THE TONE PATTERN OF JAPANESE:
AN AUTOSEGMENTAL THEORY OF TONOLOGY
by
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To my wife Chib,
my daughter Sawako,
my son Tomotake,

With love and thanks.
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Linguistics on August 11, 1975 in partial fulfillment of the
requirements for the degree of Doctor of Philosophy.

ABSTRACT

This dissertation analyzes the tonal characteristics of
a large number of Japanese dialects in the light of a version
of the autosegmental theory propounded by J. Goldsmith.
Among the significant results of the work are: i) tonal rules
may be dependent on phonological information; ii) tonal rules
are at least partially ordered; iii) there are only four
basic tone melodies High-Low(HL), Low-High-Low(LiL), Low-High
(LoHi), and Mid(··), which characterize all Japanese dialects;
and no dialects, with minor exceptions, have more than two of
these basic tone melodies; iv) the tone association rules in
all accentual systems assign H to a particular V. Accentual
systems can have words with a specially marked mora with
which H is associated, as well as words without such a mora;
vi) there are dialects in which all words are accentually
unmarked (these dialects resemble accentless languages such
as Kende, Kikuyu, etc.).

Certain alternative tonological theories are analyzed
and compared with the present autosegmental theory. Some
arguments in favor of the present theory are given.

Thesis supervisor: Morris Halle
Title: Professor of Linguistics
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INTRODUCTION

In this work, I would like to focus my attention on the problems of (i) how a tonal level and a phonological level are related; and (ii) how the well-formed surface tonal contours of a language are derived. It has been taken for granted in standard generative phonology (e.g., Chomsky-Halle (1968)) that if a vowel is deleted, then everything in the vocalic segment disappears. Take for instance the well-known High Vowel Deletion Rule in Japanese compounds. Roughly speaking, this rule deletes a morpheme-final high vowel [i] or [u], when it is preceded by /k, or t/ and followed by a voiceless consonant. Consider the following cases:

(1) a. (i) gaku (ii) gaku-mon (iii) gak-koo
   'learn' 'learning' 'school'

b. (i) ?iti (ii) ?iti-do (iii) ?ip-pon
   'one' 'once' 'one(slender object)'

In (1), "gaku" and "?iti" are loan words from Chinese. In the compounds in (ii), the morpheme-final high vowels [i] and [u] are not deleted, because the following consonant is voiced in each case. On the other hand, in (iii), they are deleted because the following consonant is voiceless. The underlying structures of (1iii) are thus as follows:
(2) a. gaku-koo
   b. titi-pon

After the deletion of the high vowels from these structures, [t] in (2b) is turned into a homorganic consonant [p]. Once these vowels are deleted, they leave no trace behind.

On the other hand, Goldsmith discussed in his paper (1975 a), that in many tone languages the tone that a vowel had remains and shows up on some other vowel when a vowel is deleted. A similar phenomenon is observed in Japanese.\(^2\)

This is very strange and poses a recalcitrant problem if we assume that tone is included in the vocalic segment. This is true because in that case the tone would have to be deleted when the vowel which bears it is deleted. However, if we assume, in line with Goldsmith's proposal, that tone constitutes a level which is independent of a phonological level as illustrated in (3) a way to handle this tonal survival becomes available.

(3) CVCGVCV... a phonological level
    L H L ... a tonal level

Given this dual structure we will need a mechanism to connect the tonal level with the phonological level. As will be made clear, these two levels are connected under certain constraints, and there is a certain regularity in the mode of connection.
We will see that the mechanism for connecting these two levels consists of two processes: a small number of language-particular processes and a number of universal processes. Among the language particular processes, there is a rule which connects the leftmost tone of the tonal level with the leftmost V by drawing a line between them. Supposing that this rule applies to (3), we will have the following structure:

\[(4) \quad \underline{CV}CV\underline{CV}CV \]

\[\quad \quad \quad \quad \quad L \quad H \quad L \quad .\]

A line between a V and a tone is called an association line. (4) itself is not sufficient, because it says nothing about how the remaining H and L tones are connected with the vowels. As we will see, a universal process applies to (4), and connects the H and L tones with the syllables as follows:

\[(5) \quad \underline{CV}CV\underline{CV}CV \]

\[\quad \quad \quad \quad \quad L \quad H \quad L \quad .\]

Thus, all of the tones of the tonal level are connected with one of the V's of the phonological level and vice versa. This is a correct output for the association of the two levels.

However, the two levels cannot be connected for example in such a way as to produce crossed lines as in:
Furthermore, every vocalic segment must be connected with at least one tone. Thus, the following structure, which leaves a V unconnected with any tone,

(7) CVCVCVCV
     \_\_\_\_
    L   H   L

is ill-formed:

To understand why this is so, consider the following analogy. In music, a melody goes from left to right and so does a poem. Because of a temporal linearity constraint, the melody and the poem can be connected, for instance, as follows:

(8) a. \.\ \.\ \.\ \.\ \.\ \.\ \.\ ha ru-ga ki ta
     'spring-Sub came'

b. \.\ \.\ \.\ \.\ \.\ \.\ ha ru-ga ki ta
     'spring-Sub came'

but it can never be connected as follows:

(9) \.\ \.\ \.\ \.\ \.\ ha ru-ga ki ta

Nor can we connect a poem with a melody in such a way as to leave some syllable unconnected with any melody:
\[(10) \quad \hat{\text{ha ru-ga ki ta}} \]

It is obvious that every syllable of a poem must somehow be related with a part of the melody. What is wrong with (9) is that "ga", which temporarily precedes "ki" and "ta", is connected with which temporarily follows and . In other words, the crossing of the lines disturbs linear correspondence relations between a poem and a melody.

Note that the relation between a poem and a melody almost exactly parallels the relation between the phonological level and the tonal level. Because of the very nature of temporal linearity of speech, the phonological level consists of a sequence of (phonological) segments and the tonological level also consists of a sequence of (tonal) segments. The temporal linearity constraint which works in the case of music also operates here to prevent the tonal level from being connected with the phonological level as in (6). To put this in another way, the crossed association of tones with phonological segments is prohibited by the more general constraint of temporal linearity.

The problems we are going to discuss in the following chapters are: (i) how these two levels are connected and (ii) what constraint is imposed on the association of tonal and phonological levels. In the first part of our
discussion, we will make the ideas sketched above clear, apply them to the descriptions of a number of Japanese dialects, and attempt to show that the ideas work in very interesting ways. Then in the second part of our discussion, we will try to define direction in which the tonological theory should be modified, and compare some of the major tonological theories proposed up to now.
FOOTNOTES TO INTRODUCTION

1. For a more detailed discussion, see McCawley (1968, pp. 115 ff.).

2. We will discuss an example of this found in Kameyama Japanese later in Chapter 5.
CHAPTER 1

THE TONE SYSTEM OF THE TÔKYÔ DIALECT

1.1. Introduction—An Autosegmental Treatment of TÔkyô Nouns

I will first discuss the tone system of the TÔkyô dialect, or standard Japanese, in order to present my version of the autosegmental theory and to illustrate how the present autosegmental theory works.

TÔkyô has the following 4 tonal classes for 3 syllable nouns, depending on where the abstract accent marker, represented by the * in (1), is placed in the lexicon:

(1) a. ñoti b. kokôro c. atamâ(-ga) d. miyako(-ga)

| | | | | | | | |
|H|L|LH|LH|LH|

'life' 'heart' 'head+Sub' 'cap. city'

As illustrated in (1), if a noun has a star on the initial vowel as in "ñoti", the surface melody is realized as HLL; if it has a star on the second vowel as in "kokôro", the surface melody is realized as LHL; if it has a star on the third (or as in (1), the final) vowel as in "atamâ", the surface melody is realized as LHH, and if an enclitic "ga" (Sub.) follows it, the "ga" has a L tone; and finally, if there is no star as in "miyako", the surface melody is
realized as LHH. But in this case, if the enclitic "ga" follows it, "ga" has a H tone. In general, if a starless enclitic follows a starred word, the enclitic has a L tone, and if it follows a starless word, it has a H tone.

Let me call a dialect like Tôkyô, which makes use of star, an accentual system. On the other hand, Chinese and other tone languages which do not use star will be referred to as non-accentual languages. I assume that in an accentual system a simple word can be specified in the lexicon with at most one star.

The autosegmental theory assumes, as Goldsmith (1974 a, b, c) proposed, that there are two phonological levels: (i) a level of a phonological segmental matrix as in Chomsky-Halle's standard generative phonology; and (ii) a level of a tonological segmental matrix. The latter is usually represented as in HL, LHL, ML, etc, where H is a high level pitch; M is a mid level pitch; and L is a low level pitch. H is, technically, an abbreviation of the feature complex [+H, -L]; M an abbreviation of the feature complex [-H, -L]; and L an abbreviation of the feature complex [-H, +L]. Each tonological segmental matrix like HL, and LHL will be called a tone melody.

I assume that there are two types of tone melodies: (i) the basic tone melody which typically appears on a lexical item as in (1), and (ii) the special tone melody which will
be used for a special construction like disjunctive question in English (see Goldsmith 1974b), to which we will return below in Part III. One of the main concerns in this and ensuing chapters will be determining how many basic tone melodies different Japanese dialects have, and what they are.

As indicated in (1), each component of the tone melody, HL, or LHL, is called a "tone" (or a "toneme"). It is associated with a tone-bearing unit. Tone-bearing units in most Japanese dialects are vowels and the syllabic nasal ŭ, both of which should be voiced. An association line is a line which connects a tone with a tone-bearing unit.

In the lexicon, no tone melody is associated with the phonological string. In particular, in the lexicon of the Tōkyō dialect, the examples in (1) are simply specified as in (2):

(2) a. *noti b. kokoro c. atama d. miyako

I will show in this chapter that Tōkyō has only one basic tone melody, HL, and that the tone contours in (1) are surface realizations of this basic tone melody. Let us now see how this basic tone melody is associated with each word and phrase. Tone association processes are divided into two types: the language-particular tone association rules and Universal Tone Association Conventions; and my claim is that each language has at most one language-particular tone association rule schema for the basic tone melody, and that
everything else will be handled by the Universal Tone Association Conventions. In the case of the Tôkyô dialect, the tone association rule consists of the following two sub-rules:

(3) **The Tone Association Rule** (Tôkyô):

(a) If a string has at least one $^1 V^1$, then associate the $H$ tone of the basic tone melody with the leftmost $V^*$;

(b) If it has no $V^*$ (i.e. if it is unaccented), then associate the $H$ tone of the basic tone melody with the rightmost $V$.

Rule (a) applies to accented words and rule (b) applies to unaccented words. These two rules are formally stated with the help of a $Q$ variable (or a unique variable) developed by Halle and Vergnaud:

(3)' $## Q V$ (i) where $Q$ is the maximal sequence of phonological segments which does not contain the $V^*$.  
$H$ (ii) where the dotted line indicates the structural change (SC) of the rule.

Condition (i) in the above formula forces us to choose the leftmost $V^*$ if a given domain contains two stars (or more) as in:

(4)  
\[
\begin{array}{c}
a. / kokoro made / \\
H L
\end{array}
\quad \begin{array}{c}
b. / inoti desu / \\
H L
\end{array}
\]  
(Continued)
'heart + even'    'life + is'

Rule (3)' applies also to the examples in (2) and associates the melody HL as follows:

(5) a. *inoti  b. kokôro  c. atama  d. miyako
     H L      H L      H L      H L

     e. atama-ga  f. miyako-ga
            H L    H L

Let us now turn to the Universal Tone Association Conventions. The function of the conventions is to associate every tone with at least one of the 5 and vice versa. They will, as a first approximation, be stated as follows:

(6) **Universal Tone Association Conventions:**

(i)a. All tones should be associated with at least one tone-bearing unit, and conversely, all tone-bearing units should be associated with at least one tone in the tone melody.

b. No association lines should cross.

(ii) To guarantee (i), perform the following process:

a. If a domain contains only one free tone, or if it contains only one free tone to the right (or left) of a bound tone, the free tone should
be associated with every free tone-bearing unit or every tone-bearing unit on the same side of the bound tone. I.e.

\[
\begin{array}{c}
V \\
| \\
T_1 \\
\end{array} \quad \text{P} \quad \quad \text{\textit{\textit{(where P is the longest sequence of free tone-bearing units, and T}_2 \text{ is a free tone. } // \text{ indicates that this is a mirror image process.)}}} \\
\end{array}
\]

b. If a domain contains no V to the right (or left) of a bound V, and if it contains at least one free tone, the free tone should be associated with the bound tone-bearing unit. I.e.

\[
\begin{array}{c}
V \\
| \\
T_1 \\
\end{array} \quad \text{\textit{\textit{(where Q is the longest sequence of free tones.)}}} \\
\end{array}
\]

c. If a domain contains at least one V to the right (or left) of a bound tone and if there is no free tone, then associate the bound tone with the remaining free tone-bearing units. I.e.

\[
\begin{array}{c}
R \\
| \\
T \\
\end{array} \quad \text{\textit{\textit{\textit{(where R is the maximal sequence of free tone-bearing units.)}}} \\
\end{array}
\]

In (6) and elsewhere, a dotted association line in a formula (i.e. a convention or a rule) indicates the structural change (SC) of the process. By a "free tone", I mean a tone which is not yet associated with a tone-bearing unit by any of the previous tone association processes. In examples (4) and (5), the L tone is a free tone. By a "bound tone", I mean a
tone which is associated with a tone-bearing unit by some previous tone association process. In examples (4) and (5), the H tone is a bound tone. Convention (6 iia) applies to examples (4) and (5) and associates the free L tone with the longest possible sequence of free tone-bearing units, as indicated by the dotted lines:

(7) a. kokoro made  b. inoti desu  
\[ \begin{array}{cc}
  & P \\
  & \downarrow \\
 H & L \\
  & \downarrow \\
 & P \\
\end{array} \]  
\[ \begin{array}{cc}
  & P \\
  & \downarrow \\
 H & L \\
  & \downarrow \\
 & P \\
\end{array} \]

(8) a. inoti  b. kokoro  c. atama  d. miyako  
\[ \begin{array}{cc}
  & P \\
  & \downarrow \\
 H & L \\
  & \downarrow \\
 & P \\
\end{array} \]  
\[ \begin{array}{cc}
  & P \\
  & \downarrow \\
 H & L \\
  & \downarrow \\
 & P \\
\end{array} \]  
\[ \begin{array}{cc}
  & P \\
  & \downarrow \\
 H & L \\
  & \downarrow \\
 & P \\
\end{array} \]

In (7a), P is the sequence "ro made"; in (7b), it is the sequence "noti desu"; and so on. Notice that in (8 c, d, and f), Convention (6 iia) does not apply, because there is no free tone-bearing unit in these examples. Here, we cannot apply the convention in question to (8 c, d, and f) as follows:

(9) a. *atama  b. *miyako  c. *miyako-ga  
\[ \begin{array}{cc}
  & \downarrow \\
 H & L \\
  & \downarrow \\
\end{array} \]  
\[ \begin{array}{cc}
  & \downarrow \\
 H & L \\
  & \downarrow \\
\end{array} \]  
\[ \begin{array}{cc}
  & \downarrow \\
 H & L \\
  & \downarrow \\
\end{array} \]

If it were to apply, it would violate (6 ib) by producing
crossed lines as in (9), which is prohibited by that
convention. Furthermore, convention (6 iia) prohibits the
drawing of association lines as follows:

\[(7)' \quad \begin{align*}
  \text{a. } & \text{koko } \text{ma} \text{de} \\
  \text{b. } & \text{inot } \text{ma} \text{de}
\end{align*}\]

\[
\begin{array}{c c c c c}
  H & L & \quad H & L \\
\end{array}
\]

An association such as that in (7a)' and (7b)' is illegitimate
since the L tone is associated with tone-bearing units which
are already bound by the H tone. Notice that convention
(6 iia) consists of two mirror image processes. Thus, it
applies to the cases where a free tone is to the left of a
bound tone, as in (10):

\[(10) \quad \begin{align*}
  \text{a. } & V V V V V \\
  \text{b. } & V V \\
  \text{c. } & V V V V V
\end{align*}\]

\[
\begin{array}{c c c}
  L H & \quad L H L & \quad H L
\end{array}
\]

It takes (10) to the corresponding (10)', where the dotted
lines indicate the effects of convention (6 iia):

\[(10)' \quad \begin{align*}
  \text{a. } & V V V V V \\
  \text{b. } & V V \\
  \text{c. } & V V V V V
\end{align*}\]

\[
\begin{array}{c c c c c}
  L H & . & \quad L H L & \quad H L
\end{array}
\]

Convention (6 iia) also applies to cases where free
tones occur to the right and left of a bound tone, as in
(11):

\[(11) \quad \begin{align*}
  \text{a. } & V V V V V \\
  \text{b. } & V V V V V
\end{align*}\]

\[
\begin{array}{c c c c c}
  L H L & \quad M H L
\end{array}
\]
It converts (11) to (11)'

(11): a. \begin{array}{c} V V V V V V \\ L H L \end{array} 
     \begin{array}{c} V V V V V V \\ M H L \end{array}

Here again, the dotted association lines indicate the effects of the convention under consideration. Finally, the same convention (6 iia) applies to cases where a domain contains only one tone as in (12):

(12) a. V V V V \hspace{1cm} b. V V V V V
     H \hspace{2cm} L

and converts (12) into (12)'

(12)': a. \begin{array}{c} V V V V \\ H \end{array} 
     \begin{array}{c} V V V V V V \\ L \end{array}

Though (6 iia) will be elaborated later to handle a situation which is more complicated than the above examples, it will suffice for the time-being.

Now let us see how convention (6iib) applies to (7) and (8). Obviously it does not apply to (7a, b) and (8a, b, and e), because they no longer contain a free tone. It applies only to (8c, d, and f) and (10b)' as indicated by the dotted lines in (13):

(13) a. atama \hspace{1cm} b. miyako \hspace{1cm} c. miyako-ga \hspace{1cm} d. V V
     \begin{array}{c} / \hspace{1cm} / \hspace{1cm} / \hspace{1cm} / \hspace{1cm} / \\ H L \hspace{1cm} H L \hspace{1cm} H L \hspace{1cm} L H L \end{array}
Notice here that since convention (611b) is a mirror image process, it also applies to the following cases:

(14) a. \[ CV \] b. \[ CV \]
   \[ LHL \] \[ LHL \]

and it will associate the free L and H tones as in (14):

(14)' a. \[ CV \] b. \[ CV \]
   \[ LHL \] \[ LHL \]

Here again, the dotted lines indicate the effects of convention (611b).

Finally consider convention (611c). It applies to (7a), (8b and e), and (13a, b, and c), and derives the followings:

(15) a. \[ kokoro \text{ made} \] b. \[ kokoro \] c. \[ atama\text{–}ga \]
   \[ H \] \[ H \] \[ H \]
   \[ L \] \[ L \] \[ L \]

d. \[ atama \] e. \[ miyako \] f. \[ miyako\text{–}ga \]
   \[ H \] \[ H \] \[ H \]
   \[ L \] \[ L \] \[ L \]

Notice that convention (611c) is also a mirror image convention. Thus, it applies to the following cases:

(16) a. \[ CV CV CV \] b. \[ CV CV CV \]
   \[ L \] \[ H \]

In (16a), the bound L tone is associated with the free V's as indicated by the dotted lines. Likewise, in (16b), the bound
H tone is associated with the free V's, as indicated also by the dotted line. Thus, every tone of the basic tone melody is now associated with at least one tone-bearing unit and vice versa. It should be noted that these Universal Tone Association Conventions are nothing but a first approximation. (6iiia) especially requires further elaboration, to which I will return later in this work. However, I hope that it will be sufficient for illustrative purposes.

Now compare the melodies derived by the association of the basic tone melody in (17):

(17) a. \[ \text{inotu} \quad b. \text{kokoro} \quad c. \text{atama} \quad c'. \text{atama}-\text{ga} \]

\[
\begin{bmatrix}
\text{H} & \text{L} \\
\text{H} & \text{L} \\
\text{H} & \text{L} \\
\text{H} & \text{L}
\end{bmatrix}
\]

\[ \text{d. miyako} \quad \text{d'. miyako}-\text{ga} \]

\[
\begin{bmatrix}
\text{H} & \text{L} \\
\text{H} & \text{L} \\
\text{H} & \text{L}
\end{bmatrix}
\]

with the corresponding surface melodies in (1), which are reproduced here for ease of reference:

(1) a. \[ \text{inotu} \quad b. \text{kokoro} \quad c. \text{atama} \quad c'. \text{atama}-\text{ga} \]

\[
\begin{bmatrix}
\text{H} & \text{L} \\
\text{L} & \text{H} & \text{L} \\
\text{L} & \text{H} \\
\text{L} & \text{H} \quad \text{L}
\end{bmatrix}
\]

\[ \text{d. miyako} \quad \text{d'. miyako}-\text{ga} \]

\[
\begin{bmatrix}
\text{L} & \text{H} \\
\text{L} & \text{H} \quad \text{L}
\end{bmatrix}
\]

Examination of (15) and (1) will immediately reveal the following two differences: (i) The surface melodies in (1)
have an initial L tone, if the initial mora is starless, while the corresponding melodies in (15) have an initial H tone; (ii) any HL contour tone which is associated with a final V in (17) is simplified to a H level tone in (1).

Consider first the former, i.e., the appearance of the initial low tone in the surface melodies in (1b-d'). This will be handled by the following Initial Lowering Rule, which lowers the initial H tone if it is followed by another H-toned mora:

\[ \begin{align*}
V & \quad C_0 \quad V \\
H & \quad \rightarrow \quad L & \quad H
\end{align*} \]

(18) **The Initial Lowering Rule (Tôkyô):**

Though this rule will require further elaboration to which I will return later, let us accept (18) as it is. It does not apply to (17a), because the initial H toned mora is followed by a low toned mora. It applies to (17b-d') and lowers the initial H tone to a low tone as in (19):

(19) a. inôti  b. kokôro  c. atâma  c' atâma-ga

\[ \begin{align*}
H & \quad L \\
L & \quad H & \quad L & \quad L & \quad L
\end{align*} \]

\[ \begin{align*}
d. \text{miyako} & \quad d' \text{miyako-ga} \\
L & \quad H & \quad L & \quad L
\end{align*} \]

In (19), the dotted lines indicate the effects of the lowering rule.
Now let me turn to the second difference. In general Tôkyô is said to have no surface contour tone. This will be handled if we introduce the following HL contour tone simplification rule:

(20) The Tone Simplification Rule (Tôkyô):

\[
L \rightarrow \emptyset \quad \begin{array}{c}
V \\
H
\end{array} \quad \text{or} \quad \begin{array}{c}
V \\
H
\end{array} \rightarrow \quad \begin{array}{c}
V \\
H
\end{array}
\]

The function of this rule is to delete the L tone out of a HL contour tone and turn it into a H level tone. This rule applies to (19c, d, and d') and turns them into (21):

(21) a. atama b. miyako c. miyako-ga

\[
\begin{array}{c}
L \\
H
\end{array} \quad \begin{array}{c}
L \\
H
\end{array} \quad \begin{array}{c}
L \\
H
\end{array}
\]

We now have the surface melodies in (1). So far, I have proposed the following system for Tôkyô:

(22) a. the basic tone melody: HL
b. The Tone Association rule (3)'

\[
\begin{array}{c}
Q \\
V
\end{array} \rightarrow \quad \begin{array}{c}
H
\end{array}
\]

where Q is the maximal phonological string which does not contain \( \emptyset \).

c. The Initial Lowering rule (18):

\[
\begin{array}{c}
V \quad C_o \\
H
\end{array} \rightarrow \quad \begin{array}{c}
V \quad C_o \\
L \quad H
\end{array} \quad \begin{array}{c}
H
\end{array}
\]

\[\# \# C\]
d. The Tone Simplification rule (20):

\[ L \rightarrow \emptyset \quad \frac{V}{H} \quad \left( \text{or} \quad \frac{V}{H} \rightarrow \frac{V}{H} \right) \]

Given system (22), the lexical star specification as in (2), and the Universal Tone Association Conventions (6), we will be able to handle most of the tone melodies associated with nouns. For example, the above system predicts that the surface tone melodies of one mora nouns with or without an enclitic "ga" (sub) will be derived in the following way:

(23)

<table>
<thead>
<tr>
<th>Underlying Representation</th>
<th>unaccented</th>
<th>accented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone Association (3)'</td>
<td>( ?e )</td>
<td>( ?e-ga )</td>
</tr>
<tr>
<td>Universal Tone Association Conventions (6)</td>
<td>( ?e )</td>
<td>( ?e-ga )</td>
</tr>
<tr>
<td>Initial Lowering (18)</td>
<td>( ?e-ga )</td>
<td>( ?e-ga )</td>
</tr>
<tr>
<td>Tone Simplification (20)</td>
<td>( ?e )</td>
<td>( ?e-ga )</td>
</tr>
<tr>
<td>output</td>
<td>( ?e )</td>
<td>( ?e-ga )</td>
</tr>
</tbody>
</table>
Since Tôkyô has \( n+1 \) tonal classes for \( n \) syllable nouns, one syllable nouns are of two tonal classes: the accented class as in "?e*" (picture) and the accentless class as in "?e" (handle). The Tone Association rule (3)' applies to each string in (23), and associates the H tone with the final V in (a) and (b), and with the starred V in (c) and (d). Then the Universal Tone Association Conventions (6) associate the L tone with the final V as indicated in each example. In (b), the universal convention in (6iic) associates the H tone with the initial V. Then the Initial Lowering rule applies to (b) and lowers the initial H tone to a L tone, and finally by the Tone Simplification rule (20), the HL contour tone in (a), (b), and (c) is simplified to a H level tone. Thus, we have the well-formed output melodies in (23).

