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**Tone and Accent in Carrier<sup>1</sup>**

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**0.0 Introduction**

This paper is a re-analysis of the tone system in Central Carrier, an Athapaskan language spoke in British Columbia. I argue that the tonal patterns in Carrier are a result of an underlying contrast between accented and unaccented morphemes rather than between morphemes with tonal contrasts, a distinction between a pitch accent language vs. a tone language (Trubestkoy 1969, McCawley 1970, 1978, Beckman 1986). The data in this paper is taken largely from Pike (1986), also from Morice (1932) and Story (1984) as noted.

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1. A version of this paper was presented at the Athapaskan Conference, University of Victoria, B.C., August 1987. I would like to thank E.D. Cooke, Keren Rice and Gillian Story and members of the tone seminar, spring 1987 at UMass, especially, John McCarthy, Scott Myers, Lisa Selkirk.

This analysis is of interest to the classification of Athapaskan languages as tone languages and the study of tonogenesis. Whereas tonal contrasts arise from a phonological reanalysis of segmental contrasts, accentual contrasts do not (Hombert 1978, Beckman 1986). The tone of the closely related Athapaskan languages has been analyzed to fall within a phonological hypothesis of tonogenesis (Krauss and Leer 1976, Leer 1979, Kingston 1987). The Carrier data and analysis calls into question a blanket classification of these languages as examples of 'tone languages'.

Furthermore the existence of a pitch accent system among a group of closely related languages characterized as tone languages speaks of a closer relationship between tone and accent systems than is implicit in the typology, 'accent vs tone', and is evidence for a view which holds that tone systems vary along a continuum, as was proposed for the Bantu languages by Clements and Goldsmith (1984).

In the first section of this paper I will present the data. In the second section an analysis is offered. The data can be accounted for by positing a contrast between accented and unaccented words. The tone pattern HL is assigned to accented words, unaccented words receive a final H by default. Included is a brief discussion of Pike's analysis of the behavior of the syllables preceding the tone. They are apparently toneless, showing a phonetic effect of rising in pitch to the high toned syllable according to the syllable's constituency.

#### 1.0 Carrier Data

In a discussion of tone in Central Carrier Pike (1986) provides a typology of four Word types and two Class types. As these word and class types are instrumental in understanding the underlying tonal contrasts, I will lay them out.

Three of the word types are polysyllables, the fourth is monosyllables. The first three are as follows: polysyllables with a step down between syllables, words with a final high tone, words with low on all syllables. Two word classes are posited, with all words belong to either one or the other dependent on their effect on the following word. Class L lowers the tones of all the syllables of the following word,

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those of Class NL have no effect on the tone of the following words. Let me discuss each Word and Class type with examples.

## 1.1 Word Types

The first type are polysyllables with "sharp" step down. In this type the syllables after step-down are low:

## (1) type 1

wási	`lynx'	debe	`goat'
dák'et	`autumn'	mándah	`canvas'
nizres	`black flies'	cáʔc'el	`baby'
yatúba	`ocean shore'	nanádiljo	`dew'
kék'etʔ'u	`stocking'	k'enyéndeneret	
		`he saws it to	
		pieces'	

The second type are those marked with a high tone on the last syllable.

## (2) type 2

dambá	`red willow berry'	taló	`salmon'
decen	`tree'	lebedák	`potato'
centexí	`coyote'	besdelé	`revolver'
dagét	`fish spear'		

The third type are polysyllables marked L on all syllables. Pike states these occur "only as a result of tone sandhi", and gives the following examples:

## (3) type 3

- (a) tʔ'erés niʔ'èn `he sees the snake'  
 `snake' `he sees'
- (b) 'iʔó c'udèn `one child'  
 `one' `child'

The second word in (3) is the example of the type three words.

The words and morphemes of this type are different from the others in that type 3 is not a membership class. The words and morphemes that exhibit type 3 pattern show alternations with type 1, 2 and 4 patterns.

Words of type 4 are all monosyllables. Since tone is defined as a contrast between two syllables no tone

is marked on monosyllables. These monosyllables in conjunction with the type 3 pattern (3) that are the key to the pitch accent analysis.

