	/kesi/		'scrape'
	/k+l+esi/	[klés]	'scraped'
	/balo?/		'shoot'
	/b+l+alo?/	[blálə?]	'shot'
	/?arom/		'taste'
	/?+l+arom/	[?əlárəm]	'tasted'
	/?amu/		'break'
	/?+l+amu/	[?əlám]	'broken'

This schwa epenthesis rule may be formulated as follows:

51. Glottal Schwa Epenthesis

$$\begin{array}{ccc} * \; ? \; \emptyset \; C & & \partial \\ 1 \; 2 \; 3 & \Longrightarrow & 1 \; 2 \; 3 \end{array}$$

The string glottal stop plus consonant and its mirror image, consonant plus glottal stop, become glottal stop plus schwa plus consonant and consonant plus schwa plus glottal stop respectively.

The derivation of a form from (49) would proceed as follows:

52.	[bú?]	[bə?ík]
	'spouse'	'my spouse'
	/bu?i/	/bu?i+k/
Stress	bú?i	bu?í+k
Final Vowel Deletion	bú?	-
High Vowel Deletion	-	b?í+k
Vowel Reduction	-	-
Glottal Schwa Epenthesis	-	bə?í+k
	[bú?]	[bə?ík]

There are other environments where schwa epenthesis takes place which we will discuss in later sections.

We have now shown that there are at least three sources for the surface lax vowel schwa. It can be the reduction of an underlying nonhigh tense vowel, or the reduction of a stem final high tense vowel, or the result of an epenthesis rule. It would be ideal if we could explain all occurrences of surface schwa in these three ways. However, a problem arises when we consider words like the following:

53.	ŋálək	'child'
	ŋələkék	'my child'
	kəmúr	'tail'
	kəmrík	'my tail'

ʔúsəm	'beard'
ʔəsəmék	'my beard'

Each of these forms contains a schwa in the unstressed syllable of the unpossessed form. It is clear that these schwas are not epenthetic when we consider forms like the following:

54.	málk	'chicken'
	məlkék	'my chicken'
	kmál	'very'
	mərásm	'to sew'

These examples show the consonant clusters [lk#], [#km], and [sm#]. The examples in (53) show these same sequences of consonant separated by a schwa: [lək#], [#kəm], and [səm#]. We can only conclude then that the schwas in question are not epenthetic and are not present for the purpose of breaking up unwanted consonant clusters. Therefore, they must be reductions of underlying tense vowels. However, it is not possible to determine which tense vowels underlie which schwas, since forms like those in (53) are not derivationally related to other forms in which the tense vowel appears on the surface. Since any decision about which tense vowels underlie these schwas would be an arbitrary one, we have chosen to represent them as underlying schwas. We should at this point consider the Wilson analysis of this problem. In 2.5 of her dissertation, she describes possible ways of handling the indeterminacy of the vowels underlying these schwas. She chooses to represent such vowels as /V/, that is, a segment marked [+syllabic], an unspecified vowel. She is unconvinced that underlying forms must be fully specified and wishes to

employ the principle of maximum use of phonological rules. According to this principle, the rule that reduces unstressed interconsonantal vowels would also apply to underlying /V/ and convert it to surface schwa. This well-motivated and productive rule would then be maximally employed. To posit underlying schwa would be to minimize the use of the vowel reduction rule. Another reason for Wilson's positing underlying /V/ is that she finds it unconvincing to posit underlying schwa for those vowels which are deleted rather than reduced. She is referring to certain underlying stem final vowels which never surface, but which are required for the correct application of her stress rule. It should be pointed out that unlike the stress rule we have adopted, Wilson's rule states that stress is assigned to the penultimate vowel in a word of two or more syllables. Suffixed and unsuffixed forms are stressed in the same way in her system. Take for example the following forms:

55. bád 'rock'
bədúk 'my rock'

It is clear that the second example in (55) will not be stressed correctly according to her rule, given our underlying forms.

56. /badu/ 'rock'
/badu+k/ 'my rock'

However, because of her conviction that her stress rule is correct, Wilson assumes that the underlying form of the suffix in (55) is not /-k/, but /-kV/, and that after stress has been assigned to the penultimate vowel, the final unspecified vowel of the suffix is

deleted by the same rule that deletes the stem final vowel of the unsuffixed form in (55). Her derivation of these forms would proceed as follows:

57. 57.

	/badu/	/badu+kV/
Stress	bádu	badú+kV
Final Vowel Deletion	bád	badú+k
Vowel Reduction	-	bədú+k
	[bád]	[bədúk]

Wilson treats all single consonantal suffixes in this manner, that is, by placing the unspecified vowel /V/ in word final position, so as to insure correct stress placement. An analysis which posits underlying schwa in this position is unattractive to her. However, there is no motivation whatsoever for positing any vowel at all in this position, if one accepts the hypothesis that suffixed and unsuffixed forms are stressed differently, as we have demonstrated. Thus the problem of which vowel to posit in forms like the second example of (55) is completely eliminated, and we are free to focus in on the more basic problem of the indeterminacy of the vowels which underlie schwas in examples such as those in (53). Our position is the following: when a surface schwa cannot be accounted for by means of the Vowel Reduction Rule (47) or the Glottal Schwa Epenthesis Rule (51), or the various schwa epenthesis processes discussed in Chapter One, we will represent it in underlying form as a schwa. It is clear that the language is moving from a position in which the underlying quality of all schwas could be determined to

a position where this is no longer true. At this point, the underlying quality of only some schwas can be determined. It is our prediction that as the language develops in the future, the number of schwas whose underlying quality can be determined will diminish, and that there will arise contrasts between schwas and tense vowels that cannot be accounted for by phonological rules. At that point, the status of underlying schwa will be more secure than at present. We will discuss this problem in greater detail in Chapter Five, where we deal with emerging trends in the language.

Vowel Clusters

We turn now to a discussion of alienably possessed nouns whose underlying forms contain clusters of two vowels. Once again we will point up that tendency in the language towards reduction of syllabic segments in unstressed positions. We have already seen that many unstressed single vowels in interconsonantal position are either deleted or reduced. We will now show that clusters of two vowels, neither of which is stressed, are reduced to one vowel.

Consider the following data, which are a sampling of nouns whose underlying representations contain clusters of two vowels of different heights:

58.	/ai/	[ʔáys]	'news'	[ʔisék]	'my news'
	/au/	[sáwr]	'shoelace'	[surék]	'my shoelace'
	/ae/	[bágb]	'pipe'	[bebék]	'my pipe'
	/ao/	[ŋáǫk]	'flute'	[ŋokék]	'my flute'
	/oi/	[ŋlóyk]	'dance'	[ŋlikék]	'my dance'

/ou/	[udówd]	'money'	[ududék]	'my money'
/ia/	[dyáll]	'ship'	[dillék]	'my ship'
/ea/	[klę́ald]	'temperature'	[kleldék]	'my temperature'
/oa/	[omǫ́a?əl]	'river'	[omo?əlék]	'my river'
/io/	[dyósə?]	'pond'	[disə?ék]	'my pond'

The following observations may be made about these data. In the unpossessed forms, the two underlying vowels have formed a surface diphthong with one vowel more prominent than the other. In each case it is the lower of the two vowels which is the more prominent. The higher of the two vowels is always the less prominent and is never stressed. In the possessed forms, the two underlying vowels have reduced to one as a result of the fact that neither vowel is stressed. In each case, it is the lower of the two vowels which is the deletable vowel.

These facts make sense phonetically speaking. If we were to measure the amplitude or acoustic prominence of vowels, we would see that the lower a vowel is, the greater its amplitude. Therefore, it is quite natural, when two vowels of different heights stand together, for the vowel which has the greater amplitude to become the more prominent vowel of the diphthong, and for the other vowel to assume a more reduced status. This is the case in the unpossessed forms of (58). It is interesting to note that cross-linguistically it is rather easy to find diphthongs of this type. However, those of the opposite type, that is, where the higher of

the two vowels is the more prominent, are rare. In the possessed forms of (58), the stress falls on a syllable other than the one containing the vowel cluster. We have seen that Palauan tends to play down its unstressed syllables through deletion and reduction processes. It is quite natural then that what begins in the underlying representation as a sequence of two vowels which subsequently do not receive stress, appears on the surface as one vowel, that vowel being the one with lower amplitude. The fact that the vowel with the lower amplitude is the one which appears on the surface is in keeping with the tendency to play down unstressed syllables.

Let us turn now to a consideration of the phonological rules needed to derive the forms in (58). It is clear that the Stress Assignment rule, as we have formulated it in (15), is not able to assign stress correctly to the unpossessed forms of (58), because it cannot choose which of two vowels is the lower. However, if we adjust the underlying forms so that they contain only one vowel when the Stress Assignment rule applies, then no decision must be made between two contiguous vowels. We propose the following gliding rule:

59. Gliding (First Version)

$$\begin{bmatrix} V \\ \alpha\,\text{high} \\ \beta\,\text{low} \end{bmatrix} \longrightarrow [-\text{syllabic}] \;/\; \begin{bmatrix} V \\ \gamma\,\text{high} \\ \delta\,\text{low} \end{bmatrix}$$

Condition: If $\alpha = +$, and $\gamma = -$;
if $\alpha = -$, $\beta = -$, and $\delta = +$.

The higher of two contiguous vowels becomes a glide.

Below we give a sample derivation to show the operation of this rule and the Stress Assignment rule:

60.	[sáwr]	[dyáll]	[dyósə?]
	'shoelace'	'ship'	'pond'
	/saur/	/diall/	/diosə?/
Gliding	sawr	dyall	dyosə?
Stress	sáwr	dyáll	dyósə?

Consider now how we might derive the possessed forms of (58) using these two rules plus the Vowel Reduction rule (47) that we discussed earlier in this chapter.

61.	[surék]	[dillék]	[disə?ék]
	'my shoelace'	'my ship'	'my pond'
	/saur+e+k/	/diall+e+k/	/diosə?+e+k/
Gliding	sawr+e+k	dyall+e+k	dyosə?+e+k/
Stress	sawr+é+k	dyall+é+k	dyosə?+é+k
Vowel Reduction	səwr+é+k	dyəll+é+k	dyəsə?+é+k

All that is needed to complete this derivation is a rule that would blend the two elements of the diphthong, unstressed lax vowel and glide, into one element, a vowel whose quality is determined by the quality of the glide. We propose the following rule:

62. Diphthong Simplification

$$* \begin{bmatrix} -\text{cons} \\ -\text{syll} \\ \alpha\text{high} \\ \beta\text{back} \end{bmatrix} \quad \begin{bmatrix} -\text{stress} \\ -\text{tense} \end{bmatrix} \Rightarrow \begin{bmatrix} \overset{\text{V}}{} \\ \alpha\text{high} \\ \beta\text{back} \end{bmatrix}$$

The derivation of (61) may be completed as follows:

63.				
		səwr+é+k	dyəll+é+k	dyəsə?+é+k
	Diphthong Simplification	sur+é+k	dill+é+k	disə?+é+k
		[surék]	[dillék]	[disə?ék]

By allowing the Vowel Reduction Rule to apply to the vowels in diphthongs, we are able to show parallelism between the reduction of unstressed diphthongs and the reduction of unstressed single vowels.

Let us turn now to a consideration of clusters of two vowels of the same height. The facts are less clear for these clusters mainly because there are fewer examples. However we will present the following analysis.

Consider the nouns below which contain clusters of two vowels of the same height.

64.					
	/eo/	[oreómal]	'forest'	[oremalék]	'my forest'
	/oe/	[baróel]	'spear'	[barelék]	'my spear'
	/iu/	[?yúkl]	'good voice'	[?iklék]	'my good voice'
	/ui/	[búyk]	'boy'	[bikék]	'my boy'

These can be supplemented by examples of verbs. We discuss verb morphology in detail in Chapter Three. However it will not be necessary for the reader to have knowledge of the intricacies of verb morphology in order to see the facts concerning vowel clusters in the following forms. We have underlined the stems.

65.

	Imperfective		Perfective
/oe/	[omóʔ]	'throw a spear'	[meʔíy]
/eo/	[omɛ́b]	'create'	[mebíy]
/ui/	[mənədúvb]	'carve'	[ʔodibíy]
/iu/	[omasyúr]	'steer'	[masiríy]

Once again we notice that the stressable vowel is the deletable vowel. However, the decision as to which vowel this is does not depend on the height of the two vowels, since both are the same height. Rather, it depends on the front/back parameter. The examples in (64) and (65) show that in clusters of two vowels of the same height, it is the back vowel which is the candidate for stress assignment and the front vowel which is the candidate for gliding. In order to account for these facts, we revise the Gliding rule (59) as follows:

66. Gliding (Second Version)

$$\begin{bmatrix} V \\ \alpha\text{high} \\ \beta\text{low} \\ \gamma\text{back} \end{bmatrix} \longrightarrow [\text{-syllabic}] \;/\; \cdot \;\; \begin{bmatrix} V \\ \delta\text{high} \\ \epsilon\text{low} \\ \zeta\text{back} \end{bmatrix}$$

Condition: If $\alpha = +$, and $\delta = -$;
if $\alpha = -$, $\beta = -$, and $\epsilon = +$;
if $\alpha = \delta$ and $\beta = \epsilon$, and $\gamma = -$
and $\zeta = +$.

Given two contiguous vowels of different heights, the higher vowel becomes a glide. Given two contiguous vowels of the same height, the front vowel becomes a glide.

A slight adjustment needs to be made in the Vowel Reduction rule (47) in order to account for the reduction of high vowels in clusters like /ui/ and /iu/. Recall that the Vowel Reduction rule as it stands now, applies to high vowels only when they appear in stem final position before a suffix. High vowels which are flanked by stem consonants which are [+consonantal] are not affected by the Vowel Reduction rule. However, the data in (64) and (65) show that the rule does affect a high vowel flanked by a true consonant and a glide. Given these facts we reformulate the Vowel Reduction rule as follows:

67. Vowel Reduction (Second Version)

$$\begin{bmatrix} V \\ -\text{stress} \\ +\text{stem} \end{bmatrix} \longrightarrow [-\text{tense}] \;/\; C \_\_\_ C$$

Constraint: $V \;[+\text{high}] \longrightarrow [-\text{Reduction}] \;/\; [\,X\,[+\text{cons}]\_\_\_[+\text{cons}]\;Y\,]$ (X: stem; Y: stem)

Below we give a sample derivation of some forms from (64) showing the operation of the revised Gliding and Vowel Reduction rules:

68.

	[búyk]	[bikék]
	'boy'	'my boy'
	/buik/	/buik+e+k/
Gliding	buyk	buyk+e+k
Stress	búyk	buyk+é+k
Vowel Reduction	-	bəyk+é+k
Diphthong Simplification	-	bik+é+k

As we said earlier, the facts regarding clusters of vowels of the same height are less certain than those regarding clusters of vowels of different heights. We say this because of the following forms, which are apparent exceptions to our rules.

69. a) barréɋd 'weight'
    b) barredék 'my weight'
    c) líws 'coconut'
    d) lisék 'my coconut'

Let us examine these forms to see how they are exceptional. Examples (69a) and (69c) are violations of the Gliding rule in that the back vowel has glided rather than the front. In examples (69b) and (69d) the quality of the vowel which appears on the surface does not correspond to the quality of the glide of the diphthong in the unsuffixed form. As a result, the principle which states that the stressable vowel is the deletable vowel is somewhat weakened. The interesting fact about the forms of (69) is that each unsuffixed form shows a falling diphthong. In other words, in each vowel cluster it is the first vowel which is the more prominent member of the diphthong. We have no exceptions to the rules which show rising diphthongs, that is, those in which the second vowel is the more prominent. We should also point out that, given all the known two-vowel clusters, both those containing vowels of the same height and those containing vowels of different heights, those that appear on the surface as falling diphthongs far outnumber those that appear as rising diphthongs. A second

interesting fact is that in the suffixed forms of (69) it is not the front vowel which appears on the surface, but rather the first vowel. All these facts seem to indicate that perhaps in the future development of the language, more importance will be given to the position of vowels in clusters than to their values for the feature [back]. In other words, in clusters of two vowels of the same height, the Gliding rule will affect the second vowel rather than the front vowel. Of course, we can only speculate at this point, since we have only a few forms which cannot be accounted for by our rules. However, the fact that these forms have a good deal in common leads us to hypothesize about the direction in which the language may be moving.

Consider how we might handle the derivations of exceptional forms such as those in (69). Obviously their unpossessed forms must be marked as exceptions to the Gliding rule (66) for reasons that we have explained above. However, they appear to be subject to another gliding rule which is sensitive to the position of vowels rather than to their values for the features [high] and [back]. We propose the following rule:

70. Falling Diphthong Formation

$$V \longrightarrow [-\text{syllabic}] \; / \; V \_\_$$

A vowel preceded by another vowel becomes a glide.

Below we show a sample derivation of some forms from (69):

71.	[líws]	[lisék]
	'coconut'	my coconut'
	/lius/	/lius+e+k/
Gliding	-	lyus+e+k
Falling Diphthong Formation	liws	-
Stress	líws	lyus+é+k
Vowel Reduction	-	lyəs+é+k
Diphthong Simplification	-	lis+é+k
	[líws]	[lisék]

Let us turn now to a consideration of nouns containing clusters of two identical vowels. Consider the following data:

72.	/ii/	[míy?]	'nut-bearing tree'	[mi?ék]	'my nut-bearing tree'
	/uu/	[lúwk]	'nest'	[lukék]	'my nest'
	/oo/	[dəkóǫl]	'cigarette'[4]	[dəkolék]	'my cigarette'
	/ee/	[déęl]	'nail'	[delék]	'my nail'

Once again we see the tendency to minimize unstressed syllables by reducing them in some way. In this case, a cluster of two identical vowels is simplified to one vowel. We can easily account for the derivations of the forms in (72) by allowing the Falling Diphthong Formation rule (70) to operate on their underlying forms. Notice that the Gliding rule (66) will not apply to them because it is formulated in such a way as to affect only clusters whose vowels are different either in height or backness. Thus we can maximize the use of the Falling Diphthong Formation rule (70) which is needed

independently for the derivation of the exceptional forms in (69). This rule receives stronger motivation from the fact that underlying clusters of two identical vowels never appear on the surface as glide-plus-vowel combinations, but always as vowel-plus-glide combinations. Below we give a sample derivation of some forms from (72):

73.	[míy?]	[mi?ék]
	'nut tree'	'my nut tree'
	/mii?/	/mii?+e+k/
Gliding	-	-
Falling Diphthong Formation	miy?	miy?+e+k
Stress	míy?	miy?+é+k
Vowel Reduction	-	məy?+é+k
Diphthong Simplification	-	mi?+é+k
	[míy?]	[mi?ék]

The last group of vowel clusters to be discussed are those which appear in word initial position. Though they number only a few, they merit discussion because they reflect interesting facts about the language. Consider the following data:

74.	/ea/	[ɋábəd]	'cloud'	[ebədék]	'my cloud'
	/oa/	[ɋá?]	'leg'	[o?ík]	'my leg'
	/io/	[yóps]	'suds'	[ipsék]	'my suds'
	/oe/	[ɋés]	'appearance'	[osəɲék][5]	'my appearance'

/eo/	[gólt]	'wind'	[elték]	'my wind'
/ui/	[wíŋəl]	'tooth'	[uŋəlék]	'my tooth'
/iu/	[yúns]	'island'	[insék]	'my island'

All the examples in (74) can be handled very nicely by the rules we have postulated thus far, except for the words for 'appearance' and 'tooth'. These show diphthongization of the back vowel rather than the front vowel. This is a violation of the Gliding rule (66). Notice, however, the one thing that all forms in (74) have in common. It is always the first vowel of the original cluster which becomes a glide. In other words, the first vowel assumes the characteristics of a consonant. This is not unusual, since there is a strong tendency in the language for words to begin in a consonant. For example, there is a historical rule which epenthesizes a velar nasal in word initial position in forms which are originally vowel initial.

75.	Palauan	Indonesian	
	ŋálək	anak	'child'
	ŋúrəd	ugat	'vein'
	ŋíkəl	ikan	'fish'

Consequently there are few vowel initial words in the language today. Even these are altered by means of some consonantal segment placed in word initial position. For example, when a word begins in a single high front vowel followed by a consonant, that vowel is palatalized, as in:

76.	/is/	[ʸís]	'nose'
	/idok l]	[ʸidókəl]	'dirty'

Also, when a word begins in a single high back vowel followed by a consonant, that vowel is labialized, as in:

77.	/um/	[^{w}úm]	'kitchen'
	/ulə?/	[^{w}úlə?]	'rug'

Nonhigh vowels in this same position often have a glottal stop inserted at the beginning of the word, as in:

78.	[olámk] -	[?olámk]	'razor'
	[olásə?] -	[?olásə?]	'axe'

It is not unusual then that when a word begins in two vowels, the first one glides in order to perform the function of a consonant. We propose the following rule then to handle this process, and we order it before the general Gliding rule (66):

79. Initial Gliding

V ⟶ [- syllabic] / # ___ V

Change a word initial vowel to a glide when it is followed by a vowel.

Below is a sample derivation showing the operation of this rule:

80.			
		[wíŋəl]	[uŋəlék]
		'tooth'	'my tooth'
		/uiŋəl/	/uiŋəl+e+k/
	Initial Gliding	wiŋəl	wiŋəl+e+k
	Gliding	-	-
	Falling Diphthong Formation	-	-
	Stress	wíŋəl	wiŋəl+é+k

Vowel Reduction	-	wəŋəl+é+k
Diphthong Simplification	-	uŋəl+é+k
	[wíŋəl]	[uŋəlék]

Often words beginning in a mid glide such as the following have alternate pronunciations:

81.	/eabəd/	[ɐ́abəd]	- [yábəd]	'cloud'
	/oa?/	[ɷá?]	- [wá?]	'leg'
	/oes/	[ɷés]	- [wés]	'appearance'
	/eolt/	[ɐ́olt]	- [yólt]	'wind'

However, there is no variation in pronunciation of their possessed forms. We attribute the variation shown in (81) to an optional late rule which raises mid glides to high in word initial position.

82. Glide Raising (Opt)

$$\begin{bmatrix} -\text{cons} \\ -\text{syll} \\ -\text{high} \end{bmatrix} \longrightarrow [+\text{high}] \;/\; \# \_\_$$

It operates as follows:

83.		[yábəd]	[wá?]
		'cloud'	'leg'
		/eabəd/	/oa?i/
	Initial Gliding	ɐabəd	ɷa?i
	Gliding	-	-
	Falling Diphthong Formation	-	-
	Stress	ɐ́abəd	ɷá?i

Final Vowel Deletion	-	ɋá?
Vowel Reduction	-	-
Diphthong Simplification	-	-
Glide Raising	yábəd	wá?
	[yábəd]	[wá?]

We summarize briefly by listing the rules we have postulated thus far in the order in which they apply:

84. Initial Gliding (79)

Gliding (66)

Falling Diphthong Formation (70)

Stress (15)

Final Vowel Deletion (10)

High Vowel Deletion (44)

Vowel Reduction (67)

Glottal Schwa Epenthesis (51)

Diphthong Simplification (62)

Glide Raising (82)

Stem Augmentation

Our last topic in this chapter concerns a phonological rule that applies to a small class of nouns. These nouns, when inflected for possession, contain the consonant [ŋ] between the final consonant of the stem and the thematic vowel [e]. This epenthesized [ŋ] has no meaning, nor is it predictable. Consider the following forms:

85.

			Unpossessed	Possessed
a)	/um/	'kitchen'	[^{w}úm]	[^{w}umənʲék]
b)	/ʔat/	'praise'	[ʔát]	[ʔatənʲék]
c)	/deb/	'sugarcane'	[déb]	[dəbənʲék]
d)	/rur/	'shame'	[rúr]	[rrənʲék]
e)	/ʔlim/	'companion'	[ʔəlím]	[ʔəlmənʲék]
f)	/ses/	'diligence'	[sés]	[səsənʲék]
g)	/bas/	'charcoal'	[bás]	[bəsənʲék]
h)	/kob/	'cup (Eng.)'	[kob]	[kəbənʲék]
i)	/sukal/	'sugar (Eng.)'	[sukal]	[sukələnʲék]
j)	/katuu/	'cat (Sp.)'	[katuw]	[katunʲék]

Notice that the unpossessed forms of examples (a) to (i) end in a stressed vowel followed by a consonant. Because of this we would expect that the underlying form of the stem would end in a vowel and that the possessive suffixes would be regularly attached to the right of this stem final vowel. In example (j) which ends in a geminate vowel, we would expect the possessive suffixes to be added directly to the right of this long vowel. However, in both cases, the stem is augmented by the consonant [ŋ]. The schwa which appears to the left of the [ŋ] in examples (a) to (i) is the result of an epenthesis rule designed to separate consonants which do not form clusters on the surface. Consider now the results of this nasal augmentation process. The derived stems would be:

86. a) umŋ

b) ʔatŋ

c) debŋ

d) rurŋ

e) ʔlimŋ

f) sesŋ

g) basŋ

h) kobŋ

i) sukalŋ

j) katuwŋ

These new stems now fit two of the patterns described in (19). Examples (a) to (i) fit the pattern [VCC#], and example (j) fits the pattern [VGC#]. Recall that when an unpossessed form ends in one of the patterns of (19), it will be inflected as a Pattern 1 noun. That is, it will take the thematic vowel [e] before the possessive suffixes for first, second, and third persons singular, and first person plural inclusive. This is precisely what happens to the forms in (86).

87. a) umŋ+e+k

b) ʔatŋ+e+k

c) debŋ+e+k

d) rurŋ+e+k

e) ʔlimŋ+e+k

etc.

If we were to divide Palauan nouns into two groups, those possessed according to Pattern 1 and those possessed according to Patterns 2 to 4, we would find that those in the former group far outnumber those in the latter. In a sense then Pattern 1 is more the norm that the other patterns. Given these facts, it seems clear that nasal augmentation of stems like those in (86) is designed to increase the number of Pattern 1 forms. Later, in Chapter Three, we show that nasal augmentation also applies to verb stems with apparently the same result. That is, stems are altered to conform to a pattern that is already the most prevalent one. This rule of nasal augmentation appears to be one expression of a rather pervasive tendency in the language to reshape underlying forms to conform to regular patterns. We will discuss this tendency and its various expressions in Chapter Five.