1.2. **On the Basic Tone Melody for Unaccented Nouns**

In the above discussion, we assumed that Tôkyô has one and only one basic tone melody: HL. This melody seems reasonable for accented words, because all of them have a L tone on the mora which appears after *V. However, one might wonder why unaccented words like "miyako(-ga)" in (1d) "?e" and "?e-ga" in (23a and b), which will have no L tone after the H tone, are assumed to have the HL basic tone melody. To put this in another way, what is wrong with considering H the basic tone melody for unaccented words?
There are a few reasons why accentless words have the HL basic melody and not the H basic melody. Let us consider some of them here.

1.2.1. **Q-Phrases in Women's Speech**

First of all, consider Q-phrases in women's speech. In women's speech, if a polite prefix "o" is attached to a noun, then the initial mora of the noun receives a star regardless of the existence of the lexical star. (See Tashiro 1966, p.93.) Consider the following examples:

\[(24)\]

\[(i)\]
\[\begin{array}{c}
\text{a. } huro^* \\
\text{b. } susi^*
\end{array}\]

's' bath' 'susi(one of the Japanese dishes)'

\[(ii)\]
\[\begin{array}{c}
\text{a. } tegami^* \\
\text{b. } sentaku^*
\end{array}\]

'letter' 'washing'

In these examples, as well as in other examples in the following discussion, a horizontal line over a mora or a sequence of moras indicates that it is high toned; and a line under a mora or a sequence of moras indicates that it is low toned. Examples (24i) illustrate cases where "o" is attached to accented words; and examples (24ii) illustrate cases where it is attached to accentless words. The surface melodies of these Q-phrases will automatically be accounted for if we assume (i) that accentless words have the same HL basic melody as accented words; and (ii) that Tôkyô has the following Star Assignment rule for women's speech;
The Star Assignment rule for "o"-Phrases in
Women's Speech:
\[ V \rightarrow * / \# \#_o + C_o \]

This rule assigns a star to the vowel which occurs immediately
after the prefix "o". Thus, If we take (24ia) and (24iia)
as examples, the derivations will be as follows:

(a) o-huro\* b. o-tegami underlying representation
   o-huro\* o-tegami Star Assign (25)
   o-huro\* o-tegami Tone Association (3)'
   HL \quad HL
   o-huro\* o-tegami Univ. Tone Association
   HL \quad HL
   o-huro\* o-tegami Initial Lowering (18)
   LH \quad LH \quad LH
   ___ ___
   Tone Simplif. (20)

That is to say, if we assume that unaccented words have a HL
basic tone melody, then their output melodies are an
automatic consequence of the Star Assignment rule (25) and
of the rest of the system which was independently introduced
in (22).

On the other hand, if we were to assume that unaccented
words have a H basic tone melody, we would need either a
Lowering rule which lowers the H tone associated with the V's to the right of the leftmost * in the "o" phrases in (24), or a convention for the selection of basic tone melodies which says that if a phrase is already starred when the tone association process applies, then the HL basic tone melody is selected for the phrase, and otherwise, the H basic melody is selected. This approach requires two additional mechanisms in addition to system (22) and the Star Assignment rule (25): (i) the H basic tone melody, in addition to the HL basic tone melody, and (ii) either a lowering rule or a convention for the selection of basic tone melodies. Since proposing a HL melody for unaccented words can handle the facts in (24) without these additional mechanisms, it is superior to proposing a H basic melody for unaccented words. Therefore, we conclude that unaccented words in Tôkyô have also a HL basic tone melody. This suggests that Tôkyô has one and only one basic tone melody.

1.2.2. De-Starring of "no"-Phrases

A similar argument is also possible in terms of a number of other processes in Japanese. One argument can be found in the De-Starring process of "no"-phrases. This is a well known rule in Standard Japanese which deletes a star on the final "syllable" of a noun when a "no"-phrase contains a final-accented word of at least two "syllables". Consider the following cases:
(27)(1) a. kawa* 'river' kawa-no 'river + Gen'
b. atama* 'head' atama-no 'head + Gen'
c. nihon* 'Japan' nihon-no 'Japan + Gen'
d. kindo* 'yesterday' kindo-no 'yesterday's'

(ii) a. ha* 'teeth' ha-no 'teeth + Gen'
b. kyoo* 'today' kyoo-no 'today's'
c. hon* 'book' hon-no 'book + Gen'

(iii) a. utiwa* 'fan' utiwa-no 'fan + Gen'
b. irogami* 'color paper' irogami-no 'color paper + Gen'
c. arasi* 'storm' arasi-no 'storm + Gen'

The examples in (27i) illustrate cases where a noun which has at least two syllables has a star on the final syllable. The De-Starring Rule applies to the "no"-phrases with such nouns. On the other hand, the examples in (27ii) show that if a noun has only one syllable, then the De-Starring Rule does not apply to the "no"-phrase with the noun; and the examples in (27iii) show that if a noun has a star on the non-final syllable, then the De-starring rule is also blocked.

To handle these cases, let me propose the following De-starring rule:

(28) The De-Starring Rule of "no"-Phrases (Tôkyô):

\[ \hat{v} \longrightarrow V \big/ V C_0 \text{(+[seg]}) + \text{no} # \]

The environmental specification of this rule will automatically exclude the examples in (27ii and iii) from
the domain of this De-Starring Rule. The optional element of \([+\text{seg}]\) will correctly allow examples (27i)c and d) to undergo this rule.\(^6\) Recall that all of the nouns in (27i) have a HL melody. The melodies of the "no"-phrases which contain these nouns will automatically be handled by the system of rules in (22) and (28). However, if we were to assume that lexically unaccented words had a H basic melody, we would have either to treat the melodies of the lexically unaccented words and the derived unaccented words differently, or to introduce the convention for the selection of basic tone melodies which we have already mentioned in the previous section. If the former were the case, then it would miss a certain generalization, because both kinds of unaccented words could not be handled in the same way. In addition to this, this approach would require a H basic tone melody in addition to the HL basic tone melody. This is more costly than proposing a HL melody for unaccented words. Similarly, if the latter were the case, then it would mean that the additional convention for the selection of tone melodies would be necessary. As we have seen in the previous section, this is also inferior to the HL melody approach in question.

The basic problem with our system is the need for a tone simplification rule. Note, however, that the two melody theory, which assumes the HL melody for accented words and the H melody for unaccented words, would also need a Tone
Simplification Rule? To see this, consider an accented word "otoko" (man) and an unaccented word "usagi" (rabbit). Since the former is assumed to have the HL melody, we would have a contour tone on the final V after tone association as in "otoko". To derive the surface melody from this structure, we would clearly need a Tone Simplification. If so, then the two melody theory is clearly more complicated than our theory.

Notice that we could modify the two melody theory so that the theory assumes the H melody for both final-accented words and unaccented words, and the HL melody for non-final-accented words. However, such a theory would be tantamount to claiming that a final-accented word never has a contour tone. As we will see later, this is false. Thus, such a modified two melody theory would not hold, unless we were to introduce other ad hoc mechanism. Therefore, no version of the two melody theory would be justifiable. On the bases of these observations, it will now be clear that unaccented nouns have the HL basic tone melody.

(Excursus)

Before going on to the next topic, let me digress a little and critically comment on Okuda's treatment of the De-Starring of "no"-phrases. Okuda claims, after arguing against McCawley's treatment of the same process, that the
correct treatment will be to introduce an accent (=star) attraction rule which attracts the final accent of a polysyllabic noun onto the enclitic "no". In other words, he essentially claims that the "no"-phrase, such as "kawa-no" in (27ia), has a final star as in "kawa-no*". However, there is a certain amount of counter-evidence to show that the "no"-phrases under consideration should not have a final star. To show that Okuda's treatment does not work, let us consider the following fact. In Japanese an enclitic "ne", which is almost empty of meaning, and which can be placed in a phrase-final position, shows the same tonal behavior as an enclitic like "ga" (subject marker (sub.)), when it follow a noun. Thus consider the following cases:

\[(29)\]

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>kawa* 'river'</td>
<td>kawa-ga</td>
<td>kawa(-ga)-ne</td>
</tr>
<tr>
<td>b.</td>
<td>saru 'monkey'</td>
<td>saru-ga</td>
<td>saru(-ga)-ne</td>
</tr>
<tr>
<td>c.</td>
<td>mizu 'water'</td>
<td>mizu-ga</td>
<td>mizu(-ga)-ne</td>
</tr>
</tbody>
</table>

In column I, "kawa*" has a final-star; "saru", an initial star; and "mizu", no star. Thus, in column II, the enclitic "ga" has an all-L contour after the starred words, while it has a H contour after the starless word. Similarly, the enclitic "ne", which can follow nouns either directly or indirectly (e.g. after "ga"), has a L contour after the starred words, while it has a H contour after the starless word.

This much in mind, consider the following examples:
As indicated in (30c and d), "ne" has a L tone when it follows starred "no" phrases. Thus, if Okuda is correct in his claim that "no"-phrases attract a star onto the enclitic "no", then "ne" would have to have a L tone as indicated in column II in (29a and b). However, the fact is that it has a H tone, as indicated in column I in (30a and b). Thus, Okuda's theory makes a wrong prediction here, while our De-Starring Rule (28) correctly predicts that the enclitic "ne" has a H tone in (30a and b). This observation shows that Okuda's rule does not work, and it suggests that rule (28) is correct.

Now let us turn to McCawley's treatment of the process in question. McCawley claimed that the accent marker ('') was placed on the syllable boundary and not on the syllable. On the basis of this claim, he claimed that the process in question would be handled in the following way: first place a preaccent on the "no"-phrases under consideration. Then, by a general rule which removes all accent from a phrase with preaccentuation, word-final accent will be deleted. Thus, the "no"-phrases in question will eventually be deaccented.
I will return to the notion of "preaccent" later in the discussion of the Osaka dialect and will argue that it makes a wrong prediction. However, let us assume here, for the sake of argument, that the notion is valid.

Notice here that McCawley's preaccent solution is crucially dependent on the syllable boundary accent hypothesis which claims that the accent marker should be placed on the "syllable boundary" and not on the syllable.

Now consider his actual description of the facts. He places his accent marker (') as follows:

\[(31)\] a. niho'n 'Japan' \[\underline{niho'n}\]  
  b. ryo'ori 'cuisine' \[\underline{ryori}\]

Notice that these words are all two syllable nouns and syllable boundaries—if there are any—would be placed as follows:

\[(32)\] a. \$ ni \$ hon \$ (where \$ stands for a syllable  
  b. \$ ryoo \$ ri \$ boundary.)

No one, I believe, would challenge this description of syllable boundary placement. However, since McCawley places his accent marker on the place where no syllable boundary exists, as in \[(31)\), his claim that it should be placed on the syllable boundary is violated by his own analysis.

One might try to defend his position by referring to the fact that "only the first mora of a long syllable may be
followed by the fall in pitch, as in (31), if the syllable in question is accented. There is no case where Tokyō has a surface contrast between *CV\textsuperscript{NC}CV and CV\textsuperscript{VC}CV on the one hand, and *CV\textsuperscript{NC}CV (where N is a syllabic nasal) and CV\textsuperscript{NC}CV on the other. Because of this, he could place his accent marker simply as in (33)?

(33) a. nihon’
   b. ryoo’ri

Then, a set of tone realization rules—whatever they may be—will handle the fact that the fall in pitch occurs on the first mora of an accented long syllable.

As far as the Tokyō dialect is concerned, this putative solution (33) might work well. However, in the Kyōto dialect, for instance, which has the following contrast in surface melodies:

(34) a. on’na (on\textsuperscript{na}) ‘woman’
   b. o’ndo (o\textsuperscript{ndo}) ‘temperature’

it does not work well, because the accent marker will have to be placed as in (34) to represent the contrast. Since this is so, (34b) violates the claim in question. I conclude therefore that McCawley’s syllable boundary accent theory does not hold.

This suggests, then, that his notion of "preaccent" is untenable because it is crucially dependent on the
syllable boundary accent theory. Therefore, it would be reasonable to exclude McCawley's preaccent treatment of the De-Starring of "no"-phrases from the list of possible solutions.

1.3. On the Initial Lowering Rule

Let us now turn to the problem of the Initial Lowering Rule in Tôkyô. This rule is found in a number of Japanese dialects. However, full justification of the Lowering rule will be postponed until the discussion of the Marugame dialect and the Takamatsu dialect, because they are the most suitable dialects for the purpose. Here I am mainly concerned with the details of the lowering rule in Tôkyô. In section 1.0 of this chapter, I tentatively proposed the following Initial Lowering Rule (18):

(18) The Initial Lowering Rule (Tôkyô):

\[
\begin{array}{c}
V \ C_0 \ V \\
\downarrow \\
H \\
\rightarrow \\
V \ C_0 \ V \\
\uparrow \\
L \\
\rightarrow \\
H \\
\end{array}
\]

In regard to this rule, consider the following cases which were pointed out by S. Kawakami (1973):

(35) a. \( \text{umi-de} + \text{oyogî} \rightarrow \text{umi-de oyogî} \)
    'sea-in'  'swim'    'swimming in the sea'

b. \( \text{kosui-de} + \text{oyogî} \rightarrow \text{kosui-de oyogî} \)
    'lake-in'    'swimming in the lake'
When the initial starred phrase "**uni-de**" is followed by the medial starred phrase "**gyōgi**", and they are uttered in a natural way without any pause between them, then the surface melody will be as indicated to the right of the arrow. Only the initial-starred mora has a full-fledged H tone, and the string from the second mora to the next starred mora will be uttered with a tone which is much lower than that of the initial-starred mora; then after the second-starred mora, tone is further lowered. On the other hand, in (35b) where the starless phrase "**kosui-de**" is followed by the medial starred "**gyōgi**", if they are uttered in a natural way without any pause between them, then the surface melody will be as follows: Only the initial mora and the final mora (after the starred V) will be low and everything in between will be high.

The melody in (35a) will be handled by the notion of downdrift. In Japanese, it is generally believed that Downdrift makes a sequence of H-toned moras M-toned when it is preceded by a L-toned sequence which itself is preceded by a H-toned sequence. Thus, McCawley (1968) and Shibatani (1972), for instance, claim that the phrase "kabutte mitara" has a surface pitch contour "**kabutte mitara**" (i.e. **LLLLLLL**). Though such a melody might occur in a deliberate and relatively slow speech, the most natural surface melody seems to be "**kabutte mitara**". Namely, the H pitch on "**mi**" is lowered to the level of the L pitch of the preceding phrase, and the L
pitch on "tara" is made lower than the lowered pitch on "mi".
Thus, in the present study, downdrift in Tōkyō is regarded as
a process which (i) makes the HL contour of the second phrase
in (36) start with a H pitch equal to the preceding L pitch
and go on to a lowered L pitch, if the preceding phrase has
a low tone after a H tone as in (36a), as indicated in (a');

\[(36)\]
\[
\begin{array}{c}
\text{a'}\
\#\# \text{CV CV CV CV CVV##} \\
\text{L H L H L}
\end{array}
\]

\[(36)\] b. \#
\[
\begin{array}{c}
\text{b'}\
\#\# \text{CV CV CV CVV##} \\
\text{L H L H L}
\end{array}
\]

and which makes the LiHL contour of the second phrase in (36b)
into a L-lowered H(or M)-lowered-L contour, as indicated in
(b')'. This much in mind, observe the following derivations:

\[(36)'\]
\[
\begin{array}{c}
\text{a'}\
\#\# \text{umi-de oyogii ##} \\
\text{H L H L}
\end{array}
\]

Tone Association (3)'

\[
\begin{array}{c}
\text{b'}\
\#\# \text{umi-de oyogii ##} \\
\text{H L H L}
\end{array}
\]

Universal Tone Ass. Conventions (6)

\[
\begin{array}{c}
\text{c'}\
\#\# \text{umi-de ## oyogii} \\
\text{H L H L}
\end{array}
\]

Downdrift

First, by the Tone Association rule (3)', the H of the basic
tone melody HL is associated with each ♭ as indicated by the
solid line. Then, by the Universal Tone Association Conventions (6), the remaining free tones and free V's are associated respectively with the suitable V's and tones, as indicated by the dotted lines in (36)'. To this output, Downdrift applies and the H toned sequence which follows a L tone which is in turn preceded by a H tone is lowered, as indicated in (36c)'. What is particularly interesting here is that the Initial Lowering Rule (18) does not apply to the initial H of the second phrase "oyogi" in (35). However, if a pause is introduced between the two phrases under consideration, then the Initial Lowering Rule applies to "oyogi" and derives the LHL melody "oyogi". This observation suggests that the Initial Lowering Rule is crucially dependent on the presence of a pause in front of the initial mora.

Consider next how the melody in (35b) is derived:

(37)  

\[
\text{Tone Ass. (3)'}
\]

\[
\text{Univ. Tone Ass. Conventions}
\]

\[
\text{Initial Lowering (18)}
\]

\[
\text{Tone Simplif. (20)}
\]

Continued
output

After the tone association by Tone Association Rule (3), and Universal Conventions (6), the Initial Lowering Rule applies to the initial mora of the first phrase. Then, Tone Simplification Rule (20) applies to the HL contour tone which appears at the final mora of the first phrase. Notice here that the Initial Lowering Rule does not apply to the initial mora of the second phrase. Here again, the difference between the two initial moras seems to be related to the existence of a pause. This is supported by the fact that if a pause is inserted between the two phrases, the initial mora of the second phrase is lowered, and the surface form is:

\[(38) \quad ## kōsui-de \{pause\} o-yōgi ##\]

In (37), Downdrift does not apply to the string because the two H tones are not separated by a low tone. On the other hand, in (38), the H tone is lowered because, after the lowering of the initial mora "o", a L intervenes between the two H tones. These observations suggest that Downdrift should follow the Initial Lowering Rule.

On the basis of the above observations, I suggest that the Initial Lowering Rule in Tōkyō be formalized as follows:

\[(39) \quad \text{The Initial Lowering Rule (Revised)}: \quad \]

\[
\begin{array}{c}
V_{C_o} V \\
H \\
\rightarrow \\
L \\
V_{C_o} V \\
H \\
\end{array}
\quad / (+\text{pause}) \quad C_o
\]
Now let us turn next to the fact that when the medially starred word "oy[gi]" is uttered in isolation it is always uttered with a LHL tone in deliberate pronunciation. This is true in general. However, it seems that this requires two comments: (i) according to Kawakami (1973), in casual pronunciation, it is sometimes uttered with a HHL tone as "oy[gi]". If this is the case, the Initial Lowering process is crucially dependent at least in part on the style of speech. If this is so, then it suggests that the process is phonetic in nature rather than phonological and that that is best treated by a phonetic rule¹⁰ (ii) Secondly, even in deliberate pronunciation, the lowering is affected, at least for some speakers, by the phonological characteristics of the string. Thus, if the second mora consists of either the so-called "syllabic nasal" n, or a V without a consonant, the initial lowering process will not apply. Thus, consider the following cases which were first pointed out, as far as I know, by Hattori (1954, 1960):

(40) (i)a. komagire *(chopped into) small pieces*
    b. konagona *crushed to pieces*

(ii)a. kooban *police station*
    b. kondan *familiar talk*

Examples (40i) illustrate the cases in which the second mora has a CV structure; and examples (40ii) illustrate the cases in which the second mora has a V structure as in (a) or a
syllabic nasal as in (b). The former two examples have an initial L tone, while the latter two have an initial H tone (at least) for some Tôkyô speakers. Thus the Initial Lowering Rule for such speakers will be stated as follows:

\[ \begin{array}{c}
V C_1 V \\
\downarrow H \\
\rightarrow L
\end{array} \quad \begin{array}{c}
V C_1 V \\
\downarrow [\text{+pause}] C_0
\end{array} \]

The difference between (41) and (39) is that in (41) the second mora must have a \(C_1V\) structure, while in (39) it has a \(C_0V\) structure (where \(V\) really should be \([+\text{sonorant}]\) here).

It should be noted that the fact that the applicability of the Initial Lowering process is dependent on the \(C_1V\) structure of the second mora is by no means an isolated fact. It is also found in a number of Japanese dialects, as we will see later. Thus, this will be counted as one of the cases in which a tonal process is dependent on, or affected by, the phonological configuration of the string.

As a final observation in regard to the process in question, consider the following cases where the second mora consists only of a geminate consonant or of a \([V\text{-voice}]\) structure.

\[ \begin{array}{ll}
(42) & I & II \\
(\text{i}) & a. \underline{\text{kossetu}} & \underline{\text{kossetu}} & 'fracture of a bone' \\
& b. \underline{\text{koppu}} & \underline{\text{koppu}} & 'cup, or glass' \\
(\text{ii}) & a. \underline{\text{kosikake}} & \underline{\text{kosikake}} & 'chair' \\
& b. \underline{\text{katiku}} & \underline{\text{katiku}} & 'domestic animal'
\end{array} \]
Examples (i) illustrate the cases in which the second mora consists of a geminate consonant; and examples (ii) illustrate the cases in which the second mora consists of \( C[-\text{voice}] \) structure. Every accent dictionary in Japanese indicates the melody in column II only. However, it seems that in actual practice, the melody is as in column I. In our theory, the latter will be handled as follows:

\[(43)\]

\begin{align*}
a. \text{kossetu} & \quad b. \text{koppu} & \quad c. \text{kosikake} & \quad d. \text{katiku} \\
\end{align*}

\begin{itemize}
\item \text{Tone Association by (3)" and by Universal Conventions} \\
\item \text{Initial Lowering (39).} \\
\item \text{Tone Simplification (20)} \\
\item \text{High Vowel Devoicing} \\
\end{itemize}

In (43), I introduced a \textit{High Vowel Devoicing} Rule. Approximately speaking, it is a rule which devoices the high vowels \([i]\) and \([u]\), when one of them is surrounded by voiceless consonants. I tentatively assume here that this rule applies after tonal processes. I will return to this rule in the next section, and we will see that this assumption entails very interesting consequences. Now let us
see how it interacts with the other rules to derive the surface melodies of the examples in question. In (43), first the H tone of the basic tone melody HL is associated with the final V, as indicated by the solid line, because all of the examples are starless. Then by the Universal Tone Association Conventions, the L tone is associated with the final V and the high tone is associated with the first, second, and third V, if any, as indicated by the dotted lines. Notice here that the mora consisting only of the voiceless geminate consonant never has a tone. Then the Initial Lowering Rule lowers the initial H tone to the L tone, and Tone Simplification (20) simplifies the HL contour into a H level tone. The High Vowel Devoicing Rule applies to (43c and d), and devoices the high vowel [i] in the second mora. Here, let us assume also that there is a general convention to the effect that (44):

(44) Erasure Convention for Association Lines: if a tone-bearing unit V is turned into an element which cannot carry a tone by some phonological process (such as Devoicing rules, Deletions, Glide Formation, etc.), then the association line drawn between a tone and the element in question will automatically be erased.

This general convention works automatically after High Vowel Devoicing, and erases the association lines. Thus, the
structures "ș" and "ț" have no surface tone. I suggest that the final outputs in (43) are the formal representations of the melodies in column I of (42). One might wonder how to explain the melodies in column II of (42). Personally, I doubt the existence of such melodies. However, if it turns out that they do exist, then I suggest that such melodies will be informal representations of the following structures:

\[(45)\]
\[
\begin{align*}
\text{a. kossetu} & \quad \text{b. koppu} & \quad \text{c. kosikake} & \quad \text{d. katiku} \\
\text{L} & \quad \text{H} & \quad \text{L} & \quad \text{H} & \quad \text{L} & \quad \text{H}
\end{align*}
\]

To derive these structures, I suggest that a subdialect of the Tōkyō dialect has the following low level flop rule:

\[(46)\] The Flop Rule (Tōkyō):

\[
\begin{align*}
V & \quad C \left( \begin{array}{c}
\text{V} \\
\text{-voice}
\end{array} \right) \quad C \quad V \\
\text{L} & \quad \text{H}
\end{align*}
\]

(where the dotted line indicates the structural change (SC).)

In (46), the H tone is connected with a V which is already associated with a L tone. As a result of this, it forms an initial LH rising tone. In other words, my claim is that if a Tōkyō speaker feels that a geminate C or a \(C\left[ \text{\begin{array}{c}
\text{V} \\
\text{-voice}
\end{array}} \right] \) structure in the second mora of each example is H toned, then that is due to the fact that it is preceded by the rising tone at the initial V, and followed by a H toned mora.

Otherwise, we would have to drastically redefine the notion of a tone-bearing unit which is assumed in this work. (See
footnote 1.)

To summarize, I have made the following observations concerning the Initial Lowering process:

(47)a. The Initial Lowering Rule is dependent on the existence of a pause (? or intonation boundary). To reflect this, I suggested that it be formalized as in (39). In this relation, I also showed that Downdrift follows the Initial Lowering rule.

b. The Initial Lowering process is dependent on phonological configurations. Thus, for some speakers, it applies only when the second mora consists of the C₁V structure. See (41) and the discussion related to it.

c. I suggested that a mora which consists only of a geminate consonant is never associated with a tone.

d. I postulated a general convention (44) which says that if a V is turned into an element which cannot have a tone or if it is deleted, then the association line which connects the V and a tone is erased.

e. The convention automatically works after the High Vowel Devoicing Rule in Tôkyô Japanese, which, it is suggested, applies after the tonal processes.

f. If the second mora consists of the C([-voice])
structure and if a native speaker feels that the voiceless mora is high toned, then it is because of the rising tone on the initial mora produced by Flop rule (46).

1.4. On the So-Called Accent Slide in Tôkyô

In the previous section, the two proposals were made: (i) the ordering of tonal processes with respect to a phonological rule — The High Vowel Deletion Rule —; and (ii) an Erasure Convention for association lines (44). This section is concerned with some of the consequences of these two proposals.