(4) type 4

yes `wolf'	Yes `flour'	soh `a robin'
can `rain'	ʒez `dust'	cen `dirt'
ce `rock'	tu `water'	ʒo `fish'

Note that there is a contrast between monosyllables that affect the following word/morpheme those that don't. In the following example the monosyllables affects an alternation on the following word:

(5)

(a) yes niʔ'èn  
 `wolf' `he sees'

vs

(b) xoh niʔ'én  
 `goose' `he sees'

The monosyllable yes changes the following word from a type 2 to a type 3. this leads to a discussion of Class.

## 1.2 Word Classes

Pike divides words into two classes "L", "NL" depending on whether or not they effect a lowering of tone on the following word. Class L marks all the syllables of the following word with a low tone, Class NL has no effect on the following word. Examples follow, from Pike.

1.2.1 Class L Class L makes following word/morpheme low. The effects of class L words are shown in three categories, one across morpheme boundaries and two examples across word boundaries, N + V and quantifier plus noun.

The first example is with a nominal suffix -iloh 'not a'. This morpheme surfaces with two tonal patterns:

- (6)
- |                   |       |                  |
|-------------------|-------|------------------|
| /calék/ + /iloh/  | ----> | calékiloh        |
| 'squirrel'        |       | 'not a squirrel' |
| <br>              |       |                  |
| /hunliz/ + /iloh/ | ----> | hunliziloh       |
| 'skunk'           |       | 'not a skunk'    |

Another example is a direct object plus verb where the direct object affects the tones of the verb. The verb nil'en 'he sees' has high tone on the final syllable, and it'as 'we two are cutting' has a step-down on the first syllable:

- (7)
- |                               |        |                     |
|-------------------------------|--------|---------------------|
| /tɬ'erés/ + /nil'en/          | -----> | tɬ'erés niɬ'èn      |
| snake he sees                 |        | 'he sees the snake' |
| <br>                          |        |                     |
| /calék/ + /it'as/             | --->   | calék it'às         |
| squirrel 'we two are cutting' |        |                     |

A third class L example involves a quantifier plus a noun. The quantifier marks all the tones on the noun as low:

- (8)
- |                   |           |             |
|-------------------|-----------|-------------|
| /'iɬó/ + /c'uden/ | ----->    | 'iló c'ùdèn |
| 'one child'       |           |             |
| <br>              |           |             |
| 'iɬó bànèk        | one bread |             |
| 'iɬó yès          | one wolf  |             |

The above examples show that monosyllables have the same effect of altering the tones of the following words as do polysyllables.

Pike remarks that all words of type one, morphemes with step-down, belong to class L.

1.2.2 Class NL Morphemes of Class NL do not affect the tones of the following word. Below are examples of quantified nouns, and noun verb combinations:

- (9)
- (a)   nanki   báneK           (cf. 'iʒó báneK (8))  
      two    breads
  - (b)   hwezih it'as  
      we two are cutting the caribou
  - (c)   t'evés nil'én  
      he sees the popular tree  
      gegús nil'én  
      he sees the pig

In all of the preceding, the second word in the pairs differs from those in the preceding section by retaining its distinct tonal pattern.

In the next section an analysis of Carrier is presented that relies on an underlying contrast not of tone but an underlying contrast of accented vs unaccented.

#### 2.1 Analysis: Accented vs Unaccented

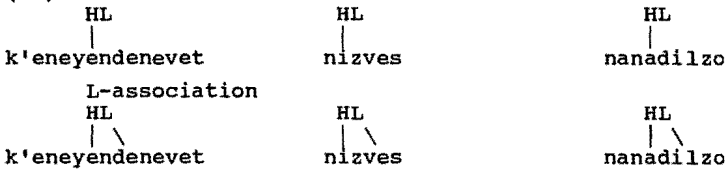
I will assume an autosegmental analysis of tone assignment (Goldsmith 1984) where tone is assigned to tone-bearing units (TBA's).