Footnotes to Chapter Two

[1]Besides the possessive suffixes, there is only one other inflectional affix found in nouns, the prefix /r-/. It is a plural marker which occurs on human nouns only. For example:

ʔád	'man'	rəʔád	'men'
ŋáləkˀ	'child'	rəŋáləkˀ	'children'

[2]The schwas which often appear to the left of the future participle /-l/ are inserted by various epenthesis rules. See Dental Schwa Epenthesis (Chapter One (31)) and Glottal Schwa Epenthesis (Chapter Two (51)).

[3]The schwa which appears to the left of the suffix is inserted by Glottal Schwa Epenthesis (Chapter Two (51)).

[4]This form is a nominal use of the future participle of the verb 'to blow' /doko/. When vowel final stems are followed by the future participle suffix /-l/, the final vowel is copied. For example:

/doko+l/ ⟶ dokoo+l

[5]The velar nasal augment which appears in this surface form is discussed in the last section of Chapter Two.

CHAPTER THREE: Verb Morphology

Introduction

This chapter deals with various topics in the phonology and morphology of the Palauan verb. As in all languages, the verbs of Palauan may be classified into various groups according to their morphological composition and syntactic behavior. The largest and most important group of verbs in Palauan is composed of active transitive verbs. It is here that we see best the intricacies of morpheme arrangement add the phonological alternations which these morphemes undergo. For this reason we have chosen to devote this entire chapter to an examination of the major phonological rules which affect active transitive verbs. However, when it proves relevant and helpful to our discussion, we mention various other verb classes and include data from them.

It will be useful to give a brief sketch of the major inflections which occur in active transitive verbs. Consider the forms below which show the verb stem /dasa?/ 'to carve' inflected for the three aspects and two tenses which exist in Palauan:

Present middle	[mədásə?]	/m+dasa?/
Present imperfective	[mələ́sə?]	/m+dasa?/ [+IMP]
Present perfective (3rd sg. obj.)	[dosə?íy]	/d+m+asa?+il/

Past middle	[mildásə?]	/m+il+dasa?/
Past imperfective	[millásə?]	/m+il+dasa?/ [+IMP]
Past perfective (3rd sg. obj.)	[dilәsə?íy]	/d+m+il+asa?+ii/

We have given the underlying forms for these six forms, showing affixes such as the 'verb marker' /m/ and the past tense /-il-/. Obviously there are rather intricate phonological processes involved in relating these underlying forms to their surface forms. These processes, as well as the meanings of the various morphemes and the syntactic feature [IMP], will be discussed in detail in the various sections of this chapter.

Active transitive verbs can also occur with the two suffixes /-u/ 'predictive' and /-a/ 'inchoative'. For example:

mәlásə?	'carve (present imperfective)'
mәlәsə?ú	'to be about to carve'
mәlәsə?á	'to be starting to carve'

There are two participles, past and future, which can be formed on active transitive verb stems. The past participle has the infix /-l-/ inserted to the right of the initial stem consonant. For example:

/d+l+asa?/	[dәlásə?]	'carved'
/k+l+imud/	[klímd]	'cut (of hair)'
/l+l+o?ad/	[llóʔәd]	'broken (of cord)'

The future participle is formed by adding one of two possible suffixes that have the same meaning but are used by different age groups. The future participle and the two suffixes in

question will be discussed in detail in Chapter Five. Below we give some examples:

/dasa?+l/	[dəsá?əl]	'to be carved'
/tabak+l/	[təbákl]	'to be patched'
/dakul+l/	[dəkúll]	'to be buried'
/reŋod+all/	[rəŋədáll]	'to be tied'
/?osm+all/	[?əsmáll]	'to be rung (of a bell)'

There are two nominal forms which can be derived from active transitive verb stems, both of which contain an /o-/ prefix. The two /o-/ prefixes may constitute one and the same prefix, or they may be different prefixes that happen to be homophonous. The first nominal form is a gerund which is constructed from the present imperfective form of the verb with the prefixed /o-/. For example:

/o+m+dasa?/ [+IMP]	[oməlásə?]	'act of carving'
/o+m+tabak/ [+IMP]	[oməlábək]	'act of patching'

These gerunds, because they function like nouns, can be inflected for possession. For example:

oməlásə?	omələsə?ék	'my act of carving'
oməlábək	omələbəkék	'my act of patching'

The second nominal is an instrumental noun which is formed by adding the prefix /o-/ to the present imperfective stem of the verb. For example:

/o+tamik/ [+IMP]	[olámk]	'razor'
/o+kesi/ [+IMP]	[oŋés]	'scraper'

These can also be inflected for possession:

olámk	olamkék	'my razor'
oŋés	oŋasík	'my scraper'

Throughout this chapter we will be discussing those inflected forms of active transitive verbs that prove most interesting for phonological analysis. A more exhaustive treatment of Palauan verb morphology and syntax will be found in Wilson (1972) and Josephs (to appear). The chapter is divided into four major sections. The first deals with the phonological processes which operate in middle and imperfective forms of active transitive verbs, specifically those processes triggered by the presence of the feature [IMP]. In the second section, we discuss in detail the verb marker /m/, a very productive affix which is realized in a variety of surface phonetic shapes and positions in active transitive verbs. Sections three and four deal with derived verb stems and causative verbs respectively, and the effect of the phonological processes on them.

Imperfective Marker

The active transitive verb in Palauan is inflected for three aspects, which we refer to as imperfective, perfective, and middle. Since we are interested primarily in the phonological aspects of these inflected forms, we will not be discussing their syntactic functions in detail. However, we have listed below some examples which demonstrate how each aspect operates in a simple sentence.

1. Imperfective

   a dilméy a mla məlábək a báyl

   Dilmei has patch clothing

   'Dilmei has been patching clothing.'

2. Perfective

   a dilméy a mla tobəkíy a báyl

   Dilmei has patch clothing

   'Dilmei has patched the clothing.'

3. Middle

   a báyl a mla mətábək

   clothing has patch

   'The clothing has gotten patched.'

The imperfective aspect, exemplified in (1), is used to focus attention on the agent's performance of a continuous action. The perfective aspect, exemplified in (2), is used to focus attention on the completion of an action. The middle aspect, exemplified in (3), is used when the surface subject NP undergoes the action of the verb and no agent is present in the sentence.

Throughout this section, we will discuss in detail the various morphemes that go into the composition of the three aspects, and the phonological processes that they undergo. The first morpheme to be discussed is the imperfective marker. Below we have listed underlying verb stems and their middle and imperfective forms.

4.			Middle	Imperfective
a)	/balo?/	'shoot'	[obálə?]	[omálə?]
b)	/?arom/	'taste'	[mə?áɾəm]	[məŋáɾəm]
c)	/kidib/	'gather'	[məkídəb]	[məŋídəb]
d)	/tabak/	'patch'	[mətábək]	[məlábək]
e)	/dalom/	'plant'	[mədáləm]	[məláləm]
f)	/sesob/	'burn'	[məsésəb]	[məlésəb]
g)	/le?ot/	'tie'	[məlé?ət]	[məlé?ət]
h)	/rusa?/	'pound'	[mərúsə?]	[mərúsə?]
i)	/ata?/	'wash'	[məŋátə?]	[məlátə?]

The prefixes [o-] in (4a) and [mə-] in (4b) to (4i) will be discussed in detail in later section of this chapter. For the time being, we will simply identify them as two forms of a single affix, underlying /m/, which serves to identify forms as verbs. We will refer to it as the verb marker (VM).

At this point, we want to focus attention on the initial consonants of the verb stems that appear in the Middle and Imperfective columns. We have summarized these consonantal alternations in the following list:

5.		Middle	Imperfective
a)	/b/	[b]	[m]
b)	/?/	[?]	[ŋ]
c)	/k/	[k]	[ŋ]
d)	/t/	[t]	[l]
e)	/d/	[d]	[l]

f)	/s/	[s]	[l]
g)	/l/	[l]	[l]
h)	/r/	[r]	[r]
i)	∅	[ŋ]	[l]

For the time being, we will consider only those verb stems that alternate according to the patterns in (5a) to (5f), that is, labial stems, velar stems, and nonliquid dental stems. We will treat stems falling into patterns (5g) to (5i) shortly.

It is clear that we must accept middle forms as more basic than imperfective forms, since we can predict the imperfective consonants if we know the middle forms. It would be impossible to predict the middle forms on the basis of the imperfective. It is also clear that the imperfective forms are somehow more complex than the middle forms. It must be the case that imperfective forms contain some entity that is capable of triggering the consonant shift. We will refer to that entity as a syntactic feature [IMP] 'imperfective'. All imperfective forms would be marked [+IMP], while middle and perfective forms would be marked [-IMP].

What can be said now about the phonological manifestation of this syntactic feature [+IMP]? If we consider for the moment only stems beginning with labials and velars, it is clear that the [+IMP] feature manifests itself as a nasal homorganic to the original stem consonant. Turning to the nonliquid dental stems, we would like to find that this generalization holds true for them also, that [+IMP] is manifested as a dental nasal [n]. Recall, however, that Palauan has no dental nasal, and what we find is [l] instead. This absence

of the dental nasal from the inventory of nasals is conspicuous and calls for some discussion.

The first thing that should be noted is that, considering what is known of languages throughout the world, it is very unusual for a language to have a nasal inventory that includes /m/ and /ŋ/, but not /n/. In fact, in languages that have one nasal, that nasal is /n/. It is the most natural, the most expected of the nasals. This fact has been captured nicely in the theory of markedness developed by Chomsky and Halle in SPE.[1] In terms of the features [anterior] and [coronal], we have the following matrices:

6.

	/m	n	ŋ/	/m	n	ŋ/
anterior	+	+	-	U	U	M
coronal	-	+	-	M	U	U

Because [+anterior] is the natural or expected value for consonants, /m/ and /n/ are unmarked for this feature, whereas /ŋ/ is marked. Because [+coronal] is tha natural or expected value for [+anterior] consonants, /n/ is unmarked and /m/ is marked. Because [-coronal] is the natural or expected value for [-anterior] consonants, /ŋ/ is unmarked. Thus /n/ is the unmarked nasal.

This unusual state of affairs with regard to Palauan nasals is the result of a historical development that changed all /n/'s to /l/'s. Consider the following list of cognate sets from Palauan and related Indonesian languages:

Footnotes for this chapter are on pp. 157 and 158.

7.	English	Palauan	Indonesian	Tagalog	Ilokano
	chicken	málk	manuk	manuk	manok
	moon	búyl	bulan	buwan	bulan
	rain	?úll	hudjan	ulan	
	pus	lálɔ?	nanah	nana?	
	coconut	líws	njiur	niyog	niog
	gray hair	?ɔbáll	uban	uban	uban
	sun	síls	sinar	sinag	sinamar

These data clearly demonstrate the change of /n/ to /l/ in Palauan. Apparently this rule still operates to some extent in the language today, if one considers what happens to borrowed words, such as those below.

8.	lás	'eggplant'	Japanese	nasu
	mɔrikél	'American'		
	símól	'Simon'		
	kampaláŋ	'bell'	Spanish	campana

Recall now the data presented in (4a) to (4f) and the corresponding alternations in (5a) to (5f). Naturally we want our analysis of the imperfective marker to be uniform for labials, velars, and nonliquid dentals. We have already shown that for labials and velars the imperfective marker is realized phonologically as a nasal consonant that is homorganic to the original underlying initial stem consonant. Taking into consideration the existence of a rule which changes /n/ to /l/, we can account for the imperfective forms of nonliquid dental stems in the same way as those of labial and velar stems. The imperfective marker is realized phonologically as a dental

nasal, that is, a nasal homorganic to the original underlying stem consonant. At a later point in the derivation, this nasal is changed to [l]. It should be noted here that this elimination of all dental nasals from the language is only one facet of a rather pervasive tendency to eliminate nasals in general. We will speak further of this tendency when we discuss the verb marker affix /m/.

In order to account for the imperfective forms of verbs like those in (4a) to (4f) we will adopt the following set of rules:

9. Nasal Insertion (First Version)

$$\emptyset \longrightarrow \overset{C}{[+\text{nasal}]} \;/\; [\underset{\substack{\text{stem}\\ [+\text{IMP}]}}{\_\_\_\_}\; C$$

To the immediate left of the initial consonant of a stem marked [+IMP], insert a nasal consonant.

10. Nasal Replacement

$$+ \quad \overset{C}{[+\text{nasal}]} \quad \overset{C}{\begin{bmatrix}\alpha\,\text{ant}\\ \beta\,\text{cor}\end{bmatrix}} \qquad \overset{2}{\begin{bmatrix}\alpha\,\text{ant}\\ \beta\,\text{cor}\end{bmatrix}}$$

$$1 \qquad 2 \qquad 3 \qquad \Longrightarrow \qquad 1 \qquad \emptyset$$

In stem initial position, a nasal consonant becomes homorganic to a following consonant. The latter consonant is deleted.

11. Dental Denasalization

$$\overset{C}{\begin{bmatrix}+\text{nasal}\\ +\text{ant}\\ +\text{cor}\end{bmatrix}} \longrightarrow \begin{bmatrix}-\text{nasal}\\ +\text{lateral}\end{bmatrix}$$

Convert n to l.

The following derivation demonstrates the operation of these rules:

12.	[omálə?]	[məŋárəm]	[məlábək]
	'shoot'	'taste'	'patch'
	/m+balo?/ [+IMP]	/m+?arom/ [+IMP]	/m+tabak/ [+IMP]
Nasal Insertion	m+mbalo?	m+n?arom	m+ntabak
Nasal Replacement	m+malo?	m+ŋarom	m+nabak
Dental Denasalization	-	-	m+labak
Stress	m+málo?	m+ŋárom	m+lábak
Vowel Reduction	m+málə?	m+ŋárəm	m+lábək
Other rules to be discussed	. . .	. . .	. . .
	[omálə?]	[məŋárəm]	[məlábək]

Let us now turn to a consideration of stems beginning in liquid dental consonants, such as those in (4g) and (4h), which we repeat below.

13.		Middle	Imperfective
/le?ot/	'tie'	[məlé?ət]	[məlé?ət]
/rusa?/	'pound'	[mərúsə?]	[mərúsə?]

Notice that there is no alternation of stem initial consonants in the middle and imperfective forms. In each case, the original underlying stem initial consonant is preserved. When these forms are used in sentences, it is the context that must determine whether middle or imperfective is being used. For example:

14. Imperfective

a ʔád a mərúsɔʔ ɔr a bád

man pound rock

'The man is pounding the rock.'

15. Middle

a bád a mərúsɔʔ

rock pound

'The rock gets pounded.'

The simplest analysis for such forms involves the assumption that the Nasal Insertion rule (9) does not apply to them because their initial stem consonants prevent this. We can constrain the rule to apply only to stems beginning in nonsonorant consonants. In this way /l/ and /r/ will not be affected. Thus we revise the Nasal Insertion rule to read as follows:

16. Nasal Insertion (Second Version)

$$\emptyset \longrightarrow \overset{C}{[+nasal]} \; / \; [\underset{\substack{stem \\ [+IMP]}}{\_\_\_\_} \; \overset{C}{[-son]}$$

It is interesting to note that in at least one language related to Palauan, namely Indonesian,[2] we find a similar situation. There is a verbal prefix /meŋ-/ whose final nasal consonant assimilates to a stem initial nonsonorant consonant. If the initial stem consonant is voiceless, it is generally deleted. For example:

17. Indonesian

besar	membesar	'expand'
pukul	memukul	'hit'
duga	menduga	'suspect'

tarik	menarik	'pull'
serah	menerah	'surrender'
guntiŋ	meŋguntiŋ	'cut with scissors'
kirim	meŋirim	'send'

However, before stem initial sonorant consonants, the nasal consonant is absent. For example:

18. Indonesian

lihat	melihat	'look at'
rebah	merebah	'fall down'

It is not unreasonable to assume then that the restriction that we have built into the Nasal Insertion rule (16) is correct for Palauan as well as related languages, such as Indonesian.

However, consider the consequences for our analysis if we allowed nasal insertion to take place before sonorant consonants. Take for example the following derivations:

19.

	[məlóʔəd]	[mərúsəʔ]
	'break cord'	'pound'
	/m+loʔad/ [+IMP]	/m+rusaʔ/ [+IMP]
Nasal Insertion	m+nloʔad	m+nrusaʔ
Nasal Replacement	m+noʔad	m+nusaʔ
Dental Denasalization	m+loʔad	m+lusaʔ
Other rules	. .	. .
	[məlóʔəd]	*[məlúsəʔ]

This analysis poses no serious problems for stems beginning in /l/, but it does for stems beginning in /r/. We might want to handle the /r/ stems by means of an assimilation rule that would change the sequence -nr- to -rr-. This would be followed by a degemination rule that would change -rr- to -r-. For example:

20.

	/m+rusa?/ [+IMP]
Nasal Insertion	m+nrusa?
Assimilation	m+rrusa?
Degemination	m+rusa?
Nasal Replacement	-
Dental Denasalization	-
Other rules	. . .
	[marúsə?]

However, there are numerous examples of the sequence [-rr-] in Palauan words, such as:

21.

kərrír	'their medicine'
kərrúk	'chicken'
rrúsə?	'pounded'
rrúwl	'done'

The proposed degemination rule would not be capable of distinguishing which sequences of double r's should be simplified and which should not.

There is, however, a considerable amount of evidence for an assimilation rule of the form:

22. Liquid Assimilation

$$l \longrightarrow r \;/\; \_\_(V)\ r$$

Take for example the past tense forms of /rusa?/ 'to pound':

23.	[mirrúsɔ?]	/m+il+rusa?/	'middle'
	[mirrúsɔ?]	/m+il+rusa?/ [+IMP]	'imperfective'

Suppose we attempt to derive the imperfective form in (23) in the same way as we derived its present tense form in (20).

24.

	/m+il+rusa?/ [+IMP]
Nasal Insertion	m+il+nrusa?
Assimilation	m+il+rrusa?
Degemination	m+il+rusa?
Nasal Replacement	-
Dental Denasalization	-
Other rules	. . .
	*[milrúsɔ?]

It is clear that another assimilation rule, one like (22), is necessary to derive the correct form [mirrúsɔ?].

However, if we assume that our formulation of Nasal Insertion (16) is correct, the derivation of (24) is straightforward.

25.

	/m+il+rusa?/ [+IMP]
Nasal Insertion	-
Nasal Replacement	-
Dental Denasalization	-

Stress	m+il+rúsa?
Vowel Reduction	m+il+rúsə?
Liquid Assimilation	m+ir+rúsə?
	[mirrúsə?]

There is additional support from the noun system for a Liquid Assimilation rule such as (22). Consider the third plural possessed form of the following noun:

26. /dila/

dəlák[3]	'my mother'
dəlám	'your (sg) mother'
dəlál	'his mother'
dəlád	'our (incl) mother'
dələmám	'our (excl) mother'
dələmíw	'your (pl) mother'
dərrír	'their mother'

The form for 'their mother' is derived as follows:

27. /dila+rir/

Stress	dila+rír
High Vowel Deletion	dla+rír
Vowel Reduction	dlə+rír
Liquid Assimilation	drə+rír
Dental Schwa Epenthesis	dərə+rír
Schwa Deletion	dər+rír
	[dərrír]

Schwa Deletion seems to occur between identical sonorant consonants. For example:

28. /baru+rir/ [bərrír] 'their blanket'

/dama+mam/ [dəmmám] 'our father'

Now that we have established the existence of an assimilation rule of the form (22), we will show that it must apply after Dental Denasalization, and the rules such as Assimilation and Degemination in the derivations of (20) and (24) are unnecessary complications of the grammar. Consider the following forms of the stem /durubak/ 'poke':

29. [mədərúbək] /m+durubak/ 'middle'

[mərrúbək] /m+durubak/ [+IMP] 'imperfective'

If we assume that our formulation of Nasal Insertion (16) is correct and that there is a rule of Liquid Assimilation such as (22), then the derivation of the imperfective form of /durubak/ is straightforward.

30.

	/m+durubak/ [+IMP]
Nasal Insertion	m+ndurubak
Nasal Replacement	m+nurubak
Dental Denasalization	m+lurubak
Stress	m+lurúbak
High Vowel Deletion	m+lrúbak
Vowel Reduction	m+lrúbək
Liquid Assimilation	m+lrúbək
Other rules to be discussed	[mərrúbək]

If Liquid Assimilation were expanded to include assimilation of n to r as well as l to r, and if it were to apply before Nasal Replacement and Dental Denasalization, as it must in derivation (20), we would not be able to derive [mərrúbək] correctly. For example:

31.

	/m+durubak/ [+IMP]
Nasal Insertion	m+ndurubak
Liquid Assimilation	-
Nasal Replacement	m+nurubak
Dental Denasalization	m+lurubak
Stress	m+lurúbak
High Vowel Deletion	m+lrúbak
Vowel Reduction	m+lrúbək
Other rules	. . .
	*[məlrúbək]

Thus we have shown that there is indeed a Liquid Assimilation rule of the form (22) and that it must follow Dental Denasalization. This assimilation rule does not help us in deriving the present imperfective forms of verbsstems beginning in /r/. If we were to attempt to account for such forms by introducing other rules, we would need another assimilation rule and a degemination rule that would apply before Nasal Replacement. There is no motivation for such rules in other areas of the language and they are clearly unnecessary complications of the analysis. We have chosen, therefore, to retain the

Nasal Insertion rule as we have stated it in (16) in order to account for the lack of alternation in verb stems beginning in /l/ and /r/.

There is another class of verb stems, a small group whose initial consonant is /s/, which appear to be exceptions to the Nasal Insertion rule (16). In other words, they show no alternations in their initial stem consonant. For example:

32.

		Middle	Imperfective
/samik/	'husk'	[məsámk]	[məsámk]
/sebok/	'kick'	[məsébək]	[məsébək]
/sibo?/	'break off'	[məsíbə?]	[məsíbə?]
/sumo?/	'massage'	[məsúmə?]	[məsúmə?]
/subad/	'announce'	[məsúbəd]	[məsúbəd]
/sibu/	'use a pick'	[məsíb]	[məsíb]
/silok/	'launder'	[məsíləkl]	[məsíləkl]
/sakid/	'tie'	[məsákt]	[məsákt]
/saro?/	'step on'	[məsárə?]	[məsárə?]

These verbs do not appear to have anything in common semantically or phonologically that would help us in determining why their initial stem consonants do not alternate according to the regular pattern for dental consonants. Perhaps this apparent exception to a synchronic rule can be explained through historical facts that might show that Palauan /s/ has more than one source in the protolanguage. It might be the case then that one source of /s/ was subject to Nasal Insertion while the other was not. Whatever the historical explanation, we are still left with a situation in which we must mark certain stems in /s/ as exceptions to the Nasal Insertion rule.

We are now ready to begin discussion of those verb stems that alternate according to the pattern in (51). For convenience we repeat the example given in (41) below:

33.			Middle	Imperfective
	/ata?/	'wash'	[məŋátə?]	[məlátə?]

At first, it appears that we are faced with a rather strange alternation between a velar nasal and a dental liquid, an alternation which cannot be accounted for by our rules of Nasal Insertion and Nasal Replacement. However, this case can be quite easily accounted for by recognizing the behavior of the velar nasal throughout the language, and by digging a bit into derivational morphology. Consider the following verbs which display this surface [ŋ]-[l] alternation and some nouns which are derivationally related to them:

34.	Middle	Imperfective		Nouns	
	məŋílt	məlílt	'elect'	iltéɛt	'nobility'
	məŋɛ́ólt		'get fresh air'	ɛ́ólt	'wind, luck'
		məlɛ́ólt	'go around happy-go-lucky'		
	məŋím	məlím	'drink'	ilúməl	'drink'

The important thing to notice here is that the nouns have no initial [ŋ], whereas the verbs do. Let us consider for a moment the distribution and behavior of /ŋ/ throughout the language. It is interesting to note that when a situation arises in which insertion of a consonant is called for, the velar nasal is the consonant invariably selected. This fact is true both historically and synchronically. In the following list we see the results of a widespread historical rule

which inserted a velar nasal in word initial position in an original vowel initial form. Consider the following cognate sets:

35.

English	Palauan	Indonesian	Tagalog	Ilokano
'vein'	ŋúrəd	urat	ugat	urat
'child'	ŋálək	anak	anak	anak
'fire'	ŋaw	api	apoy	apoy
'fish'	ŋikəl	ikan		

There are at least two environments in which synchronic rules of velar nasal epenthesis take place. There is a surface phonetic constraint which prohibits words from ending in a single vowel before a pause. To avoid such a situation, the language epenthesizes a velar nasal. For example:

36. ak mó ra skúwl
    I go school
    'I'm going to school.'
    ak móŋ
    I go
    'I'm going.'

37. ak məŋá ra ŋíkəl
    I eat fish
    'I'm eating fish.'
    ak məŋáŋ
    I eat
    'I'm eating.'

The second environment where velar nasal epenthesis takes place was discussed briefly in Chapter Two. There we spoke of a

small class of nouns which, when inflected for possession, contain the velar nasal between the final segment of the stem and the thematic vowel [e]. For example:

38.	/um/	'kitchen'	[ʷúm]	[ʷumaŋék]
	/bas/	'charcoal'	[bás]	[basaŋék]

Later in this chapter, we will show how this same process of velar nasal epenthesis applies to perfective forms of certain verbs when object pronoun suffixes are added.

Given these facts about various environments in which the velar nasal is inserted, it does not seem unreasonable to conclude that the velar nasal which appears in the middle forms in (34) is also inserted. It would be ideal if we could provide for every verb displaying the [ŋ]-[l] alternation a related noun beginning in a vowel. However, those that we do provide indicate the feasibility of a velar nasal epenthesis rule for verbs. This hypothesis is strengthened by the fact that velar nasal epenthesis seems to be a quite common phenomenon throughout the language. Thus we propose the following rule:

39. Verbal Nasal Epenthesis

$$\emptyset \rightarrow \begin{bmatrix} C \\ +\text{nasal} \\ -\text{ant} \\ -\text{cor} \end{bmatrix} \; / \; \begin{bmatrix} \_\_\_\_ \; V \\ \text{verb} \\ \text{stem} \\ [-\text{IMP}] \end{bmatrix}$$

Insert a velar nasal to the left of an initial vowel of a verb stem marked [-IMP].