1.4.1. Some of the Facts

Let us consider, to begin with, the following fact. In Tôkyô, adjectives are of two classes: accented and unaccented which in general parallel the accented and unaccented verbs, respectively. The former has a penultimate star in the present, but the latter has no star. Thus, observe the following cases:

(48)  

\[ \begin{array}{ccc}
\text{Accented} & \text{Unaccented} \\
\text{a. } \text{sirô} & \text{white} & \text{akai} & \text{red} \\
\text{b. } \text{tanōsî} & \text{happy} & \text{tumētai} & \text{cold} \\
\text{c. } \text{onomisirô} & \text{interesting} & \text{nēmanurui} & \text{luke warm} \\
\end{array} \]

The penultimate accent of the accented adjectives will be handled by assuming that there is a star assignment rule which
applies only to the accented classes. This rule assigns a star to the penultimate mora of present forms of the accented adjectives.

Now consider the following conjugational forms of each of the adjectives in (48a) and (48b):

<table>
<thead>
<tr>
<th></th>
<th>Accented</th>
<th>Unaccented</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. stem</td>
<td>sirok-</td>
<td>akak-</td>
</tr>
<tr>
<td>b. Pre-Verbal</td>
<td>sirokoku</td>
<td>akakuku</td>
</tr>
<tr>
<td>c. ...+ wa</td>
<td>sirokoku-wa</td>
<td>akaku-wa</td>
</tr>
<tr>
<td>d. Past</td>
<td>sirokatta</td>
<td>akakatta</td>
</tr>
<tr>
<td>e. Conditional</td>
<td>sirokereba</td>
<td>akakereba</td>
</tr>
<tr>
<td>f. De-Adjectival noun</td>
<td>sirosa</td>
<td>akasa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Accented</th>
<th>Unaccented</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. stem</td>
<td>tanosik-</td>
<td>tumetak-</td>
</tr>
<tr>
<td>b. Pre-Verbal</td>
<td>tanosiku</td>
<td>tumetaku</td>
</tr>
<tr>
<td>c. ...+ wa</td>
<td>tanosiku-wa</td>
<td>tumetaku-wa</td>
</tr>
<tr>
<td>d. Past</td>
<td>tanosikatta</td>
<td>tumetakatta</td>
</tr>
<tr>
<td>e. Conditional</td>
<td>tanosikereba</td>
<td>tumetakereba</td>
</tr>
<tr>
<td>f. De-Adjectival noun</td>
<td>tanosisa</td>
<td>tumetasa</td>
</tr>
</tbody>
</table>

In (49) and (50), all the conjugational forms of the accented adjectives have a star on the penultimate vowel of the stem. On the other hand, in the unaccented adjectives, only (c), (d) and (e) in (49) and (50) get star on the final vowel of
the stem. To handle the star assignment for these unaccented cases, we will need the following star assignment rule:

(51) \[ V \rightarrow * \bigg/ \bigg[ \begin{array}{l} \text{kwa} \\ \text{katta} \\ \text{kereba} \end{array} \bigg] \text{Adj} \]

In the case of the accented adjectives, I suggest that the star is assigned to a particular vowel by the following star assignment rule:

(52) \[ V \rightarrow * \bigg/ \bigg[ \begin{array}{l} \text{i} \\ \left( \text{C}_o \text{V} \right) + \text{Q} \end{array} \bigg] \text{Adj} \]

(a) 

(b) \[ \left( \text{Q is the longest sequence of segments} \right) \]

This rule assigns the star to the penultimate mora of the present and to the penultimate mora of the stem of the other conjugational forms.

This much in mind, let us turn to the following unaccented adjectives:

(53) \begin{align*}
\text{Present} & \\
\text{a. yasasii} & \text{yasasikatta} \\
\text{b. kanasii} & \text{kanasikatta}
\end{align*}

Rule (51) predicts that the past forms of these adjectives have a star on "si". However, the surface melody has a high tone only on the second mora, as if the star were on it. Traditionally a phenomenon of this sort was regarded as accent slide caused by High Vowel Devoicing. (See, for
example, Tashiro (1966)). As a result of the devoicing of an accented vowel, the accent is said to have moved one mora to the left. This would formally be stated as follows:

\[(54) \quad V C_o \left[ \begin{array}{c} \hat{v} \\ \text{-voice} \end{array} \right] \rightarrow V C_o \left[ \begin{array}{c} \hat{v} \\ \text{-voice} \end{array} \right] \]

That is to say, if a starred V is devoiced, then the * is moved one mora to the left. However, notice that in the above discussion, we assumed that the High Vowel Devoicing applies after the tonal processes. Thus, if the traditional explanation is correct, it would be in conflict with our theory, and if our theory is correct, then rule (54) is wrong.

The question is: which is the case? To answer this, consider first how the melodies of the past forms in (53) are handled in our theory. First, a star is assigned to the antepenultimate vowel by rule (51):

\[(55)\]

a. Underlying Str. /yasasikatta/ /kanasikatta/
b. by (51) yasasikatta kanasikatta
c. Tone Association of (3)
   H  L  H  L
d. Tone Ass. by Univ. Conv. (6)
   yasasikatta^*  kanasikatta^*
   H  L  H  L
e. Initial Lowering yasasikatta^*  kanasikatta^*
   L  H  L  L

continued
Then, by Tone Association Rule (3)' and by the Universal Tone Association Conventions (6), the basic melody $\ddot{H}L$ is assigned to each string. After that, the Initial Lowering Rule applies and finally, High Vowel Devoicing applies to devoice the high toned vowel [i]. As a consequence of this, the Erasure Convention (44) which deletes association lines works automatically, and the association line which connects the voiceless V and the $\ddot{H}$ tone is deleted. Thus, the correct surface melody is derived by the system which has already been introduced. What is interesting in this derivation is that it gives the reason that, as a result of the High Vowel Devoicing Rule, the $\ddot{H}$ tone occurs only on the second mora in this case, and not, say, on the second or the penultimate vowel. A theory with rule (54) could also handle these particular cases, but it would not give a reason why the $\ddot{H}$ tone should occur only on the second vowel, because there is no particular reason that a star should be moved to the left and not to the right.

1.4.2. Some Additional Facts

This is not the whole story. In some other cases, the High Vowel Devoicing Rule causes the $\ddot{H}$ tone to appear on the mora which follows the devoiced V. Consider the following
In all of these cases, the examples in column I have a H tone one mora to the right of the mora where the H normally occurs (Compare I and II). The theory with rule (54) would not handle these cases as it stands. Needless to say, such a theory would have to incorporate a mirror image rule of (54). However, if such a rule were to be added to (54), then it would be necessary to mark which rule was applicable. Facts exactly parallel to those from adjectives are also found in verbal conjugations and in nouns. Thus, they are commonly found in Japanese and by no means isolated facts. However, strangely, their theoretical relevance seems not to have attracted attention.

1.4.3. The Autosegmental Theory vs. The Segmental Theory

Now consider how these examples are handled in our autosegmental theory:

(57)  a. tikaku  b. atuku-wa  c. atukereba  d. atukatta

a. Star Assign.  tikaku  
   (52)  

b. Star Assign.  
   (51)  atuku-wa  atukereba  atukatta

(continued)
In (53a), "tikaku" gets a star by rule (52), for it belongs to the accented class. Star Assignment (52) applies to this adjective, and assigns a star to the first mora. Star Assignment Rule (51) applies to other cases, and assigns a star to the second V of each form. Then the Tone Association and the Initial Lowering Rules apply as usual. After these tonal processes, the High Vowel Devoicing Rule and the Erasure Convention work to devoice the high vowels and erase the association lines between the voiceless high vowels and the H tones. As a consequence of this, the H tone is now left unconnected with any vowel. Here, the Universal Tone
Association conventions (6) operate to force us to reassociate the H tone with a vowel.

Recall that Tôkyô has a Tone Association Rule which associates the H tone with the rightmost vowel. This rule applies again and associates the H tone with the rightmost associable vowel. In these examples, the H tone is associated with the V to the right of the voiceless V, because it is blocked from being associated with the other vowels which occur to its right by the Universal Convention which prohibits the crossing of lines. This explains why the unbound H tone always is associated with the vowel to the right of the voiceless vowel and not with one to the left of the voiceless vowel. Finally the Tone Simplification Rule which is formally stated as:

\[
\text{Tone Simplification Rule II} \\
\begin{array}{c}
V \ 
C \ 
V \rightarrow \ V \ C \ V \\
H \ 
L \ 
\rightarrow \ 
H \ 
L
\end{array}
\]

simplifies the HL contour tone to a H level tone. What is necessary here is to add one more simplification rule which applies after the High Vowel Devoicing Rule. Note that The Tone Simplification Rule II is not so bad as it might seem at first sight, because if Tone Simplification Rule (20) is stated as follows:
then we can collapse (20)' and the newly introduced Simplification Rule II into a single schema:

\[
\begin{array}{c}
\begin{array}{c}
V \\
H \\
L
\end{array}
\end{array}
\rightarrow
\begin{array}{c}
\begin{array}{c}
V \left( C_0 V \right) \\
H \\
L
\end{array}
\end{array}
\]

What is important in our analysis is that the surface appearance of the H tone is accounted for in terms of the interaction of the Universal Tone Association Conventions, Tone Association Rule (3)', the High Vowel Devoicing Rule and the Erasuse Convention for association lines.

Now consider how the above facts are accounted for within a segmental theory of tonology, which is implicitly or explicitly assumed in the Standard Generative phonology. As far as I know, no grammar of standard Japanese, with perhaps the single exception of McCawley's interesting book (1968), has ever concerned itself with the phenomena under consideration. As correctly noted by McCawley, we can never put the High Vowel Devoicing Rule before the star (or accent) assignment rule and assign the star (or accent or its equivalent) to the V where the H tone appears on surface, because to do so would complicate the star assignment rules. Thus, to keep the rules in their most general forms, we have
to apply the High Vowel Devoicing Rule after the Star Assignment Rule.

Secondly, if we were to apply the High Vowel Devoicing Rule before tone association, and to introduce Star Shift Rules like (54) and its mirror image rule, then, as I mentioned above, we would not be able to account for the surface appearance of the H tone in a general way, because we could not predict in a general way which star shift (i.e., (54) or its mirror image rule) would apply to certain cases. This entails that the High Vowel Devoicing applies after tone assignment.

In this connection. McCawley's analysis (1968, 153ff) deserves scrutiny, because he proposed an analysis essentially different from the present analysis which claims that the tone association rule should precede the High Vowel Devoicing Rule. He proposed an accent shift rule which shifts the accent one syllable to the right when the accented vowel is devoiced. Thus, "ti[kaku]" in (56a) is derived as follows:

\[(58)\]

\begin{align*}
\text{accent placement} & \quad \text{hu'kaku} \\
\text{High Vowel devoicing} & \quad \text{hy'kaku} \\
\text{accent shift} & \quad \text{huka'ku}
\end{align*}

(where (i) "u" is a voiceless [u], and (ii) ' is an accent marker)
His accent placement essentially corresponds to (52b) in the present chapter. His accent shift rule is essentially a mirror image rule of rule (54). In his system the tone assignment process applies to the output of the accent shift rule. However, notice that his system would incorrectly predict that the past forms in (53) could have the following melodies as a result of the accent shift rule:

\[(59)\]

\[
\begin{array}{ccc}
\text{accent placement} & \text{yasasi'}katta & \text{kanasi'}katta \\
\text{High V. devoicing} & \text{yasasi'}katta & \text{kanasi'}katta \\
\text{Accent shift} & \text{yasasika'}tta & \text{kanasika'}tta \\
\text{output melody} & \text{yasasika'\textsuperscript{\texttt{\tiny t}}ta} & \text{kanasika'\textsuperscript{\texttt{\tiny t}}ta}
\end{array}
\]

These melodies are ill-formed. Notice here that we are not claiming that there is no way of blocking this. It would be possible to block these ill-formed melodies, by specifying a suitable environment for the accent shift rule. However, the point is that there is no principled way of blocking these melodies in his theory. This is markedly different from our autosegmental treatment. Thus, it is clear that McCawley's theory lacks explanatory adequacy.

Now let us turn to a third point. It seems that the High Vowel Devoicing Rule must apply after the Initial Lowering Rule, because if the former were to apply before the latter, then we would derive the incorrect melody
"atuku-wa" from "atuku-wa" in (57f) as follows:

```
| H | L |
\ V \ V
```

underlying form atuku-wa
Star Assignment atuku-wa
Tone Association atuku-wa
```
| H | L |
\ V \ V
```
High V. Devoicing and Erasure
Convention atuku-wa
```
| H | L |
\ V \ V
```
Initial Lowering inapplicable

```
| H | L |
\ V \ V
```
output (ill-formed) atuku-wa

This much in mind, consider a segmental theory of tonology with the following rules: 12

(60)a. The accent marker is specified on some vowel of a word in the lexicon or is assigned by some accent assignment rules.

b. A H Distribution Rule places the feature [+h] on all vowels of a word.

c. A Lowering Rule makes the tonal feature [+h] on all vowels following the accented vowel into [+L-]h].

d. An Initial Lowering Rule turns the initial [+h] into [+L,-H], if it is followed by another vowel
with \([+H]\)

e. A High Vowel Devoicing Rule devoices the high vowels \([i]\) and \([u]\).

This theory would assign the tonal features to (56a and b) in the following way.

\[(61) \quad \begin{align*}
a. \text{tikaku} & \quad \begin{aligned} & +H+H+H \\ & [+L] [+L] \\ & [-H] [-H] \\ & [+H] \\ & [-H] [-H] \\ & [+L] \\ & [-H] \end{aligned} \\
b. \text{atuku-wa} & \quad \begin{aligned} & +H+H+H \\ & [+H] [+H] [+H] \\ & [+L] [+L] \\ & [-H] [-H] \end{aligned} \end{align*}\]

H Distribution

Lowering

Initial Lowering

High V. Devoicing

\[
\begin{array}{c|c}
\text{output} & \text{(incorrect)} \\
\hline
t & \begin{aligned} & k \text{a} k \text{u} \\ & [+L] [+L] \\ & [-H] [-H] \\ & [+H] \\ & [-H] [-H] \\ & [+L] \\ & [-H] \\ & [+H] \\ & [-H] \end{aligned} \\
\end{array}
\]

In a theory like this, we would need an additional rule to reassign the circled \(H\) tone to the vowel which appears to the right of the voiceless vowel. What is questionable about this theory is that the necessary rule would have no independent motivation. In other words, the reassociation would not be an automatic consequence of the segmental theory of tonology as sketched above. This is markedly different from our theory, because in our theory the reassociation of the \(H\) tone is, as we have already seen, an automatic consequence of the autosegmental theory. This observation suggests that the two theories are different in terms of their explanatory power. The autosegmental theory exceeds the segmental theory in
explanatory adequacy. Therefore, I conclude that the autosegmental theory should be chosen as the theory of tonology.

1.4.4. **On the Ordering of Rules**

Let us turn our attention to the ordering of rules. In the above discussion, I have argued that the High Vowel Devoicing Rule should follow the tone association process and the Initial Lowering Rule. However, the devoicing rule under consideration must precede the Tone Simplification Rule in the Tôkyô dialect. If correct, this is of theoretical importance, because the above observation suggests that tonal rules and phonological rules can be ordered as follows:

(62) 1. (Some of the phonological rules)

2. Some of the tonal rules.

3. Some of the phonological rules.

4. Some of the tonal rules

5. (Some of the phonological rules)

We will return to an actual example in the Kameyama dialect which suggests that some of the phonological rules precede tonal association rules. This ordering relation between the tonal rules and phonological rules suggests that they both belong to the single component: the phonological component. To put it in another way, we should not set up a new tonological component which is different from the phonological
component.

1.4.5. **Summary of Section 1.4**

In the above discussion, I reviewed some of the facts concerning the star assignment processes for the conjugational forms of adjectives and concerning the so-called accent slide allegedly due to the High Vowel Devoicing Rule. Then I argued that processes of this sort will automatically be accounted for in our autosegmental theory. I also argued that the High Vowel Devoicing Rule follows the Initial Lowering Rule and precedes the Tone Simplification Rule. Then I compared a version of the segmental theory of tonology and the autosegmental theory, and I pointed out that the latter is superior to the former in terms of explanatory adequacy. On the basis of this observation, I concluded that our autosegmental theory should be chosen, instead of the segmental theory, as a possible theory of tonology. Finally I suggested that since phonological rules and tonological rules are ordered before and after each other and apply one after another, tonological rules must belong to the phonological component.

1.5. **Contour Tone in Tōkyō**

Though it is said that Tōkyō Japanese has, in general, no contour tone, this is only a rough approximation. When examined more closely, Tōkyō seems to have a contour tone.
Akinaga (1966), for example, observes that a contour tone appears when the final starred phrase is followed by another phrase. Thus consider the following examples:

(63) a. \( \hat{\text{hana}} + \overset{\text{*}}{\text{saku}} \rightarrow \hat{\text{hana}} \overset{\text{*}}{\text{saku}} \)
    \('\text{flower}' \ 'bloom' \ 'flowers bloom'\)

b. \( \overset{\text{*}}{\text{netya}} + \overset{\text{okita}}{\text{netya} \overset{\text{*}}{\text{okita}}} \)
    \('\text{slept-and'} \ 'got up' \ 'slept and got up'\)

Every text that I have consulted agrees that expressions like \( \hat{\text{hana}} \) and \( \overset{\text{*}}{\text{netya}} \) have a \( \text{H} \) level tone when they occur in isolation. However, when they precede another phrase, contour tone appears as indicated to the right of the arrow in (63). In general, there are four possible cases:

(64) (i) \( \hat{V} \#\# \text{CVX} \#\# \)
    (\( \text{i} \)) \( \hat{V} \#\# \emptyset \)
    (\( \text{iii} \)) \( \overset{\text{V}}{\text{CVX}} \#\# \)
    (\( \text{iv} \)) \( \overset{\text{V}}{\text{CVX}} \#\# \emptyset \)  \( (\text{where } \emptyset \text{ stands for null.}) \)

That is, a contour tone appears only when the final-starred phrase is followed by another phrase as in (i), and a \( \text{H} \) level tone appears in all the other cases as in (ii-iv). Taking this into consideration, let me (following Halle's suggestion) reformulate the Tone Simplification Rule (20) as follows:

(65) \( \text{L} \rightarrow \emptyset / \hat{\text{a}} \)

\( \langle \overset{\text{V}}{\text{CVX}} \rangle_b \#\# \)

\( \hat{\text{H}} \)

\( \text{b} = \text{a} \)
This rule says that if followed by another phrase, the V with which the HL contour tone is associated must be starless for the rule to apply; otherwise, it does not care whether the V is starred or not. This makes it possible to handle the facts in (63), without adding any extra rule in the grammar. What remains to be clarified in (63) is a L level surface melody of "saku". This is handled by Downdrift discussed above. Thus, the derivation of "hana{saku}" in (63) will be as follows:

(66)  

a. Tone Association (3)':

b. by Universal Conventions (6):

c. Initial Lowering (18):

d. Tone Simplification (20):

e. Downdrift:

First, by the Tone Association Rule (3)', the H tone of the basic tone melody is associated with the final (starred) vowels; then, by the Universal Tone Association Conventions, the free L tone is associated with the final V, and the free initial V with the H tone; at level (c), the Initial
Lowering Rule (39) lowers the H tone associated with the initial V of "hana", but it is blocked from applying to the initial V of "saku", because there is no pause between the two phrases; then, at level (d), the Tone Simplification Rule applies to "saku" and simplifies the HL contour tone to a H level tone; Finally, at level (e), Downdrift automatically lowers the H tone associated with "saku", because it is preceded by a L tone which is preceded by another H tone. Therefore, these are handled quite naturally within the framework developed so far.

I noted at the outset of this section that final starred words are usually uttered with a H level tone when they occur in isolation. However, according to Fujimura (A native speaker of the Tōkyō dialect), contour tone appears in that situation in his speech. For such a speaker, the Tone Simplification Rule will apply only to a contour tone associated with a starless V. Thus, it will be formalized as follows:

(67) The Tone Simplification Rule (For some speakers):

\[
\begin{array}{c}
\text{L} \\
\rightarrow \emptyset
\end{array}
\begin{array}{c}
\text{H} \\
\vdash
\end{array}
\]

The difference between (67) and (20) is that (67) applies only to the starless V, while (20) applies to both starred and starless cases with the proviso that the word must
conform to the rule’s environment. A rule like (67) is not an unusual one, but is also found in a number of Japanese dialects, as we will see below. Thus, the existence of contour tone in Tokyō poses no problem: it is expected in our framework with the HL melody and the Tone Simplification Rule.

1.6. Summary

Let me now summarize what I have proposed up to now.

The proposed system for Tokyō is:

(68)a. Basic Tone Melody: HL

b. Tone Association (3)’:

\[ \#\# Q V \]
\[ \H \] (where Q contains no \( \ddot{v} \).)

c. Initial Lowering:

\[(39)(i) \]
\[ V C_o V \]
\[ \H \rightarrow \H (\text{pause}) C_o \]

or for some speakers

\[(41)(ii) \]
\[ V C_1 V \]
\[ \H \rightarrow \H (\text{pause}) C_o \]

d. High Vowel Devoicing:

The High Vowels [i] and [u] are devoiced when surrounded by the voiceless consonants.

e. Tone Simplification (65):

\[ L \rightarrow \emptyset \]
\[ \H (b > a) \] Continued
or (67)

\[
\begin{array}{c}
L \rightarrow \emptyset \\
\uparrow \quad \left[ \begin{array}{c}
-^* \\
V
\end{array} \right] \\
\downarrow \\
H
\end{array}
\]

f. Downdrift (36c): 
Lower the H toned moras, if they are preceded by a sequence of H toned moras and low toned moras. 15

In this system, we have seen that these apply in this order. What should be noted is that after the High Vowel Devoicing Rule, the Tone Association Rule is forced to apply by the Universal Tone Association Conventions (6) to reassociate the free H tone with a suitable V (cf. section 1.4.3). In regard to (68c) and (68e), we have seen that depending on the speaker, the form of rule or its condition is slightly different.

In addition to this, I discussed the following two linguistic universals (see footnote 2)

(69) **Universal Tone Association Conventions** (6):

(i)a. All tones should be associated with at least one tone-bearing unit, and conversely, all tone-bearing units should be associated with at least one tone in the tone melody.

b. No association lines should cross.
(ii)a. \[ \left( \begin{array}{c} V \\ T_1 \end{array} \right) \begin{array}{c} P \\ T_2 \end{array} \] (P is the maximal sequence of tone-bearing units.)

b. \[ \begin{array}{c} V \\ T \\ Q \end{array} \] (where Q is the maximal sequence of tones.)

c. \[ \begin{array}{c} R \\ V \\ T \end{array} \] (where R is the maximal sequence of tone-bearing units.)

Note: // indicates that (6ii) are all mirror image processes

(70) **Erasure Convention for Association Lines** (44):

If a tone-bearing unit V is turned into an element which can no longer carry a tone by some phonological process (such as Devoicing rules, deletions, glide formation, etc), then the association line drawn between a tone and the element in question will automatically be erased.

We have seen that the interaction of the system of rules and conventions (69) and (70) accounts for the surface position of a H tone allegedly affected by the High Vowel Devoicing, and argued that in this respect, segmental theory of tonology cannot attain the level of explanatory adequacy. Finally, I discussed briefly the fact that the contour tone which appears in Tōkyō is automatically handled by the system of rules introduced above. In the above discussion, I have
tried to present an outline of a version of autosegmental theory. Let me apply the theory, as a next step, to the tonological descriptions of Japanese dialects.
FOOTNOTES TO CHAPTER 1

1. Here, V (or \^\) stands for a tone-bearing unit. In Japanese, a tone-bearing unit is, as noted above, assumed to be a voiced vowel or a syllabic nasal n. That is, it is assumed to be a mora whose head consists of [\(+\text{sonorant}\)]. * is a feature which corresponds to [\(+\text{Accent}\)] (or perhaps [\(+\text{stress}\)]). Thus, [\(-\text{Accent}\)] will be represented as [\(-\ast\)].

2. It should be noted that these conventions are very similar to Goldsmith's Well-Formedness Condition for Tone Association. In particular, (ia) and (ib) are exactly the same as Goldsmith's, and so are (iib) and (iic). However, as will be made clear later, (iia) is different from Goldsmith's.

3. To be more precise, this statement is rather inaccurate. However, let us accept this approximate statement for the time being, for it will suffice for the present purpose. We will return to this point below. (See section 1.5, p. 71;)

4. In (25), I tentatively assume that the prefix "o" is followed by a morpheme boundary (\(+\)). Even if it turns out that "o" is followed by a word boundary (\(#\)), it will not affect the main point of the present argument.

5. Notice that the locution "syllable" and not "mora" is
intentionally used here. This point is of importance, as Okuda (1971, p.25) correctly pointed out, in the light of the popular belief which is typically reflected in McCawley's claim that "Japanese has phonological rules which depends on the number of mora, but none... which depends on the number of syllables." (p.133) It shows that contrary to the popular belief, the notion of "syllable" plays an important role in standard Japanese.

6. There are a small number of exceptions to this rule. For instance, it does not apply to a "no"-phrase with the head noun "sensei" (teacher). Thus the phrase has a LHHLLL surface melody as in "sensei-no", and not a LHHHHH surface melody. However, we are not concerned with minor details here.

7. I owe this argument to M. Halle (personal communication).

8. See McCawley (1968).

9. In our terminology, (33) is almost equivalent to claiming that * occurs only on a syllabic nucleus as in "nihon" and "ryooiri" in Tokyoo, which I believe is the case.

10. These observations suggest that the approach setting up LHL as the basic melody of Tokyoo (cf. Goldsmith (1974c)) is not appropriate.

11. Recall that the Tone Association Rule (3)' was formally stated as follows:

\[
(3)' \quad \#\# Q \uparrow \downarrow \hat{H}
\]
(i) where Q is the maximal sequence of phonological segments which do not contain the \( \dagger \).

(ii) where the dotted line indicates the SC of the rule.

