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REDUPLICATION AND CYCLICAL RULE ORDERING

IN KANKANAEY MORPHOPHONEMICS

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0. INTRODUCTION

For some time there has existed a need on the Philippine linguistics scene for a description which adequately accounts for the interaction of reduplication with morphophonemic rules. That such a description does not presently exist may be due to the general tendency among linguists to describe language in terms of separate categories, such as phonology, semantics, and syntax, morphophonemics falling under the former category, reduplication under one or both of the latter. Some degree of compartmentalization is, of course, necessary in order to separate the data being analyzed into manageable chunks, but it is clear that for Kankanaey[1] (and, I suspect, a number of other Philippine languages), an analysis of the morphophonemic system which fails to take into account the role of reduplication deprives the analyst of valuable insights into the functioning of the system as a whole.

The purpose of this paper is to demonstrate that cyclical ordered rules provide a viable means of describing the relationship between reduplication and morphophonemic processes in Kankanaey.[2] It is not my intention at this time to discuss in any detail the theoretical implications of individual rules, nor even to argue in general terms for the superiority of cyclical rules over other types of phonological rule ordering, as I am deliberately reserving all such argumentation for a future, more thorough treatment of the subject. This paper, accordingly, should be regarded merely as the bare bones of a description which I trust will be fleshed out in the near future. It is presented now only in the hope that it will provide useful insights to linguists working with other Philippine languages.

For purposes of this discussion, we will designate three categories of rules - spelling rules, morphophonemic or cyclical rules, and phonological or post-cyclical rules. Spelling rules are those which produce the basic underlying forms upon which the other rules operate, and may

be divided into early and late spelling rules. The early rules are ordered immediately preceding the rule cycle and include affixation and what we will call root reduplication. The late rule is what we will call stem reduplication and applies following the rule cycle. Forms which undergo this rule are automatically directed back to the beginning of the cycle.

It may be helpful at this point to define some of the characteristics of root and stem reduplication with the understanding that these are merely temporary labels attached for the sake of convenience. Root reduplication seems to be morphologically motivated, as it is sensitive to morpheme boundaries. That is, in reduplication involving a prefixed or infixed root, only the root is reduplicated; the affix is not affected. Stem reduplication, on the other hand, seems to be more phonologically motivated (although it does carry lexical content), inasmuch as it crosses morpheme boundaries, affecting both affix and root. An example of a root which can be spelled with either type of reduplication is ?e'dep 'to extinguish'. When it is spelled with the stative prefix ma- and CVC root reduplication, the rule output is ma?ed?e'dep 'to keep being extinguished'. Given the same prefix but CVC stem reduplication, the rule output is madmad'?ep 'being extinguished'. In the first case, reduplication applies to the root before other morphophonemic rules. In the second case, the root undergoes both vowel syncope and glottal metathesis before reduplication applies. This confirms the hypothesis that Kankanaey has two distinct types of reduplication, one of which is spelled early, the other late. It is also clear from the above example that reduplication carries lexical meaning.

This raises a question that would provide interesting material for a future discussion, namely, whether it would be legitimate to distinguish the early and late reduplication spelling rules in Kankanaey as morphological and phonological. Does current theory allow a phonological process to be responsive to lexical entities?

To return to the other types of rules, the morphophonemic or cyclical rules are those rules which apply after any spelling rule. Most of them are quite limited in application, as their structural descriptions can be met only by forms spelled with certain affixes. There are no restrictions against rules applying more than once in succeeding cycles, but at the same time, neither does any derivation actually require a rule to apply more than once.

The only phonological rule, gemination, is ordered following the late spelling rule, and thus cannot apply to a form until after the cyclical rules have applied. Gemination is being designated a phonological rule, because its structural description, with only one exception (see rule 12), is not limited by morphological considerations.

I. DESCRIPTION OF RULES

In the discussion of individual rules which follows, use will be made of the notion of rule bleeding and feeding as developed by Kiparsky (1968), Anderson (1974), and others. If rule A alters a form in such a way that it can undergo rule B, then rule A is said to feed rule B. If rule A, however, applies to a form which would otherwise undergo rule B and alters it in such a way that it no longer meets the structural description of rule B, then rule A is said to bleed rule B. Rules which are neutral in respect to feeding and bleeding and which occur at the same point in the derivational cycle are assigned the same number in the linear order.