This rule insures that underlying /m+ata?/, the middle form of the verb 'wash', becomes m+ŋata? and eventually, by other rules, [maŋáta?].

But what about the imperfective form [məlátə?] where no velar nasal appears? Instead we find an [l] which is the realization of the imperfective marker in underlying vowel initial stems. This calls for a revision of the Nasal Insertion rule (16). As the rule stands now, it accounts for the insertion of a nasal to the left of an initial nonsonorant consonant of a verb stem marked [+IMP]. However, we have some vowel initial stems, and we must account for the presence of the imperfective marker [l] to the left of the initial vowel. We will revise the Nasal Insertion rule to read as follows:

40. Nasal Insertion (Third Version)

$$\emptyset \longrightarrow \begin{matrix} C \\ [+\text{nasal}] \end{matrix} \; / \; [\underset{\substack{\text{stem} \\ [+\text{IMP}]}}{\_\_\_\_} \; \left\{ \begin{matrix} C \\ [-\text{sonorant}] \end{matrix} \right. \left. \begin{matrix} \\ V \end{matrix} \right\}$$

Insert a nasal consonant to the left of a stem marked [+IMP] if that stem begins in a nonsonorant consonant or a vowel.

How can we insure that the correct nasal n is inserted in the imperfective forms of vowel initial stems? With consonant stems there is never any problem in deriving the correct nasal, because the environment, that is, the initial consonant, decides this for us. But with vowel stems, there is nothing in the environment to determine the exact specification of the nasal. Here markedness theory comes to the rescue, because in a system with markedness, the unspecified segment is equivalent to the unmarked segment. Recall that earlier we showed that the dental nasal is the unmarked nasal. Thus we are able to insure the correct specification of the inserted nasal as dental in

just those stems where the environment cannot decide this for us.

Consider how we might handle this problem in a system without markedness. We might adopt an archiphonemic solution in which the feature [+IMP] triggers the insertion of a nasal archiphoneme, that is, an unspecified nasal. Rules would then be needed for the correct realization of the nasal archiphoneme in all its positions. For consonant initial stems the realization rules would be similar to that part of our Nasal Replacement rule (10) that effects homorganicity between inserted nasal and stem initial consonant. Note however that a special rule would be needed to specify the correct realization of the nasal archiphoneme in vowel initial stems. The unspecified segment, that is, the archiphoneme, is not equivalent to the unmarked segment, because an archiphoneme is not equivalent to any one of its realizations. Rather, it represents all the features that its realizations have in common. Thus the system that includes markedness has a considerable advantage over the one which does not, and leads to a more economical analysis.

Below we give the complete derivations of middle and imperfective forms of /ata?/ 'wash':

41.

	[məŋátə?]	[məlátə?]
	/m+ata?/	/m+ata?/ [+IMP]
Verbal Nasal Epenthesis	m+ŋata?	-
Nasal Insertion	-	m+nata?
Nasal Replacement	-	-
Dental Denasalization	-	m+lata?

Stress	m+ŋáta?	m+láta?
Vowel Reduction	m+ŋáta?	m+láta?
Other rules to be discussed	.	.
	.	.
	.	.
	[məŋátə?]	[məlátə?]

Verb Marker

We now turn to a discussion of the affix we have chosen to call the Verb Marker (VM). This affix is a very productive one and is realized in a variety of surface phonetic shapes and positions. In the first part of this section, we discuss those instances where the VM appears as a prefix on verb stems. In the second part, we discuss those instances where it appears as an infix. Since infixation of the VM occurs in perfective forms of active transitive verbs, we devote a portion of the discussion to the general composition of such forms and the phonological processes involved.

Verb Marker as Prefix

Earlier in this chapter, we spoke briefly of the three-way aspect contrast displayed in active transitive verbs: imperfective, perfective, and middle. It is in the imperfective and middle forms that the VM appears as a prefix. Though its underlying form is simply /m/, it has a variety realizations in prefix position: [m], [m], [o], and [u]. We will discuss each of these and the phonological rules responsible for linking them to the underlying representation /m/.

Consider first the following middle and imperfective forms in which the VM shows up as a first position prefix having the surface phonetic shape [mə-]:

42.			Middle	Imperfective
	/dasa?/	'carve'	[mədásə?]	[məlásə?]
	/sesob/	'burn'	[məsésəb]	[məlésəb]
	/lo?ad/	'break cord'	[məló?əd]	[məló?əd]
	/kimud/	'cut hair'	[məkímd]	[məŋímd]
	/?udul/	'collect'	[mə?údəl]	[məŋúdəl]

The VM also appears as a [mə-] prefix in some stative intransitive verbs, which resemble English adjectives. For example:

43.	/dakt/	[mədákt]	'afraid'
	/du?a/	[mədú?]	'skilled'
	/?edi/	[mə?éd]	'thirsty, shallow'
	/?uu/	[mə?úw]	'shady'
	/rur/	[mərúr]	'bashful'

We have chosen to represent the VM as /m/ in underlying form. We do this because there is a good deal of evidence to show that the schwa which appears in the [mə-] prefix is predictable and can be inserted by an epenthesis rule. There are at least two other verbal prefixes which, if a schwa epenthesis rule were included in the analysis, could be represented in underlying form as single consonants, as we have suggested for the VM. A small class of stative verbs is marked on the surface by a [bə-] prefix. For example:

44.	/ralm/	'water'	[bərálm]	'watery, tasteless'
	/sokəl/	'ringworm'	[bəsókəl]	'infected with ringworm'

Another small class of stative verbs is marked by a [kə-] prefix. For example:

45. /dorom/ [kədórəm] 'sharp'

/debo/ [kədéb] 'short'

Neither of these two prefixes is terribly productive. The few forms they appear in may be remnants of larger classes which existed at an earlier period in the language. Nevertheless, they help to support our schwa epenthesis analysis. Our preliminary formulation of the epenthesis rule will read as follows:

46. Prefix Schwa Epenthesis

$$\emptyset \longrightarrow \overset{V}{[-\text{tense}]} \;/\; \#[+\text{cons}] + \_\_\_\_ [+\text{cons}]$$

Insert a schwa to the left of a consonantal segment if a single consonantal prefix precedes it.

It is easy to see how this rule would convert the forms below:

47. /m+dasa?/ [mədásə?] 'carve (middle)'

/m+dakt/ [mədákt] 'afraid'

/b+ralm/ [bərálm] 'watery, tasteless'

/k+dorom/ [kədórəm] 'sharp'

As we present additional data involving more complicated morphophonemic alternations, we will revise this epenthesis rule and show how it can work to our advantage in the context of the total analysis.

We have seen thus far that the middle and imperfective forms of active transitive verbs are rather simply constructed. Both follow the formula:

48. VM + Stem

The difference between them lies in the fact that imperfective forms are marked [+IMP], the feature which triggers the initial stem

consonant alternations that we examined earlier in this chapter.

Past tense forms of these same middle and imperfective forms are built on the same formula with the addition of the Past Tense marker /-il-/ which is positioned to the right of the VM. Thus we have the past tense formula:

49. VM + Past + Stem

Below we give the past tense forms of the verbs in (42):

50.		Middle	Imperfective
/dasa?/	'carve'	[mildásə?]	[millásə?]
/sesob/	'burn'	[milsésəb]	[millésəb]
/lo?ad/	'break cord'	[millóʔəd]	[millóʔəd]
/kimud/	'cut hair'	[milkímd]	[milŋímd]
/ʔudul/	'collect'	[milə?údəl]	[milᵊŋudəl]

The important thing to notice in these past tense forms is that no schwa is inserted to the right of the VM /m/ because it is not followed in underlying representation by a consonant. Thus these forms do not meet the structural description of the Prefix Schwa Epenthesis rule.

Let us now consider those verbs in which the VM /m/ can be linked to surface prefixes [o-] and [u-]. The present tense middle and imperfective forms of verbs whose stems begin in a labial consonant show an [o-] prefix. For example:

51.		Middle	Imperfective
/balo?/	'shoot'	[obálə?]	[omálə?]
/basa?/	'count'	[obásə?]	[omásə?]
/buŋut/	'curl'	[obúnt]	[omúnt]

The past tense middle and imperfective forms of these same verbs show an [u-] prefix. For example:

52.			Middle	Imperfective
	/balo?/	'shoot'	[ulbálə?]	[ulmálɔ?]
	/basa?/	'count'	[ulbásə?]	[ulmásɔ?]
	/buŋut/	'curl'	[ulbúnt]	[ulmúnt]

We assume that the forms above in (51) and (52) are built on patterns (48) and (49) respectively. Take for example the present and past tense middle forms of /balo?/ 'shoot':

53.					
	Present	VM	+	Stem	
		/m	+	balo?/	
	Past	VM	+ Past	+	Stem
		/m	+ il	+	balo?/

When the Prefix Schwa Epenthesis rule (46) operates on the underlying forms on (53), it yields:

54.		
	Present	m+əbalo?
	Past	m+il+balo?

Thus we have a situation where the sequence of VM /m/ plus a nonhigh vowel results on the surface as the vowel [o], and the sequence of VM /m/ plus a high vowel results on the surface as the vowel [u]. For example:

55.					
	Present	m	+ ə		balo?
		o			balo?
	Past	m	+ i	l +	balo?
		u		l +	balo?

We will not, at this point, present the phonological rules necessary for linking the two levels in (55). When we have presented the remainder of the data showing the various realizations and positions of the VM /m/, the characterization of the phonological processes involved will become clearer. At that point, we will posit the rules necessary to account for the various alternations.

Verb Marker as Infix

We turn now to a consideration of those forms in which the VM /m/ appears, not as a prefix, but as an infix. We find this to be the case in the perfective forms of all active transitive verbs. In order to understand clearly the phonological processes affecting the infixed VM, it is necessary to first discuss the general composition of perfective forms.

There are eight possible forms for a perfective verb, since they are marked to indicate the person and number of the direct object of the verb:

56.

Singular	First person
	Second person
	Third person
Plural	First person inclusive
	First person exclusive
	Second person
	Third person human
	Third person nonhuman

The first seven forms are marked by means of an object marker suffix. The eighth has no suffix. Perfective verbs are also marked with the VM /m/. However, unlike middle and imperfective forms, the perfective forms show the VM as an infix immediately to the right of the initial stem consonant, rather than as a prefix preceding the stem. This infixed VM participates in some rather complex phonological processes, and it is often very difficult to recognize it in the surface phonetics.

With this introduction, let us now examine a list of perfective forms for a typical transitive verb stem /le?ot/ 'to tie':

57. Singular

	First	lo?əták
	Second	lo?ətáw
	Third	lo?ətíy
Plural		
	First incl.	lo?ətíd
	First excl.	lo?ətəmám
	Second	lo?ətəmíw
	Third human	lo?ətətərír
	Third nonhuman	ɬmé?ət

Before getting into our discussion of the phonological processes that affect the verb stem and the infixed VM, we will briefly examine the object marker suffixes that appear in perfective forms. We can see from the list above that for a consonant final stem like /le?ot/ the suffixes take the following shape:

58. Singular

First	-ak
Second	-aw
Third	-iy

Plural

First incl.	-id
First excl.	-əmam
Second	-əmiw
Third human	-ətərir

Consider now the present perfective forms of a verb whose stem is vowel final, /rusu/ 'to inject, pierce':

59. Singular

First	rusəkák
Second	rusəkáw
Third	rusúr

Plural

First incl.	rusəkíd
First excl.	rusəkəmám
Second	rusəkəmíw
Third human	rusətərír
Third nonhuman	ɾmús

Compare the two sets of suffixes:

60.

	C final	V final
Singular		
First	-ak	-kak
Second	-aw	-kaw

	Third	-iy	-r
Plural			
	First incl.	-id	-kid
	First excl.	-əmam	-kəmam
	Second	-əmiw	-kəmiw
	Third human	-ətərir	-tərir

A brief inspection will reveal that, except for the third person singular, the two sets of suffixes are very much alike. The major difference lies in the absence of the suffix initial consonant when the stem is consonant final. Recall that earlier we had an example of suffix initial consonants being deleted after consonant final stems. In Chapter Two, we discussed in detail the possession of nouns by means of suffixation of pronoun forms. These possessive suffixes are obviously closely related phonologically to the object pronoun suffixes of (60), though we will not explore that relationship in this study. In discussing the possessive suffixes we showed that when a noun stem ends in a vowel, the suffixes take the following shape:

61.	Singular	First	-k
		Second	-m
		Third	-l
	Plural	First incl.	-d
		First excl.	-mam
		Second	-miw
		Third	-rir

However, when the noun stem ends in a consonant, the endings are:

62.	Singular	First	-e-k
		Second	-e-m
		Third	-e-l
	Plural	First incl.	-e-d
		First excl.	-am
		Second	-iw
		Third	-ir

In Chapter Two, we suggested a rule of suffix initial consonant deletion to handle the variation in the last three suffixes.

63.			C final	V final
	Plural	First excl.	-am	-mam
		Second	-iw	-miw
		Third	-ir	-rir

It is clear that the same rule is operating in object pronoun suffixes. In order to avoid a heavy concentration of consonants at the morpheme boundary, the suffix initial consonant, whether it be /m/, /r/, or /k/, is deleted.[4]

Consider now the third singular object pronoun suffixes that appear on perfective verbs:

64.	Consonant final	-iy
	Vowel final	-r

This is indeed a strange alternation and one that we find very difficult to account for in a natural way. Of course, it may be possible to provide historical evidence to show the phonological relationship between these two suffixes. On the other hand, examination of

historical facts might show that these two suffixes have always been totally different elements. Whatever the historical situation may be, the only reasonable synchronic analysis appears to be one which treats this alternation as a case of suppletion. In other words, we would list in the lexicon two object suffixes for third person singular and state when each is used.

Recall that in Chapter Two, we spoke of a small class of nouns whose stems are augmented by an epenthesized velar nasal when possessive suffixes are added. Parallel to these nouns are a small class of verbs whose stems are augmented by an epenthesized velar nasal in their perfective forms when the object pronoun suffixes are added. For example:

65.

		Imperfective	Perfective
/tat/	'tear'	[məlát]	[totəŋíy]
/deb/	'stop'	[məléb]	[dobəŋíy]
/dor/	'shade'	[omdór]	[mədərəŋíy]
/bar/	'slap the face'	[omár]	[mərəŋíy]

Once again, as with the nouns, the unsuffixed forms end in a stressed vowel followed by a consonant. We would expect then that the third singular suffixed form would show a stem final vowel followed by the /-r/ suffix. However what we find is the stem followed by the nasal augment followed by the [-iy] suffix. The complete paradigm is as follows:[5]

66. /deb/

dobəŋák

dobəŋáw

dobəŋíy

dobəŋíd

dobəŋəmám

dobəŋəmíw

dobəŋətərír

dwéb

Thus it is inflected as an underlying consonant final verb stem of the /CVCVC/ shape. That is, its surface stem in suffixed forms has the same shape as that of a verb like /le?ot/ 'to tie', inflected in (57). It is interesting to note that, with the exception of forms like those of (65), the unsuffixed forms of underlying consonant final verb stems have the same surface patterns as the unsuffixed forms of Pattern 1 nouns (see Chapter One). We repeat those patterns here:

67. V́CC# stressed vowel followed by two consonants

V́GC# stressed vowel followed by a glide followed by one consonant

V́C₃C# stressed vowel followed by two consonants separated by a schwa

For example:

68.

		Imperfective	Perfective
V́CC#			
/latk/	'remember'	[məlátk]	[lotkák]
			[lotkáw]
			[lotkíy] etc.

V́GC#			
/dau?/	'wound'	[məláw?]	[dow?ák]
			[dow?áw]
			[dow?íy] etc.
V́CəC#			
/tabak/	'patch'	[məlábək]	[tobəkák]
			[tobəkáw]
			[tobəkíy] etc.

The stems in the unsuffixed forms of (66) obviously do not follow any of these patterns, and because of this we would not predict that they should be inflected for the perfective in the same way as the verbs which do not follow these patterns. However, suppose we alter the underlying stems of the verbs in (66) by means of a nasal augmentation rule which inserts a velar nasal between the stem final segment and the suffix. This would insure that their surface stems conform to a pattern that is more regular throughout the language, and thus their perfective forms would resemble those of verbs like /le?ot/ 'to tie' (57) and /tabak/ 'to patch' (68), whose stems are not subject to the nasal augmentation rule. As we said in Chapter Two, we interpret this augmentation process to be a reflection of a pervasive tendency in the language to regularize the shapes of underlying forms to conform to the more common patterns already existing in the language. There are a few methods by which this is achieved, and nasal augmentation is only one of them. We will be discussing this tendency and its various manifestations later in Chapter Five.

This concludes our discussion of the general composition of perfective forms of active transitive verbs. We are now ready to consider the phonological processes affecting the VM /m/ as it appears in perfective forms. Recall that, unlike middle and imperfective forms, perfective forms show the VM as an infix positioned immediately to the right of the initial stem consonant, rather than a prefix. We propose the following then as the underlying representations for the perfective forms of /le?ot/ 'to tie':

69. Singular

First	/l+m+e?ot+kak/	[lo?əták]
Second	/l+m+e?ot+kaw/	[lo?ətáw]
Third	/l+m+e?ot+ii/	[lo?ətíy]
Plural		
First incl.	/l+m+e?ot+kid/	[lo?ətíd]
First excl.	/l+m+e?ot+kəmam/	[lo?ətəmám]
Second	/l+m+e?ot+kəmiw/	[lo?ətəmíw]
Third human	/l+m+e?ot+ətərir/	[lo?ətətərír]
Third nonhuman	/l+m+e?ot/	[ɬmé?ət]

It is interesting to note that the VM shows up as an infix in another class of verbs, active intransitive verbs. These verbs, being intransitive, are not inflected for aspect as are active transitive verbs. However, in their present tense forms, they show the VM as an infix. For example:

70. ɬmórə? 'slide and fall down'
ɬmúrət 'run'
ɬmáŋəl 'cry'

ʔəmíys	'run away'
ɬmúwt	'return'

The question arises: What do perfective forms of active transitive verbs have in common with active intransitive verbs that should be reflected in the position of the VM? If there is a syntactic or semantic relationship, it is certainly not apparent on a synchronic level. Whatever the historical explanation may be, we are still faced with the need for a synchronic one. Wilson (1972) in section 5.3 proposes that the variation in the position of the VM be handled by means of a metathesis rule. The VM, in her analysis /mV/, is a prefix in underlying representation. In certain verb forms, a metathesis rule causes the VM to switch positions with the initial stem consonant. For example, first person singular perfective form of /leʔot/ 'to tie' would be handled by Wilson in the following way:

71. Wilson's rules

	[loʔəták]
	/mV+leʔot+akV/
Vowel Deletion	m+leʔot+akV
Metathesis	lmeʔot+akV
Stress	lmeʔot+ákV
Vowel Deletion	lmeʔot+ák

Other rules then relate the last line of this derivation to its surface form [loʔəták].

We have rejected this analysis for several reasons. We have shown elsewhere that the unspecified vowels represented by /V/ are not necessary for correct stress assignment. Neither is the /V/

necessary in her underlying representation of the VM, since this /V/ shows up on the surface as a schwa, and we have demonstrated that this schwa can be accounted for by means of an epenthesis rule. Furthermore, there is no way to block Wilson's first rule of Vowel Deletion in those cases where the VM does not metathesize. It is in just these cases where the /V/ should be preserved so that, in her system, it can be converted to schwa. Our major objection however is to her metathesis rule. Throughout the language we have found no evidence to support a phonological rule of metathesis that applies to one and only one phoneme, and only when that phoneme has morphemic status. It would be more reasonable to assume that the entry of the VM /m/ in the lexicon would contain information concerning its position with regard to the stem. Every grammar must contain as part of its syntactic component mechanisms for arranging morphemes in proper linear order. There are rules of raising, preposing, and postposing, all of which take the elements present in an underlying phrase marker and place them in proper position. For example, many have adopted the position that the category of 'tense' appears in the deep structure as a higher verb and that the syntactic rule of predicate raising is employed in order to bring together the tense and the element which ultimately carries the tense on the surface. Suppose we have a language in which tense shows up on the surface as a suffix on a verb stem. It is not unreasonable to assume that when the underlying verb stem is moved by the predicate raising rule to the position of the higher verb of 'tense', the resulting configuration might look something like Verb stem + tense rather than Tense + Verb stem or some

other configuration. So also with the Palauan VM /m/. Whatever the syntactic mechanisms may be for linking this morpheme with a verb stem, we assume that they are sensitive both to the lexical entry for this morpheme and to the manner in which the underlying verb stem may be marked, whether it be middle, imperfective, perfective, intransitive, etc. Obviously we do not intend to propose the form or the operation of such mechanisms, since they are part of the syntactic component and beyond the scope of this study. We only wish to take the position that the positioning of the VM /m/ in the verb stem should not be accounted for by means of a phonological rule which reflects a process that is not found in any other area of the language.

We now turn to a formulation of the phonological rules that are necessary for linking the underlying and surface representations of perfective forms such as those in (69). For the sake of simplicity throughout the discussion, we will cite only two of the possible eight perfective forms, the third singular and the third plural nonhuman.

The most striking fact about the perfective forms of /le?ot/ listed above is that the VM /m/ has disappeared in all but the third plural nonhuman form. In just those forms where the /m/ is not present, the stem vowel of the first syllable is lacking also. In place of the sequence of infixed VM plus stem vowel, we find an [o]. It appears that these changes depend in some way on the stress assignment. The one case in which the stress is assigned to the stem vowel of the first syllable, that is, the third plural nonhuman form,

retains that stem vowel and also the VM preceding it.

These facts are also true of verb stems containing the other nonhigh vowels /a/ and /o/ in their first syllables. For example:

72.

		Perfective	
		Singular	Plural
/dakul/	'bury'	[doklíy]	[θmákl]
/latk/	'remember'	[lotkíy]	[ɬmátk]
/lo?ad/	'break cord'	[lo?ədíy]	[ɬmó?əd]
/dorat/	cut'	[dorətíy]	[θmórət]

Thus we have a situation where the underlying sequence of VM /m/ plus an unstressed nonhigh vowel shows up on the surface as the vowel [o]. For example:

73. /l+[m+e]?ot+ii/ /d+[m+a]kul+ii/ /d+[m+o]rat+ii/

[l [o]? tiy] [d [o] kliy] [d [o] r tiy]

[lo?ətíy] [doklíy] [dorətíy]

Recall that we had this very same situation when we examined the prefixation of the VM /m/ on labial initial verb stems in their middle and imperfective forms (51-55). We repeat those examples here:

74. /balo?/

Present	Middle	Imperfective
	/m+balo?/	/m+balo?/ [+IMP]
	[m+ə] balo?	[m+ə] malo?
	[o] balo?	[o] malo?
	[obálə?]	[omálə?]

Consider now the following data. They show stems containing labial consonants /m/ or /b/ somewhere to the right of the point where the VM is infixed.

75.

		Perfective	
		Singular	Plural
/tabak/	'patch'	[tóbəkíy]	[twábək]
/dalom/	'plant'	[dolə́míy]	[dwáləm]
/sebok/	'kick'	[sobəkíy]	[swébək]
/te?ib/	'pull out'	[to?əbíy]	[twé?əb]
/dorom/	'sharpen'	[dorə́míy]	[dwórəm]
/doba?/	'cut in half'	[dobə?íy]	[dwóbə?]

Notice that in the plural forms the VM /m/ has changed to [w]. Once again we have an instance of the VM being modified in such a way as to conceal its true underlying identity, /m/. Recall that earlier we suggested that there existed in Palauan a tendency to eliminate nasals. We saw one manifestation of this tendency in the Dental Denasalization rule (11) which effects a change from n to l. We now have several examples which suggest that a Labial Denasalization rule is in order.

To account for the plural forms in (75) we posit the following rule:

76. Labial Denasalization

$$/m/ \longrightarrow w \;/\; \#C+\_\_+[+\text{stress}]\ X\ \overset{V}{\underset{C}{\begin{bmatrix}+\text{ant}\\-\text{cor}\end{bmatrix}}}$$

Change infixed /m/ to w before a stressed vowel if a labial consonant appears to the right of the infixed /m/.

A sample derivation follows:

77.

	[twábɔk]	[dwáləm]
	'patch'	'plant'
	/t+m+abak/	/d+m+alom/
Stress	t+m+ábak	d+m+álom
Labial Denasalization	t+w+ábak	d+w+álom
Vowel Reduction	t+w+ábɔk	d+w+áləm
	[twábɔk]	[dwáləm]

Let us assume now that the forms in (73) and (74) go through a stage where /m/ becomes w. In other words, let us assume that the Labial Denasalization rule operates in environments additional to the one stated in (76). For example, in order to account for the forms in (73) we would incorporate the following environment into the rule:

78.

$$/m/ \longrightarrow w \;/\; \#C+\_\_+ \begin{bmatrix} C \\ -high \\ -stress \end{bmatrix}$$

Change infixed /m/ to w if an unstressed nonhigh vowel appears immediately to its right.

To account for the forms in (74) we would incorporate the following environment into the rule:

79.

$$/m/ \longrightarrow w \;/\; \#\_\_+X \underset{stem}{\left[\begin{bmatrix} C \\ +ant \\ -cor \end{bmatrix} \right.}$$

Change /m/ to w when it occurs as a prefix on a stem which begins in a labial consonant.

If we allow Labial Denasalization to apply in the three environments (76), (78), and (79), the following derivations result:

80.

a)	[twábɔk]	[lo?ɔtíy]
	/t+m+abak/	/l+m+e?ot+iy/
Stress	t+m+ábak	l+m+e?ot+íy
Prefix Schwa Epenthesis	-	-
Labial Denasalization	t+w+ábak	l+w+e?ot+íy
Vowel Reduction	t+w+abɔk	l+w+ɔ?ɔt+íy
b)	[obálɔ?]	[ulbálɔ?]
	/m+halo?/	/m+il+balo?/
Stress	m+bálo?	m+il+bálo?
Prefix Schwa Epenthesis	m+ɔbálo?	-
Labial Denasalization	w+ɔbálo?	w+il+bálo?
Vowel Reduction	w+ɔbálɔ?	w+il+bálɔ?