Recall also that we assumed (fn. 1) that the tone-bearing units in Japanese are the vowels and the syllabic nasal \( n \), both of which should be voiced. In view of this, the \( \dagger \) in condition (i) should, to be more precise, be interpreted as 
\[
\begin{cases} 
* \\
{\text{+son}} \\
{\text{+voice}} 
\end{cases}
\]

Thus, in "at\( \dagger \)ku-wa", for instance, the segment "\( \dagger \)" can not bear the unbound \( H \) tone. Furthermore, because of Universal Convention (61b) which prohibits the crossing of association lines, the \( H \) tone will be blocked from being associated with the final mora "wa". Therefore, the only permitted \( V \) with which the \( H \) tone in question can be reassociated is that in the penultimate mora "ku". Thus, the above-developed theory reassociates the unbound \( H \) tone with the low toned "u", as in "at\( \dagger \)ku-wa".

\[
\begin{array}{c c c}
L & H & L \\
\end{array}
\]

12. In effect, this is essentially McCawley's, and Shibatani's framework. I also once assumed this
framework in my paper (1973).

13. We will return to this point later and argue that the two systems are different in terms of explanatory adequacy.

14. This will be modified later. See (13) and footnote 3 in Chapter 13.

15. For a detailed discussion, see pp. 47ff. of this chapter. See also (16) in Chapter 13.
CHAPTER 2

REMARKS ON INITIAL LOWERING DIALECTS

2.0. Introductory Remarks

In the preceding discussion on the Tôkyô dialect, I suggested that Tôkyô had an Initial Lowering Rule, which lowers an initial H tone to a L tone when followed by another H tone. This was formalized as in (1):

\[
(1) \quad \begin{array}{c}
\text{VC}_0V \\
\text{H} \\
\end{array} \rightarrow \begin{array}{c}
\text{VC}_0V \\
\text{L} \\
\text{H} \\
\end{array} / \quad \#\#C \\
\]

We have seen that some speakers have a slightly different version of this rule. However, for the present purpose, this version will be sufficient. What is particularly interesting in this type of Initial Lowering process is that it applies only to the initial mora, or to the initial sequence of moras. There is no lowering rule which lowers only the second high-toned mora, leaving the initial mora and the third mora high-toned. Schematically, we have the following process:\(^1\)

\[
(2) \quad \begin{array}{c}
\text{C}_0\text{V}_1\text{C}_0\text{V}_2\text{C}_0\text{V}_3\text{C}_0\text{V}_4\text{C}_0\text{V}_5 \\
\text{H} \\
\end{array} \\
\]

continued
(a) $C_0V_1 \rightarrow L$
(b) $C_0V_1C_0V_2 \rightarrow L$
(c) $C_0V_1C_0V_2C_0V_3 \rightarrow L$ etc.

\[ \text{cf. } \Rightarrow \] (a)' $C_0V_2 \rightarrow L$
(b)' $C_0V_2C_0V_3 \rightarrow L$
(c)' $C_0V_3 \rightarrow L$ etc.

That is to say, the Initial Lowering Rule lowers the initial sequence of H-toned moras up to the $n$th mora, but as indicated in (2), it cannot lower the second mora alone or the second and third moras together or the third mora alone. This is very different from the Initial Raising (or L-to-[L]raising) Rules, which tolerate a raising process such that only the second mora, or the third mora is raised. (We will return to some of the raising rules later.)

Secondly, the Initial Lowering process could in principle exist only in a dialect (or a language) which contained a HL or H basic tone melody. This also contrasts with the Initial Raising process, which can exist only in a dialect with a LHL melody (and probably a LH melody).\(^2\)

I will discuss below a couple of Initial Lowering dialects (i.e. dialects with an Initial Lowering Rule).

2.1. The Nagoya Dialect

The Nagoya dialect has exactly the same tonal classes as the Tôkyô dialect. Thus, depending on where the star is specified in the lexicon, there exist $n+1$ tonal classes for
n-syllable nouns. In regard to the basic tone melody, this dialect also has a HL melody. However, according to Mizutani (1960), it has a slightly different Initial Lowering process from that in Tôkyô. The Initial Lowering process in this dialect will be summarized as follows:

(3)a. In Nagoya the Initial Lowering Rule lowers the initial mora alone, if the second mora either consists of the structure CV, or has the structure CV* and is followed by \[ \begin{cases} \text{[+son]} \\ \text{[i#]} \end{cases} \]. Otherwise (i.e., if the second mora consists only of the syllabic nasal N, or only of V), the process does not apply.

b. The Initial Lowering Rule lowers the initial and the second moras, only if the second and the third moras have the structure CVCV and the star occurs either on the third mora or after it, or it does not occur at all.

Thus, compare the following cases:

(4) Nagoya Tôkyô

| a. kawa(-ga) | same | 'river' |
| b. take ~take(-ga) | take(-ga) | 'bamboo' |
| c. sakura(-ga) | sakura(-ga) | 'cherry' |
| d. atama(-ga) | atama(-ga) | 'head' |
| e. nagagutu(-ga) | nagagutu(-ga) | 'boots' |
| f. atataru | atataru | 'to warm' |
(5) Nagoya  Tōkyō

| a. konnitiwa | konnitiwa | Good day |
| b. imootō(-ga) | imootō(-ga) | younger sister |
| c. skannē | ? | no good |

In Nagoya, only the initial mora is lowered when the second mora has a star as in (4a), or when the second mora is followed by the ## as in "take" in (4b) or when the third mora consists of only V or N as in (5b,c). Notice here that if the second mora consists of N (or V) only as in (5a), the Lowering Rule does not apply.

On the other hand, if the star occurs on the third mora as in (4d), or later as in (4f), or no star exists and the string consists of the 3 moras of a C_vC_vC_v structure as in (4b,c,e), then the initial and the second moras become L. The process will formally be stated, as a first approximation, as follows:

(6) Initial Lowering in Nagoya:

\[
\begin{array}{c}
V(CV)CV \quad V(CV)CV \\
\downarrow \quad \downarrow \\
H \quad L \quad H
\end{array} / \text{##}_c
\]

Notice that surface tonal differences between Nagoya and Tōkyō stem mainly from the difference between (1) and (6), except for some idiosyncratic differences in the position of star in the lexicon.

In the above discussion, we assumed that the basic tone
melody in Nagoya is HL. Now consider what will happen if we assume that the basic tone melody is LHL. Then we would need the following raising rule:

\[
(7) \quad \text{The L-to-H Raising Rule:} \quad \frac{(V(CV)C)QV}{L \quad H} \rightarrow \frac{(V(CV)C)QV}{L \quad H}
\]

In (7), Q stands for the maximal string which is associated with the L tone. Except for the fact that rule (7) is slightly more complicated than (6), I have no crucial evidence upon which to choose one of these alternative approaches in Nagoya. However, if the claim that Tôkyô has a HL melody is correct, then it will be more natural to assume that Nagoya also has a HL melody, because the two systems are fairly similar to each other. Thus, until some crucial evidence against this proposal is found, I assume that Nagoya has a HL melody. In any case, it is clear that the Initial Lowering process in Nagoya is crucially dependent on the internal structure of the second mora and the third mora, if any. Thus, this is counted as a piece of evidence to show a phonological influence upon a tonological process.

2.2. The Matsue Dialect

As a second instance of an initial lowering dialect, let us consider the tone system of the Matsue dialect. This dialect is very interesting in that its Initial Lowering
process is dependent on the height of vowels (i.e., on the feature [\text{+high}]). According to Wada (1962), whose description is credited to Hiroto-Ôhara (1953), Matsue has basically the same tone system as TÔkyô. This will be clear if we compare the following melodies in Matsue and TÔkyô:

\begin{enumerate}
\item[(8)]
\begin{tabular}{lll}
Matsue & TÔkyô &\
\hline
a. 
\underline{ïwasi-ga} & same & 'sardine' \\
b. 
\underline{otoko-ga} & same & 'man'
\hline
c. 
\underline{asahi-ga} & \underline{asahi} (cf. \underline{kokoro} \text{'heart'}) & 'rising sun'
\hline
d. 
\underline{kabuto-ga} & same & 'helmet'
\end{tabular}

[\text{note: "ga" = Subject marker}]
\end{enumerate}

Though the melodies in (c) are different in Matsue and TÔkyô, judging from the similarity in (8), we can safely claim that they have the same tonal classes, basic tone melody, Tone Association Rule, etc. However, the Matsue dialect has the following two interesting characteristics:

(1) If a noun has a star on the final mora, and the mora contains a [\text{+high}] vowel, then the high tone on it is moved one mora to the right when it is followed by an enclitic.

Thus compare the following cases:

\begin{enumerate}
\item[(9)]
\begin{tabular}{lll}
In isolation & \underline{+ga} & \underline{+ga+VP} \\
\hline
a. \underline{hana} & 'flower' & \underline{hana-ga} & \underline{hana-ga siroi} 'white' \\
b. \underline{kami} & 'hair' & \underline{kami-ga} & \underline{kami-ga siroi} \\
c. \underline{turu} & 'crane' & \underline{turu-ga} & \underline{turu-ga siroi}
\end{tabular}

\end{enumerate
In (9), it is clear that (c) is initial-starred. All the others have the same surface melody when they are uttered in isolation. However, when they occur before ga+VP, (a) and (b) contrast with (d) and (e). The former two will have a star on the final mora, while the latter two will have no star. In the case of the final-starred words, if the star is on the [+high] vowel as in (9b), then the high tone on it is shifted one mora to the right.

How should this shift be treated? There are two possible alternative solutions in our framework: One of them assumes the following Star Shift Rule, which moves the star one mora to the right:

\[
\text{The Star Shift Rule:} \quad \left[ \begin{array}{c} \text{+high} \\ \text{C}_o V \end{array} \right] \rightarrow \left[ \begin{array}{c} \text{V} \\ \text{C}_o \text{V} \end{array} \right] + \text{C}_o \text{V}
\]

In (10), the plus boundary (+) is assumed to appear between a noun and an enclitic. The other solution assumes the Flop Rule, which applies to a string in the same situation:

\[
\text{The Flop Rule:} \quad \left[ \begin{array}{c} \text{+high} \\ \text{C}_o V \end{array} \right] \rightarrow \left[ \begin{array}{c} \text{K} \\ \text{L} \end{array} \right]
\]

In (11), the dotted association line indicates the structural
change (SC) of the rule. Notice that in this solution the Tone Simplification Rule, which is independently needed to account for the fact that this dialect has no contour tone, is assumed to apply after the Flop Rule. Solution (10) claims that the shift of the H tone is due to the star shift, which applies before the tone mapping processes, while solution (11) claims that it is due to the Flop Rule, which applies after the tone mapping processes and before the Tone Simplification. Since the data accessible to me at present contain no crucial example relevant to the choice between these two solutions, I can say nothing conclusive here. However, it seems to me that solution (11) is more interesting in that it claims that the process is ordered before the Tone Simplification and after the Tone Association processes. In other words, solution (11) claims that the shift is purely tonological, while solution (10) claims that it is more or less morphological. Furthermore, solution (11) can more easily be falsified, because it claims, in addition to the above ordering of rules, that the Flop Rule also precedes the Initial Lowering Rule, which is our next topic.

(ii) The second characteristic of this dialect is that the Initial Lowering Rule lowers the initial mora if it is followed by a second mora with the structure CV. In addition to this, if the second mora and any number of the successive moras consist of the structure \( C \left[ \frac{V}{\text{high}} \right]^n \) and this is
followed by a CV sequence, then everything before that CV is lowered. For instance, compare (9a) and (9b) on the one hand, and (9d) and (9e) on the other. Since in "kami-ga" (9b and e), the second mora has the structure \( C^{+\text{high}} \) followed by CV, the Initial Lowering Rule applies to the first and the second moras. On the other hand, in (9a and d), the Initial Lowering Rule lowers the initial mora alone, because the second mora has no \( C^{+\text{high}} \). Based on the above observation and on some other facts to which we will turn in the following discussion, I would like to propose the following Initial Lowering Rule for the Matsue dialect:

\[(12) \text{ The Initial Lowering Rule (Matsue):} \]

\[
\begin{array}{c}
\text{V} & \text{Q} & \text{C} & \text{V} \\
\text{H} & \text{L} & \text{H} & \text{L}
\end{array}
\]

\( (\text{where } Q = (C^{+\text{high}})_o)^n \)

This rule claims that the initial high-toned sequence \( V(C^{+\text{high}})_o^n \) is lowered to L, leaving the H-toned mora after the sequence as it was. Here, \( (C^{+\text{high}})_o^n \) stands for the longest sequence of \( C^{+\text{high}} \), including null. Thus, in the following example:

\[(13) \text{harisigo-to-ga} \quad \text{'needle work'} \]

everything before the starred mora is lowered by (12).
Notice that Q cannot contain anything other than $C^{+\text{high}}$.

Thus, if the second mora has $C^{-\text{high}}$ or the syllabic nasal, as in (14):

(14) a. otosimono-$\_{\text{ga}}$ 'lost property'  
b. kenbikyoo-$\_{\text{ga}}$ 'microscope'

then the rule applies only to the first mora as in (a) or it does not apply at all as in (b). Furthermore, Q does not contain word boundaries (##), as illustrated in (15):

(15) a. kami##kur$\_\~u$ 'paper + cut' 'cut the paper'  
b* kami##kur$\_\~u$

Ill-formedness of (15b) clearly shows that Q cannot contain word boundaries. Finally, the example in (16):

(16) suiyoobi-$\_{\text{ga}}##kur$u 'Wednesday + comes'

suggests that unless the second mora has the $C^{+\text{high}}$ structure, the rule does not apply to the vowel, even if it is high. These observations will be sufficient to justify formula (12).

What is particularly interesting in this rule is that (i) this tonal rule is dependent on phonological information such as the height of the vowel, and the existence of C; and that (ii) the unique variable Q seems best conditioned by a positive condition, not by a negative condition.

In regard to the first point, notice that in Japanese,
It is common for some of the tonal processes to be dependent on the feature [high]. What is very interesting here is that the Initial Lowering Rule is partly dependent on this feature. It is not an isolated fact in Matsue that the Initial Lowering Rule is dependent on this feature (see section 2.3, for instance). Furthermore, as we will see later, some other tonal processes such as the Flop Rule in Takamatsu and other dialects are also dependent on the height of the vowel.

The fact that the unique variable Q will best be conditioned by a positive condition is extremely interesting, because if this is the case then it implies that Halle and Vergnaud's claim that Q variables can have only negative conditions should be modified, so as to permit positive conditions. To see this point, suppose that in (12) Q is conditioned by (17):

(17) \( Q \neq \ldots \text{C} \left[ \text{\text{-high}} \right] \ldots \)

Then rule (12) would apply to (14b) and (16) and turn them into the following ill-formed structures:

(14b') \( \text{*kenbikyoo-ga} \)

(16)' \( \text{*suiyooobi-ga} \text{##kuru} \)

To prevent these ill-formed melodies from being derived, Q must further be conditioned in an ad hoc way as follows:

(18a) \( Q \neq \ldots \text{N} \ldots \) (where N = syllabic nasal)

b. \( Q \neq \ldots \left[ \text{\text{+\text{high}}} \right] \ldots \)
there are three objections to these negative conditions. The first and weak objection is that the negative conditions become too complicated. Secondly, conditions (17) and (18) are very clumsy means of expressing the generalization that only a sequence of the structure \( C[+\text{high}] \) can be lowered together with the initial mora. Thirdly and more seriously, condition (18b) cannot distinguish (16) from, say, (13). All of these difficulties will disappear if we put the positive condition on \( Q \) as in (12).

Notice here that in the present theory of the standard generative phonology, we have logically the following three cases: (i) the generalization is best captured by negative conditions alone, (ii) it is best captured by positive conditions alone, and (iii) either negative or positive conditions can equally capture the generalization. (12) is an example of case (ii). As an example of case (i), let us take the Rendaku in Japanese. This is a rule which turns an initial voiceless stop of the right member of a compound into the corresponding voiced stop. The rule will be formalized as:

\[
(19) \quad \text{Rendaku (Tokyo)}: \quad C \rightarrow [+\text{voice}] / [+\text{son}] + _- _Q \# \\
\text{(where } Q \text{ contains no } [+\text{cons }.]) \\
\text{[−son }] +[+\text{voice}] \\
\]

For example, this rule applies to the following cases:
(20) a. ama + kasa \rightarrow ama-gasa
    'rain' 'umbrella'
b. san + pai \rightarrow san-bai
    'three' 'cups'
c. kara + koromo \rightarrow kara-goromo
    'Chinese' 'clothes'

and turns the underlying stops /k, p, and t/ into their voiced counterparts.

What is remarkable here is that if the second member of the compound contains a voiced stop, the rule never applies. Thus consider the following examples, which are cited from K. Kindaichi (1938):

(21) a. sira-kabe \underline{=} 'white wall'
b. binan-kazura \underline{=} ?
c. sita-goodan 'pre-consultation'
d. kuro-\underline{ta}bi 'black socks'

In these examples, because of the voiced stop in the right member of the compound, the initial stop never becomes voiced.

Notice here that if we were to try to state the condition in positive terms, then it would hopelessly become complicated. Thus, this is a clear example of case (i) where the generalization is best captured by negative conditions.

Notice also that if a negative specification and a
positive specification can be stated with equal generality for some rule, then that rule would be a possible example of case (iii). At present, I have no clearcut cases, but I am sure that such examples will be found.

In the above discussion of the Matsue dialect, we have seen that the Initial Lowering Rule in this dialect is dependent on phonological configurations and that its condition on the Q variable is best stated as a positive condition. And then I enumerated the 3 logically possible cases for positive and negative conditions on Q variables, and briefly discussed each case.

2.3. Concluding Remarks

In the above discussion, we examined two kinds of Tôkyô-type dialects. In regard to Kyôto type dialects, the Initial Lowering Rule is found, for example, in Takamatsu, Marugame, Takami, Sanagi, etc. To mention just one case, in the dialect of Takami, the Initial Lowering Rule is dependent on the height of the second vowel. Thus, the Initial Lowering Rule is formalized as:

\[
(22) \quad \begin{array}{c}
V \left[ V \begin{array}{c}
- \text{high}
\end{array}
\right] \\
\xrightarrow{H} \\
V \left[ V \begin{array}{c}
- \text{high}
\end{array}
\right]
\end{array} \\
\xrightarrow{L} \\
# # C_o
\]

This rule applies only when the second mora has a C and a non-high vowel. What is interesting in (22), as opposed to (12), is that in (22) the process is dependent on the vowel
height of the neighboring mora. The above discussion seems to show clearly that Initial Lowering Rules of some dialects are dependent on phonological information.
FOOTNOTES TO CHAPTER 2

1. It should be noted that although there is a language such that it has a surface melody like $\text{/library}$ (HLLHL), the initial $H$ tone in such a melody is derived by an Initial Raising Rule and not by a Lowering Rule which lowers the second and the third syllables to $L$, leaving the initial and the fourth syllables $H$. Thus, the existence of a HLLHL surface melody does not contradict the present claim.

2. I intend this to be an empirical claim and not a mere notational device.
CHAPTER 3

THE TONE SYSTEM OF THE HIROSAMI DIALECT

3.0. Intoductive Remarks

In the discussion of Tōkyō Japanese, I suggested that the H tone of the basic tone melody in Tōkyō is associated with the final V of a phrase, if the phrase has no star. I will call a dialect which is characterized by such an association rule a last-H type dialect. As another example of a last-H type dialect, let us consider the Hirosaki dialect. This dialect is of interest in three respects: (i) it has a H tone either on the starred vowel or on the final vowel of a starless word, which is different from Tōkyō, which has a high tone sequence from the second V up to the starred V. (ii) it has a clear tonal difference between a final-starred word and a starless word; and (iii) it tells us that we need a star shift rule. I will argue that (i) will be automatically handled by posing a basic tone melody LHL.

3.1. The Tone System of Hirosaki Nouns

Let us begin with the analysis of nouns in Hirosaki. Hirosaki is classified as one of the Tōkyō-type dialects, because it has ntl surface tone melodies for n mora words.
Thus, according to Konoshima, M. (1961), the Hirosaki dialect has the following system of surface tone melodies for nouns:

(1) | I | II | III | IV |
---|---|----|-----|----|
a. | 0 | 00 | 000 | 0000
b. | 0/ | 00 | 000 | 0000

c. | 0/ | 00 | 000 | 0000

d. | 00 | 000 | 0000

e. | 000

As indicated in (1a), unaccented one mora nouns are low if uttered in isolation. On the other hand, other unaccented nouns have a high tone on the final mora, and all the other preceding moras are low. In regard to the accented class, final-accented words have a HL falling contour at the end. However, in the other accented words, the accented mora alone can be high, and all the others are low. The peculiarity of these surface melodies of this dialect will be characterized as follows:

(2) a. Only the accented mora, or the final mora of an unaccented word can be high.

b. Final-accented words are distinguished from unaccented words by the existence of falling tone.

We will discuss how these will be handled in the autosegmental theory. Consider for instance the three mora nouns in Hirosaki:
(3) Hirosaki

<table>
<thead>
<tr>
<th>Japanese</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>karada</td>
<td>'body'</td>
</tr>
<tr>
<td>karada-ga</td>
<td></td>
</tr>
<tr>
<td>atama</td>
<td>'head'</td>
</tr>
<tr>
<td>atama-ga</td>
<td></td>
</tr>
<tr>
<td>inotì</td>
<td>'life'</td>
</tr>
<tr>
<td>inotì-ga</td>
<td></td>
</tr>
<tr>
<td>kabuto</td>
<td>'helmet'</td>
</tr>
<tr>
<td>kabuto-ga</td>
<td></td>
</tr>
</tbody>
</table>

Compared with the corresponding words in Tôkyô, we immediately notice that (i) the initial and second accented words have the same surface melody; and that (ii) the difference between the two emerges, if a word has a star on the third mora (or later) or if it has no star. Thus, in Hirosaki, a starless word in (3a) has a high tone on the final V alone, while in Tôkyô, such a word has a high level melody except for the initial V. Similarly, in (3b), Hirosaki has a HL contour tone on the final starred V, while Tôkyô has a high level melody up to the starred V except again for the initial V.

We observed in Chapter 1 that the basic tone melody in Tôkyô is HL and the initial L tone is handled by the Initial Lowering Rule. What is then the correct basic tone melody of Hirosaki? I suggest that it is LHL. Since the unaccented word in (3a) has a final H tone, the Tone Association Rule will be exactly the same as that in Tôkyô.

(4) The Tone Association Rule (Tôkyô, Hirosaki):

a. If a string has at least one \( \tilde{\text{V}} \), associate the H tone of the basic tone melody with the leftmost \( \tilde{\text{V}} \).
b. If it has no \( \hat{v} \), then associate the H tone of the basic tone melody with the rightmost V.

\[(4)' \quad \#QV \quad (\text{where } Q \text{ is the maximal sequence of phonological segments which does not contain the } \hat{v}.\)]

As discussed in Chapter 1, \((4)'\) is a formalized version of \((4)\). Notice that given the LHL basic tone melody and Tone Association Rule \((4)\), the Universal Tone Association Conventions automatically assign the L tone to all the V's which precede the H toned V as follows:

\[(5) \quad \text{a. karada}^2 \quad \text{b. karada-ga} \quad \text{c. atama}^\hat{\text{a}} \quad \text{d. atama-ga} \]

This means the fact that only the accented mora, or the final mora of unaccented words has a high tone and all the others have a L tone is a logical consequence of the basic tone melody LHL and independently introduced mechanisms.

What remains to be handled in \((5)\) is the final H level tone of the unaccented words such as \text{karada} and \text{karada-ga}. This will easily be handled if we introduce a Tone Simplification Rule which simplifies a HL ontonour tone associated with the starless V to a H level tone. It will be formalized as follows:

\[(6) \quad \text{The Tone Simplification Rule (Hirosaki):} \]
We also need another Simplification Rule to simplify a LH contour tone associated with the starred V to a H tone. This will apply to the following LH contour tone:

(7) a. kabuto (=3d) b. kabuto

and simplify it to a H tone, as indicated in (7b). Thus, the rule will be formalized as follows:

(8) The Tone Simplification II (Hirosaki):

Now suppose, for the sake of argument, that Hirosaki had the same basic tone melody as Tôkyô: HL. Then, we would have, after the tone association processes, the following structures:

(9) a. karada b. karada-ga c. atama d. atama-ga

To derive structures (5) from (9), we would need the following rule:
\begin{equation}
\begin{array}{cc}
\text{(10)} & \text{H-to-L Lowering:} \\
Q & \downarrow \\
Y & \rightarrow \\
\downarrow & \downarrow \\
H & L & H
\end{array}
\end{equation}

This rule lowers the maximal high-toned sequence to a low-toned sequence, leaving the final H-toned V. Then, Tone Simplification Rules (6) would work and derive the correct surface melodies in (3). It is clear that the HL melody theory works. However, there are a couple of problems in this theory. First of all, Lowering Rule (10) would be indispensable in the HL melody theory. On the other hand, in the LHL melody theory, we need no such rule. Thus, the HL melody theory is more costly than the LHL melody theory. Secondly, and more seriously, the HL melody theory cannot give a reason why Hirosaki has melodies illustrated in (3). To put this in another way, there is no logical reason why Hirosaki has rule (10), and not a rule which lowers everything to the left of the \( \hat{v} \). Notice that there is nothing wrong with the latter rule, and the rule would derive a H level surface melody for (9a and b), a LL Falling surface melody for (9c), and a LLHL surface melody for (9d). On the other hand, the LHL melody theory predicts correctly that Hirosaki has no H level surface melody. That is, once the LHL melody is chosen, then our formalism predicts that only one mora can be high (unless some additional Raising Rule is introduced).
Considered in this way, it should be clear that the basic tone melody in Hiroasaki should be LHL.