Type one words exhibit a tonal pattern Pike calls 'step down'. The tonal pattern here is a sequence of two tones, HL. The tones are associated the TBU's. To account for the position of the tones in the word and their ability to effect a low tone alternation on the following word, the type 1 words are characterized as underlyingly accented. The tonal pattern is associated later. In the following the location of the step-down in the surface form is the accented syllable, realized as the diacritic '\*'.  
 (10) accented morphemes

- |                          |               |             |
|--------------------------|---------------|-------------|
| *                        | *             | *           |
| /k'enyendenevet/         | /nizves/      | /nanadilzo/ |
| 'he saws it into pieces' | 'black flies' | 'dew'       |

The tonal sequence HL is assigned. The H tone associates to the accented syllable, the L tone to the next syllable:

(11) H association:



We need a spread rule which spreads L tone to the right, a follows:

(12) L-spread:



Any morpheme that is attached to an accented word will undergo L tone spread. This will result in the alternation found in (5) above, repeated below.

(13)

- |     |                   |                     |
|-----|-------------------|---------------------|
| (a) | yes <u>niɣ'èn</u> | 'he sees the wolf'  |
|     | vs                |                     |
| (b) | xoh <u>niɣ'én</u> | 'he sees the goose' |

The L tone alternation in (a) can be analyzed as a result of L tone spread across the word boundary.

This covers all the cases of step down, morphemes of type one. The remaining words are either final highs or monosyllables. We will examine these and give rules and derivations.

## 2.2 Final Highs and Monosyllables

A contrast exists among monosyllables and words with final H's between morphemes that cause L tone alternates on adjacent words (class L) and ones that don't (class NL). In this section I will give an account of this contrast as a contrast between accented and unaccented words. Accented words affect the tone of the adjacent word. Unaccented words receive a default tone on the final syllable and have no affect on the following word or morpheme. Of interest is the fact that this group of accented words, words with final accent (poly- and monosyllables), will effect a tone change across the word boundary, as opposed to the



step-down cases in which L tone spread operates only within words.

As we have seen monosyllables (4) can belong to either class (L/NL). Their class affiliation is determined by their effect on the following word: those that cause low tone alternates to appear are class L. Words of type 2 (2), final high's, also have this property. They can effect low tone alternations on following morphemes.

Below are examples of monosyllables and polysyllables contrasting type one and two and contrasting class L ((a) and (c)) and class NL ((b) and (d)):

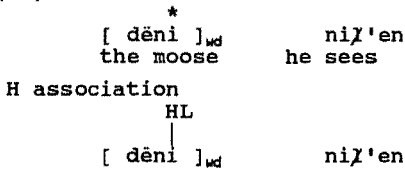
- (14)
- |     |               |                            |
|-----|---------------|----------------------------|
| (a) | dēní niχ'èn   | 'he sees the moose'        |
| (b) | t'ērēs niχ'én | 'he sees the popular tree' |
| (c) | yes níl'èn    | 'he sees the wolf'         |
| (d) | χèt niχ'én    | 'he sees smoke'            |

These pairs contrast in the effect they have on the following word. The first word in (a) causes the L tone alternate to appear; in (b) the same verb appears with a final H. In (c) and (d) the first words are monosyllables. They differ in their effect on the tone of the adjacent word just the same way the words in (a) and (b) do.

The real distinction here is between morphemes that cause alternations and those that don't rather than between word types.

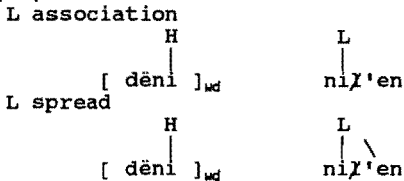
Consider the examples of final H's in (a) and (b). The example in (a) exhibits class 'L' effects. The example (b) does not. This contrast among monosyllables is shown in (c) and (d). These contrasts can be captured with the accent vs unaccent analysis. All of these morphemes have final high tones, those that cause spread are like the type one cases, they are underlyingly accented. The accented word is marked with HL, H tone associates to the final syllable.

(15)



In this case, the L tone cannot be associated to any tone within the word. Morphemes with an accented final syllable produce a floating low tone. The L tone associates to the next available syllable, which is in the next word. Low tone spread will spread the tone.

(16)

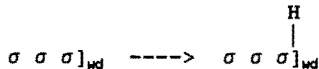


The result is the L tone alternation of the adjacent word.

This leaves us with the unaccented words. To account for the H tone in (14b) a default rule is posited.