Feature abbreviations used in the rule statements are given in footnote #1. Other symbols and abbreviations are as follows: C - consonant, V - vowel, Ø - null or zero, # - word boundary, & - morpheme boundary, . - syllable boundary, opt - optional, ± will be used in place of the Greek letter alpha to indicate that a segment has the same feature value as that indicated by ± for some other segment in the rule. For instance, in rule 3, ±ac indicates that if the segment to the right of the arrow is -acute, the segment to the right of the slash mark will also be -acute.

All examples are written phonemically, using the phonemes listed in footnote 1, except that velar nasal is written as a digraph, ng.

A distinction is made in the rules between stem and root, so a stem is hereby defined as an affixed root.

1A. Affixation.

Directly or indirectly, all cyclical rules are fed by affixation, different affixes, of course, feeding different rules. CV prefixes feed cyclical rules 2A and 4 and the post-cyclical gemination rule, suffixes feed 2A and 2B, mang- feeds 3, -inom- feeds 5A and 6, ?ini- feeds 5B, -om- feeds 6, and -?- feeds 9.

1B. Root Reduplication.

Of the three types of root reduplication in Kankanaey (initial CV, CVC and CVC(C)V), the latter two are neutral with respect to feeding and bleeding. The former feeds only the gemination rule. 'siyek + ka- + CV → kassi'siyek.

2A. Stress Shift.

Stress regularly shifts one syllable to the right upon inflectional suffixation[3] of roots other than the following: CV(C), CVC.CV, CVC.CVC (where V_2 is not e), and CVC.CVC.CVC; and shifts one syllable to the left upon prefixation of one-syllable stative roots with ma-, na-, or ka-. If, however, the above prefixation occurs in combination with suffixation, stress remains on the root.[4] In the following examples, a gloss is provided only where necessary to distinguish between stative

and other roots. kol'kol + -an → kol'kolan, bed'bed + -an → bedbe'dan, ?ag'to + -en → ?ag'toen, sak'pipi + -en → sakpi'pi?en, 'da?o + -en → da'?o?en, ?e'dad + -en → ?edda'den, ?od + -en → '?oden, ?om + ma- → 'ma?om 'to be ripe', kay + ma- → 'makay 'to be old', dan + ma- → ma'dan 'to walk', ?om + ma-...-an → ma'?oman.

I was very interested in Schane's description of preferred syllable structure rules (Schane, p. 207-209), and made some cursory attempts to discover if there were general rules governing stress placement in Kankanaey that would account for stress shift being blocked in words having the above four syllable structures. Thus far I have been unsuccessful, but the following general restraints relating to stress may be noted: a) Although stress does occur on the antepenultimate syllable of a few unaffixable roots, affixable roots permit stress on one of the last two syllables only. Thus, stress shift is obligatory for forms such as sak'pipi above in order to keep stress on one of the last two syllables. b) Stress may not occur prior to a root-medial consonant-glottal cluster. Thus, when forms such as bad'bado 'clothes' are infixed with glottal, stress shifts so as to follow the d? cluster. badbad'?o.

2B Glottal Insertion.

$$\emptyset \rightarrow \text{?} \;/\; V\&\_\_V.$$

Upon suffixation of vowel-final roots, glottal is inserted between the final vowel of the root and the suffix vowel. ?a'ba + -en → ?aba'?en.

For the sake of argument, it could be asserted that the underlying suffixes are -?en and -?an rather than -en and -an and that glottal is deleted upon suffixation of consonant-final roots. '?abot + -?en → ?a'boten. Such a rule, however, would have little internal motivation, because forms such as *?a'bot?en would not in fact violate Kankanaey syllable structure rules, and there is thus no reason why glottal should be deleted. The glottal insertion rule, on the other hand, is highly motivated, because syllable structure rules prohibit vowel clusters.

3. Assimilation and Reduction.

a.
$$\begin{bmatrix} +\text{nas} \\ +\text{bk} \end{bmatrix} \longrightarrow \left\{ \begin{bmatrix} +\text{ac} \\ \pm\text{bk} \end{bmatrix}, \begin{bmatrix} +\text{ac} \end{bmatrix} \right\} \;/\; \_\_ \;\&\; \left\{ \begin{bmatrix} +\text{or} \\ -\text{con} \\ +\text{ac} \\ \pm\text{bk} \end{bmatrix}, \begin{bmatrix} +\text{sib} \end{bmatrix}, \begin{bmatrix} -\text{syl} \\ +\text{con} \\ -\text{sib} \end{bmatrix} \right\}$$

b.
$$\left\{ \begin{bmatrix} -\text{con} \end{bmatrix}, \begin{bmatrix} +\text{sib} \end{bmatrix} \right\} \longrightarrow \emptyset \;/\; \begin{bmatrix} +\text{nas} \end{bmatrix} \&\_\_$$