Obviously there is question as to whether or not the three rules (76), (78), and (79) should be collapsed into one rule of the form:

81.

$$/m/ \rightarrow w \; / \; \begin{cases} \#C+\_\_\_+ \; [+\text{stress}] \; X \; \begin{bmatrix} C \\ +\text{ant} \\ -\text{cor} \end{bmatrix} & \text{(a)} \\ \#C+\_\_\_+ \; \begin{bmatrix} V \\ -\text{high} \\ -\text{stress} \end{bmatrix} & \text{(b)} \\ \#\_\_\_+ \; X \; \underset{\text{stem}}{\left[\; \begin{bmatrix} C \\ +\text{ant} \\ -\text{cor} \end{bmatrix} \right.} & \text{(c)} \end{cases}$$

The three environments are somewhat related to each other. For instance, (a) is related to (b) in that the position of the VM /m/ is the same in each case. Environments (a) and (c) are related in

that both contain a labial consonant to the right of the VM /m/ which triggers the change to w. Furthermore there is no evidence to show that these three environments must be separated from one another. That is, no other phonological rules intervene. Therefore, even though the rule as it is stated in (81) may appear awkward and unwieldy, we will treat Labial Denasalization as a unified process rather than as a series of disconnected processes.

Consider now the last lines of the derivations in (80) and what type of phonological rule is necessary to produce the correct surface forms. We repeat this line below:

82. t+w+ábək l+w+ə?ə́t+iy w+əbálə? w+il+bálə?

The desired surface forms are:

83. twábək lo?ətíy obálə? ulbálə?

No new rule is needed to derive [twábək]. However, some sort of blending rule is necessary to derive the three other forms. We propose the following:

84. Blending

$$\begin{bmatrix} -\text{cons} \\ -\text{syll} \\ +\text{back} \\ +\text{round} \end{bmatrix} + \begin{bmatrix} V \\ -\text{stress} \\ \alpha\text{high} \end{bmatrix} \Rightarrow \begin{bmatrix} V \\ +\text{back} \\ +\text{round} \\ \alpha\text{high} \end{bmatrix}$$

The sequence of the glide w plus an unstressed vowel separated by a morpheme boundary changes to a single back rounded vowel having the same value for the feature [high] as the original vowel of the sequence.

The rule can effectively change the intermediate forms of (82) into the surface forms of (83). The process captured by the rule is a very natural one, since the resulting vowels [u] and [o] embody characteristics of both their components, the roundness and the backness of the w glide, and the syllabicity and particular degree of height of the original vowels. Moreover the process is a very natural one for Palauan. We have seen in earlier discussions that there is a strong tendency in the language to reduce unstressed syllables. This tendency is reflected in various rules which were treated in Chapter Two, such as Final Vowel Deletion, High Vowel Deletion, and Vowel Reduction, all of which affect unstressed single vowels by either deleting them or reducing them to schwa. We also discussed the reduction of syllables containing two underlying vowels, and showed how through various rules of diphthong formation and simplification, sequences of two underlying vowels, neither of which is stressed, are reduced to one vowel. The rules of Labial Denasalization and Blending are simply two more manifestations of the tendency to reduce unstressed syllables to a single vowel. A glide plus vowel sequence, whose source is the VM /m/ plus an underlying or epenthetic vowel, reduces to a single vowel in unstressed position.

Consider now the relationship between the Blending rule (84) and the Diphthong Simplification rule (Chapter Two (62)). We repeat the latter rule below:

85. Diphthong Simplification

$$\ast\begin{bmatrix}-\text{cons}\\-\text{syll}\\ \alpha\text{high}\\ \beta\text{back}\end{bmatrix}\quad\begin{matrix}V\\ \begin{bmatrix}-\text{stress}\\-\text{tense}\end{bmatrix}\end{matrix}\quad\Longrightarrow\quad\begin{matrix}V\\ \begin{bmatrix}\alpha\text{high}\\ \beta\text{back}\end{bmatrix}\end{matrix}$$

The two elements of a diphthong, unstressed lax vowel plus glide, or vice versa, blend into one element, a vowel whose quality matches that of the glide.

Recall how this rule operates in deriving pairs of words such as:

86. sáwr 'shoelace'

surék 'my shoelace'

dyáll 'ship'

dillék 'my ship'

87.

	/saur/	/saur+e+k/	/diall/	/diall+e+k/
Gliding	saur	saur+e+k	dyall	dyall+e+k
Stress	sáwr	sawr+é+k	dyáll	dyall+é+k
Vowel Reduction	-	səwr+é+k	-	dyəll+é+k
Diphthong Simplification	-	sur+é+k	-	dill+é+k
	[sáwr]	[surék]	[dyáll]	[dillék]

Consider the outcome of allowing Diphthong Simplification (85) to apply after Vowel Reduction and before Blending in the derivations of (80):

88.

	[lo?atíy]	[obálə?]	[ulbálə?]
	/l+m+e?ot+iy/	/m+balo?/	/m+il+balo?/
Stress	l+m+e?ot+íy	m+bálo?	m+il+bálo?
Prefix Schwa Epenthesis	-	m+əbálo?	-
Labial Denasalization	l+w+e?ot+íy	w+əbálo?	w+il+bálo?

Vowel Reduction	l+w+ə?ə+t+íy	w+əbálə?	w+il+bálə?
Diphthong Simplification	lu?ə+t+íy	ubálə?	-
Blending	-	-	ul+bálə?
	*[lu?ətíy]	*[ubálə?]	[ulbálə?]

It is clear that this ordering is incorrect because surface forms [lo?ətíy] and [obálə?] cannot be derived properly. Instead of the vowel [o] in these forms we get [u]. The correct ordering is:

89. 1. Blending

2. Diphthong Simplification

The effect of this ordering is that Blending bleeds Diphthong Simplification of thise forms where we do not want Diphthong Simplification to apply, that is, those glide-plus-vowel sequences whose source is the VM /m/ followed by an underlying or epenthetic vowel. The glide-vowel and vowel-glide sequences which remain after Blending has applied are the very ones where we want Diphthong Simplification to apply, that is, those whose source is two underlying stem vowels. The element in the Blending rule that makes it capable of bleeding the Diphthong Simplification rule of just the right forms is the morpheme boundary explicitly stated in the environment. The presence of this boundary in the formulation of the rule (84) allows it to operate only on those forms in which the glide and the vowel are separated by a morpheme boundary. This is equivalent to saying that the Blending rule can affect only those sequences whose glide was originally the morpheme /m/. It cannot affect those sequences whose source is two underlying stem vowels because no morpheme boundary is present between two stem vowels.

The verb stems which are crucial examples of the ordering of (89) are those which contain underlying vowel clusters. Take for instance the stem /dau?/ 'to cut, wound'. Below we list its middle, imperfective, and perfective forms:

90.	Middle	[mədáw?]	/m+dau?/
	Imperfective	[məláw?]	/m+dau?/ [+IMP]
	Perfective		
	Singular	[dow?íy]	/d+m+au?+ii/
	Plural	[θmáw?]	/d+m+au?/

Consider the derivation of the singular perfective form:

91.		/d+m+au?+ii/
	Gliding rules	d+m+aw?+iy
	Stress	d+m+aw?+íy
	Prefix Schwa Epenthesis	-
	Labial Denasalization	d+w+aw?+íy
	Vowel Reduction	d+w+əw?+íy
	Blending	dow?+íy
	Diphthong Simplification	-
		[dow?íy]

If we were to switch the order of (89), the following incorrect derivation would result:

92.		/d+m+au?+ii/
		.
		.
		.
	Vowel Reduction	d+w+əw?+íy

Diphthong Simplification	duw?+íy
Blending	-
	*[duw?íy]

Clearly the Blending rule must operate first in order to combine the w derived from /m/ and the schwa into the vowel [o].

Obviously this relationship between Blending and Diphthong Simplification is one in which the notion of extrinsic ordering plays an important role. Consider the consequences if we were to adopt the position that extrinsic rule ordering statements are not necessary in phonological description. The two rules in question, if allowed to operate without any restriction on the order of their application, will in many cases produce incorrect results, as in (88) and (92). It is clear that, if the extrinsic rule ordering statement concerning these two rules is abandoned, some other mechanism must be employed to insure their correct application. One possibility is the notion of global rule.[6] It has been argued that phonological rules must be global in nature. That is, the conditions which determine whether or not two adjacent lines in a derivation are related by a particular rule must refer not only to the information contained in the two adjacent lines but also to information contained in previous lines of the derivation in question. In other words, it is claimed that rules must be powerful enough to refer not only to a particular line of a derivation but to the entire derivational history of the form in question. If the extrinsic rule ordering statement concerning Blending and Diphthong Simplification is abandoned, then we must in some sense complicate the grammar by allowing these two rules to be global

in nature. In other words, they would be powerful enough to refer back to the underlying representations of the forms in question. Blending would apply only to those diphthongs whose underlying representation contains the VM /m/. Diphthong Simplification would apply only to those diphthongs whose underlying representation is two vowels. Because global conditions are built into the rules, there is no need for an ordering restriction on them.

However, it may not be necessary to allow rules to be this powerful as a result of eliminating extrinsic rule ordering restriction. It has been argued that all restrictions on relative order of application of grammatical rules are determined by universal rather than language specific principles.[7] Those who argue for this hypothesis have proposed the following universal principle as one of those which govern the order of application of rules: for any representation R which meets the structural description of each of two rules A and B, A takes applicational precedence over B if and only if the structural description of A properly includes the structural description of B. This principle is known as Proper Inclusion Precedence. Given the two rules Blending and Diphthong Simplification, this principle predicts the correct ordering, since the structural description of Blending properly includes the structural description of Diphthong Simplification. In other words, the cases to which Blending applies form a subset of the cases to which Diphthong Simplification applies. This is one example of a situation which often arises between two rules, where a context sensitive rule applies

before a context free rule. The Blending rule is sensitive to the presence of the morpheme boundary in the string, whereas the Diphthong Simplification rule applies "elsewhere", that is, regardless of the presence or absence of a morpheme boundary. Thus Blending must apply first in order to prevent those strings containing a morpheme boundary from being affected by the Diphthong Simplification rule. This ordering is successfully predicted by Proper Inclusion Precedence.

If it can be shown crosslinguistically that Proper Inclusion Precedence and principles like it can successfully predict the correct ordering relationships between rules, then it would seem that something as powerful as global rules would be an unnecessary complication of the phonological framework. Obviously, the task of showing this is beyond the scope of this present study.

Let us summarize briefly before continuing this discussion of the infixed VM /m/ in perfective forms. Thus far we have addressed ourselves to the perfective forms of those stems whose initial consonants are nonlabial and whose initial syllables contain a nonhigh vowel. It remains for us to discuss two other groups of stems: first, those whose initial consonants are nonlabial and whose initial syllables contain high vowels; second, those whose initial consonants are labial.

Below we list some examples from the first group:

93.

		Perfective	
		Singular	Plural
/silok/	'launder'	[siləkíy]	[smíləkˌ]
/kimud/	'cut hair'	[kimdíy]	[kwímd]
/rusa?/	'pound'	[rusə?íy]	[ɾmúsə?]
/subad/	'announce'	[subədíy]	[swúbəd]

Notice that only the third person plural nonhuman form shows evidence of the VM /m/ on the surface. In all other perfective forms of such verbs, the VM has disappeared and the stem vowel of the first syllable remains intact. Apparently there is a rule which deletes the infixed VM when it precedes an unstressed high vowel. We can investigate this problem more fully by looking to see what happens when the infixed VM precedes the past tense marker /-il-/ which contains a high front vowel. We have just this configuration in the past tense forms of perfectives. These past tense forms resemble their present tense counterparts, in that the VM /m/ is infixed to the right of the initial stem consonant. The past tense marker /-il-/ is positioned to the right of the VM, its usual position. Below are some examples:

94.

		Perfective	
		Singular	Plural
/dasa?/	'carve'	[dilə́sə?íy]	[dilásə?]
		/d+m+il+asa?+ii/	/d+m+il+asa?/
/le?ot/	'tie'	[lilə?ətíy]	[lilé?ət]
		/l+m+il+e?ot+ii/	/l+m+il+e?ot/

/lo?ad/ 'break cord' [lilə?ədíy] [lilóʔəd]

/l+m+il+o?ad+ii/ /l+m+il+o?ad/

It is clear that we must have a rule of Verb Marker Deletion that will apply to the infixed VM when followed by an unstressed high vowel. The question arises: at what point in the derivation does this rule operate? Recall that we have postulated a rule of High Vowel Deletion of the form:

95. High Vowel Deletion

$$\begin{bmatrix} V \\ +back \\ +high \\ -stress \end{bmatrix} \longrightarrow \emptyset \;/\; [\underset{stem}{\;} X \; [+cons] \_\_ [+cons] \; Y]_{stem}$$

Notice that in the singular perfective form of /subad/ (93) [subədíy] the high vowel in the first syllable has not been deleted. This indicates that there is something in the environment of this vowel that prevents it from undergoing the deletion rule. Thus the VM /m/ must be present to the left of the vowel when the High Vowel Deletion rule applies. We suggest then that the VM Deletion rule is ordered after High Vowel Deletion. Obviously VM Deletion must precede Labial Denasalization, since we do not want the VM /m/ to be converted to w and thus become subject to the Blending rule. The proper ordering of the rules then is:

96. High Vowel Deletion
Verb Marker Deletion
Labial Denasalization
etc.

The VM Deletion rule may be formulated as follows:

97. Verb Marker Deletion

$$/m/ \longrightarrow \emptyset \;/\; /\!/C+\_\_\_+ \begin{bmatrix} V \\ +high \\ -stress \end{bmatrix}$$

Delete the VM /m/ when infixed and followed by an unstressed high vowel.

Below we give a sample derivation to show the operation of the rule:

98.	[subədíy]	[dilәsә?íy]
	'announce (present)'	'carve (past)'
	/s+m+ubad+iy/	/d+m+il+asa?+iy/
Stress	s+m+ubad+íy	d+m+il+asa?+íy
High Vowel Deletion	-	-
VM Deletion	subad+íy	d+il+asa?+íy
Prefix Schwa Epenthesis	-	-
Labial Denasalization	-	-
Vowel Reduction	subəd+íy	d+il+əsə?+íy
Blending	-	-
Diphthong Simplification	-	-
	[subədíy]	[dilәsә?íy]

The VM Deletion rule also applies in stems containing two underlying contiguous vowels, the first of which is a high vowel. For example:

99. /tui?/ 'to shine'

Middle [mətúy?]

Imperfective [məlúy?]

Perfective

Singular [ti?íy]

Plural [tmúy?]

Below we show the derivations of the perfective forms:

100.	[ti?íy]	[tmúy?]
	/t+m+ui?+ii/	/t+m+ui?/
Gliding rules	t+m+uy?+iy	t+m+uy?
Stress	t+m+uy?+íy	t+m+úy?
High Vowel Deletion	-	-
VM Deletion	tuy?+íy	-
Prefix Schwa Epenthesis	-	-
Labial Denasalization	-	-
Vowel Reduction	təy?+íy	-
Blending	-	-
Diphthong Simplification	ti?+íy	-
	[ti?íy]	[tmúy?]

This concludes our discussion of perfective forms of verb stems beginning in a nonlabial consonant and containing a high vowel in the first syllable, and the behavior of the VM /m/ when infixed in these stems. At this point in our analysis, the rules we have postulated are capable of deriving the inflected forms of all stems beginning in a nonlabial consonant, both those with nonhigh vowels in their first syllable and those with high vowels.

It remains for us to discuss one more group of stems, those which begin in a labial consonant, and their interaction with the

infixed VM /m/ in their perfective forms. We have already discussed their middle and imperfective forms and the phonological processes affecting the prefixed VM on these stems. We repeat here one of our earlier examples:

101. /basa?/ 'to count'

Present Middle	[obás?]	/m+basa?/
Present Imperfective	[omás?]	/m+basa?/ [+IMP]
Past Middle	[ulbás?]	/m+il+basa?/
Past Imperfective	[ulmás?]	/m+il+basa?/ [+IMP]

Consider now the perfective forms of this stem:

102. Present Singular	[mas?íy]	/b+m+asa?+ii/
Present Plural	[más?]	/b+m+asa?/
Past Singular	[milas?íy]	/b+m+il+asa?+ii/
Past Plural	[milás?]	/b+m+il+asa?/

Notice that these forms are not affected by the Labial Denasalization and Blending rules. The VM /m/ remains throughout. Also the stem vowel of the first syllable, when unstressed, is affected by the Vowel Reduction rule. Furthermore, we notice a new development in the deletion of the initial stem consonant. This is a quite natural process for Palauan, since the language does not tolerate homorganic clusters in initial position, and chooses various means of avoiding them, such as schwa epenthesis. In this case, a deletion process is used to simplify the cluster. The rule can be stated as follows:

103. Labial Deletion

b → ∅ / # ___ + m

In word initial position, delete /b/ when it is followed by the VM /m/.

If we allow Labial Deletion to apply before Labial Denasalization (81) we can prevent the VM /m/ from changing to w. The reason for this is that once the initial labial consonant has been deleted, the VM /m/ is no longer infixed. The derivation would proceed as follows:

104.

	[məsəʔíy]	[másəʔ]
	/b+m+asaʔ+iy/	/b+m+asaʔ/
Stress	b+m+asaʔ+íy	b+m+ásaʔ
Labial Deletion	m+asaʔ+íy	m+ásaʔ
Labial Denasalization	-	-
Vowel Reduction	m+əsəʔ+íy	m+ásəʔ
	[məsəʔíy]	[másəʔ]

If we allow Labial Deletion to apply before VM Deletion (97) we can prevent the VM from deleting before the high front vowel of the past tense marker /-il-/ in the past perfective forms of labial initial stems such as /basaʔ/ 'to count'. For example:

105.

	[miləsəʔíy]	[milásəʔ]
	/b+m+il+asaʔ+iy/	/b+m+il+asaʔ/
Stress	b+m+il+asaʔ+íy	b+m+il+ásaʔ
Labial Deletion	m+il+asaʔ+íy	m+il+ásaʔ
VM Deletion	-	-
Labial Denasalization	-	-

Vowel Reduction	m+il+əsə?+íy	m+il+ásə?
	[mílə sə?íy]	[mílásə?]

Thus we are able to derive the inflected forms of all stems beginning in a labial consonant and to account for the behavior of the VM /m/ when prefixed and infixed on such stems.

Let us summarize briefly by listing the phonological rules we have postulated thus far in this chapter and in Chapter Two in the order in which they apply:

106.

	Two	Three
Initial Gliding	79	
Gliding	66	
Falling Diphthong Formation	77	
Verbal Nasal Epenthesis		39
Nasal Insertion		40
Nasal Replacement		10
Dental Denasalization		11
Stress Assignment	15	
Final Vowel Deletion	10	
High Vowel Deletion	44	
Labial Deletion		103
Verb Marker Deletion		97
Prefix Schwa Epenthesis		46
Labial Denasalization		81
Vowel Reduction	69	

Glottal Schwa Epenthesis	51	
Blending		84
Diphthong Simplification	62	
Glide Raising	82	

Derived Verb Stems

Thus far our discussion of verb morphology has centered around nonderived verb stems, that is, those stems which are monomorphemic and cannot be further segmented, and to which affixes are directly added. We now turn to a group of active transitive verbs built on derived stems and the phonological processes which they undergo.

The stems of these verbs are derived by means of the prefix /b-/. We mentioned this prefix briefly in an earlier section of this chapter when we treated Prefix Schwa Epenthesis (46). It is prefixed to a small group of stems to form stative verbs. For example:

107.	/ralm/	'water'	[bərálm]	'watery, tasteless'
	/sokəl/	'ringworm'	[bəsókəl]	'infected with ringworm'
	/ʔesu/	'newness'	[bəʔés]	'new'

However, this prefix is found most often in the composition of the active transitive verbs we are about to discuss. The present middle and imperfective forms of such verbs are built up according to the following formulae:

108.	Middle	VM + b + Stem
	Imperfective	VM + b + Stem [+IMP]

Thus given a stem like /ralm/ 'water', we have the following set of words:

109. Noun [rálm] 'water'

Stative Verb [bərálm] 'watery, tasteless'

Active Transitive Verb [omrálm] 'to rinse'

It would be very neat if for every active transitive verb of this type we could find a related noun and stative verb. However, this is not possible. Since the class of stative verbs with the prefix /b-/ is small, it is usually the case that the set contains only the noun and active transitive verb. For example, we have the set:

110. Noun [dór] 'shade'

Active Transitive Verb [omdór] 'to shade'

One would hope to find the word [bədór] 'shady' to fill out the set. However, there is no such form.

Let us consider now some other examples of verbs whose stems are derived by means of the prefix /b-/. In each case we list the present imperfective form.

111. /karu/ [kár] 'medicine'

[omkár] 'administer medicine'

/ŋakl/ [ŋákl] 'name'

[omŋákl] 'to name'

/ʔara/ [ʔár] 'price'

[oməʔár] 'buy'

/karad/ [kárəd] 'flame'

[omkárəd] 'light a lamp'

/dois/ [dóys] 'crowd'

[omdóys] 'increase'

For the purposes of discussion, we have listed below the various inflected forms of one of these verbs [omkár] 'to administer medicine':

112.	Present middle	a) mukár
		b) opkár
	Present imperfective	omkár
	Present perfective singular	məkərúr
	Present perfective plural	məkár
	Past middle	a) mlukár
		b) uləpkár
	Past imperfective	uləmkár
	Past perfective singular	milkərúr
	Past perfective plural	milkár

Notice that two forms exist for the middle aspect in both present and past tenses. These two middle forms appear to be in free variation. According to native Palauan speakers, there is no difference in meaning between the two, and there does not seem to be a tendency to use one rather than the other.

In order to discuss the phonological processes involved in the derivations of these verbs, we will first consider the imperfective, perfective, and (b) middle forms. We assume that the underlying representations of these forms are built according to the same formulae as parallel forms of verbs having nonderived stems. Recall that middle forms contain the prefixed VM /m/ plus the stem. The imperfective forms contain the infixed VM /m/ plus the stem which is marked [+IMP]. Perfective forms are constructed by infixing the VM

/m/ to the immediate right of the initial stem consonant and by suffixing the appropriate pronoun object if one is called for. The past tense marker /-il-/ is infixed to the right of the VM in all three aspects. Assuming that the underlying stem for the verb [omkár] 'to administer medicine' is /b+karu/, the underlying forms of its various aspects and tenses are the following:

113. Present middle b) /m+b+karu/

Present imperfective /m+b+karu/ [+IMP]

Present perfective singular /b+m+karu+r/

Present perfective plural /b+m+karu/

Past middle b) /m+il+b+karu/

Past imperfective /m+il+b+karu/ [+IMP]

Past perfective singular /b+m+il+karu+r/

Past perfective plural /b+m+il+karu/

Given the underlying forms above, we can easily derive the surface present tense forms by using the rules we have postulated for verbs with nonderived stems. Consider the following derivations:

114.

a)	Middle (b)	Imperfective
	[opkár]	[omkár]
	/m+b+karu/	/m+b+karu/ [+IMP]
Nasal Insertion	-	m+mb+karu
Nasal Replacement	-	m+m+karu
Stress	m+b+káru	m+m+káru
Final Vowel Deletion	m+b+kár	m+m+kár

High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
Prefix Schwa Epenthesis	m+əb+kár	m+əm+kár
Labial Denasalization	w+əb+kár	w+əm+kár
Vowel Reduction	-	-
Glottal Schwa Epenthesis	-	-
Blending	ob+kár	om+kár
Diphthong Simplification	-	-
Labial Devoicing	op+kár	-
	[opkár]	[omkár]

b)

	Perfective	
	Singular	Plural
	[məkərúr]	[məkár]
	/b+m+karu+r/	/b+m+karu/
Nasal Insertion	-	-
Nasal Replacement	-	-
Stress	b+m+karú+r	b+m+káru
Final Vowel Deletion	-	b+m+kár
High Vowel Deletion	-	-
Labial Deletion	m+karú+r	m+kár
VM Deletion	-	-
Prefix Schwa Epenthesis	m+əkarú+r	m+əkár
Labial Denasalization	-	-

Vowel Reduction	m+əkərú+r	-
Glottal Schwa Epenthesis	-	-
Blending	-	-
Diphthong Simplification	-	-
Labial Devoicing	-	-
	[məkərúr]	[məkár]

In order to derive the surface past tense forms of (112), we need to make one change in the Prefix Schwa Epenthesis rule. Recall that this rule has the form:

115) Prefix Schwa Epenthesis

$$\emptyset \rightarrow \overset{V}{[-\text{tense}]} \;/\; \# \; [+\text{cons}] + \_\_\_ \; [+\text{cons}]$$

Now that we are dealing with verb stems that are preceded by as many as three prefixes, it is necessary to expand this rule to account for schwa epenthesis after a prefix that is in a position other than initial position. In other words, we want to account for the underlined schwas in the following examples:

116. Past middle (b)	[ulə̲pkár]	/m+il+b+karu/
Past Imperfective	[ulə̲mkár]	/m+il+b+karu/ [+IMP]

These examples plus others that we will present in the last section of this chapter on causative verbs indicate that the process of prefix schwa epenthesis operates in the following environments:

117. $\# \; [+\text{cons}] + \_\_\_ \; [+\text{cons}]_1$

between a word initial single consonantal prefix and one or more consonantal segments;

118. # [+seg]$_1$[+cons]+___[+cons]+[+cons] .

between a noninitial consonantal segment on the left and on the right a single consonantal prefix followed by a consonantal segment.