The above-mentioned system can handle all of the surface melodies of longer words, when such a word occurs in isolation and when it is followed by an enlitech like "ga" (sub), "mo" (also), etc. However, we have to add one more simplification rule for monosyllabic words. Consider the following cases.

(11) a. e  'handle'  b. e→ga
      c. e  'picture'  d. e→ga

As for (11b) and (11c-d), we have no problem with them, because Tone Simplification Rules (6) and (8) correctly handle their respective surface melodies. However, the L level surface melody in (11a) will not be handled, if it is correct at all, by the system of rules developed so far. Thus, to derive the L level melody in (11a), we will need the following Simplification Rule:

(12)  \[
\begin{array}{c}
\text{[\text{-}\overline{\text{V}}]} \\
\text{[\text{-}\overline{\text{V}}]} \\
\text{L H L} \\
\rightarrow \\
\text{L}
\end{array}
\]

Now notice that both (12) and (6) apply only to a contour tone associated with a starless V. Thus, we will be able to collapse these two rules as follows:
This rule states that if there is a contour tone associated with a starless \( V \), delete every thing except for the leftmost tone.

To summarize, we have proposed the following system for Hirosaki:

(14) a. Basic Tone Melody: LHL

b. Tone Association: \( \#\# \frac{Q}{V} \) \( \text{(where } Q \text{ contains } \bar{H} \text{ no } \breve{H} \text{.)} \)

c. Tone Simplification Rules:

\[
\begin{align*}
(13) & \quad \begin{array}{c}
\downarrow \\
T \ T_0 \ T
\end{array} \quad \rightarrow \quad \begin{array}{c}
\downarrow \\
T
\end{array} \\
& \quad \text{(where } T_0 \text{ is the maximal sequence of tonal segments.)}
\end{align*}
\]

\[
\begin{align*}
(8) & \quad \begin{array}{c}
\bar{H} \ \bar{H}
\end{array} \quad \rightarrow \quad \begin{array}{c}
\bar{H}
\end{array}
\end{align*}
\]

Since the Tone Association rule is the same as Tôkyô's, the differences in the surface melodies stem from the difference in the basic tone melody, the difference in the Tone Simplification Rules, and the existence of the Initial Lowering Rule in Tôkyô.
To illustrate how the above system works, I will present some sample derivations:

\[(15)\] a. /niwatori/  
\[\text{Tone Association} \]
\[\text{simplif. niwatori} \]
\[\text{(13)} \]
\[\text{(8)} \]
\[\text{output: niwatori kaminari koomori} \]

The topmost structures stand for the output of the Tone Association processes. The solid line indicates the effect of Tone Association rule (14b), and the dotted lines, the effects of the Universal Tone Association Conventions. The Tone Simplification Rule applies only to the starless word "niwatori" (chicken), but not to the final starred word "kaminari" (thunder). Tone Simplification Rule (8) applies only to (15c) which has a LH contour tone associated with the initial starred V. 4

3.2. **On the Star Shift Rule**

Let us turn to the second problem: the Star Shift Rule. Hirosaki is especially interesting in that it tells us that we need a Star Shift Rule. In the discussion of Tōkyō dialect,
we observed that Tôkyô has a star insertion rule and a star deletion rule. As an example of the former, we observed the star assignment rule for "o"-phrases in women's speech (cf. section 1.2.1), and as an example of the latter, we observed the De-Starring Rule if "no"-phrases (cf. section 1.2.2.). Thus, if we succeed in showing the existence of the Star Shift Rule, then that will entail that we have every logically possible type of star rule. Furthermore, once the existence of a Star Shift Rule is attested, it opens a way to apply the star shift analysis to some other dialects. Thus, it is of tremendous importance.

In order to show that Hirosaki has a Star Shift Rule, let us consider the following examples:

(16) I II III IV V
    a. ame 'candy'  amega amemo amesa amedabe
    b.  ame* 'rain'  amega amemo amesa amedabe
    c.  aki 'autumn'  aki-ga aki-mo aki-sa aki-dabe

Column I shows that two mora words have 3 tonal classes. In Columns II-V, examples (a) show that enclitics such as "ga" (sub.) "mo" (also), "sa" (direction) "dabe" (it is ~, isn't it), etc. are inherently starless, because, if these enclitics were assumed to be starred, then the above-developed system predicts that examples (IIa-Va) have the following surface melodies:
However, these predicted surface melodies are ill-formed. Thus, the enclitics must be starless. Examples (IIc-Vc) shows that when these enclitics are added to an initial-starred word (or more generally, a non-final starred word), the star remains on the same V on which it occurs when the noun is uttered in isolation.

On the other hand, in the case of a final starred word such as "ame" (rain), the star moves one mora to the right, when the word is followed by an enclitic such as "sa", "dabe", etc.; but when it is followed by an enclitic such as "ga", "mo", etc., the star stays on the final mora of the noun. In order to handle the movement of star in (IVb) and (Vb), we will need a special Star Shift Rule which moves a word-final star to the following mora. This rule will apply only to words with the enclitics "sa", "dabe", "ma\textsuperscript{nde}" (even), etc.

We will now investigate the way the Star Shift Rule functions in order to give its correct formalization. According to Hirayama (1957), the diminutive "ko" acts the same way as the star shift enclitics. Thus observe the following examples:

(17)a. \textit{ame} 'candy' \textit{ame-kko}\textsuperscript{5}

b. \textit{ame} 'rain' \textit{ame-kko}

c. \textit{obi} 'Japanese belt' \textit{obi-kko}
(a) shows that "ko" is inherently starless and (c) that it does not attract the star when it is attached to a non-final-starred noun. On the other hand, (b) shows that "ko" attracts the star, when it is attached to the final-starred noun.

What is interesting here is that if the string with the diminutive "ko" is followed by "sa", "ba" (obj), "maⁿde" (even), "dabe" etc., the Star Shift Rule applies again and moves the star one more mora to the right. The rule does not apply if "no" (Gen.), "mo", "ga", etc. follow the strings under discussion. Thus, compare the following cases:

\[
\begin{align*}
\text{I double star} & \quad \text{II single star} \\
\text{shift} & \quad \text{shift} \\
\text{ame-} & \begin{array}{c}
\text{ame-kko-}
\
\text{ame-kko-}
\end{array}
\begin{array}{c}
\text{ba} \\
\text{sa}
\end{array}
\begin{array}{c}
\text{no} \\
\text{ga}
\end{array}
\begin{array}{c}
\text{dabe} \\
\text{maⁿde}
\end{array}
\begin{array}{c}
\text{mo} \\
\text{de}
\end{array}
\end{align*}
\]

In column I, the star on the diminutive "⁻" is moved one mora to the right, and thus the first mora of the following enclitics has the star. On the other hand, in column II, the star remains on the diminutive.

Now consider what will happen if "no+maⁿde" and "dabe+sa" follow a word attached with the diminutive. Checking the data available at present, I have so far been unable to find cases such as, say, (19a,b):
In (a) and (b), "sa" and "dabe" belong to the class which invites star shift if attached to the final starred word, and "no" belongs to the class which does not invite star shift. Thus, judging from the observations above, the star on the diminutive will not be shifted onto "sa" in (19a) and (19b).

On the basis of the above observations, I suggest that the Star Shift Rule be formalized as in (20):

(20) The Star Shift Rule (Hirosaki):

\[ \text{V}_o \text{C}_o \text{C}_o \text{V} \rightarrow \text{V}_o \text{C}_o \text{C}_o \text{V} / \text{##X \quad ##Y} \]

It should be noted that there are two plausible way to apply this rule to "ame-kko-ba" and "ame-kko-ma\text{nde}"; (i) the Iterative Hypothesis, which assumes that this rule applies iteratively; and (ii) the Cyclic Hypothesis, which assumes that it applies cyclically. Since I have no clear evidence favoring one of these alternatives, I will leave the problem open here.

Now let us justify rule (20). For this purpose, let us consider some of the conjugational forms of verbs in Hirosaki. In Hirosaki, just like Tōkyō, verbs are of the two types: accented and unaccented. The accented verbs always have a star on the stem-final vowel of the present. Thus, consider the following:
(21) a. \( \text{kak-u} \) 'write + present'
    b. \( \text{yon-u} \) 'read + present'
    c. \( \text{atimaru-u} \) 'gather + present'

Now consider the following conjugational forms:

(22) Pre-Verbal            Past
    a. \( \text{ka-i-te} \)         \( \text{ka-i-ta} \)
    b. \( \text{yon-de} \)          \( \text{yon-da} \)
    c. \( \text{atimatte} \)       \( \text{atimatta} \)

In (22a), the stem final "k" of "kak" (write) is deleted by the
velar deletion rule (we will return to this process in the
next chapter.). The voiced coronal "d" in (22b) is derived by
a consonant voicing rule. What is remarkable here is that in
(a), which has a theme vowel "i", the star on the verb stem
does not move, while in (b) and (c), which have no vowel between
the final starred V and the following pre-verbal morpheme
"te (de)" and past morpheme "ta(da)", the star is attracted
to these morphemes. This will automatically be handled by the
independently introduced rule (20). (20) does not apply to
(22a) because of the vowel "i" which intervenes between the
verb stem and the conjugational morpheme. On the other hand,
(22b) and (22c), which satisfy the SD of (20) as follows:

(23) a. \( \text{yon-de} \) → \( \text{yon-de} \)
undergo rule (20) and shift the star on to the morphemes "de" and "te". Thus, the star shift observed in some conjugational forms will be accounted for by extending the independently introduced rule (20) to apply to these pre-verbal and past morphemes. This observation justifies our treatment of star shift in nouns.

3.3. **Summary**

In the above discussion of the tone system of Hirosaki, we have seen that if Hirosaki is assumed to have the basic tone melody LHL, then the fact that Hirosaki has only one high-toned mora per phrase follows automatically. We have also noted that Hirosaki has exactly the same Tone Association Rule as Tôkyô, but that the Tone Simplification Rules in this dialect are different from the corresponding rule in Tôkyô. Then, we have tried to show that Hirosaki has a Star Shift Rule (20), which applies to the cases in which a final starred word is followed by a certain type of enclitic. This rule moves the star to the initial vowel of the enclitic. Finally, we have argued that the star shift processes found in some verbal conjugational forms are automatically handled by extending rule (20) to such cases.
FOOTNOTES TO CHAPTER 3

1. Since "inoti" has an initial star in Tôkyô, a second-starred word "kokoro" (heart) is supplied here.

2. In (5), the solid association line indicates the effect of rule (4)\textsuperscript{a}, and the dotted lines, the effects of the Universal Tone Association Conventions.

3. As for the Tone Simplification Rule in Tôkyô, see p. 33 in Chapter 1 and section 1.5. in the same chapter.

4. Though four mora words have two more tonal classes: e.g. "kudamono" (fruits), and "toranku" (suitcase), they are omitted from the sample, because their derivations are straightforward.

5. A gemination process automatically applies if the diminutive is attached to a noun.
CHAPTER 4

THE TONE SYSTEM OF THE ŌSAKA DIALECT

4.0. Introductory Remarks

This chapter is concerned with the tone system of the Ōsaka dialect, which is chosen as a representative of the Kansai dialects (or the Kyōto type dialects). This dialect, as well as the other Kansai dialects, is particularly interesting in that it has two basic tone melodies: HL and LHL. In this respect, this dialect markedly contrasts with the Tōkyō-type dialects and some other types of dialects. Since the publications on the tone system of the Ōsaka dialect are relatively few in number and most of them are written in Japanese, let me discuss the tone system of this dialect in as much detail as the available data allow.

The questions which will be covered here are: (i) How are star and melodic classes specified for nouns, verbs, and adjectives in the lexicon? (ii) What tone association rule is necessary in Ōsaka? (iii) What are the tone alternation rules in Ōsaka? (iv) What are the Star Assignment Rules and Star Deletion Rules in Ōsaka? (v) What are some of the theoretical implications of the autosegmental analysis of this dialect?
4.1. The Tone System of Nouns in Ōsaka

4.1.1. Some Factual Observations

Let first examine the tone system of nouns in Ōsaka.

Ōsaka nouns have the following tonal classes:

<table>
<thead>
<tr>
<th>(1)</th>
<th>I.LHL</th>
<th>II.HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>examples</td>
<td>gloss</td>
<td>analysis</td>
</tr>
<tr>
<td>1a. ee ~ e-ga</td>
<td>picture</td>
<td>o</td>
</tr>
<tr>
<td>1b. (gap 1)</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>2a. sora ~</td>
<td>sky</td>
<td>oo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sora-ga</td>
</tr>
<tr>
<td>2b. (gap 2)</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>2c. ame ~</td>
<td>rain</td>
<td>oo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ame-ga</td>
</tr>
<tr>
<td>3a. suzume ~</td>
<td>sparrow</td>
<td>ooo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>suzume-ga</td>
</tr>
<tr>
<td>3b. (gap 3)</td>
<td></td>
<td>* ooo</td>
</tr>
<tr>
<td>3c. kabuto</td>
<td>helmet</td>
<td>ooo</td>
</tr>
<tr>
<td>3d. mātari</td>
<td>match</td>
<td>ooo</td>
</tr>
<tr>
<td>4a. tukemono ~</td>
<td>pickles</td>
<td>oooo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tukemono-ga</td>
</tr>
<tr>
<td>4b. (gap 4)</td>
<td></td>
<td>* oooo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* nightingale</td>
</tr>
<tr>
<td>4c. bitamin</td>
<td>vitamin</td>
<td>oooo</td>
</tr>
<tr>
<td>4d. nokogiri</td>
<td>sow</td>
<td>ooo</td>
</tr>
<tr>
<td>4c. (gap 8)</td>
<td></td>
<td>* oooo</td>
</tr>
</tbody>
</table>
In (1), examples in column I belong to the LHL melody class, while those in column II belong to the HL melody class. The Arabic numerals indicate the number of moras which a word has in the lexicon. The circle (o) represents a mora, and star (*) indicates the presence of the abstract accent marker. The horizontal line over a mora (or a sequence of moras) indicates that it has a high tone, while that under a mora indicates that it has a low tone. The slant (\(\backslash\)) indicates that the mora has a HL falling tone.

Examination of these examples suggests that Ōsaka has:

(2) a. no initial-accented LHL melody noun (see gaps 1, 2, 3, and 4)

b. no final-accented HL melody noun of at least two moras (See gaps 5, 6, and 7).

c. no final-accented LHL melody noun of four moras (and possibly more) (See gap 8).

Let me make some brief comments on these gaps. Suppose that Ōsaka had initial-accented LHL melody nouns. Then, after the tone association processes, which will be discussed later, they would have the following structures:

(3) a. C\(\hat{V}\)V  b. C\(\hat{V}\)CV  c. C\(\hat{V}\)CV\(\hat{V}\)  d. C\(\hat{V}\)CV\(\hat{V}\)CV\(\hat{V}\)

\[
\begin{align*}
\text{LHL} & \quad \text{L HL} & \quad \text{L H L} & \quad \text{L H L}
\end{align*}
\]

To these structures, the Tone Simplification Rule which simplifies a LH contour tone to a H level tone would apply and derive the following surface melodies:
(4) a. CVV b. CVGV c. CVGCVV d. CVGCVGCVV

Notice that these surface melodies are exactly the same as the surface melodies of initial-accented HL melody words. Thus, in the surface structure, the LHL melody words would never be distinguishable, except for the compound formation, which will also be discussed later. Since this is so, it would be next to impossible to distinguish the two types of initial-accented words. Thus, the initial accented LHL melody words would lose their identity. Furthermore, as will be discussed later, the LHL melody class is a marked class and the HL melody class is an unmarked class. Therefore, it is reasonable that the Osaka dialect has unmarked initial-accented nouns only. Considered in this way, we can say that the gaps in (2a) are systematic and not accidental. It seems that Kansai dialects in general share property (2a).

Let us now turn to the gaps in (2b). Suppose that Osaka had final-accented HL melody words. Then the surface melodies would be as follows, for reasons which will be clear in the discussions below:

(5) a. CVG b. CVGCVG c. CVGCVGCV

These surface melodies can be distinguished from the surface melodies of unaccented HL melody words. That is, there seems
to be no reason why \( \hat{O} \)saka has no final-accented nouns of at least two moras. Thus, it seems that it is accidental that \( \hat{O} \)saka has no such nouns. Actually this seems to be indirectly confirmed, because Kameyama which belongs to one of the Kansai dialects, has some final-accented HL melody nouns (See Chapter 5).

Finally, consider the gaps in (2c). Examination of table (1) might suggest that \( \hat{O} \)saka does not put a star more than 3 moras from the beginning of a word. This is not correct as it is, because \( \hat{O} \)saka has, for instance, the following compounds which have a star on the 4\(^{th}\) mora or more from the beginning of a word:

(6) a. \( \text{soori}-\text{daizin} \) 'the prime minister'
    star on the 4\(^{th}\) mora

b. \( \text{rikugun}-\text{daizin} \) 'the minister of the army'
    star on the 5\(^{th}\) mora

However, most words of at least 4 moras are compounds. As we will see below, the compound formation rule in \( \hat{O} \)saka never places a star on the final mora of a compound. This will explain why a long word (i.e. a word of at least 4 moras) has no final star in \( \hat{O} \)saka. Gaps 7 and 8 then are dependent on the nature of compound formation in \( \hat{O} \)saka. Considered in this way, the gaps 7 and 8 in \( \hat{O} \)saka are systematic in the sense that it is dependent on the nature of compound formation.
This observation suggests that if a dialect has a compound formation rule which places a star on the final mora of a long word the dialect will place a star on the word's final mora. This is apparently be confirmed by the dialects of Marugame and Takamatsu, which has final-accented long words. We will return to these dialects below in Chapter 6.

Let us turn to a phonological process in (1). As illustrated in (1a) and (1b), one mora nouns are lengthened, when they occur in isolation, by a rule named Monosyllabic Lengthening:

\( \theta \longrightarrow [+\text{seg}] / \# \# \) \( \text{C}_{\text{o}} \text{V}_- \# \# \)

This rule inserts a feature \([+\text{seg}]\) after a vowel and before word boundaries, when a word has only one syllable. In the case of \(\hat{O}saka\), this rule usually does not apply if a monosyllabic noun is followed by an enclitic. After the application of this rule, I assume that the newly-inserted \([+\text{seg}]\) receives every other feature from the neighboring \(V\) by the universal convention\(^4\) which is reminiscent of the reassociation of tone.

4.1.2. The System of Tonological Rules for Nouns

Now let us first examine the HL melody nouns in (1). Compare the 3 mora nouns in \(\hat{O}saka\) with the corresponding nouns in Tōkyō:
In (8), even though there are some (systematic) differences in the position of star (e.g. "otoko" (man) has the medial star in 大阪, while it has the final star in 東京), their surface melodies are very similar. The only difference between the two melodies is that 東京 lowers the initial mora when it is followed by another high-toned mora. As we have seen in Chapter 1, this lowering process will be handled by the Initial Lowering Rule. It is clear that 大阪 has no Initial Lowering Rule. Thus, the tonological rules necessary to derive the surface melodies for the HL melody nouns are exactly the same as those in 東京. Thus, the necessary rules are the following two:

9 a. The Tone Association Rule:

\[
\begin{array}{c}
\text{Q} \\
\text{V} \\
\text{H}
\end{array}
\]

where Q contains no \( \ddash \), and the dotted line indicates the structural change.

b. The Tone Simplification Rule:

\[
L \rightarrow \emptyset / V \\
\text{or} \\
L \rightarrow V
\]
Rule (9a) associates the H tone with the leftmost ᕾ, if there is any, and otherwise it associates the H tone with the rightmost V. Thus consider the following cases:

(10) a. sakana-ga 'fish + Sub' b. ᕾ*noti-gurai 'life + only'
     \[ H \quad L \quad H \quad L \]

In (10a), the phrase "sakana-ga" has no star. Thus the H tone is associated with the final V. On the other hand, (10b) has two ᕾ's in the same domain, because an enclitic "gurai" has an inherent star. Thus, rule (9a) associates the H tone with the leftmost ᕾ (i.e. the initial vowel of "noti").

The Universal Tone Association Conventions apply to these structures in (10), and turn them into (11):

(11) a. sakana-ga b. ᕾ*noti-gurai
     \[ H \quad L \quad H \quad L \]

In (11), the dotted lines indicate the effects of the Universal Tone Association Conventions. (11b) is a well-formed surface melody of the phrase. But in the case of (7a), to derive a well-formed surface melody, we must simplify the HL contour tone to a H level tone. Tone Simplification Rule (9b) applies to (11a) and deletes the L tone. This observation shows that the rules needed to derive the surface melodies for the HL melody nouns are the two rules in (9).

Now let us turn to the problem how the surface melodies for the LHL melody nouns are derived. If we compare the
unaccented nouns in column I of (1) with the final-accented nouns, we see that the former have H level tones on the final mora of the phrase, while the latter have HL contour tones on the final mora. Notice here that given the LHL melody, Tone Association Rule (9a), and the Universal Tone Association Conventions, the surface melodies for the final-accented nouns (as well as for other accented nouns) are automatically derived. Likewise, the surface melodies for unaccented LHL melody nouns will be derived by the LHL melody, rules (9a and b), and the Universal Tone Association Conventions.

The only thing we have to do is to block the application of Tone Simplification Rule (9b) to the final-accented words like "ame" (rain) and "matti" (match). This can easily be achieved by reformulating (9b) as follows:

\[(12) \quad L \rightarrow \emptyset / \begin{array}{c} \text{[♯]} \\ \frac{H}{\text{L}} \end{array} \]

To illustrate how the surface melodies for LHL melody nouns are derived, consider the following sample derivations:

\[(13) \quad \text{a. } /\text{e/ 'picture'} \xrightarrow{\text{Monosyllabic Tone Association}} e e \xrightarrow{\text{Lengthening}} (9a)\]

\[
\begin{array}{c}
\text{e e} \xrightarrow{\text{Universal Conventions}} \text{L H L} \\
\text{e e} \xrightarrow{\text{Simplification (12)}} \text{L H L} \\
\text{e e} \xrightarrow{\text{L H}}
\end{array}
\]
In (13), the effects of the Universal Tone Association Conventions are represented by dotted lines. It seems to me that these derivational processes are obvious, and thus do not require additional comments.

With regard to Tone Simplification Rule (12), it is interesting to note that Osaka requires only the HL contour simplification rule for nouns. This contrasts markedly with other dialects with the LHL basic melody, because they require both HL and LH contour simplification. The fact that Osaka nouns need no LH contour simplification is an automatic consequences of Monosyllabic Lengthening (7) and restriction (2a), which exclude the initial-accented LHL melody nouns.
4.1.3. *Some Supporting Arguments for the Preceding Analysis*

In the above discussion of the Osaka nouns, we have assumed several things:

(14) a. nouns with a H level surface melody belong to the HL melody class, and not to a H melody class.  
b. nouns with $L^n_1$ H surface melody belong to the LHL melody class and not to a LH melody class.  
c. nouns with the initial star belong to the HL melody class, and not to the LHL melody class.

Let us now turn to these points and argue that the above assumptions are correct.

To show that (14a and b) are right, consider first the enclitics "mo" (even), "e" (directional), "made" (even), etc. What is peculiar to these enclitics is that they assign the * to the final mora of the preceding noun, if the noun is unaccented. Thus, consider the following cases:

(15) a. *sora* 'sky' *sora-mo* unaccented LHL  
b. *take* 'bamboo' *take-mo* unaccented HL  
c. *kabuto* 'helmet' *kabuto-mo* accented LHL  
d. *yama* 'mountain' *yama-mo* accented HL

The unaccented words in (15a and b) receive the star on their final mora, but the accented words in (15c and d) do not.

This will be handled by introducing the following minor
morphological Star Assignment Rule:

\[(16)\quad v \rightarrow \ast / \#\# q \rightarrow \{ - \text{mo} \} \text{ etc.} \]

(where \( q \) contains no \( \ast \).)

Now notice that McCawley and his followers, who claim that a notion of preaccent is necessary, would also claim that "mo" has a "preaccent" and thus that it has a lexical representation like "mo", as in McCawley (1968), or "\( \bar{\text{mo}} \)", as in Okuda (1971). However, there seems to be, for one thing, no crucial supporting evidence, despite McCawley's efforts, to show the necessity of the notion of preaccent. For another, there is a clear counter-example against postulating the preaccent (or pre-star, we will call it in our theory), for the enclitics "mo" (even), "e" (directional), etc. To see this, consider the following cases:

\[(17)\quad \left\{ \begin{array}{c}
(a) \quad \text{"ga" wa} \\
\quad \quad \text{Sub Top} \\
(b) \quad \text{"wa" wa} \\
\quad \quad \text{Top Top} \\
(c) \quad \text{"o" wa} \\
\quad \quad \text{Obj Top} \\
\end{array} \right\}
\]

zyosi desu

"enclitic" is

No one has ever doubted that the enclitics "ga", "wa", and "o" are unaccented in Osaka. The tone melodies in (17) suggest
that these enclitics belong to the unaccented HL melody class. Furthermore, the claim that these enclitics are unaccented will be confirmed by the fact that the following phrases with these enclitics have a H level surface melody:

(18) a. usi-wa 'cow + Top' * usi-wa
    b. usi-ga 'cow + Sub' * usi-ga
    c. usi-o 'cow + Obj' * usi-o

Namely, when the unaccented noun "usi" is followed by these enclitics, none of the output phrases ever has a falling contour on the enlitical. These facts clearly show that these enclitics are starless, because if these enclitics were assumed to have stars, then they would have to have surface falling tones on the final mora. On the other hand, enclitics such as, "kara"(from) and "silka"(only) are generally considered to be initial-accented. This will be confirmed by the following facts:

(19) a. usi-kara 'from cow'
    b. kata-kara 'from the shoulder'

If the enclitic "kara" were unaccented, then the surface melodies would have to be "*usi-kara" and "*kata-kara", respectively, because both of the preceding nouns "usi" and "kata" are unaccented. However, it is obvious that this is not the case. Thus the claim that "kara" is unaccented cannot be maintained. Furthermore, consider the following
The examples in (20) suggest that these belong to the initial-accented HL melody class.