(17) Final high default tone:

Insert H:



(18) Final high default tone:



This rule associates H tone to the final syllable of unaccented words. It must be seen to occur after low tone spread and to apply to words without tone.

This analysis works for both polysyllables and monosyllables and classifies morphemes not by their tonal pattern but by their effect on the following

morpheme. The case in (14c) above represents an accented monosyllable and contrasts with (14d).

(19)

HL  
\*  
yes nil'en        'he sees the wolf'  
tone association and spread:  
H    L  
|    | \  
yes nil'en

In (14d) the morpheme let is unaccented and receives a final high by (18).

While it is the case that accented words are assigned a tonal pattern HL, and these accented morphemes are the locus of alternations of adjacent morphemes, L tone will not spread across word boundaries. It is only monosyllables and final accented words, with their floating L tones, that will affect L tone alternate on the adjacent word.

Because the accented morphemes affect low tones on all morphemes that follow them, without distinction, a rule is needed that deletes all but the first accent of a given domain. The following is an example of two adjacent accented morphemes:

(20)

                  \*            \*  
/'ilo/    /banek/    --> 'iló bànèk  
          one        bread        'one bread'  
vs  
                  nanki bánèk 'two breads'

The domain must be at least greater than a word, as in the previous example. The low tone spread occurs over a word boundary. I write this informally as a rule that deletes all but the first (rightmost) accent within a phrase. Note it is exactly the accent that is deleted, not the tone. The existence of this phenomena is evidence for underlying accent rather than underlying tone.<sup>2</sup>

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2. In this sort of phenomena adjacency is defined on a tier, here the tier that bears the accent and not on the as adjacency of tone bearing units, the syllables. Similar phenomena is found in Japanese and Bantu. See Myers (1987:155) for discussion.

## (21) Accent Deletion:

\* -->  $\phi$  / \* \_\_

This rule will also account for the deletion of accents after accent within words. A derivation follows:

## (22)

*		
'ilo + banek		Deaccent Rule
HL		
'ilo	c'uden	H-association
H	L	
'ilo	c'uden	L-association
H	L	
'ilo	c'uden	L-spread

Accented monosyllables present a similar instance. Note the verb in example (24) and (23). In (23) is shown a contrast between the first person dual plural and the third singular. The contrast is in the placement of the accent:

## (23)

*		*	
(a) nil'en	(b) nil'en		
we two see	he sees		

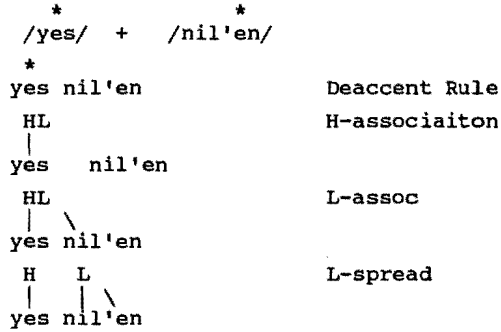
Given the rule of final high, this contrast is predicted to be between an accented word (a) and an unaccented (b). The accented word receives its final high via (18). Further evidence of paradigmatic use of accent in verbal inflection can be found in Story (1984:24), and Morice (1932)<sup>3</sup>.

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 3. Note also the paradigm from Story. The contrast here in tone is always between an accented word and an unaccented, in these paradigms Story does not mark tone on the third person.

ʔedits'o	ʔedits'o
we two hear	he hears
lúkad	lúkad
we two clap	he claps

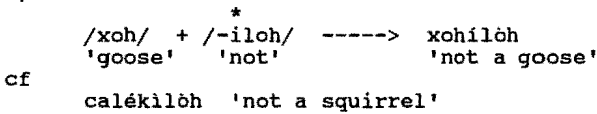
See Story (1984) for further examples.