When CVng- (mang-, nang-, pang-) is prefixed to a root with initial oral stop or sibilant, a) the final nasal of the prefix assimilates to the point of articulation of the initial consonant of the root, and b) that consonant is subsequently reduced. When the root-initial consonant is glottal, assimilation does not occur, but glottal is reduced. When the root-initial consonant is a non-sibilant, non-syllabic continuant (m, n, ng, l, w, y), the final nasal of the prefix becomes +acute, but no reduction occurs. '?anop + mang- --> ma'nganop, la'yad + mang- --> manla'yad, nga'lat + mang- --> mannga'lat, kan + mang- --> ma'ngan, 'sadong + mang- --> ma'nadong, bid'king + mang- --> mamid'king, ga'yabas + mang- --> mangnga'yabas, yam'yam + mang- --> manyam'yam, wa'nes + mang- --> manwa'nes, meg'meg + mang- --> manmeg'meg.

It is clear that the final nasal of the prefix is ng rather than the cannibal nasal N, because in Kankanaey, unlike some of the other Cordilleran languages,[5] both the other nasals m and n are stable with respect to assimilation. ka'li + man- --> manka'li (*mangka'li), 'bigaw + man- --> man'bigaw (*mam'bigaw), de'ges + -om- --> dem'ges (*deng'ges).

It is not so clear what happens to the CVng- in the case of the non-sibilant, non-syllabic continuants. There is some support for the hypothesis that when the above continuants occur root-initially, they block affixation with CVng-. That is the interpretation followed by Gieser and Reid in their respective analyses of Kalinga and Bontoc morphophonemics. Presumably, then, in syntactic structures requiring a CVng- affix (e.g., certain verb complements), the verb is forced to accept a different subject-focus affix, such as man-, instead. This solution avoids the unnatural assimilation described in the rule above in which a velar nasal assimilates to the alveolar point of articulation preceding a bilabial (meg'meg) and also preceding another velar (nga'lat), but at the same time, it forces one to the conclusion that phonological entities can block syntactic and semantic rules, a conclusion which I am somewhat leery of accepting at this point. There is, in fact, evidence that phonological sequences are subject to syntactic pressures. The sequences ow, iy and V? never occur within syllable boundaries of unaffixed forms. So it may be assumed that there are phonological restrictions against such occurrences in Kankanaey-[6] These restrictions, however, are overpowered by the syntactic and semantic pressures of reduplication and glottal infixation (see rule 9), with the result that all three of these sequences do occur in reduplicated forms.

Another example of semantic considerations taking precedence over phonological ones is provided by the articles din and sin. When din follows a word ending in an open syllable, the di of the article is optionally reduced and word space eliminated. mo + din --> mon. When sin occurs in an identical environment, however, it fails to reduce, probably because unacceptable semantic ambiguity would result. Consider, for example, the following two sentences: Ida'wat mo din ma'nok ko 'Give my chicken', and Ida'wat mo sin ma'nok ko 'Give it to my chicken'. Were the reduction rule to operate equally upon both din

and sin, the resultant sentence, Ida'wat mon ma'nok ko, would be ambiguous. Consequently, the phonological rule is blocked from applying to sin in order to preserve a semantic distinction.

Other examples could be given to support the contention that phonological rules tend to be modified or restricted by syntactic and semantic pressures rather than vice-versa. (See footnote #3 for an example affecting the stress rule.) But admittedly, such examples can hardly be considered conclusive evidence that in rule 3 as stated above, CVng- is not blocked before non-sibilant, non-syllabic continuants. Fortunately, there is additional supporting evidence from Balangao and Kankanaey that CVng- does indeed occur in said environments. In Balangao, CVng- assimilates to the alveolar point of articulation before n, w, y, or l, as in Kankanaey, but before m or ng, it assimilates to the bilabial and velar points of articulation respectively (Shetler, p. 44). Also, in an unsolicited sample of written Kankanaey text, the author spelled the words manla'yad and man'lipot as mangla'yad and mang'lipot respectively, which would be highly unlikely if the underlying affix were man- rather than mang-.