The rule may be written as follows:

119. Prefix Schwa Epenthesis

$$\emptyset \rightarrow \overset{V}{[-\text{tense}]} / \# \langle [+\text{seg}]_1 \rangle\ [+\text{cons}]+\_\_\_[+\text{cons}]\ \langle +[+\text{cons}] \rangle$$

Below we show the derivations of the past tense verbs in (112):

120.

a)	Middle (b)	Imperfective
	[uləpkár]	[uləmkár]
	/m+il+b+karu/	/m+il+b+karu/ [+IMP]
Nasal Insertion	-	m+il+mb+karu
Nasal Replacement	-	m+il+m+karu
Stress	m+il+b+káru	m+il+m+káru
Final Vowel Deletion	m+il+b+kár	m+il+m+kár
High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
Prefix Schwa Epenthesis	m+il+əb+kár	m+il+əm+kár
Labial Denasalization	w+il+əb+kár	w+il+əm+kár
Vowel Reduction	-	-

Glottal Schwa Epenthesis	-	-
Blending	ul+əb+kár	ul+əm+kár
Diphthong Simplification	-	-
Labial Devoicing	ul+əp+kár	-
	[uləpkár]	[uləmkár]
b)	Perfective	
	Singular	Plural
	[milkərúr]	[milkár]
	/b+m+il+karu+r/	/b+m+il+karu/
Nasal Insertion	-	-
Nasal Replacement	-	-
Stress	b+m+il+karú+r	b+m+il+káru
Final Vowel Deletion	-	b+m+il+kár
High Vowel Deletion	-	-
Labial Deletion	m+il+karú+r	m+il+kár
VM Deletion	-	-
Prefix Schwa Epenthesis	-	-
Labial Denasalization	-	-
Vowel Reduction	m+il+kərú+r	-
Glottal Schwa Epenthesis	-	-
Blending	-	-

Diphthong Simplification	-	-
Labial Devoicing	-	-
	[milkərúr]	[milkár]

Let us now turn to the (a) middle forms [mukár] and [mlukár]. These two forms differ from the parallel (b) forms in two respects. First, in the (a) forms, the VM /m/ has remained intact, while in the (b) forms [opkár] and [uləpkár] it has been altered by the Labial Denasalization and Blending rules. Second, in the (b) forms, the derivational prefix /b-/ has remained intact while in the (a) forms it has been altered by some process not yet accounted for, and appears as the vowel [u]. It is precisely this alternation of the /b-/ prefix that prevents the Labial Denasalization and Blending rules from affecting the VM /m/, since the VM is no longer prefixed to a stem beginning in a labial consonant. Thus the structural description of the Labial Denasalization rule is not met. However, in the cases where the /b-/ prefix is not altered, that is, the (b) forms, the Labial Denasalization and Blending rules operate regularly on the VM /m/. We can only conclude that there exists a rule that optionally alters the /b-/ prefix in middle forms. Because we want this rule to apply only in middle forms, we must insure that it does not apply to imperfective and perfective forms. We can do this by ordering it after the Labial Deletion rule. Thus a perfective form like [məkərúr] /b+m+karu+r/ will be prevented from undergoing /b-/-alteration, because its /b-/ prefix will have been deleted by the Labial Deletion rule. Imperfective forms are automatically taken care of as a result

of this ordering since their /b-/ prefixes are replaced by nasals by means of the Nasal Replacement rule, which is ordered before Labial Deletion.

It is also clear that this /b-/ alteration takes place before Prefix Schwa Epenthesis. Recall that this epenthesis rule inserts a schwa to the right of a word initial single consonantal prefix if at least one consonantal segment follows. Let us consider for a moment the formation of past participles of active transitive verbs. For those verbs whose stems are nonderived, the past participle marker /-l-/ is inserted to the right of the initial stem con consonant. For example:

121.	/kimud/	'cut hair'	[klímd]	/k+l+imud/
	/basa?/	'count'	[blásə?]	/b+l+asa?/
	/tamik/	'shave'	[təlámk]	/t+l+amik/

Consider now the past participle forms of those verbs with derived stems that we are presently discussing:

122.	/b+dor/	'shade'	a) [uldór]	/b+l+dor/
			b) [bəldór]	/b+l+dor/
	/b+karu/	'give medicine'	a) [ulkár]	/b+l+karu/
			b) [bəlkár]	/b+l+karu/
	/b+doud/	'pay'	a) [uldówd]	/b+l+doud/
			b) [bəldówd]	/b+l+doud/

We see the same type of free variation present in past participles as in middle forms with apparently no difference in meaning. In the (b) forms of the past participle, the Prefix Schwa Epenthesis rule has operated giving on the surface a [bə-] prefix, whereas in the (a)

forms, it appears that the /b-/ prefix is altered before there is any possibility of inserting a schwa to the right of it. We propose then that the optional rule that alters the /b-/ prefix applies somewhere between Labial Deletion and Prefix Schwa Epenthesis.

It is also clear that the /b-/ alternation process must take place before Labial Denasalization. Otherwise the VM /m/ would change to w since it is prefixed to a stem beginning in a labial consonant, the /b-/ prefix. If the /b-/ prefix is altered before Labial Denasalization, then the VM /m/ is no longer followed by a stem initial labial consonant and will not be affected by Labial Denasalization.

The next item to be determined is the form of this rule. It is obvious that underlying morphemic /b-/ is alternating with a surface [u], but it is not clear what processes are involved in such an alternation. To change /b/ to [u] involves switching values for many features. It may be the case that this change occurs in an ordered series of steps which individually seem to be more natural than a single change of /b/ to [u]. It is this latter approach that we will take. We propose the following pair of rules:

123. b → w (Opt)

$b \longrightarrow w \;/\; + \_\_\_ +$

Morphemic /b/ optionally changes to w.

124. Glide Vocalization

$$w \longrightarrow u \;/\; \left\{ \begin{matrix} \# \\ C \end{matrix} \right\} \_\_\_ C$$

The glide w vocalizes to u between consonants and in word initial position.

As we continue to present data, it will become clear that this pair of rules is the correct way to handle the [b]-[u] alternation rather than a single rule changing /b-/ to [u].

Below we give the derivations of both (a) and (b) middle forms in order to demonstrate the operation of this rule sequence:

125.

	[mukár]	[opkár]
	/m+b+karu/	/m+b+karu/
Stress	m+b+káru	m+b+káru
Final Vowel Deletion	m+b+kár	m+b+kár
High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
b → w (Opt)	m+w+kár	-
Glide Vocalization	m+u+kár	-
Prefix Schwa Epenthesis	-	m+ɔb+kár
Labial Denasalization	-	w+ɔb+kár
Vowel Reduction	-	-
Glottal Schwa Epenthesis	-	-
Blending	-	ob+kár
Diphthong Simplification	-	-
Labial Devoicing	-	op+kár
	[mukár]	[opkár]

Consider now some other verbs of the class under discussion. The following verbs have in common the fact that their primary stems begin in a glottal stop.

126.

	Imperfective	
/ʔadw/	[omaʔádw]	'cut with scissors'
/ʔara/	[omaʔár]	'buy'
/ʔell/	[omaʔéll]	'give birth'
/ʔur/	[omaʔúr]	'count'
/ʔull/	[omaʔúll]	'hug'

Below is a list of the present and past tense forms for the middle, imperfective, and perfective aspects of one of these verbs:

127.

Present middle	a)	[moʔár]	/m+b+ʔara/
	b)	[obaʔár]	/m+b+ʔara/
Present imperfective		[omaʔár]	/m+b+ʔara/ [+IMP]
Present perfective	sg)	[maʔarár]	/b+m+ʔara+r/
	pl)	[maʔár]	/b+m+ʔara/
Past middle	a)	[mloʔár]	/m+il+b+ʔara/
	b)	[ulabaʔár]	/m+il+b+ʔara/
Past imperfective		[ulamaʔár]	/m+il+b+ʔara/ [+IMP]
Past perfective	sg)	[milaʔarár]	/b+m+il+ʔara+r/
	pl)	[milaʔár]	/b+m+il+ʔara/

This paradigm differs in many ways from that of [omkár] 'to give medicine' and other verbs whose primary stems do not begin in glottal stops. In all imperfective and perfective forms, and in the (b) middle forms, the stem initial glottal stop is preceded by schwa.

In the parallel forms of verbs like [omkár], the initial stem consonant is preceded by schwa only in those cases where the Prefix Schwa Epenthesis rule inserts it, that is, the present perfective singular and plural. Notice also that the (a) middle forms of [omə?ár] have the vowel [o] as the alternate form of the /b-/ prefix, whereas the parallel forms of [omkár] have the vowel [u].

We can explain these differences by taking into account the Glottal Schwa Epenthesis rule (Chapter Two (51)). Recall that /?/ does not join with any consonants to form consonant clusters. If through affixation or some phonological process, glottal stop appears adjacent to a consonant, a schwa is inserted between them. We have established that this rule is ordered after High Vowel Deletion. The presence of schwas in the imperfective, perfective, and (b) middle forms of verbs like [omə?ár] can be accounted for easily, since the primary stems of such verbs begin in glottal stop. Consider now how we might explain the presence of the vowel [o] in the (a) middle forms [mo?ár] and [mlo?ár]. Why do we not find [mu?ár] and [mlu?ár] instead? Assume that Glottal Schwa Epenthesis operates on these (a) middle forms as well as the other forms of the paradigm. Recall that we have already established the existence of a Blending rule that converts the sequence w plus unstressed nonhigh vowel into the vowel [o]. Thus far, this rule has applied only to those w's derived from the underlying VM /m/. There is no reason to assume that it could not also apply to w's derived from the /b-/ prefix. If this is the case, then Glottal Schwa Epenthesis must apply before Blending.

It must also apply before Glide Vocalization in order to prevent the w from changing to u. Thus the following ordering of rules results:

128. High Vowel Deletion
Labial Deletion
VM Deletion
b → w (Opt)
Prefix Schwa Epenthesis
Labial Denasalization
Vowel Reduction
Glottal Schwa Epenthesis
Glide Vocalization
Blending

Below we give the derivation of [mo?ár] and [obə?ár] to show how these rules yield the correct results:

129.

	[mo?ár]	[obə?ár]
	/m+b+?ara/	/m+b+?ara/
Stress	m+b+?ára	m+b+?ára
Final Vowel Deletion	m+b+?ár	m+b+?ár
High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
b → w (Opt)	m+w+?ár	-
Prefix Schwa Epenthesis	-	m+əb+?ár
Labial Denasalization	-	w+əb+?ár
Vowel Reduction	-	-

Glottal Schwa Epenthesis	m+w+ə?ár	w+əb+ə?ár
Glide Vocalization	-	-
Blending	m+o?ár	ob+ə?ár
Diphthong Simplification	-	-
	[mo?ár]	[obə?ár]

The one form that we have not yet discussed is the past tense of the (a) middle forms, for example, [mlukár] 'to give medicine' and [mlo?ár] 'to buy'. There is one peculiarity about such forms, and that is the absence of the vowel [i] in the past tense marker. Presumably the underlying representations for [mlukár] and [mlo?ár] are /m+il+b+karu/ and /m+il+b+?ara/ respectively. There is no apparent reason for the vowel to disappear from a morpheme where it is normally present. The only solution that we can suggest is that perhaps this vowel should be marked to undergo a minor rule of deletion that applies only when the past tense marker /-il-/ appears with derived verb stems such as those in question. Perhaps the High Vowel Deletion rule, which has been shown to affect some high front stem vowels, is becoming more general and is now beginning to affect the high front vowel of the past tense marker in certain environments.

Causative Verbs

In this section, we continue to discuss verbs with derived stems, specifically, a group of causative verbs which appear to be constructed of a primary stem preceded by a string of inflectional and derivational affixes. They are subject to many of the same

phonological processes as verbs derived by means of the /b-/ prefix.

Below we give some examples of the imperfective forms of some causative verbs and the primary stems from which they are derived.

130.	dákt	'fear'
	omɔkdákt	'frighten'
	látk	'remembrance'
	omɔklátk	'remind'
	rágl	'road'
	omɔkrágl	'guide'
	dólɔʔ	'depth'
	omɔkdólɔʔ	'deepen'

Though it is not difficult to segment these verbs to determine the underlying forms of the inflectional and derivational prefixes, it is somewhat difficult to assign meanings to some of the prefixes. For example, we suggest the following underlying form for the imperfective of such verbs:

131. /m+b+k+Stem/
[+IMP]

The first prefix /m/ is the VM that we have already discussed at length. It undergoes the same phonological processes in causative verbs as in other verbs we have discussed. The second prefix /b-/ is a bit more difficult to identify. It may be the same /b-/ prefix that appears in the derived stems of verbs like [omkár] 'to give medicine', which we discussed in the previous section of this chapter. Or it may be an entirely different prefix which appears in causative

verbs, but which is homophonous with the /b-/ prefix discussed earlier. Whatever its true identity, we will see that it undergoes the same phonological processes as the other /b-/ prefix.

The third prefix /k-/ is also rather difficult to identify. Recall that we spoke earlier of a small class of stative verbs derived by means of a /k-/ prefix (Chapter Three (45)). For example:

132. /dorom/ [kədórəm] 'sharp'
/debo/ [kədéb] 'short'

It may be the case that these two /k-/ prefixes are one and the same, and that all causative verbs are constructed on a derived stative verb stem. If this were the case, then we could say that the notion of causation is introduced by the /b-/ prefix, and that the /m/ affix simply performs its usual role and marks the entire derived stem as a verb. The ideal situation would be if we had a number of sets showing the various stages of derivation, such as the following:

133. a) Stem
b) k + Stem 'stative verb'
c) VM + b + k + Stem 'causative verb'

However, it is usually the case that the only forms available to us are the (a) form, that is, the primary stem, and the (c) form, the causative verb.

Thus we are left with a situation in which there is no overwhelming support for our proposed underlying representation for causative verbs and the semantic labels we place on the various segments. However, there is far less evidence to show that our approximations are incorrect.

Below we list the inflected forms of the causative verb [omɔkdákt] 'to frighten':

134. Present middle	a)	[mukdákt]	/m+b+k+dakt/
	b)	[obɔkdákt]	/m+b+k+dakt/
Present imperfective		[omɔkdákt]	/m+b+k+dakt/ [+IMP]
Present perfective	sg)	[mɔkdɔktíy]	/b+m+k+dakt+ii/
	pl)	[mɔkdákt]	/b+m+k+dakt/
Past middle	a)	[mlukdákt]	/m+il+b+k+dakt/
	b)	[uləbɔkdákt]	/m+il+b+k+dakt/
Past imperfective		[uləmɔkdákt]	/m+il+b+k+dakt/ [+IMP]
Past perfective	sg)	[miləkdɔktíy]	/b+m+il+k+dakt+ii/
	pl)	[miləkdákt]	/b+m+il+k+dakt/

A brief inspection of the underlying forms will show that they are constructed according to the regular formulae that we have observed in verbs of other classes. In middle and imperfective forms, the VM /m/ appears as a prefix in first position, while in perfective forms it appears as an infix positioned immediately to the right of the initial stem consonant. In all past tense forms, the past tense marker /-il-/ appears in its proper position, immediately to the right of the VM /m/.

We can easily derive the inflected forms above by means of the rules postulated thus far. For example:

135. Imperfective

	Present	Past
	[oməkdákt]	[uləməkdákt]
	/m+b+k+dakt/ [+IMP]	/m+il+b+k+dakt/ [+IMP]
Nasal Insertion	m+nb+k+dakt	m+il+nb+k+dakt
Nasal Replacement	m+m+k+dakt	m+il+m+k+dakt
Stress	m+m+k+dákt	m+il+m+k+dákt
Final Vowel Deletion	-	-
High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
b → w (Opt)	-	-
Prefix Schwa Epenthesis	m+əm+ək+dákt	m+il+əm+ək+dákt
Labial Denasalization	w+əm+ək+dákt	w+il+əm+ək+dákt
Vowel Reduction	-	-
Glottal Schwa Epenthesis	-	-
Glide Vocalization	-	-
Blending	om+ək+dákt	ul+əm+ək+dákt
Diphthong Simplification	-	-
	[oməkdákt]	[uləməkdákt]

136. Present Perfective

	Singular	Plural
	[məkdəktíy]	[məkdákt]
	/b+m+k+dakt+íy/	/b+m+k+dakt/
Nasal Insertion	-	-
Nasal Replacement	-	-
Stress	b+m+k+dakt+íy	b+m+k+dákt
Final Vowel Deletion	-	-
High Vowel Deletion	-	-
Labial Deletion	m+k+dakt+íy	m+k+dákt
VM Deletion	-	-
b → w (Opt)	-	-
Prefix Schwa Epenthesis	m+ək+dakt+íy	m+ək+dákt
Labial Denasalization	-	-
Vowel Reduction	m+ək+dəkt+íy	-
Glottal Schwa Epenthesis	-	-
Glide Vocalization	-	-
Blending	-	-
Diphthong Simplification	-	-
	[məkdəktíy]	[məkdákt]

137. Past Perfective

	Singular	Plural
	[miləkdəktíy]	[miləkdákt]
	/b+m+il+k+dakt+iy/	/b+m+il+k+dakt/
Nasal Insertion	-	-
Nasal Replacement	-	-
Stress	b+m+il+k+dakt+íy	b+m+il+k+dákt
Final Vowel Deletion	-	-
High Vowel Deletion	-	-
Labial Deletion	m+il+k+dakt+íy	m+il+k+dákt
VM Deletion	-	-
b → w (Opt)	-	-
Prefix Schwa Epenthesis	m+il+ək+dakt+íy	m+il+ək+dákt
Labial Denasalization	-	-
Vowel Reduction	m+il+ək+dəkt+íy	-
Glottal Schwa Epenthesis	-	-
Glide Vocalization	-	-
Blending	-	-
Diphthong Simplification	-	-
	[miləkdəktíy]	[miləkdákt]

Notice that the middle forms of [omɔkdák̀t] freely vary in the same way as the parallel forms of verbs like [omkár], discussed earlier. This fact seems to indicate that the /b-/ prefixes that show up in the two types of verbs are probably the same prefix. If this is true, then we are justified in treating the sequence of [-bk-] in causative verbs as a combination of two prefixes /b-/ and /k-/.

Below we have a derivation showing how the rules we have postulated are capable of deriving both (a) and (b) middle forms of verbs like [omɔkdák̀t]:

138.

	[mukdák̀t]	[obɔkdák̀t]
	/m+b+k+dakt/	/m+b+k+dakt/
Stress	m+b+k+dák̀t	m+b+k+dák̀t
Final Vowel Deletion	-	-
High Vowel Deletion	-	-
Labial Deletion	-	-
VM Deletion	-	-
b → w (Opt)	m+w+k+dák̀t	-
Prefix Schwa Epenthesis	-	m+ɔb+ɔk+dák̀t
Labial Denasalization		w+ɔb+ɔk+dák̀t
Vowel Reduction	-	-
Glottal Schwa Epenthesis	-	-

Glide Vocalization	m+u+k+dák̀t	-
Blending	-	ob+ɔk+dák̀t
Diphthong Simplification	-	-
	[mukdák̀t]	[obɔkdák̀t]

Once again, as in the case of verbs like [omkár] 'to give medicine', we notice that the past tense of the (a) middle forms of causative verbs is peculiar in that the vowel [i] of the past tense marker /-il-/ is absent. That is, we find [mlukdákt] for the verb 'to frighten' rather than [milukdákt]. We have already suggested that perhaps this vowel should be marked to undergo a minor rule of deletion that applies only when the past tense marker /-il-/ appears with derived verb stems. There seems to be no other apparent explanation as to why this morpheme should alternate in this manner, when it is normally stable in form. Perhaps further investigation will provide a more suitable analysis.

Footnotes to Chapter Three

[1]Noam Chomsky and Morris Halle, The Sound Pattern of English (New York: Harper and Row, 1968), Chapter Nine.

[2]Data are taken from R. Ross MacDonald and Soenjono Darjowidjojo, A Student's Reference Grammar of Modern Formal Indonesian (Washington: Georgetown University Press, 1967), pp. 38-46.

[3]The high front vowel in the first syllable of /dila/ is exceptionally deleted by High Vowel Deletion. The schwas are inserted in this position by the epenthesis rule discussed in Chapter One which breaks up word initial dental clusters, Dental Schwa Epenthesis (Chapter One (31)).

[4]The alternation present in the two forms of the third plural human suffix differs slightly from those present in the other persons. There are al least two possible ways of handling the facts. The underlying from of the suffix could be /-ətərir/. When it follows a vowel initial stem, a minor rule deletes the first schwa after the stem final vowel. For example:

/rusu+ətərir/ ⟶ rusu+tərir

On the other hand, the underlying form of the suffix could be /-tərir/. A schwa is inserted then between a stem final consonant and an initial suffix consonant before the initial consonant has a chance to be deleted. No overwhelming evidence exists for either solution.

[5]The vowel [o] which appears in the first syllable of the forms in (66) is the surface manifestation of the VM /m/. The phonological processes involved are discussed in the Verb Marker section of Chapter Three.

[6]For a discussion of global rules in phonology see the following papers: Charles Kisseberth, "Is Rule Ordering Necessary in Phonology?" Issues in Linguistics: Papers in Honor of Henry and Renee Kahane, ed. Braj Kachru et al. (Urbana: University of Illinois Press, 1973); Charles Kisseberth, "On the Alternation of Vowel Length in Klamath: a Global Rule," Issues in Phonological Theory, ed. Michael Kenstowicz and Charles Kisseberth (The Hague: Mouton, 1973); Charles Kisseberth, C. W. Kim, and Michael Kenstowicz, An Introduction to Phonological Structure (To appear).

[7]These universal principles are discussed in Andreas Koutsoudas, Gerald Sanders, and Craig Noll, "On the Application of Phonological Rules," (Indiana University Linguistics Club, 1971).

CHAPTER FOUR: Reduplication

Introduction

Throughout the Indonesian language family, the process of reduplication is rather widespread. Before moving into a discussion of Palauan reduplication, we will take a brief look at the various types of reduplication found in Indonesian languages. There are at least five types represented.[1]

The first type results in complete reduplication of the stem, as in:

Indonesian	orang	'human being'
	orang-orang	'human beings'
	djalan	'walk'
	djalan-djalan	'walk about'
Tagalog	ma-hiya	'be ashamed'
	ma-hiya-hiya	'be a little ashamed'
	mag-walis	'sweep'
	mag-walis-walis	'sweep a little'

The second type involves reduplication of all but the last consonant of the stem, as in:

Ibanag	sinnum	'garment'
	sinnu-sinnum	'garments'
Tontemboan	londey	'ships'
	londe-londey	'all sorts of ships'

Footnotes for this chapter are on p. 209.

Dayak	humoṅ	'stupid'
	humo-humoṅ	'somewhat stupid'
Old Javanese	wĕlas	'pity'
	ma-wĕla-wĕlas	'deep pity'

The third type results in copying the first syllable of the stem, as in:

Tontemboan	gorit	'to saw'
	go-gorit	'saw'
Bulu	tura	'push'
	tutura	'pole for pushing'
Javanese	wĕdi	'timid'
	wĕ-wĕdi	'scarecrow'
Formosa (North Border)	warigbig	'bore'
	wa-warigbig	'borer'

The fourth type involves copying all but the first syllable of the stem, as in:

Madurese	soṅay	'river'
	ṅay-soṅay-an	'ditch'

The fifth and last type results in reduplication of the initial consonant of the stem plus the vowel [e], as in:

Indonesian	laki	'male'
	le-laki	'male, man, husband'
	tapi	'but'
	te-tapi	'but'

As is clear from the examples, reduplication signified a variety of meanings: plurality, repetition of action, distribution of action, intensification of action, weakening of action, etc. As the Palauan data is presented, we will see that many of these meanings are associated with reduplicated forms in that language also.

Palauan Reduplication in General

Two of the various types of reduplication processes described above are expecially productive in Palauan. The first, which we will refer to as Reduplication I (RE I), involves copying all segments of a stem but the rightmost one. That is, given stems of the shapes:

1. a) $C_1V_1C_2V_2C_3$
   b) $C_1V_1C_2C_3$
   c) $C_1V_1C_2V_2$
   d) $C_1V_1V_2C_2$

RE I will yield respectively:

2. a) $C_1V_1C_2V_2 + C_1V_1C_2V_2C_3$
   b) $C_1V_1C_2 + C_1V_1C_2C_3$
   c) $C_1V_1C_2 + C_1V_1C_2V_2$
   d) $C_1V_1V_2 + C_1V_1V_2C_2$

RE I may then be formulated as follows:

3. Reduplication I

$$\underset{\text{stem}}{[}\ X\ [+\text{seg}]\ \underset{\text{stem}}{]} \Rightarrow \underset{\text{stem}}{[}\ X\ X\ [+\text{seg}]\ \underset{\text{stem}}{]}$$

$$1\ \ 2\ \ 3\ \ 4 \qquad\qquad 1\ \ 2\ \ 2\ \ 3\ \ 4$$

Condition: $X = [+\text{seg}]_1^4$

The reason for incorporating stem boundaries in the formulation of the rule and for positioning them to the far left and right of the reduplicated string will become clear in a later section of this chapter where we discuss the application of rules such as Nasal Insertion and Nasal Replacement on reduplicated forms.