Now assume that "mo" "e" and "made", which assign star on the final mora of the preceding noun, are all preaccented. Then, the prediction is that the following phrases:

(21) a. "mo" wa "also" + Top
b. "e" wa "directional" + Top
c. "made" wa "even" + Top

have the melody indicated in (21). However, (21a) and (21b) are ill-formed and their well-formed melodies are:

(22) a. "mo" wa
b. "e" wa

Thus, it is clear that "mo" and "e" cannot have a preaccent. As for "made", the well-formed surface melody in (21c) will be due to the fact that the "preaccent" is nullified by the immediately following accent. Though (21c) does not provide evidence for or against the "preaccent" theory, I believe it is reasonable to conclude that "made" has no "preaccent", because "wo" and "e" which behave the same way as "made" can not have a preaccent.
On the basis of these observations, it is fair to conclude that the notion of "preaccent" should not be introduced into the theory, because it makes wrong predictions. It is remarkable that this conclusion is exactly the one we reached in Chapter 1 (p. 45) on independent grounds.

Now assume, contrary to the fact, that unaccented nouns like "sora" (sky) have a LH basic tone melody and those like "take" (bamboo) have a H basic tone melody. Then we would have to introduce either a lowering rule which lowers the H tone which is associated with an enclitic "mo", or some other mechanism to choose the LHL and HL melodies for the phrases "sora*-mo" and "take*-mo", respectively. Needless to say, this rule itself would not complicate the grammar, because the Tone Simplification Rule would be eliminated in this approach. However, it would complicate the other aspects of the grammar, because we would need basic tone melodies H and LH as well as HL and LHL. It is clear that this is an unfavorable situation. Thus, it seems fair to conclude that the unaccented words in (15a, and b) have respectively the LHL and HL melodies, if accented nouns in general have the LHL and HL melodies, respectively.

4.1.4. Compound Noun Formation in Osaka

Now consider the statement in (14c) that the initial-accented nouns in Osaka belong to the HL melody class and not to the LHL melody class. The correctness of this will be
shown by using a few rules as tests. First, in Osaka the surface tone melody of a compound is determined by the left member of the compound in the following way:

(23) **Selection of a Basic Tone Melody for the Whole Compound:**
If the left member of the compound belongs to the LHL melody class, the whole compound has a surface LHL melody; and if it belongs to the HL melody class, the whole compound has a surface HL melody.⁶

To illustrate this, consider the following cases:

(24) a. \( \underline{yama} + \underline{sakura} \rightarrow \underline{yama-zakura} \)
    'mountain' 'cherry'

   b. \( \underline{asa} + \underline{sakura} \rightarrow \underline{asa-zakura} \)
    'morning' 'cherry'

(25) a. \( \underline{tukimi} + \underline{dango} \rightarrow \underline{tukimi-dango} \)
    'appreciation' 'dumpling'
    of the moon'

   b. \( \underline{kabuto} + \underline{dango} \rightarrow \underline{kabuto-dango} \)
    'helmet' 'dumpling'

In (25), it is clear that the left member "tukimi" in (a) belongs to the HL melody class, while "kabuto" in (b) belongs to the LHL melody class. Since the right-member of each compound is shared by (a) and (b), the difference in the melody of the whole compound must be attributed to the
difference in the melody of the left member. If the left member of a compound has a HL melody, then the compound has a HL melody as a whole; and if it has a LHL melody, then the compound has a LHL melody as a whole. Since the examples in (24) are parallel to the examples in (25), the initial-accented word "yama" (mountain) should belong to the HL melody class.

In the above discussion of Compound Formation, I left the processes of star assignment and star deletion in Compound Formation unstated. Notice that once the star has been placed on a particular V of a compound, the melody is assigned just as in simple nouns. Thus, we have no difficult problem with respect to Tone Association for compound. Let me turn then to the mechanism by which the star is assigned, and briefly discuss the topic, on the basis of Wada (1942), since this is relevant to the explanation of gaps 7 and 8 in (1).

The star assignment process for a compound is mainly dependent on the length of the right member of the compound. Thus, the rule will be:

(26) **Star Assignment for a Compound**

a. If the right member of a compound consists of 3 or 4 moras, and its left member consists of either 2, 3, 4, or 5 moras, then the star is, in principle, assigned to the initial mora of the right member.

b. If the right member of a compound consists of 2
moras, then there are three cases;

(i) place the star on the initial mora of the right member of the compound.

(ii) place the star on the final mora of the left member of the compound.

(iii) place no star on any mora.

c. If the right member of a compound consists of only one mora, then there are two cases:

(i) place the star on the final mora of the left member of the compound.

(ii) place no star on any mora.

I assume that, simultaneously with these star assignment processes, the star(s) originally specified on a word in the lexicon will all be wiped out.

Formally, the Star Assignment Rules above will be stated as a first approximation as follows:

\[(27) \quad V \rightarrow * \quad \frac{}{\begin{cases} \# (C_0V) \\ \_\_\_\_ \end{cases}} \quad C_0V (C_0V) \_\_\_\_\_\]

\[(27) \] is an abbreviated form of the following sub-rules:

\[(28) \quad V \rightarrow * \quad \begin{cases} \# C_0VC_0VC_0V\_\_\_\_ \quad (a) \\ \# C_0VC_0V\_\_\_\_ \quad (b) \\ \_\_\_\_C_0V\_\_\_\_ \quad (c) \\ \_\_\_\_\_C_0VC_0V\_\_\_\_ \quad (d) \\ \_\_\_\_\_\_\_\_\_C_0V\_\_\_\_ \quad (e) \end{cases} \]
Rules (a), (b), and (c) place the star on the initial mora of the right member of the compound, when it contains 4, 3 and 2 moras respectively. (See (26a) and (26bi)). For some words (e.g. "saru" (monkey) "kore" (voice), etc.), rule (c) should not apply and rule (d) should apply (See 26bii). In addition to this, other words such as "hiro" (color), "koya" (hut) should not undergo (c) nor (d). That is their compounds get no star and the lexical star must be deleted. Rule (e) applies only to one mora words and places the star on the final mora of the left member of a compound. Some of the one mora words (e.g. "ya" (shop), "go" (language)) should be excluded from this rule. Though the situation seems to be slightly more complicated than the rule in (27) indicates, I believe the rule will cover more than 90% of the cases of star assignment in Compound Formation.

Now notice that Star Assignment Rule (27) never places a star on the final mora of a compound. As I mentioned at the outset of this chapter, this Star Assignment Rule is responsible for the non-existence of final-accented nouns of at least 4 moras, for almost all long words are compounds.

In the above discussion, we have seen two aspects of the Compound Formation---selection of a basic tone melody, and star assignment for compounds---and have argued that this compound rule shows that initial-accented nouns must belong to the HL melody class.
4.1.5. The De-Starring Rule before the Enclitic "no"

Let me provide one more argument to show that initial-accented nouns in Osaka belong to the HL melody class. To do so, I must first discuss the De-Starring Rule before the enclitic "no" in Osaka. As pointed out by Okuda (1971, 26ff.), the star in a "no"-(Gen, etc.) phrase is deleted if the head noun in the "no"-phrase belongs to the HL melody class. Thus consider the following cases:

(29) a.  \[\text{kagami } + \text{ no } \underline{\text{ana}} \rightarrow \underline{\text{kagami-no }} \underline{\text{ana}}\]

'mirror' 'Gen' 'hole'

b.  \[\text{huro?oke } + \text{ no } \underline{\text{ana}} \rightarrow \underline{\text{huro?oke-no }} \underline{\text{ana}}\]

'bath tub' 'Gen' 'hole'

In (29), the words "kagami" and "huro?oke" have a star on the penultimate mora in the lexicon. However, the star should be deleted in their "no"-phrases, because as indicated to the right of the arrow, each of the "no"-phrases has the melody which occurs with a phrase without a star.

On the other hand, this De-Starring process does not apply to "no"-phrases containing nouns with the LHL melody. Thus, consider the following cases:

(30) a.  \[\text{hatake } + \text{ no } \underline{\text{tuti}} \rightarrow \underline{\text{hatake-no }} \underline{\text{tuti}}\]

'field' 'Gen' 'soil'

b.  \[\text{tokage } + \text{ no } \underline{\text{mee}} \rightarrow \underline{\text{tokage-no }} \underline{\text{mee}}\]

'lizard' 'Gen' 'eyes'
As indicated in (30), "no"-phrases with LHL melody nouns such as "hatake" or "tokage" do not lose their lexical star.

It should be noted that even in the case of "no"-phrases with HL melody words, the De-Starring process does not apply to certain cases, for some reason. For instance, consider the following cases:

(31) a. "kara" + no ˌimi ꞵ ꞵ "kara" no ꞵˌimi ꞵ
  'enclitic 'Gen''meaning' 'from''
  b. otoko-gokoro + no ꞵˌuta ꞵ→ otoko-gokoro-no ꞵˌuta ꞵ
  'men's heart''Gen''song'

(31á) contains an enclitic "kara", from which star will never be deleted. Furthermore, in (31b), star is not deleted for some reason which is unclear to me. In any case, the point here is that the LHL melody nouns never undergo the De-Starring process, while the HL melody nouns in general undergo it.

This much in mind, consider the following initial-accented examples from Okuda(1971,26)

(32) a. ꞵˌhana ꞵ + no ꞵˌmiyako ꞵ→ ꞵˌhana-no ꞵˌmiyako ꞵ
  'flower''like''capital' glorious capital
cf. ꞵˌhana-no ꞵˌmiyako ꞵ
  b. ꞵˌhikari ꞵ + no ꞵˌhayasa ꞵ→ ꞵˌhikari-no ꞵˌhayasa ꞵ
  'light' 'Gen''speed' cf. ꞵˌhikari-no ꞵˌhayasa ꞵ
As indicated in (32), the De-Starring process applies and the output melody of each "no" phrase in (32) is a H level contour. This is exactly parallel with the examples (29) which belong to the HL melody class. This indicates that the initial-accented nouns should be classified as belonging to the HL melody class.

4.1.6. On the Nature of a Star-Bearing Unit

Let us turn to the next topic: the nature of a star-bearing unit. In Tôkyô, it is generally observed that the star-bearing units are vowels which form the syllable nucleus, and thus neither the syllabic nasal nor the second V of a VV sequence will receive the (ultimate) star. On the other hand, in Ôsaka, the syllabic nasal as well as the second V of a VV sequence may receive the star. As an illustration of this, consider the following cases:

(33) a. bentoo 'lunch' orna 'woman'
    b. sendati 'pioneer'
       sanzi 'three o'clock'

(34) a. eesi 'the rich'
    b. roogi 'alley'
    c. kyusidai 'old drama'

Except for (33a), all of these examples are cited from Maeda's Dictionary (1955). As indicated in (33) and (34), the syllabic nasal and the second V of a VV sequence should have a star in certain words. Furthermore, in Ôsaka, it is possible
to make an unaccented syllabic nasal or the second V of a VV sequence alone bear a high tone. Thus, observe the following cases:

(35) a. mie^n 'cannot see'
    b. ningen^n 'human'

These facts suggest either that the syllabic nasal is [+syl] in Ōsaka (and in all of the Kansai dialects), or that the star-bearing unit in Ōsaka is [+sonorant]. (I will return to this problem later (cf. Part II).)

Now consider the following examples in the Ōsaka and the Tōkyō dialects:

(36) Ōsaka Tōkyō
    a. osikko osikko 'piddle'
    b. supetto supetto 'spot'
    c. sokkusu sokkusu 'socks'

In Tōkyō, the star occurs on the third mora counting from the end if the third mora contains a CV structure as in (36a,b), and if the third mora does not contain a CV structure as in (36c), the star occurs on the fourth mora counting from the end. Furthermore, the geminate consonant which occurs after the ō is regarded as having a L-tone (or as toneless).

On the other hand, in Ōsaka, the geminate consonant is regarded as having a high tone as indicated in the left column of (36). It is clear, however, that the geminate
consonant does not have a star in (36), because if it were to have, the words would have the following surface melodies for (a) and (b):

(37) a. *osïko
    b. *supotîto

This is clearly counter-factual. Notice that the ill-formedness of (37) is exactly what our assumption that only vowels (or sometimes sonorants) can have a star predicts. Thus, the examples in (36) should have a star on the high-toned vowel in each case. Now, voiceless geminate consonants do not have a physical pitch contour. Why then do the native speakers of Osaka feel that the geminate consonants are high-toned?

My present conjecture is that in Osaka when a H toned vowel is followed by a \( C_1 C_1 V \) structure, a fairly superficial rule associates the H tone with the ensuing L-toned mora. Thus, the rule will be:

(38) The Phonetic Flop Rule (Osaka):

\[
V^{[+seg. \underbrace{-voice}_{H}} C V \quad (\text{where dotted line is the SC of this rule})
\]

This rule claims that all of the examples in (36) should have phonetic structures like (39) in Osaka:
The point of my claim is that the HL falling tone which occurs on a mora immediately after the mora consisting of a geminate consonant is responsible for Osaka speakers' intuitive feeling that the geminate consonant in question is H-toned. As a piece of supporting evidence for this conjecture, consider the following cases:

(40) a. ky̌sa 'grass'
     b. ty̌ka 'mound'

In (40) "u" stands for the voiceless high back vowel [u]. What is interesting here is that Osaka speakers feel that "ky̌" and "ty̌" are high-toned, in spite of the fact that they are physically toneless.

This will be handled as follows: First, assume that the High Vowel Devoicing Rule in Osaka applies after tone association; Recall here that we have already introduced an Erasure Convention for association lines which says that if a tone-bearing unit is turned into an element which cannot carry a tone by some phonological processes, then the association line which connects a tone with the element in question is automatically erased. (For discussion, see Chapter 1 above.) This convention works after High Vowel Devoicing, and erases
the association line between the H tone and the initial voiceless high vowel, as indicated at level (c) in the following derivations:

\[(41)\]

- \[(a)\] Tone Association
  \[
  \begin{array}{c}
  \text{a. } /\text{kusa}/ \\
  \text{H L} \\
  \text{b. } /\text{tu\kka}/ \\
  \text{H L}
  \end{array}
  \]

- \[(b)\] H-V Devoicing
  \[
  \begin{array}{c}
  \text{a. } /\text{kusa}/ \\
  \text{H L} \\
  \text{b. } /\text{tu\kka}/ \\
  \text{H L}
  \end{array}
  \]

- \[(c)\] Erasure Convention
  \[
  \begin{array}{c}
  \text{a. } /\text{kusa}/ \\
  \text{H L} \\
  \text{b. } /\text{tu\kka}/ \\
  \text{H L}
  \end{array}
  \]

- \[(d)\] Reassociation
  \[
  \begin{array}{c}
  \text{a. } /\text{kusa}/ \\
  \text{H L} \\
  \text{b. } /\text{tu\kka}/ \\
  \text{H L}
  \end{array}
  \]

At this point, the Universal Tone Association Conventions force us to reassociate the unbound H tone to the final L-toned mora, as indicated at level (d). Here, one of the cues which is used by Ōsaka speakers will be that the initial voiceless vowel is followed by a mora of a HL contour tone. To the extent that this observation is correct, it will provide us a piece of supporting evidence for my conjecture. It should be noted that, according to Sugita(1967), experimental data support the interpretation in (41d). If this is the case, it will be reasonable to assume that the contour tone introduced by rule (38) is responsible for the Ōsaka speakers' intuitive
feeling which we are considering.

4.1.7. An Argument against the Star Assignment Approach for Unaccented Words

In his very interesting paper, Goldsmith proposed a Star Assignment Rule which assigns the star to the final mora of the unaccented phrase. Let me briefly discuss the reason that the star assignment analysis does not hold.

Crucial evidence against this analysis comes from the following contrast between the final-accented words and the unaccented words:

(42) a. sora 'sky' vs. sara 'monkey'
    b. suzume 'sparrow' vs. matri 'match'

In the case of the unaccented nouns, the final mora has a high-level tone, while in the case of the final-accented nouns, the final mora has a HL falling contour.

If we were to assign the star to the final mora of an unaccented string and to assume that the tone association process were dependent on the star, then the surface melodies would be *"sora" and *"suzume", which is clearly not the case. Nor can we introduce a Vowel Gemination Rule for final starred words and assume that the melodies indicated in "sara" and "matri" actually have the surface structures *"saru" and *"matri". To see why we cannot do so, compare the hypothetical Vowel Gemination Rule with Monosyllabic
Lengthening Rule (7). The latter rule certainly lengthens vowels, because the output of the rule is counted as consisting of two moras. However, in the case of the hypothetical rule of Vowel Gemination, we see that "EAR\textsuperscript{*}\textsuperscript{b}" and "MATT\textsuperscript{*}\textsuperscript{a}" have two and three moras respectively, and not three and four moras respectively. Thus, it will be incorrect to introduce the hypothetical rule for the final-accented words. Therefore, the final starred mora must be short. If so, it is fair to conclude that the star assignment approach for unaccented words does not hold. It should be noted that this is by no means an isolated counter-example to the Star Assignment approach. Similar arguments will be possible in almost all accentual systems, given sufficient data.

Furthermore, theoretically there is nothing wrong with introducing Tone Association Rule (9a), which contains a subrule for an unaccented word. Far from it. As we will see later, the existence of such a rule is exactly what the present conception of the autosegmental theory claims. And it seems to me that the claim is justifiable, because if an accentual system has an unaccented word, it will be natural to treat it in a way parallel to the way in which the word is treated in a non-accentual system. Since the star assignment approach for unaccented words was empirically shown to be untenable, the theory of Tone Association processes should be modified duly in line with the proposal of the present work. (I will
return to this problem later.)

4.1.8. Summary

To summarize briefly, in the above discussion of the tone system of nouns in Ōsaka, we have noted the following:

(43)

(i) In Ōsaka, there is no initial-accented LHL melody noun (=2a)

(ii) There is no final-accented HL melody noun (=2b)

(iii) There is no final-accented LHL melody noun of four moras (or possibly more) (=2c)

(iv) Ōsaka has two basic tone melodies: HL and LHL.

(v) Ōsaka has one Tone Association Rule (9a) and Tone Simplification Rule (9b), which applies only to the HL contour tone associated with a starless V.

(vi) Ōsaka needs no LH contour Tone Simplification Rule for nouns, because it has no initial-accented LHL melody nouns and it contains the Monosyllabic Lengthening Rule.

(vii) I presented an argument for the claim that unaccented all-H surface melody words and unaccented \( L_1^N \) surface melody words should belong respectively to the HL and LHL basic melodies. At the same time, we saw that the notion of "preaccent" makes a wrong prediction.

(viii) To argue that the initial-accented nouns in Ōsaka
belong to the HL melody class and not to the LHL melody class, we examined Compound Formation in Ôsaka and the De-Starring Rule before the enclitic "no".

(ix) In Ôsaka, the syllabic nasal and the second V of a VV sequence can have a star, while the geminate consonant can not have a star. To handle the alleged H tone on the geminate consonant, I suggested a superficial Flop Rule (38), which flops the H tone associated with a vowel which occurs before a geminate consonant to the next V.

\[ L \]

Finally, I argued that the Star Assignment approach for unaccented words in Ôsaka produces the wrong empirical consequences.

4.2. The Tone System of Ôsaka Verbs

4.2.1. The Present Forms of Verbs in Ôsaka

Let us now turn our attention to the tone system of verbs in Ôsaka. In Tôkyô, verbs are divided into two classes: the accented class and the unaccented class. In Ôsaka, they are also divided into two classes, but the mode of classification is different. In Ôsaka, the present forms of verbs are all unaccented, but they belong either to the HL melody class or to the LHL melody class. Thus, consider the following examples:
(44)  

<table>
<thead>
<tr>
<th></th>
<th>HL</th>
<th>LHL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) a.</td>
<td>wur-u</td>
<td>'sell'</td>
</tr>
<tr>
<td></td>
<td>ki-ru</td>
<td>'wear'</td>
</tr>
<tr>
<td>(ii) a.</td>
<td>susum-u</td>
<td>'advance'</td>
</tr>
<tr>
<td></td>
<td>kari-ru</td>
<td>'borrow'</td>
</tr>
<tr>
<td>(iii)a.</td>
<td>yorokob-u</td>
<td>'be glad'</td>
</tr>
<tr>
<td></td>
<td>narabe-ru</td>
<td>'line up'</td>
</tr>
</tbody>
</table>

In (44), the (a) verbs are the so-called consonant-ending verbs, and the (b) verbs are vowel-ending verbs. The difference between the two is that in (a) the stem ends in a consonant while in (b) the stem ends in a vowel.

The melodies in (44) will suggest that there are no accented verbs in Osaka. As noted above, the verbs are divided into HL melody verbs and LHL melody verbs. As far as I know, there is no consonant-ending four mora verb which belongs to the LHL melody class. Furthermore, the "kakure-ru" type LHL melody verbs in (iiiib) are limited in number. Needless to say, there is no one mora verb in Osaka, as also in most Japanese dialects, because a verb stem, which has at least one vowel, is followed by "u" (or "ru" in the case of the vowel-ending verbs).

What is interesting in Osaka is that the melodic class of verbs normally remains the same in their conjugational forms. This observation seems to apply to most of the Kansai dialects. Keeping this in mind, let us now consider the
technical problem of how the melodic class of a verb is
specified in the lexicon. It seems to me that the LHL
melody verbs are marked and the HL melody verbs are unmarked,
because the number of the LHL melody verbs with at least 3
moras is much more restricted than that of the HL melody verbs.
Furthermore, since verbs belong either to the HL or to the LHL
class, we will have no need to specify the "wur-u" type verbs
as HL, and the "kat-u" type verbs as LHL in the lexicon.
If we assume that the LHL melody is marked, then the gaps (2a)
found in table (1), i.e., the fact that Ōsaka has no initial-
accented LHL melody nouns, will be explained by the fact that
in the case of nouns, the unmarked melody namely HL is chosen
for the initial-accented words.

4.2.2. The Past Forms of Verbs in Ōsaka

Let us now turn to the problem of how the melodies in the
past tense are derived. We will see that the past forms are
easily handled by introducing just one rule schema, which
assigns a star to a particular mora.

Consider first examples of three-mora consonant-ending
verbs with a HL basic tone melody:

\[(45) \quad \text{Present} \quad \text{Past} \]
\[
\begin{array}{lll}
a. \text{ʔagar-u} & \text{rise'} & \text{ʔagat-ta} \\
\text{kiraw-u} & \text{hate'} & \text{kirat-ta} \\
b. \text{ʔukab-u} & \text{float'} & \text{ʔukan-da}^{10} \\
\text{susum-u} & \text{advance'} & \text{susun-da} \\
\end{array}
\]
As indicated in (45), the present forms of these verbs belong to the unaccented HL melody class, which will result in an all-H surface melody. On the other hand, the surface melodies of their past forms indicate that a star has somehow been assigned to the initial mora. Thus, if we introduce one star assignment rule for these past forms, the surface melodies of the present and the past will be automatically handled by carrying the system of tone rules over to these cases. The Star Assignment Rule which assigns a star to the first mora of the past will be formally stated as follows:

\[(46) \quad V \longrightarrow * / \quad \#\#_C V C -ta\]

Let us now turn to the past forms of the following consonant-ending verbs in Osaka:

\[(47)\]

<table>
<thead>
<tr>
<th>Present</th>
<th>Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. a. wur-u</td>
<td>wut-*ta</td>
</tr>
<tr>
<td>b. tir-u</td>
<td>tit-*ta</td>
</tr>
<tr>
<td>II. a. ?azaker-u</td>
<td>?azaket-*ta</td>
</tr>
<tr>
<td>b. sitagaw-u</td>
<td>sitagat-*ta</td>
</tr>
<tr>
<td>III.a. kanasim-u</td>
<td>kanasim-*da</td>
</tr>
<tr>
<td>b. yorokob-u</td>
<td>yorokob-*da</td>
</tr>
</tbody>
</table>

The present forms of these verbs also have a H-level tone, while in the past forms of these verbs, the star should be assigned to the antepenultimate mora. In the case of I and II, the fall in pitch occurs after the geminate consonant \(t\),
while in the case of III, it occurs before the syllabic nasal. Cases I and II will be handled by the same mechanism as (38) in section 4.1.6. Thus, the difference in the location of the fall in pitch poses no problem here.

Now consider the problem of how the star is assigned to the past in (47). It will easily be handled if we simply modify rule (46), which is independently introduced above, as follows:

(48) $V \rightarrow * / \# \# Q \_ \_ \_ (C V) C - t a$

The only differences between (48) and (46) are: (i) the CV cluster is enclosed by parentheses in (48); and (ii) The unique variable Q is introduced in (48).