4. Syncope of V_1. (also commonly referred to as deletion)

Upon infixation or CV- prefixation of any CV.'CV(C) sequence, the initial vowel is syncopated according to the following pattern.

V_1 \ V_2	a	e	i	o
a	*	*	*	*
e	X	X	X	
i	*	*	/	
o	X	X	X	X

* = no syncope
X = regular syncope
/ = irregular syncope
□ = no examples

de'ges + ma- --> mad'ges, se'kaw + -om- --> som'kaw,
pi'sit + -in- --> pin'sit, so'bot + ?i- --> ?is'bot.

For example, when the final stem vowel is a, initial stem vowel e regularly syncopates. When the final stem vowel is i, however, initial vowel i syncopates irregularly. By irregularly, I do not mean that syncopation is optional, but rather that it occurs with some roots and not with others. In this case, there are only three roots meeting the structural description of the rule which have the vowel i as the peak of both syllables: pi'sit, ?i'wik, and pi'ngi.[7] Syncopation occurs with the first and last roots, but not with the second. pi'sit + na- --> nap'sit, pi'sit + -in- --> pin'sit, pi'ngi + -om- --> pom'ngi, ?i'wik + ?i- --> ?i??i'wik, ?i'wik + -in- --> ?inni'wik.

At this point I am unable to satisfactorily describe this irregularity, but I suspect that the explanation lies either in surrounding

dialect pressures or historical change or both (see rule 8 for more discussion on historical change). Certainly the exceptions to regular syncope can be largely explained by dialect pressures. Of the ten exceptions,[8] all but the last two are cognate with Ilocano, which, as the trade language throughout the Kankanaey area, enjoys a high degree of prestige. Inasmuch as Ilocano phonological rules do not permit syncope of the initial vowel for the words in question, it is highly understandable why these words prove exceptions to the syncope rule in Kankanaey. Of the three roots in which syncope occurs contrary to the expected pattern, ka'wani can be accounted for by postulating that the initial a is underlyingly an o, which regularly undergoes syncope. Support for this hypothesis is provided by Bontoc, in which the cognate word is in fact ko'wani. The other two exceptions cannot be accounted for at the present time.

5A. -INOM- --> -INM-.

-inom- --> -inm- / C_1__V

The infix -inom- is reduced to -inm- immediately preceding an initial stem vowel. 'tetek + -inom- --> tin'metek.

5B. ?INI- --> ?IN-.

?ini- --> ?in- / __C_1V

The prefix ?ini- is reduced to ?in- immediately preceding a CV sequence. 'payag + ?ini- --> ?in'payag, de'net + ?ini- --> ?inid'net.

6. Vowel Harmony.

a) -om- --> -em- / #C__e.

b) -(in)om- $\xrightarrow[\text{OPT}]{}$ -em- / #C__Ce.

a) When -om- is infixed to a stem in which the initial vowel e has not been reduced, the affix vowel harmonizes with the initial vowel. b) When -om- or -inom- is infixed to a stem in which the initial vowel e has been reduced, harmonization does not occur unless V_2 is also e, in which case harmonization is optional. 'bela + -om- --> be'mela, se'lak + -om- --> som'lak, de'ges + -om- --> dem'ges ~ dom'ges.

Two examples of vowel harmony not covered by this rule have been noted, but I consider two examples insufficient grounds for introducing a new rule(s) into the cycle. The examples are as follows: ?ey + ?ipa- --> ?ipe'?ey, '?agew + ka-...-an --> ka?aga'wan.

Note that the previous three rules are all bled by rule 4, syncope of V_1. Whenever the syncope rule applies to a given form, it deletes the very vowel required for the application of the other three rules. It can readily be seen why syncope must precede the other rules in the

rule order. If it followed rule 5B, for example, the initial vowel of de'net would not yet have been reduced, de'net would meet the requirements for the operation of rule 5B, and the resultant form, *?inde'net, would then fail to meet the structural description of the syncope rule.

Similarly, rule 5A bleeds the vowel harmony rule by reducing the o necessary for the application of the rule.

7. Syncope of V_2.

Upon suffixation of any CV.'CV(C) root, the final vowel of the root is syncopated according to the following pattern.[9]

V_2 \ V_1	a	e	i	o
a	*	/	*	*
e	X	X	X	
i	*	*	/	*
o	*			X

* = no syncope
X = regular syncope
/ = irregular syncope
□ = no examples

?e'gen + -an --> ?eg'nan, le'gab + -an --> legga'ban, pe'la + -en --> pella'?en, be'ka + -en --> bek'?en, bo'sog + -en --> bos'gen, li'ked + -en --> lik'den.