The second type of reduplication (RE II) involves copying the initial consonant of the stem and inserting the vowel [e] to the right of the new consonant. Given stems of the shapes:

4. a) $C_1V_1C_2V_2C_3$

   b) $C_1V_1C_2C_3$

   c) $C_1V_1C_2V_2$

   d) $C_1V_1V_2C_2$

RE II will yield respectively:

5. a) $C_1e + C_1V_1C_2V_2C_3$

   b) $C_1e + C_1V_1C_2C_3$

   c) $C_1e + C_1V_1C_2V_2$

   d) $C_1e + C_1V_1V_2C_2$

RE II may then be formulated as follows:

6. Reduplication II

$$[_{\text{stem}}\ C_j\ X\ ]_{\text{stem}} \Longrightarrow [_{\text{stem}}\ C_j \begin{bmatrix} V \\ -\text{high} \\ -\text{low} \\ -\text{back} \end{bmatrix} C_j\ X\ ]_{\text{stem}}$$

RE II can operate on unreduplicated stems and also on intermediate forms that have been reduplicated by RE I. For example, suppose a stem of the shape:

7. $C_1V_1C_2V_2C_3$

has been reduplicated by RE I to form the intermediate stem:

8. $[_{stem}\ C_1V_1C_2V_2 + C_1V_1C_2V_2C_3\ ]_{stem}$

This new stem can be reduplicated again by RE II to yield:

9. $[_{stem}\ C_1e + C_1V_1C_2V_2 + C_1V_1C_2V_2C_3\ ]_{stem}$

However, RE I cannot operate on a form that has been reduplicated by RE II. For example, we would never find a form of the shape:

10. $*C_1e + C_1V_1C_2V_2 + C_1e + C_1V_1C_2V_2C_3$

Obviously then the ordering between the two rules is:

11. RE I

RE II

Though reduplication occurs both in Palauan nouns and verbs, it is a productive synchronic process only in verbs. Occasionally one finds an example of a reduplicated noun, which suggests that perhaps at an earlier stage of the language this process may have been productive in nouns. For example:

12.	/ʔatu/	[ʔát]	'smoke'
		[ʔəta?át]	'mist, fog'

Among verbs, reduplication is widespread, affecting both stative and active verbs. It is not possible to predict whether or not a particular stem will undergo reduplication. It is necessary then that a stem be marked in its lexical entry to undergo one or both reduplication rules. Below we give some examples of stative verbs which are subject to these processes:

13.

		RE I	
mədákt	'afraid'	mədəkdákt	'sort of afraid'
məsáyk	'lazy'	məsisáyk	'sort of lazy'
məkár	'awake'	məkərkár	'continually awake'
mədú?	'skillful'	mədə?ədú?	'especially skillful'
		RE II	
dəkímɔs	'wet'	dedəkímɔs	'sort of wet'
bɛ́ot	'easy'	bebɛ́ot	'sort of easy'
sné?ər	'sick'	sesné?ər	'kind of sick'
mə?úw	'shady'	mə?e?úw	'sort of shady'

Some of the above forms are subject to both reduplication rules. For example:

14.	mədákt	'afraid'	mədedəkdákt	'sort of afraid'
	məsáyk	'lazy'	məsesisáyk	'sort of lazy'
	mədú?	'skillful'	mədedə?ədú?	'especially skillful'

The additional layer of reduplication produced by RE II apparently does not result in additional meaning. Native speakers typically state that the form which has undergone only one reduplication rule and the form which has undergone both mean the same thing.

The forms of (13) and (14) do not prove problematic in terms of phonological analysis. They simply undergo the reduplication rule or rules and then become subject to rules which have been discussed in earlier chapters. For example:

15.

	[mə?e?úw]	[məsisáyk]
	'sort of shady'	'sort of lazy'
	/m+?uu/	/m+saik/
RE I	-	m+sai+saik
RE II	m+?e+?uu	-
Gliding rules	m+?e+?uw	m+say+sayk
Stress	m+?e+?úw	m+say+sáyk
Prefix Schwa Epenthesis	m+ə?e+?úw	m+əsay+sáyk
Vowel Reduction	-	m+əsəy+sáyk
Diphthong Simplification	-	m+əsi+sáyk
	[mə?e?úw]	[məsisáyk]

The only thing which is problematic is the failure of the vowel [e] in RE II forms to undergo Vowel Reduction. This is true not only of the forms in (13) and (14) but also of all forms which undergo RE II. Since we are considering the entire string which results from the application of the reduplication rules as a stem and therefore subject to those phonological rules which apply to stems, the vowel [e] of RE II forms should reduce to schwa by Vowel Reduction. We can only conclude that, since it does not reduce, it must be in some way marked as an exception.

Among active transitive verbs, we find the greatest amount of reduplication. Five inflected forms of such verbs may be reduplicated: middle and imperfective in both present and past tenses, and the past participle. Below we list unreduplicated and reduplicated forms of the stem /tabak/ 'to patch':

16. Present middle

Unreduplicated	mətábək
RE I	mətəbətábək
RE II	mətetəbətábək

Past Middle

Unreduplicated	miltábək
RE I	miltəbətábək
RE II	miltetəbətábək

Present imperfective

Unreduplicated	məlábək
RE I	mələbətábək
RE II	məleləbətábək

Past imperfective

Unreduplicated	millábək
RE I	milləbətábək
RE II	milleləbətábək

Past participle

Unreduplicated	təlábək
RE I	tələbətábək

Once again, active transitive verbs prove to be the most interesting in terms of morphophonemic alternations, and provide us with a large body of data on which to base our discussions. Each of the categories in (16), middle, imperfective, and past participle, presents problems for phonological analysis, particularly rule ordering. In the next section of this chapter, we will discuss each in detail, showing how

they are constructed, what their semantic significance is, and how they reflect irregular behavior of phonological rules.

Reduplication in Active Transitive Verbs

We now begin our discussion of the two reduplication rules as they operate in the various forms of active transitive verbs: first, the past participle; second, the middle aspect; third, the imperfective aspect.

Past Participles

Recall that the method of forming past participles of active transitive verbs is infixing the past participle marker /-l-/ to the immediate right of the initial consonant of the underlying stem. For example:

17.	/kesi/	'scrape'	/k+l+esi/	[klés]
	/ʔatu/	'smoke'	/ʔ+l+atu/	[ʔəlát]
	/tabak/	'patch'	/t+l+abak/	[təlábɔk]
	/debos/	'cut cord'	/d+l+ebos/	[dəlébɔs]
	/balo?/	'shoot'	/b+l+alo?/	[bláləʔ]

Consider now the following reduplicated past participles:

18.	/ʔatu/	'smoke'	[ʔələtəʔát]	'smoked a lot'
	/tabak/	'patch'	[təlɔbɔtábɔk]	'patched all over'
	/debos/	'cut cord'	[dəlɔbɔdébɔs]	'cut in many pieces'

It is fairly easy to see what processes have taken place in these forms, namely RE I and infixation of /-l-/. However, it is not clear in what order these two processes take place. Suppose we take the approach that infixation of /-l-/ occurs in the syntactic component,

or as the result of some spelling rule which takes a syntactic feature and gives it a phonological shape, which is then placed in the proper position in the linear string upon which the phonological rules operate. Given the stem /tabak/, its past participle form would arrive at the phonological component with the form /t+l+abak/. Suppose we now consider RE I to be a phonological rule. Obviously, given the formulation of RE I in (3), we would derive the incorrect form *t+l+aba+t+l+abak. In other words, the infix would be reduplicated along with the verb stem. Either this approach is wrong or the RE I rule must be drastically revised so that it can distinguish between stem segments and prefixal segments. We choose to retain the present formulation of RE I, since it is capable of handling all other reduplicated forms that we have encountered and will present in subsequent sections of this chapter.

Given the validity of our present RE I rule, then, it is clear that in whatever component or components of the grammar the two processes take place, infixation must follow RE I. We have no evidence to show that infixation of /-l-/ is a phonological rule and that the underlying form of [t lab k] is anything other than /t+l+abak/. Consequently it appears that RE I may be something other than a phonological rule, perhaps a syntactic rule or series of syntactic rules. In fact, the very function of reduplication, the generating of a copy to indicate plurality, repetition, distributedness, etc. seems to classify it as a syntactic or morphological process rather than a phonological one. The data we present in the

remaining sections of this chapter, as well as the reduplicated past participle forms presented above, seem to point in the direction of treating reduplication as a process which precedes the phonological component.

Middle

The middle forms of active transitive verbs are subject to both types of reduplication. Below we give some examples:

19.	/kesi/	'scrape'	[məkés]	a)	[məkəskés]
				b)	[məkekəskés]
	/balo?/	'shoot'	[obálə?]	a)	[obələbálə?]
				b)	[obebələbálə?]
	/ata?/	'wash'	[məŋátə?]	a)	[məŋətəŋátə?]
				b)	[məŋeŋətəŋátə?]
	/tamik/	'shave'	[mətámk]	a)	[mətəmtámk]
				b)	[mətetəmtámk]
	/debos/	'cut cord'	[mədébəs]	a)	[mədəbədébəs]
				b)	[mədedəbədébəs]

Here we see various layers of reduplication. The (a) forms have been derived by RE I, whereas the (b) forms have been derived by RE I and RE II. Take for example the stem /kesi/ 'to scrape':

20.		[məkəskés]	[məkekəskés]
		/m+kesi/	/m+kesi/
	RE I	m+kes+kesi	m+kes+kesi
	RE II	-	m+ke+kes+kesi
	Stress	m+kes+késı	m+ke+kes+késı

Final Vowel Deletion	m+kes+kés	m+ke+kes+kés
Prefix Schwa Epenthesis	m+ǝkes+kés	m+ǝke+kes+kés
Vowel Reduction	m+ǝkǝs+kés	m+ǝke+kǝs+kés
	[mǝkǝskés]	[mǝkekǝskés]

Reduplicated middle forms are best translated by meansof the phrases 'easy to . . .' or 'easily . . .'. For example:

21. mǝkǝskés 'easy to scrape, easily scraped'

mǝkekǝskés 'easy to scrape, easily scraped'

They are found in sentences such as the following:

22. a bád a mǝkǝskés

rock scrape

'The rock is easy to scrape.'

'The rock is easily scraped.'

Native speakers do not make a distinction in meaning between (a) and (b) forms. Perhaps at an earlier stage in the language, there existed such a distinction, but if so, it has certainly been lost.

Imperfective

We turn now to an examination of reduplicated forms of active transitive verbs in the imperfective aspect. These follow the same patterns as reduplicated middle forms in that they are derived either by RE I alone or by RE I and RE II together. However, they differ from reduplicated middle forms in the same way that unreduplicated imperfective and middle forms differ. Imperfective forms are marked with the feature [+IMP] which triggers the operation of the Nasal Insertion rule, which in turn is followed by the Nasal

Replacement rule. We have seen in Chapter Three that these two rules operate regularly on unreduplicated forms. However, as we shall demonstrate, their interaction with the two reduplication rules brings about a number of problems having to do with rule ordering and rule application. Below we have listed several active transitive verb stems with their imperfective forms, both unreduplicated and reduplicated. They are grouped on the basis of the initial segment of the underlying stem:

23. Velar consonant

/kesi/	'scrape'	[məŋés]	a) [məŋəskés]
			b) [məŋkekəskés]
/ʔatu/	'smoke'	[məŋát]	a) [məŋətəʔát]
			b) [məŋʔeʔətəʔát]

Labial consonant

/balo?/	'shoot'	[omálə?]	a) [omələbálə?]
			b) [ombebələbálə?]

Dental consonant

/tabak/	'patch'	[məlábək]	a) [mələtətábək]
			b) [məleləbətábək]
/dakul/	'bury'	[məlákl]	a) [mələdákl]
			b) [məleləkdákl]
/subs/	'sprinkle'	[məlúps]	a) [mələpsúps]
			b) [məleləpsúps]
/lo?ad/	'break cord'	[məló?əd]	a) [mələ?əló?əd]
			b) [məleləʔəlóʔəd]

/rusa?/	'pound'	[mərúsə?]	a)	[mərsərúsə?]
			b)	[mərersərúsə?]
Vowel				
/amul/	'cut grass'	[məláml]	a)	[mələmláml]
			b)	[məleləmláml]

Once again, each verb has two reduplicated forms, one in which RE I alone has operated, and one in which both RE I and RE II have operated. Just as with reduplicated middle forms, there appears to be no semantic distinction between the two forms. When asked to differentiate between them, native speakers invariably stated that the two forms meant exactly the same thing and demonstrated that they could be used interchangeably in the same semantic and syntactic context.

There is a variety of meanings associated with reduplicated imperfective forms as we move from one verb stem to another. Sometimes the reduplication signifies repetition of action, as in:

24.	/tabak/	'patch'	[mələtətábək]	'to put many patches'
			[məleləbətábək]	
	/ʔatu/	'smoke'	[məŋətəʔát]	'to smoke many things'
			[məŋʔeʔətəʔát]	
	/dauʔ/	'cut'	[məludáwʔ]	'to cut many things'
			[məleludáwʔ]	

Sometimes the reduplication signifies action that is repeated absentmindedly or without any goal in mind, as in:

25.	/ʔaus/	'weave'	[məŋuʔáws]	'to sort of weave; to just sit around weaving'
			[məŋʔeʔuʔáws]	

	/balo?/	'shoot'	[oməlabálə?] [ombebələbálə?]	'to play around with a slingshot'
	/le?ot/	'tie'	[məla?əlé?ət] [məlelə?əlé?ət]	'to fool around with string by tying knots'

Sometimes reduplication indicates distributed action, as in:

26.	/dakul/	'bury'	[mələkdákl] [məleləkdákl]	'to bury something here, something there'
	/tamik/	'shave'	[mələmtámk] [məleləmtámk]	'to shave a little here, a little there'

It is not possible to predict which meaning will be associated with a particular stem when reduplicated. So we assume that this type of information must be included in the lexical entry of each stem, as well as some indication as to whether or not the stem may be reduplicated at all.

Let us consider now the interaction between the two reduplication rules and those rules postulated in Chapter Three which operate on imperfective forms, that is, Verbal Nasal Epenthesis, Nasal Insertion, Nasal Replacement, and Dental Denasalization. We repeat those rules below for convenience:

27. Verbal Nasal Epenthesis

$$\emptyset \rightarrow \begin{bmatrix} \text{C} \\ \text{+nas} \\ \text{-ant} \\ \text{-cor} \end{bmatrix} \quad / \quad [\underset{\substack{\text{verb} \\ \text{stem} \\ [\text{-IMP}]}}{\_\_\_} \ \text{V}$$

Insert a velar nasal to the left of an initial vowel of a verb stem marked [-IMP].

28. Nasal Insertion

$$\emptyset \longrightarrow \overset{C}{[+nas]} \; / \; [\underset{[+IMP]}{\overset{stem}{\_\_\_}} \begin{Bmatrix} C \\ [-son] \\ \\ V \end{Bmatrix}$$

Insert a nasal consonant to the left of a stem marked [+IMP] if that stem begins in a nonsonorant consonant or a vowel.

29. Nasal Replacement

$$\begin{array}{ccccccc} & & & \overset{C}{\left[\begin{smallmatrix}\alpha\,ant\\ \beta\,cor\end{smallmatrix}\right]} & & & \overset{2}{\left[\begin{smallmatrix}\alpha\,ant\\ \beta\,cor\end{smallmatrix}\right]} \\ + & \overset{C}{[+nas]} & & & & & \\ 1 & 2 & & 3 & \Longrightarrow & 1 & \emptyset \end{array}$$

In stem initial position, a nasal consonant becomes homorganic to a following consonant. The latter consonant is deleted.

30. Dental Denasalization

$$\overset{C}{\begin{bmatrix}+nas\\ +ant\\ +cor\end{bmatrix}} \longrightarrow \begin{bmatrix}-nas\\ +lat\end{bmatrix}$$

Convert n to l.

Notice that rules (27) to (29) make explicit mention of an initial stem boundary. These three processes take place in this position only. Recall also that the two reduplication rules are formulated in such a way that the entire string which is the output of each rule is considered a stem. So just as rules (27) to (29) operate in stem initial position in unreduplicated forms, they also operate in this position in reduplicated forms.

Let us consider the derivation of the (a) forms in the imperfective reduplicated column of (23). For the present we will limit our discussion to the consonant initial stems. It is clear that the (a) forms have undergone RE I only, and that they can be derived in a straightforward manner if we order the rules as follows:

31. RE I
Nasal Insertion
Nasal Replacement
Dental Denasalization

For example:

32.

	[omələbálə?]
	/m+balo?/ [+IMP]
RE I	m+balo+balo?
Nasal Insertion	m+nbalo+balo?
Nasal Replacement	m+malo+balo?
Dental Denasalization	-
Stress	m+malo+bálo?
Final Vowel Deletion	-
Prefix Schwa Epenthesis	m+əmalo+bálo?
Labial Denasalization	w+əmalo+bálo?
Vowel Reduction	w+əmələ+bálə?
Blending	omələ+bálə?
	[omələbálə?]

Now consider what ordering would be needed to derive reduplicated imperfectives of vowel initial stems, as in:

33. /amul/ 'cut grass' [məláml] [məlәmláml]

If we were to use the ordering of (31) the reduplicated form could not be correctly derived. For example:

34.

	[məláml]
	/m+amul/ [+IMP]
RE I	m+amu+amul
Nasal Insertion	m+namu+amul
Nasal Replacement	-
Dental Denasalization	m+lamu+amul
Stress	m+lamu+ámul
High Vowel Deletion	m+lamu+áml
Prefix Schwa Epenthesis	m+ələmu+áml
Vowel Reduction	m+ələmu+áml
	*[məlәmuáml]

The major problem here is that the Nasal Insertion rule places a nasal only in the leftmost occurrence of the stem. This causes an additional problem in that the High Vowel Deletion rule cannot delete the high back vowel of the copied stem, that is, the leftmost occurrence of the stem, because this vowel is not flanked by two stem consonants. We might remedy the problem by allowing the Nasal Insertion rule to insert two nasal consonants, one in the original stem and one in the copy. For example:

35.

	/m+amul/ [+IMP]
RE I	m+amu+amul
Nasal Insertion	m+namu+namul
Nasal Replacement	-
Dental Denasalization	m+lamu+lamul
Stress	m+lamu+lámul
High Vowel Deletion	m+lam+láml
Prefix Schwa Epenthesis	m+əlam+láml
Vowel Reduction	m+ələm+láml
	[mələmláml]

However, if we allow Nasal Insertion to operate this way, consider what would happen to consonant initial stems such as those derived in (32). For example:

36.

	[omələ́balə?]
	/m+balo?/ [+IMP]
RE I	m+balo+balo?
Nasal Insertion	m+nbalo+nbalo?
Nasal Replacement	m+malo+malo?
Dental Denasalization	-
Stress	m+malo+málo?
Final Vowel Deletion	-
Prefix Schwa Epenthesis	m+əmalo+málo?
Labial Denasalization	w+əmalo+málo?
Vowel Reduction	w+əmələ+málə?

Blending	omələ+málə?
	*[omələmálə?]

The problem here is that the initial consonant of the original stem has been replaced by a homorganic nasal. Thus if we want Nasal Insertion to operate on all stems, both originals and copies, then we must allow it to do so only in vowel initial stems.

An alternative solution to the problem concerning vowel initial stems involves a change in the ordering of RE I and Nasal Insertion. Suppose we retain the practice, as in (32), of allowing Nasal Insertion to apply only to the leftmost occurrence of the stem. And suppose we adopt, in addition, the following ordering of rules for vowel initial stems only:

37. Nasal Insertion
RE I
Nasal Replacement
Dental Denasalization

The reduplicated vowel initial stems can now be derived in a straightforward way.

38.

	/m+amul/ [+IMP]
Nasal Insertion	m+namul
RE I	m+namu+namul
Nasal Replacement	-
Dental Denasalization	m+lamu+lamul
Stress	m+lamu+lámul

High Vowel Deletion	m+lam+lám̀l
Prefix Schwa Epenthesis	m+əlam+lám̀l
Vowel Reduction	m+ələm+lám̀l
	[mələmlám̀l]

We have then a situation in which some forms are correctly derived by one ordering of the rules and other forms are correctly derived by another ordering. That is, for consonant initial stems, we have the ordering:

39. RE I

Nasal Insertion

For vowel initial stems, we have the ordering:

40. Nasal Insertion

RE I

A third possibility is to adopt two different Nasal Insertion rules, one for consonant initial stems and another for vowel initial stems. Notice that in the present formulation of Nasal Insertion, we must make explicit mention of both kinds of stems anyway:

41. Nasal Insertion

$$\emptyset \rightarrow \overset{C}{[+nas]} \; / \; [\underset{\substack{stem \\ [+IMP]}}{\_\_\_} \; \left\{ \begin{matrix} C \\ [-son] \end{matrix} \right. \quad \left. \begin{matrix} \\ V \end{matrix} \right\}$$

This fact is perhaps an indication that the rule should be divided into two rules. For example:

42. Nasal Insertion: Vowel Initial Stems

$$\emptyset \rightarrow \overset{C}{[+nas]} \; / \; [\underset{\substack{stem \\ [+IMP]}}{\_\_\_} \; V$$

43. Nasal Insertion: Consonant Initial Stems

$$\emptyset \longrightarrow \overset{C}{[+nas]} \; / \; [\underset{\substack{stem \\ [+IMP]}}{\_\_\_} \; \overset{C}{[-son]}$$

In this case, the ordering with respect to RE I would be:

44. Nasal Insertion: Vowel Initial Stems

RE I

Nasal Insertion: Consonant Initial Stems

We will return to this solution later when we discuss forms affected by RE II as well as RE I.

Further problems concerning rule ordering are created by the (b) forms in (23). We repeat them below:

45. Velar consonant

/kesi/	'scrape'	[məŋkekəskés]
/ʔatu/	'smoke'	[məŋʔeʔətəʔát]

Labial consonant

/balo?/	'shoot'	[ombebələbálə?]

Dental consonant

/tabak/	'patch'	[məleləbətábək]
/dakul/	'bury'	[məleləkdákl]
/subs/	'sprinkle'	[məleləpsúps]
/lo?ad/	'break cord'	[məlelə?ələ́ʔəd]
/rusa?/	'pound'	[mərersərúsə?]

Vowel

/amul/	'cut grass'	[məleləmláml]

Consider first the velar and labial stems. It is clear that the following ordering is correct for at least three of the rules in question:

46. RE I

RE II

Nasal Insertion

For example:

47.

	[məŋkekəskés]	[ombebələbálə?]
	/m+kesi/ [+IMP]	/m+balo?/ [+IMP]
RE I	m+kes+kesi	m+balo+balo?
RE II	m+ke+kes+kesi	m+be+balo+balo?
Nasal Insertion	m+nke+kes+kesi	m+nbe+balo+balo?

However a problem arises in the application of the next rule, Nasal Replacement. Recall that this rule is stated as a transformational rule which does two things. It assimilates the inserted nasal to the following consonant and deletes that consonant. But in reduplicated (b) forms of velar and labial stems, only the assimilation process takes place. The consonant to the right of the inserted nasal remains. This indicates that perhaps the nasal replacement process should be represented by two rules, assimilation and consonant deletion, rather than by one rule which effects both changes. If this were the case, then the reduplicated (b) forms of velar and labial stems could be marked as exceptions to the consonant deletion rule. This reformulation of the nasal replacement process does not affect any of our earlier analysis, since we are simply substituting two

consecutive rules for one rule in each derivation. The two new rules may be stated as follows:

48. Nasal Assimilation

$$\overset{C}{[+nas]} \longrightarrow \begin{bmatrix} \alpha ant \\ \beta cor \end{bmatrix} \quad / \quad + \_\_\_\_ \begin{bmatrix} C \\ \alpha ant \\ \beta cor \end{bmatrix}$$

49. Consonant Deletion

$$C \longrightarrow \emptyset \; / \; + \overset{C}{[+nas]} \_\_\_$$

Consider how the derivation of (47) may be completed:

50.	Nasal Assimilation	m+ŋke+kes+kesi	m+mbe+balo+balo?
	Consonant Deletion	-	-
	Stress	m+ŋke+kes+kési	m+mbe+balo+bálo?
	Final Vowel Deletion	m+ŋke+kes+kés	-
	Prefix Schwa Epenthesis	m+əŋke+kes+kés	m+əmbe+balo+bálo?
	Labial Denasalization	-	w+əmbe+balo+bálo?
	Vowel Reduction	m+əŋke+kəs+kés	w+əmbe+bələ+bálə?
	Blending	-	ombe+bələ+bálə?
		[məŋkekəskés]	[ombebələbálə?]

Notice that this type of analysis requires that velar and labial initial stems which undergo RE II must be marked as exceptions to Consonant Deletion. In forms where only RE I has applied, consonant deletion occurs regularly. For example:

51.		[məŋəskés]	[omələ bálə?]
		/m+kesi/ [+IMP]	/m+balo?/ [+IMP]
	RE I	m+kes+kesi	m+balo+balo?

Nasal Insertion	m+ŋkes+kesi	m+mbalo+balo?
Nasal Assimilation	m+ŋkes+kesi	m+mbalo+balo?
Consonant Deletion	m+ŋes+kesi	m+malo+balo?
Dental Denasalization	-	-
Stress	m+ŋes+kési	m+malo+bálo?
Final Vowel Deletion	m+ŋes+kés	-
Prefix Schwa Epenthesis	m+əŋes+kés	m+əmalo+bálo?
Labial Denasalization	-	w+əmalo+bálo?
Vowel Reduction	m+əŋəs+kés	w+əmələ+bálə?
Blending	-	omələ+bálə?
	[məŋəskés]	[omələ́bálə?]

Of course, Consonant Deletion applies regularly in unreduplicated forms also. For example:

52.		[məŋés]	[omálə?]
		/m+kesi/ [+IMP]	/m+balo?/ [+IMP]
	Nasal Insertion	m+ŋkesi	m+mbalo?
	Nasal Assimilation	m+ŋkesi	m+mbalo?
	Consonant Deletion	m+ŋesi	m+malo?
	Dental Denasalization	-	-
	Stress	m+ŋési	m+málo?
	Final Vowel Deletion	m+ŋés	-
	Prefix Schwa Epenthesis	m+əŋés	m+əmálo?

Labial Denasalization	-	w+əmálo?
Vowel Reduction	-	w+əmálə?
Blending	-	omálə?
	[məŋés]	[omálə?]

Let us summarize, then, the adjustments needed in our analysis to account for velar and labial stems that undergo both reduplication rules. First, we have reformulated the Nasal Replacement rule so that the processes involved are handled by two successive rules, Nasal Assimilation and Consonant Deletion. Second, we have restricted the operation of the Consonant Deletion rule by allowing it to apply to only unreduplicated forms of velar and labial stems and those reduplicated forms of such stems that have undergone RE I.

Further adjustments are necessary when we attempt to derive the (b) reduplicated forms of dental stems. We repeat them below for convenience:

53.	/tabak/	'patch'	[məlelə bə tábək]
	/dakul/	'bury'	[məlelə kdákl]
	/subs/	'sprinkle'	[məlelə psúps]
	/lo?ad/	'break cord'	[məlelə?ə ló?əd]
	/rusa?/	'pound'	[mərersə rúsə?]