Let us now examine the melodies of the vowel-ending verbs. Consider the following cases:

(49)  

<table>
<thead>
<tr>
<th></th>
<th>Present</th>
<th>Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>ne-ru 'sleep'</td>
<td>ne-ta</td>
</tr>
<tr>
<td></td>
<td>ki-ru 'wear'</td>
<td>ki-ta</td>
</tr>
<tr>
<td>V</td>
<td>?ake-ru 'dawn'</td>
<td>?ake-ta</td>
</tr>
<tr>
<td></td>
<td>kari-ru 'borrow'</td>
<td>kari-ta</td>
</tr>
<tr>
<td>VI</td>
<td>?ata?e-ru 'give'</td>
<td>?ata?e-ta</td>
</tr>
<tr>
<td></td>
<td>narabe-ru 'line up'</td>
<td>narabe-ta</td>
</tr>
</tbody>
</table>

Here again, the present forms have a H level tone, and in the past forms, the star falls on the antepenultimate mora, if there is any. Otherwise, it falls on the penultimate mora.
To handle the star assignment in these cases, what is needed is just to enclose by parentheses the symbol C in (48), which appears immediately before the past tense morpheme "ta". Thus the rule will be:

\[(50) \quad V \rightarrow * \ / \ #\# \ Q \ (CV) \ (C)\text{-ta}\]

Notice that this rule schema will be expanded as in:

\[(51) \quad V \rightarrow * \ / \ \begin{cases} 
#\# \ Q \ (CV)\text{-ta} & (a) \\
#\# \ Q \ (C)\text{-ta} & (b) \\
#\# \ Q \ (CV)\text{-ta} & (c) \\
#\# \ Q \ (C)\text{-ta} & (d) 
\end{cases}\]

Rules (a) and (b) apply only to the consonant-ending verbs, and rules (c) and (d) apply only to the vowel-ending verbs. What is peculiar about rule (a) is that, as noted above, it applies only when Q is null (i.e. it is restricted to apply only to consonant-ending 3-mora verbs of HL melody class.) In this sense, rule (a) is a special rule. All the other consonant-ending HL melody verbs are handled by a general rule, namely (b). Likewise, rule (c) is also restricted to the vowel-ending HL melody verbs whose stem consists of at least two vowels. Thus, rule (c) is a special rule whose domain is restricted to V and VI in (49). All the other cases are handled by rule (d), which is a general rule. This point will be clear immediately below. To summarize, the basic Star Assignment Rule is

\[V \rightarrow * \ / \ (C)\text{-ta}, \ and\]
\( V \rightarrow * / \_CV(C)\text{-}ta \) is restricted only to marked cases.

Up to now, we have only examined these verbs whose present forms have a H level surface melody. Let us now turn to the verbs which belong to the LHL melody class. Consider first the following class of verbs:

\[
\begin{array}{c|c|c}
   & \text{Present} & \text{Past} \\
\hline
\text{VII a.} & \underline{kat-u} & \underline{kat-ta} \\
   & \text{'win'} & \\
\text{b.} & \underline{ndm-u} & \underline{non-da} \\
   & \text{'drink'} & \\
\text{VIII a.} & \underline{oki-fru} & \underline{oki-ta} \\
   & \text{'get up'} & \\
\text{b.} & \underline{tate-fru} & \underline{tate-ta} \\
   & \text{'build'} & \\
\text{IX a.} & \underline{\text{?asob-u}} & \underline{\text{?ason-da}} \\
   & \text{'play'} & \\
\end{array}
\]

As illustrated in (52), the present forms of these verbs have a \( L_1^H \) surface melody, which is the surface realization of the unaccented LHL melody. In example IX, the past form has a star on the antepenultimate mora. However, notice that since "\( \text{?asob-u} \)" is a consonant-ending 3-mora verb, we would expect that it would have a star on the first mora of the past form. However, the fact is that the star appears on its antepenultimate mora. This fact suggests that (51a) should be restricted only to special cases, i.e. to consonant-ending 3-mora verbs with a HL basic tone melody. Thus, IX will be excluded from (51a), and consequently it will receive a star by rule (51b).

Now consider VIII. Here (51c) should be blocked from deriving the correct surface melody for VIII. This means that (51c) is also restricted to the verbs with the HL melody.
Thus, a star will be assigned by the general rule (d) to the penultimate mora of their past forms. Similarly, verbs in VII o not undergo rules (51d), and thus they are left unstarred. Since some of the LHL melody verbs such as:

\[
\begin{array}{ll}
(53) & \text{Present} & \text{Past} \\
 a. & \text{ku}-ru & \text{ki}-ta \\
b. & \text{de}-ru & \text{de}-ta \\
c. & \text{mi}-ru & \text{mi}-ta \\
\end{array}
\]

undergo rule (51d), the VII type verbs should be marked so as not to undergo rule (51b). That is, the type VII verbs are exceptions to the general rule (51b).

Finally let us examine another class of verbs. Consider the past forms of the following consonant-ending verbs:

\[
\begin{array}{ll}
(54) & \text{Present} & \text{Past} \\
X & a. \text{?ok}-u & \text{?oj}-ta \\
b. \text{sak}-u & \text{sai}-ta \\
c. \text{?aru}\tilde{k}-u & \text{?aru}\tilde{u}-ta \\
d. \text{odorok}-u & \text{odoroi}-ta \\
XI & a. \text{kas}-u & \text{kasi}-ta \\
b. \text{kakus}-u & \text{kakusi}-ta \\
c. \text{?arawas}-u & \text{?arawasi}-ta \\
\end{array}
\]

Judging from the present forms of these verbs, they must be consonant-ending verbs. However, in their past forms, the vowel i appears in X and XI, and furthermore, in X, the
stem-final consonant disappears before ɨ. How these should be accounted for? I suggest that the vowel ɨ is introduced by the following insertion rule:

\[
\frac{\text{i-Insertion:}}{
\emptyset \rightarrow i \quad \left\{ \begin{array}{l}
\text{k} \\
\text{g} \\
\text{s} \\
\text{z}
\end{array} \right. + \text{ta}
\}
\]

This rule inserts the vowel ɨ, if the stem ends with one of the \{k, g, s, z\} and the consonant is followed by the past morpheme "ta". After application of rule (55), I also assume the following velar deletion rule, to handle the phonetic shape of the past forms of X:

\[
\frac{\text{The Velar Deletion Rule:}}{
\left\{ \begin{array}{l}
\text{k} \\
\text{g}
\end{array} \right. \rightarrow \emptyset \quad \left\{ \begin{array}{l}
\text{+ i + ta}
\end{array} \right.
\}
\]

(56) deletes the stem-final consonant k in X and derives the surface phonetic forms in X.

Now consider the relative ordering of the Star Assignment Rules (51) (=50), (55), and (56). If we assume that (51) applies after (55) and before (56), then all of the examples in (54) will have to be marked to undergo the special rule (51c), because, as a result of the insertion of ɨ, the original consonant-ending verbs now have the same structure as the vowel-ending verbs. On the other hand, if rule (51) is assumed to apply before (55), then we can apply a general rule (51b),
because all of these verbs are automatically excluded from the domain of the special rule (51a), which applies only to 3-mora consonant-ending verbs of the HL melody class. Thus, it is reasonable to suggest that (55) and (56) should be placed at least after the Star Assignment Rule (51).

Now note that, in order to derive the surface melodies of the verbs considered above, we will need another rule in addition to the above-mentioned Star Assignment Rule. It is a Tone Simplification Rule which simplifies a LH contour tone to a H level tone. It will be formalized as in (57):

(57) The Tone Simplification Rule (II):

\[
L \rightarrow \emptyset \searrow \begin{array}{c}
* \\
H
\end{array}
\]

This rule will be necessary to derive the surface melodies of the past forms of the verbs in (53). Since the verbs in (48) belong to the LHL melody class, their past forms will have the following structure shown at level (ii) in (58), after star assignment and tone association:

(58) a. /ki-ta/  b. /de-ta/  c. /km-ta/

(i) Star Assign. (51)  

(ii) Tone Association  

(dotted lines indicate the effects of Univ. Convention)  

(continued)
(iii) Tone Simplif. (57)  
\[
\begin{align*}
\text{ki-ta} & \quad H \quad L \\
\text{de-ta} & \quad H \quad L \\
\text{mi-ta} & \quad H \quad L
\end{align*}
\]

Tone Simplification Rule (57) applies to the LH contour tones in (58ii), and simplifies each of them to a H level tone. Thus, we have correct surface melodies at level (iii).

Recall that in the discussion of the tone system of Osaka nouns we observed that the HL Contour Tone Simplification Rule applies only to the starless V's. However, (57) applies only to cases where the V with which a LH contour tone is associated has a star. Even though these two simplification rules are formally and functionally very similar, I have no reasonable way to collapse them into one rule schema at present. Thus, I will tentatively assume that Osaka requires two different simplification rules.

The other melodies of verbs will obviously be handled by the system of rules developed up to now. Thus, it will now be clear that the addition of the Star Assignment Rule (50), (=51) and (57) to the system of rules in (9) will be enough to derive the well formed surface melodies for the past forms.

To summarize, we have been concerned exclusively with the past forms of the Osaka verbs in the above discussion, and have suggested that the surface tone melodies for verbs be derived by carrying over the system of rules developed for nouns. The only additional tonal rules which are necessary for the past
forms are the Star Assignment Rule (51) and the Simplification Rule (57). The other conjugational forms will also be handled directly if we introduce a small member of Star Assignment Rules into the grammar. This implies that we need no additional Tone Association Rules in order to handle tone melodies for verbal conjugational forms.

4.3. The Tone System of Osaka Adjectives

4.3.1. The Present Forms

Let us now turn to the tone system of adjectives in Osaka. The present forms of the adjectives have the following surface melodies:

(59) surface forms       underlying form

(i) a. え   < /yok-i/  'good'
    b. すい < /suk-i/  'sour'
(ii) a. たかい < /takak-i/  'high'
    b. たかい < /takak-i/  'red'
(iii) a. うれしえ < /uresik-i/  'glad'
    b. かあし < /kanasik-i/  'sad'
(iv) おもしろい < /omosirok-i/  'interesting'

As indicated in (59), I suggest that each of the adjectives has the stem-final /k/ in the underlying representation. There are several reasons for proposing an underlying /k/ for adjectives. For example, the underlying /k/ appears in the corresponding past forms. Consider the following cases:
(60) (i)  
- yok-at-ta
- suuk-at-ta  
(ii)  
- takak-at-ta
- ?akak-at-ta  
(iii)  
- ?uresik-at-ta
- kanasik-at-ta  
(iv)  
- ?omosirok-at-ta

Thus, it is reasonable to assume a /k/ in the underlying representation of the present.

The velar /k/ is deleted by the velar deletion rule, which is nothing but an extended version of the independently introduced rule (56):

(61) **The Velar Deletion Rule (Extended Version):**

\[
\{k\} \rightarrow \emptyset \quad \text{+i (+:a) \#}
\]

The surface phonetic form \([e\#k]\) will be derived from the underlying form /yok-i/ as follows:

(62)  
/yok-i/ \rightarrow \text{Verlar Deletion} \rightarrow \text{oi} \rightarrow \text{ee}  
\rightarrow \text{yoi} \rightarrow \text{yee}  
\rightarrow \text{y-Deletion} \rightarrow \text{ee}

Here it is simply assumed that an \(\text{oi} \rightarrow \text{ee}\) rule and a \(\text{y-Deletion Rule}\) exist in Osaka and I will not be concerned with the detail of these rules. Finally, note that the
augment [-at-] in the past forms is derived from the underlying form /-ar-/ (literally "exist") by Consonant Gemination with which we will not be concerned here.

Keeping this much of the phonological processes in mind, let us examine the present forms of the adjectives in (59). Two mora adjectives are of two types: one has an unaccented LH surface melody as in "fue"; and the other has an initial-accented HL surface melody as in "suÁ". However, the other adjectives with at least 3 moras all have the same melody. Thus, the 3 mora adjectives have an initial(=antepenultimate)-accented HLL surface melody; the 4 mora adjectives, an antepenultimate-accented HHLL surface melody; and the 5 mora adjectives, an antepenultimate-accented HHLLL surface melody.

In (59), it is clear that (ia) belongs to the underlyingly unaccented LHL melody class. Likewise (iiia and b) and (iv) undoubtedly belong to the underlying HL melody class. This is further confirmed by the melodies of the following de-adjectival nouns:

(63) (i) a. yok-sa
     (iii) a. ?uresi-sa
           b. kanasisa
     (iv) ?omosirosa

To which melodic class do (59ib) and (59iia and b) belong? Recall that in the case of nouns we saw that the initial-accented nouns belong to the HL melody class.
However, the situation seems to be a little different here. To illustrate this point, consider first the corresponding de-adjectival nouns:

(64) (i) b. su-sa

(ii) a. takasa
b. akasa

It is clear that in (64), (ib) belongs to the HL melody class, while (iia, and b) belong to the LHL melody class. Thus, the corresponding present forms in (59) should belong to the same melody class as the forms in (64ib) and (64ii). Thus, "su" should belong to the HL melody class, while "takai" and "?akai" should belong to the LHL melody class. This is further confirmed by the surface melodies of the corresponding past forms in (60). The melody "suuk-at-ta"(HLLLL) will naturally be explained if the adjective "su" belongs to the HL melody class. Likewise the melodies "takak-at-ta"(LHLLL) and "?akak-at-ta"(LHLLL) will be naturally explained if the adjectives "takai" and "?akai" belong to the LHL melody class.

On the basis of these observations, we can now claim that if the two mora adjectives are initial-accented, they belong to the HL melody class, while the initial-accented 3-mora adjectives belong to the LHL melody class. To derive the surface melody for the initial-accented 3-mora adjectives, we also need Tone Simplification Rule (57), which we introduced
for verbs:

(57) **The Tone Simplification Rule (II):**

\[
L \rightarrow \emptyset
\]

\[
\uparrow
\]

\[
\uparrow
\]

\[
H
\]

How should a star be assigned to the present forms of the adjectives in (59)? The generalization about the distribution of the star will be:

(65) In the case of the present forms, the star occurs on the antepenultimate vowel of the adjectives.

As we have seen above, adjectives like "ce" in (59ia) do not have a star. However, this case is exactly what (65) predicts: Since the adjectives in (59ia) have only two moras, they are automatically excluded from the domain of (65). Thus, they will never receive a star. Notice that "su" in (59ib) is an exception to this. Since the initial accented 2 mora adjectives are limited to only "su" and "ka", it will not cost too much if the star is lexically specified on the initial mora of these adjectives.

Taking all of these facts into consideration, I would like to propose that adjectives with at least 3 moras have no lexical star specification. The star will be assigned by the following Star Assignment Rule, which is a formalized version of (65):
(66) The Star Assignment Rule for the Present Forms of the Adjectives:
\[ V \rightarrow * / _{{{C_0}V}{C_0}V} \# )_{\text{Adj}} \{ \text{Present} \} \]

4.3.2. The Past Forms and Other Conjugational Forms

Now consider the surface melodies of the past forms in (60) and the Participial, Conditional, Representative, and Tentative in (62):

(67) Participial Representative Conditional Tentative

(i) a. yo-o-te yo-kat-[ ](ri) yo-ka-roo
   b. su-u-te suu-kat-[ ](ri) suu-ka-roo

(ii) a. tak-o-o-te taka-kat-[ ](ri) taka-ka-roo
   b. ?ako-o-te ?aka-kat-[ ](ri) ?aka-ka-roo

(iii) a. ?uresyu-u-te ?uresi-kat-[ ](ri) ?uresi-ka-roo
   b. kanasyu-u-te kanasi-kat-[ ](ri) kanasi-ka-roo

(iv) ?omosiro-o-te omosiro-kat-[ ](ri) omosiro-ka-roo

In (67) the dotted horizontal line over the mora indicates that the mora is mid-toned. I suggest that the mid tone in (67) is derived by a downdrift process, which lowers a H tone to M when it is preceded by a L tone which is in turn preceded
by another H tone (For related discussion on downdrift, see Chapter 1. section 1.3.).

Notice first that the melody of the Participial will be adequately handled if we assign a star to the antepenultimate mora by (66). Now consider the Past forms in (60). Examination of (60) reveals that the star is assigned to the rightmost vowel of the stem (notice that "-at-" is an augment). Likewise, the Representative, Conditional, and Tentative all have a star on the rightmost vowel of the stem. It should be noted that in these 3 cases, the star on "*tari", "*tara", and "*roo" are assumed to be lexically specified. Thus, the Star Assignment Rule for these forms will be:

\[
(68) \quad V \longrightarrow * / \_ + ka \begin{cases} t + \begin{cases} *tara \\ *tari \\ *roo \end{cases} \end{cases} \#
\]

I assume here that Star Assignment Rules (66) and (68) are morphological rules. However, whatever the status of these rules, it will be clear that the star need not be specified on a particular mora of the adjective in the lexicon.

To summarize, we noted that (i) in the case of adjectives, the initial-accented 3-mora present forms should belong to the LHL melody class; (ii) as a consequence of this, Osaka needs Tone Simplification Rule (57) which simplifies a LH contour tone to a H level tone, as well as HL contour Simplification
Rule (12), which was introduced for nouns; and (iii) in the case of adjectives, the star need not be specified on a particular mora in the lexicon. It can be introduced on a particular mora by the Star Assignment Rules (66) and (68).

4.4. Some Miscellaneous Tonological Processes In Ôsaka

Before concluding the discussion of the tone system of the Ôsaka dialect, let me discuss interesting tonological processes which happened to attract my attention. The processes to be discussed here will be (i) Compound Verb Formation; (ii) tone melodies of the phrases with the polite prefix "o"; and (iii) the Collocational H Deletion Rule, which deletes the final H tone of an unaccented LHL melody word, if it is followed by another phrase which starts with a H tone.

4.4.1. The Compound Verb Formation Rule

In the above discussion (i.e. section 4.1.4), we noted that the Compound Noun Formation Process in Ôsaka consisted of the two parts: the selection of the Basic Tone Melody for the compound and Star Assignment (with the simultaneous deletion of the lexically specified stars). In this section, we are concerned with the process of Compound Verb Formation. While we were discussing the tone system of verbs, we noted that the verbs in Ôsaka are all unaccented. This observation also holds in the case of the compound verbs. Consider thus the following examples cited from Maeda (1949 p.185):
A compound verb is formed by connecting the stems of verbs by an augment vowel "-i-". The present morpheme "-u" will be attached to the newly derived stem as a suffix. As the illustrative cases in (69) and (70) show, compound verbs are all unaccented. They are all divided into two classes: HL melody compound verbs as in (69) and LHL melody compound verbs as in (26). Now consider the problem of how the melody class of a compound verb is determined. Recall that we observed that the melody of a compound noun was determined by the left member of the compound. Examination of (69) and (70) will immediately suggest that the same principle works here. Thus, if the left member of a compound belongs to the HL melody
class as in (69), the compound as a whole will have a HL melody. If the left member of a compound belongs to the LHL melody class as in (70), the compound as a whole will have a LHL melody.

The above observation shows clearly that the principle for the selection of the basic tone melody for a compound is shared by nouns and verbs. However, the star assignment process for compounds does not apply to verbs. I would like to suggest that this principle of melody selection should be stated differently from the Star Assignment Rule for compound nouns, which is restricted mainly to nouns.
4.4.2. **On Phrases Prefixed with the Polite "お"**

Let us now turn to the next topic: the tone melodies of phrases prefixed with the polite "お". In the course of the following discussion, it will be shown that the principle for the selection of the basic tone melody which was discussed above works here.

If a noun is prefixed with "お", then the whole phrase acquires the LHL melody, and the "お"-phrase will become either accentless, or penult-accented. Consider the following cases:

(71) a. お + \underline{isya} 'doctor' \rightarrow お-isya (i)
    \underline{kama} 'kettle' \rightarrow お-ka-a (ii)
    \underline{kao} 'face' \rightarrow お-ka-a (iii)

b. お + \underline{ato} 'back, after' \rightarrow お-at-o (iv)
    \underline{hasi} 'chopsticks' \rightarrow お-hasi (v)

c. お + \underline{kage} 'lit, shade' \rightarrow お-ka-ge (vi)
    \underline{koe} 'voice' \rightarrow お-ko-e (vii)
    \underline{mae} 'front' \rightarrow お-ma-e (viii)

continued
In (71), (a-d) all have unaccented "o" phrases, (Regrettfully I forgot to check whether case (d) exists or not. I suspect that there are some such examples, though.) On the other hand, (e-h) all have a star on the penultimate mora. As will be clear from the examples in (71a-d) and (71e-h), whether or not the whole "o" phrase acquires penultimate-accent is not predictable. It seems that whether or not the phrase takes the star is dependent on some unknown properties of the lexical item which is the right member. However, notice that the star assignment to the starred examples in (e-h) will be handled by the compound rule (28) in section 4.1.4. To ensure this, we will only have to regard the "o" phrase as a compound. Assuming that the "o" phrase is a compound, we can give the reason that it always has the LHL melody, regardless of the melody of the right member of the "o"-phrase.

Namely, if "o" is assumed to belong to the LHL melody class, then the principle for the selection of the basic tone melody of a compound leads us to the correct conclusion
that the "o" phrase as a whole has the LHL melody. Viewed in this way, we will need no special rule for handling the tone melody of "o"-phrases, because once we assume that the prefix "o" belongs to the LHL basic tone melody, then, everything else will be handled by the system of rules developed up to now. This is very interesting, because it suggests that the tonological rule system developed above is on the right track.

Now let me add one more interesting fact. The prefix "o" under consideration can also be attached to adjectives of at least 3-moras (As far as I can see, it will not be, for some reason, attached to the two mora adjectives.) Thus, consider the following cases:

(72) a. 3-mora LHL adjectives:
   \[ o + \begin{array}{l}
   \text{takai} \quad \text{'high, expensive'} \rightarrow \underline{o-\text{takai}} \\
   \text{yasui} \quad \text{'inexpensive, easy'} \rightarrow \underline{o-\text{yasui}}
\end{array} \]

b. 4-mora HL adjectives:
   \[ o + \begin{array}{l}
   \text{samisii} \quad \text{'lonely'} \rightarrow \underline{o-\text{samisii}} \\
   \text{yasasii} \quad \text{'tender-hearted'} \rightarrow \underline{o-\text{yasasii}}
\end{array} \]

Recall that if an adjective consists of 3-moras, then it always has the LHL melody, and if it consists of 4-moras, then it has always the HL melody. Regardless of the melodic class of the original adjective, the adjective phrase prefixed with "o" always has a LHL melody and a penultimate star. This fact supports the assumption that "o" belongs to the LHL melody class. Furthermore, the compound rule (28c) can be
extended to cover this case, too. What is interesting here is that the adjectives prefixed with "o" always receive a star. And, more generally, the "o"-phrases which belong to the accented class always have a penultimate star.

So far, I have argued in this section that "o"-phrases are handled by the system of rules which was independently introduced in the previous discussion. I also argued that the prefix "o" belongs to the LHL melody class and pointed out that accented "o" phrases always have a star on the penultimate mora.

4.4.3. Collocational H Deletion

Finally, let us turn to a slightly different problem. In Osaka, the tone melody of a sentence, or a phrase which consists of at least two tonal domains, will in general be handled as a composition of the tonal melodies of each tonal domain. Thus, consider the following examples:

(73) a. hon-bako-o + morau \(\rightarrow\) honbako-o morau

'book-shelf+Obj' 'be given' 'I am given a book shelf.

b. ue-ni + aru \(\rightarrow\) ue-ni aru

'up' 'loc' 'exist' 'there is X above Y'

c. neko + morota \(\rightarrow\) neko morota

'cat' 'was given' 'I had a cat'

d. koko ni + aru \(\rightarrow\) koko ni aru

'here + loc' 'exist' 'it is here'

continued
e. saru-no + atama $$\rightarrow$$ saru-no-atama

'monkey+'s' 'head' 'monkey's head'

As illustrated in (73), every phrase to the right of the arrow ($$\Rightarrow$$) has a composite melody of each tonal component.

The only thing which requires comment here is that while (73) has a H level tone up to the very end, (73b-e) have a Mid tone after the L tone. Thus, the H tones on "ru" in (73b, and d), on "mo" in (73c) and on "ta" in (73e) are realized as a surface M tone. It is clear that this kind of lowering process will be handled by the notion of downshift, which was already discussed above. (See section 4.3.2. and 1.3.) It is a process which lowers a high tone which occurs in the environment HL__, to M tone. Since this is a very familiar process, I will not go into the detail of it any more here.

Now let us turn to a case where a sentential melody is slightly different from the melodies of its components. Consider for example the following:

(74) a. aru + toki $$\rightarrow$$ aru-toki

'certain' 'time' 'once'

b. hasi + kure $$\rightarrow$$ hasi-kure

'chopsticks' 'pass' 'pass me chopsticks'

c. usagi-fo + kau $$\rightarrow$$ usagi-o-kau

'rabbit + Obj' 'keep' 'keep a rabbit'

d. vomikake-no + hdn $$\rightarrow$$ vomikake-no-hdn

'unfinished' 'book' 'a book not yet read through'
As illustrated in (74), if the second phrase begins with a H tone, and if the first phrase belongs to the unaccented LHL melody class, then the final H tone on the first phrase is realized as L. This process will be handled by a H deletion rule which I call the Collocational H Deletion Rule:

(75) The Collocational H Deletion Rule:

\[ H \rightarrow \emptyset / \# \# L \# \# H \]

This rule applies for example to (74a) and (74c) as follows:

(76)  

<table>
<thead>
<tr>
<th>I. Tone Association</th>
<th>a. ( \text{aru} # # \text{toki} )</th>
<th>b. ( \text{usagi-o} # # \text{kau} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \text{L H L} )</td>
<td>( \text{L H L} )</td>
</tr>
<tr>
<td>II. Simplification</td>
<td>( \text{aru} # # \text{toki} )</td>
<td>( \text{usagi-o} # # \text{kau} )</td>
</tr>
<tr>
<td></td>
<td>( \text{L H L} )</td>
<td>( \text{L H L} )</td>
</tr>
<tr>
<td>III. Collocational H Deletion</td>
<td>( \text{aru} # # \text{toki} )</td>
<td>( \text{usagi-o} # # \text{kau} )</td>
</tr>
<tr>
<td></td>
<td>( \text{L H L} )</td>
<td>( \text{L H L} )</td>
</tr>
<tr>
<td>IV. Reassociation</td>
<td>( \text{aru} # # \text{toki} )</td>
<td>( \text{usagi-o} # # \text{kau} )</td>
</tr>
<tr>
<td>(by Universal Tone Association Conventions)</td>
<td>( \text{L H L} )</td>
<td>( \text{L H L} )</td>
</tr>
</tbody>
</table>

First of all, the language-particular Tone Association Rule (9a) in section 4.1.2. associates the H tone with the \( \text{V} \) or, if the word is unaccented, with the final V, as indicated by the solid line in row I. The dotted lines in row I indicate the effects of the Universal Tone Association Conventions. Tone Simplification Rule(12) in section 4.1.2. applies to the
output of the tone association processes, and deletes the
circled L tone. Then, the Collocational H Deletion Rule applies
to the circled H tones in row III, and deletes them. Finally,
by the reassociation of tone by the Universal Tone Association
Conventions, the L tone, which is the only tone found in a
tonological domain of "aru" or "usagi-o", spreads to the free
tone-bearing units, as indicated by the dotted lines in row IV.