Notice that this rule is bled by syncope of V_1. In forms which are both prefixed/infixed and suffixed, deletion of the first vowel effectively blocks deletion of the second vowel, because such deletion would produce an unallowable three-consonant cluster. se'de + ka-...-an --> kasde'?an, de'net + ?i-...-an --> ?idne'tan, ?e'das + -in-...-an --> ?inde'san. Two exceptions have been noted in which syncope of V_2 apparently precedes that of V_1. although in the first example, only optionally so. ?e'teg + -in-...-an --> ?inte'gan ~?inet'gan, ?e'sek + -in-...-an --> ?ines'kan.

8. Lateral Assimilation.

$$1 \rightarrow \underline{+C} \;/\; \begin{bmatrix} \underline{+C} \\ +or \\ -sib \end{bmatrix} \;.\; \underline{\quad}\& $$

This rule applies to root-final l when vowel deletion produces a Cl sequence. If the consonant preceding l is +oral, -sibilant, l assimilates to it both in point and manner of articulation.

This rule was added to the cycle in order to account for four roots (de'nge, ke'be, pe'se, te'pe) whose object focus forms could not be satisfactorily derived by the other rules. Three other CV.'CV roots found

in the data, be'ka, de'wa, and ke'na, had object focus forms of bek'?en, dew'?en, and ken'?en, respectively, which forms were correctly derived by rules 1A, 2A, 2B and 7. So one would have expected object focus forms of deng'?en, keb'?en, pes'?en, and tep'?en, respectively, for the previously mentioned four roots. In fact, however, the actual forms are deng'ngen, keb'ben, pes'len, and tep'pen. In order to derive these forms without reference to rule 8, one would have to switch the order of rules 7 and 12, add a glottal deletion rule, and then restrict these changes to apply only to CV'CV roots ending in e. The derivation of deng'ngen would then be as follows (rule name or number is given in parentheses following the form to which it has just applied): de'nge --> de'ngeen (1A) --> denge'en (2A) --> denge'?en (2B) --> dengnge'?en (12) --> dengng'?en (7) --> deng'ngen (glottal deletion). Such a solution is, in my estimation, unacceptable, because of the relatively large number of ad hoc adjustments it forces upon the rule cycle to account for only a few forms.

It seems far more reasonable to postulate an underlying final l for the four roots in question, which requires only that a lateral assimilation rule be included in the cycle. Evidence from Bontoc strongly confirms the probably correctness of this hypothesis. All four of the roots in question have Bontoc cognates ending in l; the other three roots mentioned do not. Let us assume, then, that the proto-Kankanaey forms of these four roots had final l. This was gradually assimilated in suffixed forms and deleted elsewhere, until at present, it appears on the surface only in the form pes'len. I make no claims to be a comparative linguist, so I can't argue for the theoretical validity of the above statement. But given an underlying l plus a lateral assimilation rule, we can in fact account for the otherwise unexpected object focus forms of these roots, and we can do so without unduly violating the rest of the rule cycle.

9. Semi-vowel Replacement.

$$\left\{\begin{matrix}[w]\\[y]\end{matrix}\right\} \longrightarrow \text{-or} \;/\; \# \begin{bmatrix}-\text{syl}\\+\text{or}\end{bmatrix} \left\{\begin{matrix}[o]\\[i]\end{matrix}\right\} \_\_\_ .\&[-\text{or}]\&$$

$$\overset{\text{OPT}}{\longrightarrow} \text{-or} \;/\; \#C_1 \left\{\begin{matrix}[o]\\[i]\end{matrix}\right\} \_\_\_ .\&C_1$$

When glottal infixation results in a sequence of ow or iy within the same syllable of a root with initial oral consonant, the semi-vowel is replaced by glottal. When one of the above sequences is formed as a result of reduplication, replacement of the semi-vowel is optional, dependent on semantic considerations. When the semantic script calls for present continuing action, the semi-vowel is retained. When comparison or potential action is in view, it is replaced by glottal, which is subsequently metathesized or assimilated (see rule 10).
magiy'giyeng 'spinning', magig'?iyeng 'spinning faster';
komiyki'yang 'striding along', komik?i'yang 'walking with longer strides';

masowso'wat 'tipping downward', masos?o'wat 'liable to tip'. Notice that according to the rule, semi-vowel replacement does not occur on roots with initial glottal. man?o'?owas ('?owas), ?iy?i'yogtan (?i'yogtan).