(24)



The remaining morphemes are Class NL morphemes, those that do not affect low tones on following morphemes. Contrast the above cases with the unaccented cases below, both polysyllables and monosyllables. In the following the morpheme *xoh* 'goose' is unaccented and does not affect the initial accent of its suffix:

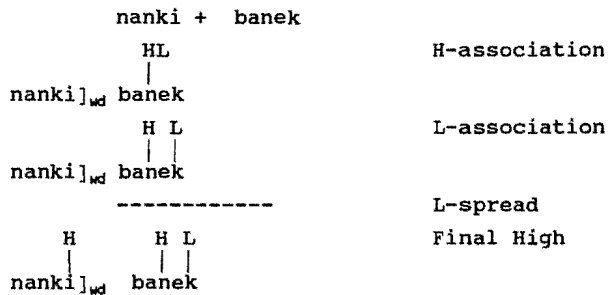
(25)



Accented words retain their own accent after unaccented words or morphemes.

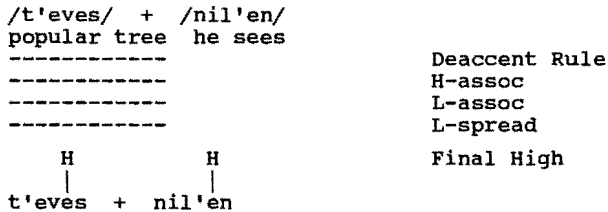
Below are some derivations of unaccented morphemes:

(26)



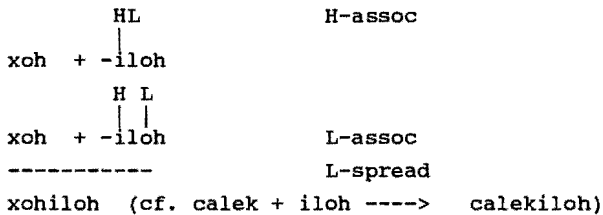
The following is a derivation of two unaccented words:

(27)



That the rule of final high operates at word level is seen in the following case where the unaccented morpheme xoh suffixes the accented morpheme -iloh. The rule of final high does not apply.

(28)



Words that don't affect the following words are thus unaccented. They receive an accent via a rule which marks the final syllable of an unaccented word with a high tone. Pike gives one example of a string of three words:

(29)

cek'ét degél nagél  
 'the muskrat packs the safety pin'

The sequence is three words with final highs, the analysis here predicts that these are a sequence of three unaccented words, the first two by virtue of the fact that they do not affect the following word, and the accent on the third, the verb is predicted, as above (23), be a final high tone by virtue of its contrast to the first person dual.

### 3. Pitch on Preaccented Syllables.

Pike also discusses the pitch on syllables that precede the tone bearing syllable. The effects she discusses are exactly what one would expect in toneless syllables. The pitch is determined by the particular constituency of the syllable.

Given a target H somewhere in a word, either on the accent or at the end of the word, a string of syllables will move towards that high exhibiting phonetic effects of their own constituency. That is a string of syllables containing voiceless aspirates will rise towards the high tone in the word. Pike states:

Words with a final high tone, which have a sequence of syllables with voiceless consonants, may have a gradual rise of pitch: necak'esc'oh 'our armpit'.

Words with a final high tone with only voiced continuants and voiceless unaspirated stops or voiceless unaspirated affricates are, in general, low in pitch.

These are phonetic effects. Carrier is a language in which, like Siamese and English, voiceless aspirates and continuants pattern together and effect a pitch that is higher than the voiced continuants and voiceless unaspirated series (Hombert 1978). The syllables preceding the accent or final high, while moving towards the target high, seem to raise or lower according to their own constituency. As these are phonetic effects, these syllables are toneless.

### 4. Summary

Carrier is a pitch accent language with a system like Japanese. The syllable is the bearer of accent and every word has a high tone, either by assigning the high tone to the accented syllable or by a default rule which assigns a high tone to the final syllable of a word. An early rule in the language deletes an accent after an accent. The contrast in Carrier is between accented vs unaccented morphemes.

The following is a rule summary:

The sequence HL to is associated to accented words:

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- i. associate H to the accented syllable
- ii. associate L to the following syllable
- iii. spread L tone to the end of the word

Inside words a deaccent rule (21) applies:

\* -->  $\phi$  / \* \_

This rule will delete an accent after an accented morpheme. This same rule applies between morphemes, within an as yet unspecified domain which at least includes a noun and verb; all but the first accent will be deleted within this domain.

This later rule results in the fact that words with final accent (or accented monosyllables) will leave a floating L. The floating L will spread onto the adjacent word.

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