Consider what happens when we employ the ordering of (50) to (52) in the derivation of a dental stem:

54.	[məlelə bə tábək]
	/m+tabak/ [+IMP]
RE I	m+taba+tabak

RE II	m+te+taba+tabak
Nasal Insertion	m+nte+taba+tabak
Nasal Assimilation	-
Consonant Deletion	m+ne+taba+tabak
Dental Denasalization	m+le+taba+tabak
Stress	m+le+taba+tábak
Prefix Schwa Epenthesis	m+ələ+taba+tábak
Vowel Reduction	m+ələ+təbə+tábək
	*[mələtəbətábək]

Clearly this ordering will not work for such forms, and the following ordering is the correct one for dental stems:

55. a) RE I
    b) Nasal Insertion
    c) Nasal Assimilation
    d) Consonant Deletion
    e) Dental Denasalization
    f) RE II

For example:

56. [mələləbətábək]

/m+tabak/
[+IMP]

RE I	m+taba+tabak
Nasal Insertion	m+ntaba+tabak
Nasal Assimilation	-
Consonant Deletion	m+naba+tabak
Dental Denasalization	m+laba+tabak

RE II	m+le+laba+tabak
Stress	m+le+laba+tábak
Prefix Schwa Epenthesis	m+ə́le+laba+tábak
Vowel Reduction	m+ə́le+ləbə+tábək
	[mə́lələ́bə́tábək]

Once again we are faced with an apparent ordering paradox in which one ordering, that of (50), correctly derives reduplicated (b) forms of velar and labial stems, and another ordering, that of (55), correctly derives the parallel forms of dental stems. A possible solution to the paradox involves the positing of two RE II rules, one for labials and velars which would apply immediately after RE I and before Nasal Insertion, and one for dentals which would apply after Dental Denasalization. This would result in the following list of ordered rules:

57. a) RE I
    b) RE II for Velars and Labials
    c) Nasal Insertion
    d) Nasal Assimilation
    e) Consonant Deletion
    f) Dental Denasalization
    g) RE II for Dentals

However, such an analysis clearly misses a generalization because it claims that indeed there are two separate RE II rules that do two different things. In fact, these two rules do the same thing and should be combined into one rule. However, there is no way to do this without causing ordering difficulties. Additional problems are

caused by reduplicated (b) forms of vowel initial stems. We repeat an example of such a form below for convenience:

58. /amul/ 'cut grass' [məleləmlámˡ]

We have the same problem here as we did with reduplicated (a) forms of vowel initial stems, as in:

59. /amul/ 'cut grass' [mələmlámˡ]

Both RE I and RE II must be ordered after Nasal Insertion and Assimilation, Initial Consonant Deletion and Dental Denasalization. Otherwise there is no stem initial consonant available for the two reduplication rules to copy. If, in the derivation of such forms, these two rules are allowed to apply before Nasal Insertion, then we must allow this latter rule to insert nasals in three positions rather than in the one position directly to the right of the VM /m/ prefix. For example:

60.

	/m+amul/	/m+amul/
RE I	m+amu+amul	m+amu+amul
RE II	. -	m+e+amu+amul
Nasal Insertion	m+namu+namul	m+ne+namu+namul
etc.	. . .	. . .
	m+ələm+lámˡ	m+əle+ləm+lámˡ
	[mələmlámˡ]	[məleləmlámˡ]

An alternative solution would be one suggested earlier in which there are two Nasal Insertion rules, one for consonant initial stems and one for vowel initial stems. The rules would then be ordered as follows:

61. a) Nasal Insertion: Vowel Initial Stems

b) RE I

c) RE II

d) Nasal Insertion: Consonant Initial Stems

The Nasal Insertion rule for vowel initial stems would insert a nasal in stem initial position, and in this way provide an initial consonant that could be copied by the reduplication rules. For example:

62.

	/m+amul/ [+IMP]	/m+amul/ [+IMP]
Nasal Insertion: Vowel Initial	m+namul	m+namul
RE I	m+namu+namul	m+namu+namul
RE II	-	m+ne+namu+namul
	.	.
	.	.
	.	.
	[mələmláml]	[mələləmláml]

This solution, at least, provides a way out of the possible ordering paradox created by the derivation of vowel initial forms.

Suppose we continue to take the approach that there are different reduplication rules for different kinds of stems. We have already suggested a possible set of ordered rules to account for consonant initial stems, that of (57). We could combine (57) with (61), modifying (b) of (57) so that it will apply to all stems except original dental stems. This would give us the set of rules:

63. a) Nasal Insertion: Vowel Initial Stems

b) RE I

c) RE II: Velar, Labial, and Original Vowel Initial Stems

d) Nasal Insertion: Consonant Initial Stems

e) Nasal Assimilation

f) Consonant Deletion

g) Dental Denasalization

h) RE II: Dental Initial Stems

These rules would operate as follows in the derivation of both reduplicated forms of /amul/ 'to cut grass':

64.

	[mələ́mlaml]	[məlelə́mlaml]
	/m+amul/ [+IMP]	/m+amul/ [+IMP]
(a)	~~m+~~namul	~~m+~~namul
(b)	~~m+~~namu+namul	~~m+~~namu+namul
(c)	-	~~m+~~ne+namu+namul
(d)	-	-
(e)	-	-
(f)	-	-
(g)	~~m+~~lamu+lamul	~~m+~~le+lamu+lamul
(h)	-	-
	•	•
	•	•
	•	•
	[mələ́mlaml]	[məlelə́mlaml]

With these rules, we can correctly derive reduplicated forms of all consonant initial stems also. For example:

65. a)		[məŋəskés]	[məŋkekəskés]
		/m+kesi/ [+IMP]	/m+kesi/ [+IMP]
	(a)	-	-
	(b)	m+kes+kesi	m+kes+kesi
	(c)	-	m+ke+kes+kesi
	(d)	m+nkes+kesi	m+nke+kes+kesi
	(e)	m+ŋkes+kesi	m+ŋke+kes+kesi
	(f)[2]	m+ɲes+kesi	-
	(g)	-	-
	(h)	-	-
		. . .	. . .
		[məŋəskés]	[məŋkekəskes]
	b)	[məlәbətábək]	[məlelәbətábək]
		/m+tabak/ [+IMP]	/m+tabak/ [+IMP]
	(a)	-	-
	(b)	m+taba+tabak	m+taba+tabak
	(c)	-	-
	(d)	m+ntaba+tabak	m+ntaba+tabak
	(e)	-	-
	(f)	m+naba+tabak	m+naba+tabak

(g)	m+laba+tabak	m+laba+tabak
(h)	-	m+le+laba+tabak
	⋮	⋮
	[mələ́bə́tabək]	[məlelə́bə́tabək]

The most that can be said in favor of this set of rules is that it works. It can correctly derive the surface forms in question. However, it contains a good deal of repetition which, if eliminated, could result in a more elegant analysis. Obviously, there are only two reduplicative processes operating in the language, and yet we must posit three rules. The analysis must also contain two Nasal Insertion rules, even though one rule is capable of handling the process for unreduplicated forms. What is lacking in such an analysis is an explanation of why phonological rules behave in such an apparently irregular manner with respect to reduplicated forms.

Palauan of course is not the first language to display reduplicated forms that behave in an irregular manner or in some way present problems for phonological analysis. This phenomenon has been noticed by linguists in many languages. Recently, Ronnie Wilbur[3] has collected analyses of various languages which exhibit reduplicated forms that are in some way exceptions to regular processes, in the hope that some universal principle might be found that could explain the causes of exceptionality. Wilbur has found that when many languages are examined, the reduplicated forms that are exceptional can be divided into two groups. The first group consists of those which fail to undergo a particular phonological rule, even though the

structural description is met. The second group consists of those which undergo a particular phonological rule even though the structural description is not met. These two cases are referred to as rule failure and rule overapplication respectively. Wilbur gives data from several languages to illustrate these two cases, among them, Madurese, Akan, and Luiseño for rule failure, and Tagalog, Dakota, and Squamish for rule overapplication. Below we repeat one example from each of the two groups for the sake of illustration.

In Luiseño we find an instance of rule failure in reduplicated forms.[4] When /č/ comes to stand before another consonant or at the end of a word by the application of various rules, it is converted to /š/. Consider the following derivation of a reduplicated noun and a reduplicated verb:[5]

66.	/čapomkat+um/	/čikʷi:-/
	'liar'	'to be sad'
Reduplication	čačapomkat+um	čikʷičikʷi:- [+R]
Stress Assignment	čáčapomkat+um	číkʷičíkʷi:- [+R]
Stress Retraction	-	číkʷíčikʷi:-
Syncope	čáčpomkat+um	čikʷíčkʷi:-
Vowel Shortening	-	čikʷíčkʷi-
/č/ to /š/	čášpomkat+um	čikʷíškʷi-
	[čášpomkatum]	[čikʷíškʷi-]
	'liars'	'to suffer'

The /č/ to /š/ rule fails to apply when adjectives are derived from verbs by reduplication. The output of the reduplication rule is $C_1V_1C_2V_2$-$C_1V_1C_2V_2$+ i + č, where $C_1V_1C_2V_2$ is a verb root, i is a nominalizer (later deleted by rule), and č is an absolutive ending. Below are some examples:

67.	?áva	'to be red'	?avá?vaš	'pink'
	máha	'to stop'	mahámhaš	'slow'
	sá:wa	'to wheeze'	sawáswaš	'hoarse'

When the initial consonant of the verb root is /č/, then in the derivation of an adjective from a verb by reduplication, the /č/ to /š/ rule fails to apply. For example:

68.	čára-	'to tear'	čaráčraš	'torn'
			*čarašraš	
	čóka-	'to be limp'	čukáčkaš	'limping'
			*čukáškaš	

Two alternative methods were presented for handling these data. The first was to attempt to reorder the reduplication rule after the /č/ to /š/ rule. This alternative was rejected because the reformulated reduplication rule must include a recapitulation of previous rules, such as stress retraction and syncope. The second alternative was to somehow mark the root. This solution was chosen, and a feature [-/č/ to /š/ rule] was used to mark the root portion of the adjective formation forms.

In Dakota, we have an example of rule overapplication in reduplicated forms.[6] There is a palatalization rule which changes /k/, /k^r/, and /k^l/ to /c/, /c^r/, and /c^l/ after front vowels /e/,

/i/, and /ə/ in active transitive verbs. In reduplicated forms, this palatalization rule appears to apply to both the original and the copied parts, even though only one part is preceded by the palatalizing vowel. For example:[7]

69. káǧa 'to make' wic⌈ákicañcañ⌉ yeya
'quickly he made it for them'

kóza 'to wave' napé kícoscoza
'he waved his hand to him'

These facts can be handled by ordering palatalization before reduplication. For example:

70. a) /wic⌈ákikaǧ⌉/
Palatalization wic⌈ákicaǧ⌉
Reduplication wic⌈ákicaǧcaǧ⌉
Devoicing wic⌈ákicañcañ⌉
[wic⌈ákicañcañ⌉]

b) /kíkoza/
Palatalization kícoza
Reduplication kícozcoza
Devoicing kícoscoza
[kícoscoza]

On the surface then it appears that the palatalization rule has overapplied, since both the original and the copy have been affected, even though only one of them is in the proper environment.

Throughout the presentation of data from various languages, Wilbur reiterates the fact that the reduplicated forms which behave

irregularly can be treated in different manners depending on the situation in each particular language. For example, the Luiseño data are handled by means of an exception feature, while the Dakota data are handled by means of rule ordering. Wilbur states that though there is a variety of treatments available for such data, there is a generalization to be captured. The result of both types of irregular rule application is to preserve identity between the original form and the copy. In other words, the failure or over-application of a rule maintains an identity relationship which would have been destroyed had the rule applied to only one part. Failure of a rule to apply maintains identity by not applying to only one part part. Overapplication of a rule maintains identity by changing both parts even though only one part meets the structural description. Wilbur suggests that this tendency to preserve identity between original and copy exists as a universal constraint on the application of phonological rules with respect to reduplicated forms. This does not mean that reduplicated forms must always result in identical parts but it does suggest that when a phonological rule does not behave as expected, it may be due to this tendency toward identity. The variety of treatments, such as exception features, rule ordering, etc., are merely descriptions of the processes in various languages, rather than explanations of the causes of exceptional forms. However, Wilbur points out that the identity constraint provides an explanation based on the function of reduplication, to generate a copy which is identical to the original.

Let us now explore the implications of Wilbur's hypothesis for the imperfective forms which undergo both reduplication rules in Palauan. We repeat pertinent examples below:

71. Labial initial

/balo?/ 'shoot' [ombebəlábálə?]

Velar initial

/kesi/ 'scrape' [məŋkekəskés]

Dental initial

/tabak/ 'patch' [məlábətábək]

Vowel initial

/amul/ 'cut grass' [məleləmlám]

The labial and velar forms provide us with good examples of rule failure. The regular application of the Consonant Deletion rule results in the deletion of the initial stem consonant when it is preceded by the inserted nasal which represents the imperfective marker. This can be seen in the unreduplicated forms and those reduplicated forms which have undergone RE I only. For example:

72. Labial /balo?/ [omálə?] [oməlábálə?]

Velar /kesi/ [məŋés] [məŋəskés]

On the basis of these forms we would expect the following for those forms which undergo both RE I and RE II:

73. Labial /balo/ *[omebəlábálə?]

Velar /kesi/ *[məŋekəskés]

However, the Consonant Deletion rule fails to apply and we find:

74. [ombebəlábálə?]

[məŋkekəskés]

Notice that these forms appear to support the hypothesis of an identity constraint. All three parts of the reduplicated form, that is, the original and the two copies, agree in their initial consonant. For example:

75. [ombebələ́bálə?]

[məŋkekəskés]

It seems then that Consonant Deletion fails to apply in order to maintain the identity relationship holding among these three parts.

The vowel initial forms, such as [məleləmlám̀l] provide us with an example of rule overapplication. The Nasal Insertion rule appears to have applied in three positions rather than in the one position directly to the right of the VM /m/. Thus, instead of:

76. ~~m+e+amu+amul~~ ~~m+ne+amu+amul~~

we get:

77. ~~m+e+amu+amul~~ ~~m+ne+namu+namul~~

which eventually becomes [məleləmlám̀l]. Notice also that Nasal Insertion overapplies in reduplicated (a) forms of vowel initial stems also. For example, instead of:

78. ~~m+amu+amul~~ ~~m+namu+amul~~

we get:

79. ~~m+amu+amul~~ ~~m+namu+namul~~

which eventually becomes [məlamlám̀l]. These forms also appear to support the hypothesis of an identity constraint. All parts of the reduplicated form, that is, the original and the copy or copies, agree in their initial consonant. For example:

80. [məleləmlámal]

[mələmlámal]

Nasal Insertion apparently overapplies to maintain the identity relationship holding among the various parts. However, even if there were no tendency to preserve identity, Nasal Insertion would probably still apply in all occurrences of the stems of vowel initial forms, since the reduplication rules seem to require that there be an initial consonant present.

Consider now the dental stems, such as /tabak/ 'to patch'. The reduplicated (b) form [məleləbətábək] provides us with an example of rule overapplication. The regular application of Nasal Insertion, Nasal Assimilation, and Consonant Deletion results in a change in the initial stem consonant that appears to the right of the VM /m/. This can be seen in the unreduplicated form and the reduplicated (a) form. For example:

81. /tabak/ [məlábək] [məlabətábək]

On the basis of these forms we would expect the following for those forms which undergo both RE I and RE II:

82. *[məletəbətábək]

However, the Nasal Insertion, Nasal Assimilation, and Consonant Deletion rules appear to overapply, and we find:

83. [məleləbətábək]

Notice however that overapplication of these rules does not extend to the rightmost occurrence of the stem. In other words, we do not find the form:

84. *[məleləbəlábək]

That is, identity is maintained between two parts of the reduplicated form rather than among all three. Suppose overapplication of these three rules were to extend to the rightmost occurrence of the stem yielding the form *[məleləbəlábək]. This would result in confusion between reduplicated (b) forms of dental initial stems and the parallel forms of vowel initial stems. For example:

85. Dental /tabak/ *[məleləbəlábək]

Vowel /amul/ [məleləmláml]

Each form shows three l's in the initial position of each occurrence of the stem, both original and copies. So there is no way of knowing that one form comes from an underlying vowel stem. This seems to indicate that, along with the tendency to maintain identity between original and copy in reduplicated forms, there exists another tendency to maintain surface distinctions between reduplicated forms whose underlying stems are different. This might explain why we find the form [məleləbətábək]. There is no question here that the underlying stem begins in /t/.

In summary, we have shown that a principle such as Wilbur's Identity Constraint is capable of explaining why certain phonological rules behave irregularly in reduplicated forms of Palauan. Thus far we have dealt with nonderived stems. In the next section we will present data showing reduplication in derived stems, and we will demonstrate how the Identity Constraint appears to be governing the application of phonological rules in these forms also.

Reduplication of Derived Stems

In Chapter Three, we discussed two classes of active transitive verbs which are built on derived stems. Those of the first group contain the derivational prefix /b-/, while those in the second group, causative verbs, contain the two derivational prefixes /b-/ and /k-/. In this section we will discuss how the two reduplication rules operate on these stems.

For stems derived by the derivational prefix /b-/ there are three possible reduplicated forms which apparently agree in meaning. Below we list some examples:

86.	/b+karad/	'light a lamp'	[omkárəd]	a) [omkərəkárəd]
				b) [omkekərəkárəd]
				c) [ombepkárəd]
	/b+karu/	'give medicine'	[omkár]	a) [omkərkár
				b) [omkekərkár
				c) [ombepkár]
	/b+to?əd/	'jerk'	[omṭó?əd]	a) [omtə?ə tó?əd]
				b) [omtetə?ə tó?əd]
				c) [ombeptó?əd]
	/b+doud/	'pay'	[omdówd]	a) [omdudówd]
				b) [omdedudówd]
				c) [ombepdówd]

The (a) and (b) forms are very much like the (a) and (b) forms of nonderived stems. In the (a) forms RE I has taken place. For example:

87. [omkarkár]

/m+b+karu/
[+IMP]

RE I	m+b+kar+karu
Nasal Insertion	m+nb+kar+karu
Nasal Assimilation	m+mb+kar+karu
Consonant Deletion	m+m+kar+karu
Stress	m+m+kar+káru
Final Vowel Deletion	m+m+kar+kár
Prefix Schwa Epenthesis	m+əm+kar+kár
Labial Denasalization	w+əm+kar+kár
Vowel Reduction	w+əm+kər+kár
Blending	om+kər+kár
	[omkərkár]

In the (b) forms, both RE I and RE II have taken place.

88. [omkekərkár]

/m+b+karu/
[+IMP]

RE I	m+b+kar+karu
RE II	m+b+ke+kar+karu
Nasal Insertion	m+nb+ke+kar+karu
Nasal Assimilation	m+mb+ke+kar+karu
Consonant Deletion	m+m+ke+kar+karu
Stress	m+m+ke+kar+káru
Final Vowel Deletion	m+m+ke+kar+kár
Prefix Schwa Epenthesis	m+əm+ke+kar+kár

Labial Denasalization	w+ɔm+ke+kar+kár
Vowel Reduction	w+ɔm+ke+kɔr+kár
Blending	om+ke+kɔr+kár
	[omkekɔrkár]

The (c) forms display a type of reduplication unseen in nonderived stems. The addition of the derivational prefix /b-/ to a stem results in the creation of a new stem. For example:

89. [b+karu]
stem stem

This fact makes the prefix /b-/ as well as the primary stem /karu/ eligible for reduplication. However, unlike the primary stem which is subject to both reduplication rules, as we saw in (87) and (88), the derived stem is subject to only RE II. For example:

90. [ombepkár]

/m+b+karu/
[+IMP]

RE I	-
RE II	m+be+b+karu
Nasal Insertion	m+mbe+b+karu
Nasal Assimilation	m+mbe+b+karu
Consonant Deletion	-
Stress	m+mbe+b+káru
Final Vowel Deletion	m+mbe+b+kár
Prefix Schwa Epenthesis	m+ɔmbe+b+kár
Labial Denasalization	w+ɔmbe+b+kár
Vowel Reduction	-

Blending	ombe+b+kár
Devoicing	ombe+p+kár
	[ombepkár]

We do not find the following form in which RE I has applied to the entire derived stem:

91) *[omkərpkar]

or the following in which both RE I and RE II have applied to the entire derived stem:

92) *[ombepkərpkár]

Nor do we find forms in which the reduplication rules have applied first to the primary stem and then to the derived stem. For example:

93. *[ombepkərkár]

*[ombepkekərkár]

Either the primary stem is reduplicated, as in:

94. [omkərkár]

[omkekərkár]

or the derived stem is reduplicated, as in:

95. [ombepkár]

but never both. Recall that earlier we formulated a constraint on the operation of the Consonant Deletion rule such that it does not apply to velar and labial stems that have undergone RE II. Notice that in the derivation above of [ombepkár], this constraint holds, since the stem has become labial initial with the addition of the derivational prefix /b-/. Because Consonant Deletion fails here, identity is maintained between the original /b-/ and the copied one. This is added support for Wilbur's Identity Constraint.

Let us turn now to causative stems, that is, those containing the two derivational prefixes /b-/ and /k-/. For these stems there are two possible reduplicated forms. For example:

96.	/b+k+dakt/ 'frighten'	[omɔkdákt]	a) [omkekdákt]
			b) [ombebɔkdákt]
	/b+k+latk/ 'remind'	[omɔklátk]	a) [omkeklátk]
			b) [ombebɔklátk]
	/b+k+diŋɔs/'satisfy'	[omɔkdiŋɔs]	a) [omkekdíŋɔs]
			b) [ombebɔkdíŋɔs]

Just as the (c) forms of (86), causatives show reduplication of the derived stems by RE II. In the (a) forms, it is the stem derived by the /k-/ prefix which is reduplicated, whereas in the (b) forms, it is the stem derived by the /b-/ prefix. Below we give some derivations:

97.	a)	[omkekdákt]
		/m+b+k+dakt/ [+IMP]
	RE I	-
	RE II	m+b+ke+k+dakt
	Nasal Insertion	m+mb+ke+k+dakt
	Nasal Assimilation	m+mb+ke+k+dakt
	Consonant Deletion	m+m+ke+k+dakt
	Stress	m+m+ke+k+dákt
	Prefix Schwa Epenthesis	m+ɔm+ke+k+dákt
	Labial Denasalization	w+ɔm+ke+k+dákt
	Vowel Reduction	-

Blending	om+ke+k+dákt
	[omkekdákt]
b)	[ombebəkdákt]
	/m+b+k+dakt/ [+IMP]
RE I	-
RE II	m+be+b+k+dakt
Nasal Insertion	m+nbe+b+k+dakt
Nasal Assimilation	m+mbe+b+k+dakt
Consonant Deletion	-
Stress	m+mbe+b+k+dákt
Prefix Schwa Epenthesis	m+əmbe+b+k+dákt
Labial Denasalization	w+əmbe+b+ək+dákt
Vowel Reduction	-
Blending	ombe+b+ək+dákt
	[ombebəkdákt]

Similar constraints govern reduplicated causative verbs as govern the reduplicated forms of verbs derived by the /b-/ prefix only. We never find forms in which both the /k-/ derived stem and the /b-/ derived stem are reduplicated. For example:

98. *[ombepkekdákt]

Nor do we find forms in which RE I has applied in any part of the string, whether it be the primary stem or the two possible derived stems. For example:

99. *[oməkdəkdákt]

*[omədəkkdákt]

*[omədəkbədákt]

Thus, in causative verbs the only possible type of reduplication is RE II on the two derived stems.

Notice that in (97), the constraint on the application of Consonant Deletion holds for [ombebədákt] but not for [omkekdákt] even though both have undergone RE II. The reason for this is that in [ombebədákt] the consonant that is subject to deletion is one which is directly involved in the RE II process, that is, the b of the reduplicated sequence be. If this b were deleted, then identity between it and the original b would be lost. We would wind up with the form *[omebədákt]. However, in the form [omkekdákt], the consonant that is subject to deletion is not one which was directly involved in the RE II process, since it is the /k-/ prefix which is reduplicated, and not the /b-/ prefix. If Consonant Deletion were to fail here, we would obtain the form *[ombkekdákt]. But the presence of the b does not gain us anything in terms of preserving identity between an original and a copy, because the b in question is not involved in the reduplicative process which affects this form. Therefore there is no reason for rule failure here. Furthermore, identity is preserved between the two k's in [omkekdákt] without any irregular behavior of the phonological rules. With these facts in mind, we will reformulate the constraint on Consonant Deletion such that the rule will not apply to velar and labial stems marked to undergo RE II only if the deletable consonant happens to be directly involved in the RE II process.

In summary then, we have shown that a principle such as the Identity Constraint is able to explain irregular behavior of phonological rules in reduplicated forms of derived stems, such as those containing the derivational prefix /b-/ and causative verbs, as well as nonderived stems.

Conclusion

In this chapter we have seen that reduplicated forms in Palauan pose a number of problems for phonological analysis. If we adopt the position that the two reduplicative processes should be characterized as phonological rules, then we are faced with rule ordering problems among the reduplication rules and the other more widespread phonological rules of Nasal Insertion, Nasal Assimilation, Consonant Deletion, and Dental Denasalization. These problems can be solved by positing a set of rules (63) which is capable of deriving grammatical forms, but which contains a good deal of repetition and fails to reflect clearly the fact that there are only two reduplicative processes in the language. Moreover this analysis provides no explanation for the apparently irregular behavior of reduplicated forms with respect to rule application.

However, Wilbur's treatment of reduplicated forms in various languages and her adoption of the Identity Constraint appears to be a step in the right direction towards explaining their irregular behavior. This type of analysis treats reduplication as a morphological process rather than a phonological one. Certainly the very function of reduplication, namely, to generate a copy identical to the original for the purpose of signifying notions such as plurality, repetition,

distributedness, etc., seems to indicate that it is a syntactic or morphological process which takes place before the phonological component. In Wilbur's system, then, the underlying representations to which the phonological rules apply are already reduplicated, and there is no need for phonological rules of reduplication. The Identity Constraint is an attempt to provide an explanation for the manner in which the phonological rules apply to these reduplicated forms. Wilbur suggests that global conditions on phonological rules be used to incorporate the Identity Constraint. In other words, phonological rules would have the power of determining if two strings are related to each other as an original an copy as a result of the morphological process of reduplication. If the form in question is an unreduplicated form, that is, one which does not contain two strings related as an original and its copy, then the phonological rule applies regularly. But if the form is reduplicated, its application is governed by the Identity Constraint which is built into the rule by means of a global constraint.