10. Glottal Metathesis or Assimilation.

a) $$\underset{1}{[-or]}\ \underset{2}{\begin{bmatrix}+or\\-syl\end{bmatrix}} \rightarrow 2\ \ 1\ /\ \_\_[+syl]\begin{bmatrix}+or\\-syl\end{bmatrix}$$

b) $$[-or] \rightarrow \begin{bmatrix}+or\\\pm C\end{bmatrix}\ /\ \_\_\begin{bmatrix}+or\\\pm C\end{bmatrix}[+syl]\ [-or]$$

Kankanaey does not permit a sequence of glottal and oral consonant. When the operation of morphophonemic rules results in such a sequence, the glottal a) metathesizes with the following consonant if the consonant following the next vowel is +oral, and b) assimilates to the following consonant if the consonant following the next vowel is -oral.

This is the last rule of the cycle. If a form then undergoes stem reduplication, it is directed back to rule 2A for another pass through the cycle. If not, it proceeds to the post-cyclical rule, gemination.

11. Stem Reduplication.

As defined previously in the paper, this type of reduplication functions as a late spelling rule. It will be noted in the sample derivations which follow that in some cases, stem reduplication is the last step in the derivation of a particular form. That is, although the reduplicated form is automatically directed back to the beginning of the rule cycle, it gets a free ride, so to speak, as it fails to meet the structural descriptions of any further rules (see sample derivations 3, 5, and 9). In other cases, reduplication serves to feed rules which did not apply to a form its first time through the cycle (see derivations 8, 11, and 12).

12. Gemination.

$$\emptyset \rightarrow \pm C\ /\ V\pm C\_\_V.C'V(C)$$

Upon affixation or reduplication other than $C_1V_1C_2V_2$, the intervocalic consonant of the pre-stress syllable geminates.
ge'tad + -en --> getta'den, ta'ked + -in- --> tinna'ked, ta'pi + ?i- --> ?itta'pi, ta'dem + -om- --> tomma'dem, ba'ga + ?i-...-an --> ?ibagga'?an, to'led + na- --> natto'led, ?a + na- + CV --> na??a'?a, 'lowa + man- + $C_1V_1C_1V_1$ --> manlollo'lowa.

Apart from being blocked by the reduplication-produced pattern $C_1V_1C_2V_2$,[10] gemination is a phonological rather than a morphological

rule, applying without regard to morpheme boundaries or to the identity of particular morphemes. Because it occurs post-cyclically, applying to the final output of the other rules, no rule ever follows this one.

The implications of the gemination rule for a practical orthography are not yet clear, as results from orthography preference surveys have thus far been inconclusive. When asked to write from dictation words containing a geminate cluster (morphophonemically-produced), a majority of testees wrote the words with a single consonant only, e.g., ?ita'pi rather than ?itta'pi. In multiple-choice portions of the survey, however, in which testees were asked to choose what they considered the most correct spelling, a clear majority indicated the choice with the geminate consonant. Reading portions of the survey were also inconclusive, varying according to the reading ability of the testees. Slower readers tended to repeat themselves on words in which the geminate cluster had been written with a single consonant, stressing the wrong syllable the first time through, and then, realizing what the word was, pronouncing it correctly the second time. Faster readers seemed to have no trouble. This is probably due to the fact that stress, although phonemic, is not written, and thus slower readers who read syllable by syllable, have trouble knowing where to pronounce stress without the presence of the geminate consonant. When the gemination is written, however, the intimate relation between it and stress helps the reader pronounce correctly. More testing will obviously need to be done in this area, but for now, gemination is being written as an aid to slower readers, especially since it doesn't seem to hinder fluent readers.

II. SAMPLE DERIVATIONS

The sample derivations which follow demonstrate how the rule cycle operates. Preceding each derivation is a summary of the morpheme input (to the left of the arrow), the morphophonemic output (to the right of the arrow), the numbers of the rules that apply in the derivation, and a brief gloss of the root. When a rule applies, the resultant form is written in and the rule identified to the right. Rules that are blocked or do not apply are marked ___, with the exception of rule 1B, which applies in none of the derivations, and so is not marked at all.

1. be'ka + -en --> bek'?en (1A,2A,2B,7) 'to dig camote'

be'kaen	1A, affixation
beka'en	2A, stress shift
beka'?en	2B, glottal insertion
___	3-6
bek'?en	7, syncope of V_2, fed by rule 2A.

2. ke'bel + -en --> keb'ben (1A,2A,7,8) 'to wet'

ke'belen	1A, affixation
kebe'len	2A, stress shift
___	2B-6
keb'len	7, syncope of V_2, feeds rule 8
keb'ben	8, lateral assimilation

3. de'pap + mang- + CVC --> manman'pap (1A,3,4,11) 'to catch'
   mangde'pap 1A, affixation
   ___ 2
   mande'pap 3a,assimilation
   mane'pap 3b, reduction
   man'pap 4, syncope of V_1, fed by 3b
   ___ 5-10
   manman'pap 11, stem reduplication

4. pe'se + -inom- --> pinem'se (1A,4,6) 'to kill'
   pinome'se 1A, affixation
   ___ 2-3
   pinom'se 4, syncope of V_1, bleeds 5A
   ___ 5
   pinem'se 6, vowel harmony
   An optional output for this derivation is pinom'se.

5. ke'neg + -om- + CVC --> kemkem'neg (1A,4,6,11) 'to become firm'
   kome'neg 1A, affixation
   ___ 2-3
   kom'neg 4, syncope of V_1
   ___ 5
   kem'neg 6, vowel harmony
   ___ 7-10
   kemkem'neg 11, stem reduplication

6. da'wat + ?ini-...-an --> ?indaw'tan (1A,2A,5B,7) 'to give'
   ?inida'watan 1A, affixation
   ?inidawa'tan 2A, stress shift
   ___ 2B-5A
   ?indawa'tan 5B, ?ini- -- ?in-
   ___ 6
   ?indaw'tan 7, syncope of V_2

7. ?e'sek + na-...-an --> nas?e'kan (1A,2A,4,10) 'to plant'
   na?e'sekan 1A, affixation
   na?ese'kan 2A, stress shift
   ___ 2B-3
   na?se'kan 4, syncope of V_1, blocks 7
   ___ 5-9
   nas?e'kan 10, glottal metathesis

8. ?om + ka- + CVC --> kak'ka?om (1A,2A,11,10) 'to become ripe'
   ka'?om 1A, affixation
   'ka?om 2A, stress shift
   ___ 2B-10
   ka?'ka?om 11, stem reduplication, return to rule 2A
   ___ 2A-9
   kak'ka?om 10, glottal assimilation

9. se'?ed + -en + CVCVC --> sed?esed'?en (1A,2A,7,10,11) 'to wait for'
   se'?eden — 1A, affixation
   se?e'den — 2A, stress shift, feeds 7
   2B-6
   se?'den — 7, syncope of V_2, feeds 10
   8-9
   sed'?en — 10, glottal metathesis
   sed?esed'?en — 11, stem reduplication

10. 'siyek + -an + CV --> sissi'yekan (1A,2A,11,12) 'to laugh at'
   'siyekan — 1A, affixation
   si'yekan — 2A, stress shift
   2B-10
   sisi'yekan — 11, stem reduplication, return to 2A
   2A-11
   sissi'yekan — 12, gemination

11. 'siyek + -an + CVC --> sis?i'yekan (1A,2A,11,9,10) 'to laugh at'
   'siyekan — 1A, affixation
   si'yekan — 2A, stress shift
   2B-9
   siysi'yekan — 11, stem reduplication, return to 2A. This form is an optional final output, depending on semantic considerations.
   2A-8
   si?si'yekan — 9, semi-vowel replacement
   sis?i'yekan — 10, glottal metathesis

12. si'yam + -?- + CVC --> sissi?'?am (1A,9,11,10) 'nine'
   siy'?am — 1A, affixation, feeds 9
   2A-8
   si?'?am — 9, semi-vowel replacement
   10
   si?si?'?am — 11, stem reduplication, return to 2A
   2A-9
   sissi?'?am — 10, glottal assimilation

III. CONCLUSION

There are a number of other morphophonemic processes in Kankanaey, which occur between word junctures. I have chosen not to include the rules describing them in this paper, because they are unordered with respect to the rules described above and have no bearing on the relationship of reduplication to morphophonemic rules.

Attention should be drawn at this point to the relatively few times the rules were required to operate cyclically. Of the twelve derivations given above, only three required a second pass through the cycle in order to complete the derivation, and as has already been mentioned, no rule was required to apply more than once, even with two passes

through the cycle. Had reduplication not been included in the scope of this paper, it would have been possible to account for the morphophonemic changes described herein by means of linearly ordered rules alone, quite apart from any cyclical application. Thus, the importance of the cycle should not be stressed unduly.