It is obviously beyond the scope of this study to determine the arguments for and against the incorporation of global conditions into phonological theory. It is clear, however, that adopting a principle such as the Identity Constraint and incorporating it into phonological rules in the form of global conditions leads to a rather insightful analysis of the irregularities of reduplicated forms in the languages handled by Wilbur and in Palauan. Our knowledge of languages with reduplication will necessarily have to be expanded in order to test her hypothesis in the future.

Footnotes to Chapter Four

[1]The data in this section were obtained from three sources: Renward Brandstetter, An Introduction to Indonesian Linguistics (London: Royal Asiatic Society, 1916), Essay I, pp. 63-64, Essay II, pp. 126-127; R. Ross MacDonald and Soenjono Darjowidjojo, A Student's Reference Grammar of Modern Formal Indonesian (Washington: Georgetown University Press, 1967), pp. 52-58; Paul Schachter and Fe T. Otanes, Tagalog Reference Grammar (Berkeley: University of California Press, 1972), pp. 336-347.

[2]Recall that velar and labial stems which have undergone RE II are exceptions to this rule.

[3]Wilbur's discussions of reduplication may be found in three works of which she is the author: "The Phonology of Reduplication" (unpublished Ph. D. dissertation, Department of Linguistics, University of Illinois, 1973); "The Identity Constraint: An Explanation of the Irregular Behavior of Some Exceptional Reduplicated Forms," Studies in Linguistic Sciences, 3 (1973), pp. 143-154; "Reduplication and Rule Ordering," Papers from the Ninth Regional Meeting of the Chicago Linguistic Society (1973), pp. 679-687. The ideas that we are presenting in this section originate in these sources.

[4]Wilbur's Luiseño data are taken from Pamela Munro and Peter John Benson, "Reduplication and Rule Ordering in Luiseño," International Journal of American Linguistics, 39 (1973), pp. 15-21.

[5][+R] is a feature which occurs on a particular class of verb augments which cause stress retraction.

[6]Wilbur's Dakota data are taken from Franz Boas and Ella Deloria, Memoirs of the National Academy of Sciences, 23 (1939).

CHAPTER FIVE: Phonological Trends

Introduction

Several times in earlier chapters we noted in speaking about a particular phonological rule that it was a reflection of some tendency which appears to pervade the language. In this chapter we will discuss two such tendencies and group together the various phonological rules through which they are manifested.

The first of these tendencies has to do with the function of nasal consonants throughout the language. The phonological rules involved are Dental Denasalization, Labial Denasalization, Verbal Nasal Epenthesis, Phrase Final Nasal Epenthesis, and Suffix Nasal Epenthesis.

The second tendency to be discussed involved the reshaping of underlying forms in the language. We will demonstrate that, by means of the Vowel Reduction, High Vowel Deletion, and Suffix Nasal Epenthesis rules, and the introduction of a new future participle suffix, the shape /CVC(ə)C/ is becoming the preferred shape for underlying stems.

Nasal Consonants

In Chapter Three, we referred several times to a rather strong tendency in Palauan to eliminate nasals. Since these references were scattered and isolated, we will in this section group together the phonological processes that reflect this tendency.

Recall that the underlying inventory of nasal in Palauan is rather odd in that it does not include /n/, the nasal which is

considered to be unmarked and the most natural of the nasals. Even in the surface phonetics the absence of [n] is conspicuous. There are but a few phonetic [n]'s and all can be analyzed as underlying velar nasals which have assimilated to contiguous dental consonants. For example:

1.	/buŋut/	'to curl'	[omúnt]	'imperfective'
	/iuŋs/	'island'	[yúns]	'island'
			[insék]	'my island'

This unusual situation is the result of a historical rule which changed all /n/'s to /l/'s. We showed that the dental denasalization process is still operative today in the imperfective marker that appears in active transitive verbs. This marker appears on the surface as a nasal consonant homorganic to the original stem initial consonant. However, in those stems that begin in a dental consonant or a vowel, we find not an [n] but an [l] as the marker of the imperfective. For example:

2.	/kesi/	'scrape'	[məŋés]
	/ʔatu/	'smoke'	[məŋát]
	/balo?/	'shoot'	[omálɔ?]
	/tabak/	'patch'	[məlábɔk]
	/dalom/	'plant'	[məlálɔm]
	/sesob/	'set fire'	[məlésɔb]

This Dental Denasalization rule also operates in borrowed words. For example:

3. las 'eggplant' Japanese nasu

mərikél 'American'

simól "Simon'

These examples clearly show a strong tendency in the language to eliminate nasals, at least, the dental nasal [n].

We also noticed in Chapter Three that this tendency affects the labial nasal /m/ in certain environments. This phoneme, when it appears as the verb marker affix, is very unstable and changes to w in three positions: first, when infixed and followed by a labial consonant, as in :

4. /t+m+abak/ [twábək] 'patch'

second, when infixed and followed by a nonhigh unstressed vowel, as in:

5. /l+m+e?ot+ii/

l+w+e?ot+ii

[lo?ətíy] 'tie'

and third, when prefixed to a stem beginning in a labial consonant, as in:

6. /m+balo?/

w+ balo?

[obálə?] 'shoot'

In the last two cases, further rules such as Blending convert the w plus the following vowel to a back vowel. A detailed discussion of all these processes appears in the Verb Marker section of Chapter Three. The point that we wish to emphasize here is that the tendency to eliminate nasal consonants in Palauan is reflected in these rules.

We turn now to a discussion of another tendency which appears to be directly opposite to the tendency to eliminate nasals. We have seen, in earlier chapters, that there are a number of environments in the language that call for the epenthesis of a consonant. Invariably the velar nasal is chosen for this function.

One such nasal epenthesis is the following:

7. Phrase Final Nasal Epenthesis

$$\emptyset \longrightarrow \eta \;/\; V \_\_\_ \|$$

There exists a surface phonetic constraint which prohibits words ending in a single vowel before a pause. To avoid such a configuration, the velar nasal is epenthesized. For example:

8. ak mó ra skúwl
   I go to school 'I'm going to school.'
   ak móŋ
   I go 'I'm going.'

A second environment is one in which a historical rule of nasal epenthesis has apparently operated, namely word initial position in an original vowel initial form. The cognate sets below give evidence of this process:

9.

English	Palauan	Indonesian	Tagalog	Ilokano
vein	ŋúrəd	urat	ugat	urat
child	ŋálək	anak	anak	anak
fire	ŋáw	api	apoy	apoy
fish	ŋíkəl	ikan		

This particular type of epenthesis operates synchronically in a more restricted way, and we have stated it in the Verbal Nasal Epenthesis rule (Chapter Three (39)). It inserts the velar nasal in initial position in underlying vowel initial stems when they are used as verbs. For example:

11.	/ata?/	'wash'	[məŋátə?]	
	/amul/	'cut grass'	[məŋáml]	
	/ubat/	'set free'	[məŋúbət]	

The third and last environment where nasal epenthesis takes place is between stems and pronoun suffixes. In the last section of Chapter One, we discussed a small group of nouns whose possessed forms contain the velar nasal between the final underlying segment of the stem and the thematic vowel [e] which appears before the possessive suffix. The unsuffixed forms of such nouns show no velar nasal in this position. For example:

12.	/deb/	'sugarcane'	[déb]	[dəbəŋék]
	/um/	'kitchen'	[ʷúm]	[ʷuməŋék]

Nasal epenthesis also takes place between a small class of verb stems and the object pronoun suffixes that appear in perfective forms of such verbs. For example:

13.	/tat/	'tear'	[məlát]	[totəŋíy]
	/bar/	'slap the face'	[omár]	[bərəŋíy]

This augmentation of suffixed stems by means of nasal epenthesis is a reflection of a tendency to reshape underlying forms, and will be discussed in more detail later in this chapter. The point worth

noting here is that this augmentation process is one more example of the use of the velar nasal for epenthesis purposes.

The facts outlined above raise some searching questions. In the first place, we have shown a good deal of evidence to support the hypothesis that Palauan tends toward the elimination of nasal consonants. On the other hand, another body of evidence shows that the language favors nasal consonants by choosing the velar nasal for epenthesis purposes rather than some nonnasal consonant. What is it that causes a language to employ apparently opposing strategies? Is there a point beyond which a language cannot go in eliminating segments in a particular series before it must begin to compensate by giving such segments a heavier functional load? These are questions that can only be answered by examining similar tendencies in the phonologies of many languages.

Secondly, the data show a rather unusual nasal series in that the unmarked nasal /n/ is missing. Furthermore the language continues to eliminate this nasal when it is derived as one realization of the imperfective marker on verbs. Moreover when a consonant is needed for epenthesis purposes, a marked nasal, the velar nasal, is chosen rather than the unmarked nasal /n/. The effect of this is that the velar nasal, which is marked according to universal theories of markedness, has become unmarked in terms of its function within the language. This suggests that perhaps the notion of universal markedness is somehow different from that of language specific markedness. If so, it would be interesting to explore why languages seem to break away from universal principles and to establish their own notions of markedness

in terms of functional load. Present day markedness theory should then be supplemented with principles that reflect the various possibilities open to specific languages with respect to deviation from universal norms.

Underlying Forms

In earlier chapters, we mentioned the existence of a future participial form of active transitive verb stems, which is composed of the underlying stem plus the suffix /-l/. Below we give some examples:

14.	/tabak/	'patch'	[təbákl]	/tabak+l/
	/dakul/	'bury'	[dəkúll]	/dakul+l/
	/daŋob/	'cover'	[dəŋóbl]	/daŋob+l/
	/samik/	'peel'	[səmíkl]	/samik+l/
	/sesob/	'set fire'	[səsóbl]	/sesob+l/
	/rusa?/	'pound'	[ɽsá?əl]	/rusa?+l/
	/kimud/	'cut hair'	[kmúdəl]	/kimud+l/
	/lo?ad/	'break cord'	[lə?ádəl]	/lo?ad+l/
	/barot/	'hide'	[bərótəl]	/barot+l/

Their derivations are straightforward:

15.		[dəkúll]	[bərótəl]
		/dakul+l/	/barot+l/
	Stress	dakúl+l	barót+l
	Vowel Reduction	dəkúl+l	bərót+l
	Dental Schwa Epenthesis	-	bərótə+l
		[dəkúll]	[bərótəl]

In the case of stems which have the underlying shape /CVCVC/, as those in (14) do, it is the future participle form which alone reveals the true identity of the vowel in the last syllable. Take for example the various inflected forms of the stem /tabak/ 'to patch':

16.

Present middle		mətábək
Present imperfective		məlábək
Present perfective		
	singular	tobəkíy
	plural	twábək
Past participle		təlábək
Instrumental		olábək
	possessed	oləbəkék
Gerund		oməlábək
	possessed	omələbəkék

None of these forms tells us what the underlying representation is for the vowel of the last syllable of the stem. In each case the surface manifestation is schwa. The future participle form [təbákl] is the only form that can give us this information. In all the other forms the vowel has been changed to schwa by the Vowel Reduction rule.

Consider now the inflected forms of those /CVCVC/ stems that have a high back vowel in the last syllable. For example:

17. /dakul/ 'to bury'

Present middle	mədákl
Present imperfective	məlákl

Present perfective		
	singular	dokl'íy
	plural	θmákl
Past participle		dəlákl
Instrumental		olákl
	possessed	oləklék
Gerund		omələ́kl
	possessed	omələklék
Future participle		dəkúll

If we did not have the future participle of this verb, we would have to assume that the underlying form of the stem is /dakl/. But the future participle tells us that it is /dakul/. In all the other forms the vowel /u/ has been deleted by the High Vowel Deletion rule.

Suppose the information contained in future participle of /CVCVC/ stems were not available to us for some reason. On consequence of this would be that a very large number of underlying forms would look very different from the way they do now. Instead of having the shape /CVCVC/ where both vowels are full vowels, they would have the shapes /CVCəC/ or /CVCC/. This would increase the number of underlying schwas in the language abd strengthen the status of this vowel as an underlying segment. It would also minimize the application of the Vowel Reduction rule and the High Vowel Deletion rule. These rules would still be needed for other forms and so would remain well motivated. However, the number of forms to which they would apply would be greatly lessened.

The state of affairs that we have just described is precisely that which we predict will exist in the near future, and for the following reasons. The future participles we have cited above in (14) are used mainly by older generations of Palauans. Rarely is a young person able to produce them in an elicitation session. Sometimes, when presented with such a form, the young person will admit that he understands it and has heard older people using it, but he does not use it himself. Among young people a new future participle suffix /-all/ has come into use. Consequently, for some verbs we find two future participles. For example:

18.			Conservative	Innovative
	/daŋob/	'cover'	[dəŋóbl]	[dəŋəbáll]
	/ba?id/	'break taro'	[bə?ídəl]	[bə?ədáll]
	/te?ib/	'pull out'	[tə?íbl]	[tə?əbáll]
	/ŋerod/	'hoist'	[ŋəródəl]	[ŋərədáll]
	/reŋod/	'tie'	[rəŋódəl]	[rəŋədáll]
	/lo?ad/	'break cord'	[lə?ádəl]	[lə?ədáll]
	/sesob/	'set fire'	[səsóbl]	[səsəbáll]
	/lu?us/	'write'	[lə?úkl][1]	[lə?əsáll]

For some verbs we find only the innovative form, as in:

19.	/sikəs/	'pole raft'	[sikəsáll]
	/riŋət/	'chew'	[riŋətáll]
	/b+rɨid/	'scatter'	[bərɨdáll
	/sais/	'delouse'	[sisáll]

Footnotes for this chapter are on pp. 229 and 230.

Either the conservative form never existed or it has disappeared, since in some cases both old and young people use the innovative form.

Consider what happens to forms to which the innovative suffix is added. For example:

20. /daŋob/ 'cover'

/daŋob+all/ → daŋob+áll → [dəŋəb+áll]

Stress Vowel Reduction

Because the suffix contains a vowel it attracts the stress which in turn causes the rightmost stem vowel to be subject to Vowel Reduction. The result of this is that no inflected form of this stem shows what vowel truly underlies the surface schwa which always appears as the rightmost vowel. Consequently, the underlying form must be /daŋəb/ rather than /daŋob/. It is only because we still find the conservative future participle [dəŋóbl] that we can with assurance posit the underlying form /daŋob/.

It is our prediction that in time all the conservative future participles will disappear, not only because they are being replaced with the innovative forms, but also because there are other syntactic constructions which can successfully convey the meaning which future participles convey. One such construction is exemplified below:

21. kirté+k əl məlábək ər a báyl

responsibility - my patch clothing

'I must patch the clothing.'

This type of sentence is used much more frequently than the one which employs the future participle, which we give below:

22. a báyl a təbákl

clothing patch

'The clothing should be patched' or

'The clothing ought to be patched.'

Elimination of the conservative future participles is one manifestation of a trend which has its origins in early stages of the development of Palauan. It is easy to see the effect of this trend if we look at some words which today have the underlying forms /CVCC/ or /CVCəC/, where the schwa does not alternate with a full vowel. Through reconstruction and comparison with other languages, we are able to establish the fact that these words once had the shape /CVCVC/ in which both vowels are full vowels which later were deleted or reduced to schwa, depending on their quality. For example:

23.

Palauan			PAN
[dákt]	'fear'	/dakt/	*takut
[málk]	'chicken'	/malk/	*manuk
[ŋálək]	'child'	/ŋalək/	*anak
[ŋíkəl]	'fish'	/ŋikəl/	*ikan

The present day forms have resulted by the application of the High Vowel Deletion rule and the Vowel Reduction rule which still operate in the language today. For example, a word like *takut lost its u by High Vowel Deletion. Perhaps there was a stage in the language where the underlying form /*takut/ showed up on the surface sometimes with an u and sometimes without it as a result of various types of affixation and stress assignment. At that point it still would have been possible to represent this word as /takut/. However, today this

is not possible since the stem meaning 'fear' always appears on the surface as [dakt] or [dəkt-]. It does not have an alternate form containing an [u] in the last syllable, and so it must be represented as /dakt/ in a present day synchronic analysis.

A word like *anak had its rightmost vowel reduced to schwa by Vowel Reduction. Perhaps there was a stage in the language where the underlying form /*anak/ showed up on the surface sometimes with an a and sometimes with a schwa in the last syllable. At that point it would have been possible to represent this word as /ŋalak/. However, since today the stem for 'child' always appears on the surface as [ŋalək] or [ŋələk], the underlying form /ŋalak/ cannot be chosen. The stem does not have an alternate form containing an [a] in the last syllable, and so must be represented as /ŋalək/ in a present day synchronic study.

In these historical changes we see the language moving from a stage in which some stems had the shape /CVCVC/ with two full vowels to the present day stage in which they have the shapes /CVCC/ and /CVCəC/. Elimination of conservative future participles contributes to the continuation of this trend toward reshaping underlying forms. The large number of active transitive verb stems of the shape /CVCVC/ will have to be represented as /CVCC/ and /CVCəC/ when their conservative future participles disappear, since there will no longer be a way of identifying what the vowel of the last syllable is.

Thus, for stems of the original shape /CVCVC/, we have some variety in present day underlying forms; /CVCVC/, /CVCəC/, and /CVCC/.

Gradually, as the conservative future participles disappear, there will be an increase in number of /CVCəC/ forms and /CVCC/ forms, and a decrease in, and eventually complete elimination of, /CVCVC/ forms. In one sense this movement toward the reshaping of underlying forms is one of simplification. Instead of three possible underlying forms for original /CVCVC/ words, as we have today, there will be two, /CVCC/ and /CVCəC/. Furthermore, in a disyllabic form, it will not be necessary to know which of six possible vowels belongs in the second syllable, since it will always be schwa. The Stress Assignment rule will also be simplified and will read: stress the rightmost tense vowel. There will be no need to distinguish stress placement in suffixed forms from stress placement in unsuffixed forms. Suffixed /CVCəC/ and /CVCC/ forms will receive stress on the vowel of the suffix as they do with the present stress rule. Recall that the only suffix without a vowel that occurs on present day /CVCVC/, /CVCəC/, and /CVCC/ forms is the conservative future participle suffix /-l/, which will eventually disappear. An unsuffixed /CVCəC/ form will receive stress on its penultimate vowel, but not because stress is penultimate in unsuffixed forms as in the present day system, but because the rightmost vowel of the stem is not tense. An unsuffixed /CVCC/ form will, of course, receive stress on its only vowel.

There is another process in the language which reflects this tendency to reshape underlying forms, namely the nasal epenthesis process that inserts the velar nasal between certain stems and their suffixes. Recall that this process takes place in possessed forms of

nouns and perfective forms of verbs. For example:

24.	/deb/	'sugarcane'	[déb]	[dəbəŋék]
	/um/	'kitchen'	[ʷúm]	[ʷuməŋék]
	/bas/	'charcoal'	[bás]	[bəsəŋék]
	/ʔat/	'praise'	[ʔát]	[ʔətəŋék]
	/rur/	'shame'	[rúr]	[rrəŋék]
25.	/tat/	'tear'	[məlát]	[totəŋíy]
	/bar/	'slap face'	[omár]	[mərəŋíy]
	/deb/	'stop'	[məléb]	[dobəŋíy]

Notice that these stems all have the shape [CVC] in their unsuffixed forms. It would be nice if we could motivate an underlying form of the shape /CVCV/ for them. However, there is no way of knowing what the final vowel would be if there is one, since it is never stressed. So these forms cannot be classified with regular /CVCV/ forms such as:

26.	/badu/	'rock'	[bád]	[bədúk]
	/mada/	'eye'	[mád]	[mədák]
	/keri/	'question'	[kér]	[kərík]

It is quite possible that, at an earlier stage of the language, these stems had final vowels, and that for some reason they have disappeared leaving no trace of their quality. If they were at one time /CVCV/ stems, then it would be necessary to explain why they lost their final vowels and the forms of (26) did not.

But a more important question to be answered is: Why do their possessed forms take the shape that they do? Earlier we mentioned that if we compare the number of /CVCV/ forms and the number of

/CVCVC/, /CVCəC/, and /CVCC/ forms throughout the language, we would find that the former group is very small in comparison to the latter. The shapes /CVCVC/, /CVCəC/, and /CVCC/ seem to be favored over /CVCV/. And we have seen that the /CVCVC/ shape is gradually disappearing with the elimination of conservative future participles. So the shapes /CVCəC/ and /CVCC/ seem to be the most highly favored. It would seem reasonable to suppose then that if the /CVC/ forms of (24) and (25) are to be adjusted to resemble more regular patterns in the language, they be given the shapes /CVCəC/ or /CVCC/. If we look at the suffixed forms of (24) and (25), we notice immediately that when the suffixes are removed, the stem has the shape [CVCəC]. For example:

27.	/deb/	'sugarcane'	[	dəbəŋ	+e+k]
	/tat/	'tear'	[	totəŋ	+iy]
				CVCəC	

The reshaping of these /CVC/ stems is accomplished by means of nasal epenthesis, which creates the shape <u>CVCC</u>, and subsequent schwa epenthesis, which breaks up the consonant-nasal cluster and results in the shape <u>CVCəC</u> to which the suffixes are added.

It is interesting to note that borrowed words of the /CVC/ shape often go through this reshaping process. For example:

28.	/kob/	'cup'	[kób]	[kəbəŋék]
	/sukal/	'sugar'	[sukál]	[sukələŋék]

It may even be the case that /CVCV/ stems will eventually take on the shape /CVCəC/ in the future. At least two such stems in our data have already done so, namely:

29.	/deso/	/ʔolu/
	'slice'	'carry on shoulder'
Present middle	mədés	məʔól
Present imperfective	məlés	məŋól
Present perfective		
singular	dosəŋíy	ʔoləŋíy
plural	θmés	ʔəmól
Past participle	dəlés	ʔəlól
Future participle	dəsóŋəl	ʔəluŋəl

The forms that are of interest here are the suffixed forms, that is, the present perfective singular and the future participle. Normally we would expect to find for these two forms the following:

30.	/deso/	/ʔolu/
Perfective	dosór	ʔolúr
Future participle	dəsóQl	ʔəlúwl

These would be derived from the underlying forms:

31.		
Perfective	/d+m+eso+r/	/ʔ+m+olu+r/
Future participle[3]	/deso+l/	/ʔolu+l/

But instead we find:

32.		
Perfective	dosəŋíy	ʔoləŋíy
Future participle	dəsóŋəl	ʔəlúŋəl

The stems in these cases all have the shape [CVCVC] when we remove the suffixes:

33. [dosəŋ +iy]
[ʔolɔŋ +iy]
[desoŋ +əl]
[ʔəluŋ +əl]
CVCVC

If the future participle forms are lost along with other conservative future participles, then the only augmented forms remaining are the perfective singular. And their stems have the [CVCəC] shape which seems to be the preferred shape that underlying forms are moving toward. For example:

34. [dosəŋ +iy]
[ʔolɔŋ +iy]
CVCəC

Notice that once the future participle is eliminated and the augmented stem is used for the perfective singular, there is no way of knowing that the underlying form is vowel final.

At this stage in the language, nasal augmentation of a stem occurs only when a suffix is added to that stem. Notice that all the unsuffixed forms in (24), (25), and (29) show no final nasal. One wonders if, in the future, the unsuffixed forms of such stems will be augmented by analogy with the suffixed forms. Interestingly enough, when one informant was asked to give the unpossessed and possessed forms for 'nose', namely:

35. /is/ [ʸís] [ʸisəŋék]

he gave the following:

36. [ʸísəŋ] [ʸisəŋék]

Perhaps this is a slight indication of future developments in the area of nasal augmentation, perhaps not. Nevertheless we offer it as an interesting example.

In summary, then, we have shown that there is a definite tendency in Palauan to alter a large majority of underlying forms so that they conform to the /CVC(ə)C/ pattern. This is accomplished by means of the Vowel Reduction and High Vowel Deletion rules, both of which operate historically and synchronically. A second phenomenon which contributes to this reshaping process is the elimination of one type of future participle and the introduction of a new type. Finally we have seen that nasal augmentation of certain stems converts them to the /CVCəC/ shape when they appear with suffixes.

Footnotes to Chapter Five

[1]This form displays a rather unusual phonological process which affects a small group of words:

s ⟶ k / ____ + l

All the inflected forms of /lu?us/ 'to write' except the conservative future participle, show an [s] in the stem final position. For example:

Present middle		məlú?əs
Present imperfective		məlú?əs
Present perfective		
	singular	lu?əsíy
	plural	lmú?əs
Past participle		llú?əs
Instrumental		olú?əs
	possessed	olə?əsék
Gerund		omalú?əs
	possessed	omalə?əsék

However, the future participle shows a [k] in this position, [lə?úkl]. These facts are true of other stems which end in /s/ also. For example:

		Future participle
/debos/	'cut cord'	[dəbókl]
/badus/	'line up'	[bədúkl]
/?adus/	'pave'	[?ədúkl]
/daŋas/	'look up at'	[dəŋákl]
/kabis/	'hang'	[kəbíkl]

[2]For a discussion of the evidence supporting the positing of underlying schwa, see Chapter Two, Sources for Schwa.

[3]The normal derivation for the future participle of a vowel final stem involves an early rule which makes a copy of the final vowel, after which Falling Diphthong Formation and Stress apply. For example:

	/?atu/	'to smoke'
	/?atu+l/	
Vowel Copy	?atuu+l	
Falling Diphthong Formation	?atuw+l	
Stress	?atúw+l	
Vowel Reduction	?ətuw+l	
	[?ətuwl]	

Note also:

/leŋi/	'borrow'	[ləŋíyl]
/doko/	'blow'	[dəkóql]
/ʔamu/	'break'	[ʔəmúwl]
/kesi/	'scrape'	[kəsíyl]
/suku/	'pack tightly'	[skúwl]

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