At the same time, I trust that the need for considering reduplication in any morphophonemic analysis has been made sufficiently clear. Given agreement on that point, cyclical ordered rules provide a relatively efficient, uncomplicated means of deriving any form in the language.

FOOTNOTES

[1]Kankanaey is a Nuclear Cordilleran language closely related to Bontoc and Balangao, spoken by approximately 100,000 people. This description of Kankanaey morphophonemics is based on the dialect of the approximately 2,000 people living in Kibungan Central, Benguet Province. The phonemes of Kankanaey along with their distinctive feature representations are given in the table below taken from Allen, 1975.

	b	d	g	p	t	k	?	m	n	ng	s	l	w	y	i	e	a	o
syllabic (syl)													-	-	+	+	+	+
continuant (con)	-	-	-	-	-	-		+	+	+			+	+	+	+	+	+
acute (ac)	-	+	-	-	+	-		-	+	-			-	+	+	-	-	-
back (bk)	-	-	+	-	-	+		-	-	+			+	-	-	-	-	+
low (low)															-	-	+	-
voiced (vd)	+	+	+	-	-	-												
oral (or)	+	+	+	+	+	+	-											
nasal (nas)								+	+	+								
lateral (lat)												+						
sibilant (sib)											+							

[2]I wish to give Austin Hale full credit for suggesting the possibility of a rule cycle and for his invaluable consultant help in arranging the rules within the cycle to the best advantage.

[3]Forms derived with the nominalizing suffix -an are irregular with respect to both stress shift and gemination. bel'?ay + -an --> bel?a'yan 'yard', te'dek + -an + CVC --> tedte'dekkan 'index finger', 'gawa + -an --> gawa'?an 'middle finger', 'gading + -an --> gading'ngan

'wrist', 'losong + -an -> losso'ngan 'mortar'. When the above roots are affixed with an inflectional suffix, however, stress shift occurs according to the rule.

[4]Exceptions that have been noted are: ?eg'yat + -en -> ?egya'ten, ?it'ling + na-...-an, -> na?itli'ngan, sa'wit + -an -> sa'witan, 'mongsan + -en -> mongsa'nen, ?am'mo + -en -> ?ammo'?en, ?an'do + pa-...-en -> pa?ando'?en, kan + -en -> ka'nen. The last exception can be accounted for by postulating a root with the underlying form ?e'kan, which is, in fact, the cognate root in Keley-i, a related Cordilleran language. (See L. Hohulin and Kanstowicz for a description of Keley-i generative rules.)

[5]In Kalinga, Ibaloi, and Balangao, alveolar nasal assimilates to the point of articulation of following bilabial or velar stops, and in Balangao, bilabial nasal assimilates to the point of articulation of following velars (Gieser, p. 57; Ballard, p. 15; Shetler, p. 41).

[6]Similar restrictions have been noted in Kalinga and Balangao. Gieser states that "in Guininaang phonology *iy cannot occur as peak and coda of the same syllable" (p. 57), while Shetler notes, "o/u and w do not occur in the same syllable. Also, i and y do not occur in the same syllable except across morpheme boundaries" (p. 20).

[7]These three roots were gleaned from a corpus of over 3000 roots, including several hundred pages of text.

[8]Roots which failed to undergo regular syncope of V_1 as expected were: lo'wam, so'kat, lo'kay, to'wang, to'led, lo'git, bo'yok, ko'lot, bo'nong, ?o'yod. Roots which underwent syncope contrary to expectation were: ka'wani, la'?em, and ?i'ket.

[9]Roots which failed to undergo regular syncope of V_2 as expected were: da'key, ?o'yod, to'kop, and ?o'mong. Of these four, however, the last three optionally syncopated, and the last two are cognate with Ilocano. Roots which underwnet syncope contrary to expectation were: la'bas, la'mat, and ba'ga, but in the case of the last two roots, the syncopation was optional, and with the last root, the form in question was a noun, bag'?en baga'?en 'slave'.

[10]Examples of this pattern, with the root given in parentheses, are as follows: siyesi'yekan ('siyek), mandowado'wa (do'wa), dinmegede'ges (de'ges), ?i?alo'?alos ('?alos), kataweta'wen (ta'wen).

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