It is remarkable that what looks superficially like the
Lowering of the H tone is actually accounted for in terms of
the interaction of Tone Deletion Rule (75) and the Universal
Tone Association Conventions. The idea of reassociation, which
was first proposed by Goldsmith to account for some of the
processes in Igbo, will handle all of what Hyman-Schuch(1974)
called the assimilation processes.

It should also be noted that in (75), the enviromental
specification \#L\#H is necessary and it can easily be
justified if we compare and examine the cases in (73) and (74).
We will not be concerned with the justification here, because
it seems to me almost obvious. What is interesting in this
rule is that it requires a tonal environment. It shows that
tonal rules can refer to a tone which is not mentioned in their
SC. Furthermore, it is very interesting to note that the
Collocational H Deletion Rule is formally parallel to a
phonological rule, which has the schematic form A \rightarrow B / X - Y.
This suggests that Tonal Rules operate completely on a par
with other Segmental Rules.

4.5. **Summary of the Tone System of the Ōsaka Dialect**

In this chapter, I selected the Ōsaka dialect out of a number of the Kansai (or the so-called Kyōto-type) dialects, and discussed the tone systems of nouns, verbs, and adjectives, and finally discussed some miscellaneous tonological processes which are of theoretical importance. To summarize, we observed that the Ōsaka dialect has two basic tone melodies: HL and LHL. It was shown that the necessary tonological rules for Ōsaka are: (i) Tone Association Rule (9a), which associates the H tone of the basic tone melodies with the leftmost TCHA, and if there is no TCHA, with the rightmost V; (ii) Tone Simplification Rules (12) and (57); (iii) Collocational H Deletion Rule (75); (iv) a few star assignment rules for the past forms of verbs, (See (51) in section 4.2.2.) and for a few conjugational forms of adjectives; and (v) the Compound Rules; (vi) the De-Accenting Rule before an enclitic "no". We have also discussed (vii) an example of the reassociation process of a H tone with a following L-toned V; and (viii) the notion of downdrift in Ōsaka. In addition to these tonological rules a few segmental phonological rules are suggested. In section 4.1, we first discussed the tone system of nouns in Ōsaka dialect, and pointed out the following generalizations:

(77) a. Ōsaka has no initial-accented LHL melody nouns.

   b. it has no final-accented HI melody nouns of at
least two moras.

c. it has no final-accented LHL melody nouns of 4-moras.

In order to support (76a), I referred to the Compound Rule and the De-Accenting Rule for "no" phrases. I also argued that the all-H surface melody and L^n_1H surface melody belong to the HL basic tone melody and the LHL basic tone melody respectively. Simultaneously, I presented an argument against the notion of "preaccent", which was already argued against independently in Chapter 1. Then we discussed the nature of the star-bearing unit in Ôsaka and finally presented an argument against the star assignment approach for unaccented words in Ôsaka.

In section 4.2, we saw that verbs in Ôsaka are all unaccented, but they are divided into HL melody verbs and LHL melody verbs. In section 4.4, we also noted that the same observation applies to compound verbs. The main concern in section 4.2, was the Star Assignment Rule for the past forms of verbs in Ôsaka.

In section 4.3, we discussed the tone system of adjectives in Ôsaka. What is especially interesting here is that adjectives belong to the initial accented LHL melody class. This made it necessary to introduce another Tone Simplification Rule which deletes the L tone from the LH contour tone.

In section 4.4, we discussed the Compound Verb Formation
Rule and some of the properties of "o"-phrases and argued that the independently introduced compound rule is automatically carried over to these cases. We also noted that the polite prefix "o" belongs to the LHL melody class. Finally, we briefly discussed the Collocational H Deletion Rule and its theoretical implications.
FOOTNOTES TO CHAPTER 4

1. See for example McCawley (1968, esp. Appendix II) for some discussion.

2. I owe the following discussion to M. Halle

3. This rule will be discussed in sections 4.2.2. and 4.3.1.

4. See N. Clements (1975a, b) for detailed discussion on this point.

5. It should be noted that the LH contour Tone Simplification Rule will be necessary for verbs and adjectives. For detailed discussion, see sections 4.2.2. and 4.3.1.

6. It goes almost without saying that there are some exceptions to this generalization. However, since they will be handled differently from the regular cases, their existence will not affect the validity of the present argument.

7. See Chapter 1. pp. 44 ff. See McCawley (1968), Kuno (1969), etc. for some discussion on this point.

8. The HL melody verbs and LHL melody verbs correspond generally to the unaccented and accented verbs (respectively) of standard Japanese. Thus, consider the verbs corresponding to (39):
(44)' Tôkyô

unaccented              accented
(i) a. wîr-u                kâtu
    b. ki-ru                mi-ru
(ii)a. susum-u            kakus-u
    b. kari-ru            tate-ru
(iii)a. yôrokoñ-b-u (ôdorôk-u)'be surprised' (cf. wutagaw-u 'doubt')
    b. narabe-ru            kakure-ru

In (44)', "yôrokoñ-u" in (iii) is the only exception which disturbs the regular correspondences between Tôkyô and Ôsaka. The accented verb "ôdorôk-u" in (iii) is enclosed by parentheses, since Ôsaka seems to have no example which fill the slot. The melody of the verbs corresponding to "ôdorôk-u" is all-H (i.e. "ôdorôk-u") in Ôsaka.

9. Note here that when we say "n-mora verbs", it stands for the verbs which have an n-mora present form.

10. Notice that in Japanese the initial consonant of the past morpheme "ta" is voiced when it follows a voiced stop such as [b, m, g, etc.]. Then [b, and m] are turned into a coronal nasal [n], and [g] is deleted after the insertion of an augument vowel[i] between [g] and "da". Since these phonological alternations are automatic, I will ignore the difference between "ta" and "da",
and, for ease of exposition, represent the past morpheme by "ta" in a rule.
CHAPTER 5

THE TONE SYSTEM OF THE KAMEYAMA DIALECT

Let us now turn to the tone system of the Kameyama dialect, which belongs to the same type as the Osaka dialect. In the discussion of the latter dialect, we observed that it has the following constraints on the lexical star structure:

(1) Osaka has:
   a. no initial-accented LHL melody noun.
   b. no final-accented HL melody noun of at least two moras.
   c. no final-accented LHL melody noun of four moras.

We will first examine whether or not Kameyama has the same constraints. Then, we will discuss some of the interesting processes in Kameyama.

This dialect, which is very similar to the Osaka dialect, is chosen here because (i) it is suitable to discuss the similarity and dissimilarity of the two tonal systems, (ii) it is factually interesting; and (iii) it shows a clear contrast between the final-accented words and the unaccented words.
According to Hattori's illuminating works (1931), (1960) etc., Kameyama has the following tonal classes and surface melodies for nouns of 1 and 2 moras:

(2)

1a. \(\text{kaa} \ '\text{mosquito}'\) \(\text{ka-\eta} \sim \text{k\aa-\eta}\) \(\text{HL unaccented}\)
1b. \(\text{\^n\a} \ '\text{name}'\) \(\text{\=n\=\eta} \sim \text{n\=n\=\eta}\) \(\text{HL initial-accented}\)
1c. \(\text{\(\widehat{\text{ki}}\text{\=i}\) 'tree'}\) \(\text{\(\widehat{\text{k\=i}}\text{-\eta}\)} \sim \text{\(\widehat{\text{k\=i}}\text{-\eta}\)} \(\text{LHL unaccented}\)
1d. \(\text{\(\widehat{\text{g\=o}}\)} \ '\text{gaperrals}'\) \(\text{\(\widehat{\text{g\=o}}\)} \text{-\eta)\) \(\text{LHL initial-accented}\)

2a. \(\text{\=a\text{\=m\=e} \ '\text{candy}'\) \(\text{\=a\text{-\eta}}\) \(\text{HL unaccented}\)
2b. \(\text{\(\widehat{\text{\=o}}\)} \ '\text{gaperrals}'\) \(\text{\(\widehat{\text{\=o}}\)} \text{-\eta)\) \(\text{HL final-accented}\)
2c. \(\text{\=a\text{\=s\=i} \ '\text{feet'}\) \(\text{\=a\text{-\eta}}\) \(\text{HL initial-accented}\)
2d. \(\text{\(\widehat{\text{\=a}}\)} \ '\text{trace'}\) \(\text{\(\widehat{\text{\=a}}\)} \text{-\eta)\) \(\text{LHL unaccented}\)
2e. \(\text{\(\widehat{\text{\=a}}\)} \ '\text{autumn'}\) \(\text{\(\widehat{\text{\=a}}\)} \text{-\eta)\) \(\text{LHL final-accented}\)
2f. \(\text{\(\widehat{\text{\=g}}\)} \ '\text{gaperrals'}\) \(\text{\(\widehat{\text{\=g}}\)} \text{-\eta)\) \(\text{LHL initial-accented}\)

If we compare these data with the corresponding data in Osaka, we will immediately notice that the two dialects have exactly the same tonal classes for nouns of 1 and 2 moras. Both have no initial-accented LHL melody nouns (cf. Chapter 4); and both have no final-accented HL melody nouns of two moras (cf. 2.2b). The only difference between the two is in the applicability of the Monosyllabic Lengthening Rule, which
was discussed in Chapter 4 (p.122). In Osaka, this rule usually does not apply if a monosyllabic noun is followed by an enclitic. On the other hand, in Kameyama, it always applies when the noun is uttered in isolation, and it also applies, though optionally, when the noun is followed by an enclitic, say, "na" (sub.).

Now let us turn to longer nouns in Kameyama. Nouns of 3, 4, and 5 moras have the following tonal classes and surface melodies:

(3)

3a. karada
   'body'
   karada-ŋa
   HL unaccented

b. asita
   'tomorrow'
   asita-ŋa
   HL final-accented (rare)

c. tamusi
   'ringworm'
   tamusi-ŋa
   HL medial accented

d. denki
   'electric'
   denki-ŋa
   HL initial-accented

e. usagi
   'rabbit'
   usagi-ŋa
   LHL unaccented

f. tikame
   'short sighted'
   tikame-ŋa
   LHL final-accented

g. karasu
   'crow, raven'
   karasu-ŋa
   LHL medial-accented

h. (gap)

*oo(-na))

LHL initial-accented

4a. irojami
   'color paper'
   irojami-ŋa
   HL unaccented

b. akuruhi
   'next day'
   akuruhi-ŋa
   HL final-accented (rare)

c. nomimono
   'drinks'
   nomimono-ŋa
   HL penult-accented

d. uesita
   'up and down'
   uesita-ŋa
   HL antepenult-accented
e. おおかみ  "wolf" おおかみ-な  HL initial-accented
f. にわとり  "chicken" にわとり-な LHL unaccented
g. くろぼ  "black person" くろぼ-な LHL final-accented
h. おやんこ  "cat" おやんこ-な LHL penult-accented
i. さばん  "morning and night" さばん-な LHL second-accented
j. ( gap おおお( -な) ) LHL initial-accented

kazarimono  "decoration" kazarimono-な HL unaccented
b. ( gap おおおお おおおお-な HL final-accented
c. たまごうり  "egg seller" たまごうり-な HL penult-accented
d. タブコボン  "ashtray" タブコボン-な HL antepenult-accented
e. みじひだり  "right and left" みじひだり-な HL second-accented
f. てんしさま  "emperor" てんしさま-な HL initial-accented
g. おおとこ  "big man" おおとこ-な LHL unaccented
h. くいしんぼ  "greedy fellow" くいしんぼ-な LHL final-accented
i. おひるまえ  "before noon, in the morning" おひるまえ-な LHL penult-accented
j. あくらん nao  "red face" あくらん-な LHL ante penult-accented
k. にせん  "bi-millennium" にせん-な LHL second accented
l. ( gap おおおお(-な) ) LHL initial-accented
Let us first examine the 3-mora nouns in (3). Here again, we have no initial-accented LHL melody nouns, as indicated in 3h of (3). What is remarkable in Kameyama is that it has, though rarely, final-accented HL melody nouns of 3-moras, as indicated in 3b of (3). Recall that we observed in (1) that Osaka has no final-accented 3-mora nouns. Kameyama is different in this respect. In other respects, both have the same tonal classes. It should be noted that here and elsewhere we are not concerned with the lexical tonal differences between the two dialects, which are found in a relatively small number of words. For example, the LHL melody noun "tikame" in 3f of (3) has a final star in Kameyama, while in Osaka it has no star. It might be interesting to investigate whether differences of this sort are systematic or not, but it is beyond the scope of this work.

Let us now turn to the 4-mora nouns. The situation is almost the same as for the 3-mora nouns. Thus, Kameyama has no initial-accented LHL melody nouns, as indicated in 4j of (3), and it has only rarely final-accented HL melody nouns, as indicated in 4b. The only difference between the two is that even though Osaka has no final-accented LHL melody nouns of 4-moras, Kameyama has some, as indicated in 4g of (3). In other respects, both have the same tonal classes.
In regard to 5 mora nouns, Kameyama has neither initial-accented LHL melody nouns nor final-accented HL melody nouns. Though we have no sufficient data in Osaka, I suspect that the situation is the same.

Taking all of these observations into consideration, we can say that Kameyama shares exactly the same restriction as (1a). However, in regard to (1b), Kameyama has a limited number of exceptions, 3 and 4 mora HL melody nouns with final accent. Finally, in regard to (1c), Kameyama has no such restriction.

Examination of the data in (2) and (3) also reveals that the HL class has $n+1$ surface tone melodics for $n$ mora nouns, with the exception of two and five mora words (see 2b and 5b in (1)).

On the other hand, the LHL class in this dialect has $n$ surface tone melodies for $n$ mora nouns. Notice that all of the words which belong to the LHL melody class have only one high-toned mora. In other words, if a word belongs to this melody class, it cannot have two (or more) high tones in sequence. This characteristic is exactly the same in Osaka. Since in other dialect (like Kōchi) LHL melody words can have two or more high tones in sequence under certain circumstances, this seems to be a remarkable characteristic of the Kameyama dialect. Furthermore, Kameyama has a clear contrast between the final-accented
nouns and unaccented nouns. Namely, the former have a HL falling tone on the final(-accented) mora, while the latter have a H level tone on the final mora.

In the above observation, I have assumed that the initial-accented nouns belong to the HL melody class. However one might wonder why the initial-accented nouns in (1) do not belong to the LHL melody class. There is a very good reason to regard the initial-accented nouns as belonging to the HL melody class. To show this, let us consider briefly the compound formation rule in this dialect. When a compound noun is formed out of two words, the rule is that the surface tone melody of the compound is determined by the left member of the compound.\(^1\) Thus, compare the following examples:

\[(4)\]  
   a. \underline{\text{Kyōto}} + \underline{\text{dai̤naku}} \quad \text{\textquoteleft university\textquoteright}  
       \underline{\text{Kyōto}}_\text{\textquoteleft Kyōto University\textquoteright}  
   b. \underline{\text{Waseda}} + \underline{\text{dai̤naku}} \quad \text{\textquoteleft Waseda University\textquoteright}  
       \underline{\text{Waseda}}_\text{\textquoteleft Waseda University\textquoteright}  
   c. \underline{\text{gennōnaku}} + \underline{\text{naïron}} \quad \text{\textquoteleft linguistics+outline\textquoteright}  
       \underline{\text{gennōnaku}}_\text{\textquoteleft General Linguistics\textquoteright}  

As illustrated in the above examples, the compound in (c) has a HL surface melody because the left member of the compound clearly has the HL melody. On the other hand, the compound in (b) has a LHL surface melody, because its left
member has the LHL melody. Likewise, if we were to assume, counterfactually, that the initial accented noun "Kyōto" in (a) belonged to the LHL melody, the compound would have the melody "Kyōto jainaku", instead of that in (a). Since this is at variance with facts, the initial-accented noun in question must have the HL melody. Similarly, the initial-accented nouns like "hana"(flower) and "hata"(flag) which belong to the 2c class in (1) will form the following compounds:

(5) a. hanasono hanazono
    b. hana kanoko hanakano
    c. hata gyooretu hatagyoretu

The surface melodies of the compounds in (5) clearly show that the words "hana" and "hata" have a HL melody. The other initial-accented nouns seem to act in the same way in compound. Thus, the above observation will be sufficient to show that the initial-accented nouns belong to the HL melody class.

Notice incidentally that in the case of the verbs like "otiru"(to fall) and "ukeru"(to receive), whose surface melody is HLL in the speech of the old generation, the situation is rather different from that of the nouns. There are ample reasons to believe that the melody of these verbs must be LHL. The most common surface melodies of
these verbs are, according to Hattori, as follows:

(6) a. おぶり  b. うけり

This suggest that the position of star in these verbs is diachronically in the process of moving one mora to the right. What is interesting in (6) is that as a result of a diachronic star shift, these words take the LHL melody. This suggests that the initial-accented verbs "おぶり" and "うけり" belong to the LHL melody class. This is confirmed by the following conjugational forms of these verbs, which are cited from Hattori (1931):

(7)    negatives          let us V

<table>
<thead>
<tr>
<th></th>
<th>otin</th>
<th>otiyo</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ukeři</td>
<td>ukeřo</td>
</tr>
<tr>
<td></td>
<td>озви</td>
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<tr>
<td>Polite</td>
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<tr>
<td>present</td>
<td>otimasu</td>
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<td></td>
<td>otimasu</td>
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<td>Past</td>
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<td>Pre-Verval</td>
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<tr>
<td>Past</td>
<td>ukemasu</td>
<td>ukemasita</td>
</tr>
<tr>
<td>Past</td>
<td>ukemasu</td>
<td>ukemasita</td>
</tr>
</tbody>
</table>

It is commonly observed that in most Japanese dialects the conjugation does not bring about a change from one melody class to another. There is no evidence to show that Kameyama violates this common observation. On the basis
of the examination of these conjugational forms, we can claim, that the verbs in question belong to the LHL melody class. This generalization applies to initial-accented verbs in general. The above observations suggest that (1) the initial-accented nouns and verbs belong to the different melodic classes; and thus that (ii) we must examine, category by category, to which melody class an initial-accented word belongs.

Note incidentally that in order to derive the surface melodies of initial-accented LHL melody verbs such as:

\[
\begin{align*}
\text{(8) Present} & \quad \text{Negative} \\
(a) \ & \ \hat{\text{otiru}} \quad \text{'fall'} & \quad \hat{\text{otin}} \quad \text{'do not fall'} \\
(b) \ & \ \hat{\text{ukeru}} \quad \text{'receive'} & \quad \hat{\text{ken}} \quad \text{'do not receive'}
\end{align*}
\]

We will need the following Tone Simplification Rule, which simplifies a LH contour tone to a H level tone when it is associated with the starred V:

\[
\begin{align*}
\text{(9) The LH Contour Tone Simplification Rule (Kameyama):} \\
\hat{\text{L}} \quad \hat{\text{H}} \quad \hat{\text{H}} & \quad \text{or} & \quad \text{L} \rightarrow \varnothing \\
\end{align*}
\]

Recall that in Ōsaka we observed that verbs and adjectives need this Tone Simplification Rule. It seems that the situation is exactly the same in the Kameyama dialect.

Now let us turn to the next problem. In the above
examples in (2) and (3), we assumed that the unaccented words with a H level surface melody belong to the HL melody class, and that those with a $L^1_H$ surface melody belong to the LHL melody class. How can we tell that they belong to the HL melody and the LHL melody classes, and not just H melody and LH melody classes?

There are a couple of pieces of evidence to show that H level surface melody words actually belong to the HL melody class and that the $L^1_H$ surface melody words belong to the LHL melody class. For one thing, we can show this again with the help of Compound Formation. Consider thus the following illustrative cases:

(10) a. $\text{getuyoo} + h_i^H \rightarrow \text{getuyoo}^\#_i^H$

'moon' 'day' 'Monday'

b. $\text{soori} + \text{daizin} \rightarrow \text{so}i^R\text{daiz}i^R$

'prime' 'minister' 'Prime minister'

Recall that in Compound Formation, the left member of the compound determines the melody of the whole compound. In (a), "getuyoo" is unaccented, and its compound has a HL surface melody. Thus, the former must have a HL melody, and not a H melody. Likewise, "soori" in (b) is unaccented, and its compound has an indubitable LHL surface melody. Thus, the word "soori" cannot have a LH melody, it must have a LHL melody.
For another, consider the situation where an enclitic like "mo" is attached to the words in question. It is a peculiarity of this enclitic that it assigns a * to the final-mora of the preceding word. Thus, if "mo" is attached to unaccented nouns (e.g. "kaa" in (2) 1a, and "kii" in (2) 1c), they will have the following surface melodies:

\[(11)\]
\[
\begin{align*}
(11)\ a. & \quad \text{kaa} & \quad \text{a'. kaa-mo} \\
& \quad \text{H} \quad \Downarrow \quad \emptyset & \quad \text{H} \quad \text{L} \\
& \quad \text{b. kii} & \quad \text{b'. kii-mo} \\
& \quad \text{LH} \quad \Downarrow \quad \emptyset & \quad \text{LH} \quad \text{L}
\end{align*}
\]

Compare (11a) and (11b). In these, the solid association line indicates that the association process is done by the Tone Association Rule, and the dotted line indicates that the association process is done by the universal conventions. In (a)' and (b)', the star is assigned by a special star assignment rule, which is limited to a restricted number of enclitics like "mo". Notice that if these words had a H basic melody and the LH basic melody, the low-tone which is assigned to "mo" would not be accounted for in a natural way. However, if they are assumed to have the HL melody and the LHL melody, respectively, then the low tone found on "mo" is an automatic consequence of the star assignment rule and the basic melodies. This observation shows that
the unaccented words in question have the HL melody and
the LHL melody, respectively (e.g. (11a) and (11b)).

The above observations cover all of the cases that are
somewhat problematic when we establish the basic melodies
in this dialect. Thus, we are now in a position to claim
that the basic tone melodies of this dialect are HL and LHL.
Since we cannot predict which of the melody classes each
word belongs to, the lexicon of this dialect must
incorporate information about which melody a given word
chooses in the case of tone association, as well as informa-
tion about where the star occurs.

Once the basic tone melodies are established, we must
establish the necessary tone association rules. Since this
dialect is similar to the Osaka dialect, we expect that the
tone association rule of this dialect will be stated as in
(12), which is formalized as in (12i):

(12) i.a. If a tonological domain has at least one ʰ,
then associate the H tone with the leftmost ʰ.

b. If it has no ʰ, then associate the H tone with
the rightmost ʰ.

ii.

## Q V

H

(where Q contains no ʰ, and the dotted line
indicates the SC of the rule.)
If we were to assume that unaccented words get the * on the final mora by the star assignment rule, and that (12ib) is excluded, then we would not be able to account for the difference in the surface tone melodies between final accented words and unaccented words, without introducing some additional unmotivated mechanisms. Thus, the Tone Association Rule (12) seems to be established.

What remains to be explained is the Mono-syllabic Lengthening Rule which applies to example (2), and the Tone Simplification Rule which is necessary to derive the correct surface melodies for unaccented words. With respect to mono-syllabic lengthening, we have already seen that it applies obligatorily when monosyllabic words are uttered in isolation, and optionally when they are followed by an enclitic. In addition to this, as illustrated in (10a), if a monosyllabic noun appears as part of a compound, the lengthening rule does not apply. However, if it is preceded by, say, an adjective, then the process applies obligatorily.

Finally, the Tone Simplification Rule, which simplifies a HL contour associated with a starless vowel to a H level tone, will be formalized as follows:

(13) The Tone Simplification Rule (Kameyama):

\[
\begin{align*}
&\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}} & \bigg\downarrow \bigg\downarrow \\
& H \quad L \quad H
\end{align*}
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}} (\text{or} \quad L \rightarrow \emptyset)
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}}
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}}
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}}
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}}
\]

\[
\begin{array}{c}
\uparrow
\end{array}{}^{\text{V}}
\]
This rule deletes a L tone when it is associated with an unstressed vowel together with a H tone.

Given the system of rules of monosyllabic lengthening, (12), and (13), and the basic tone melodies (L)HL, we can now derive all of the surface tone melodies in (2) and (3). As sample derivations, consider the following examples:

(14) 1b. na* \(\xrightarrow{\text{by Mono-}}\) naa \(\xrightarrow{\text{Syllabic Lengthening}}\) naa \(\xrightarrow{\text{by (13)}}\) naa \(\xrightarrow{\text{and Universal Conventions}}\) (U.C.) HL

2a. ame \(\xrightarrow{\text{by (13)}}\) ame \(\xrightarrow{\text{by (13)}}\) ame

3e. usagi \(\xrightarrow{\text{by (12)}}\) usagi \(\xrightarrow{\text{by (13)}}\) usagi

4g. kuronbo* \(\xrightarrow{\text{by (12)}}\) kuronbo* \(\xrightarrow{\text{and U.C.}}\) kuronbo* \(\xrightarrow{\text{L H L}}\)

5c. tamaño-uri* \(\xrightarrow{\text{by (12)}}\) tamaño-uri* \(\xrightarrow{\text{and U.C.}}\) tamaño-uri* \(\xrightarrow{\text{H L}}\)

Note: The solid line indicates the effect of (12), and they dotted lines indicate the effects of the Universal Tone Association Conventions.
In the case of the first example "na" which belongs to the HL melody class, the Monosyllabic Lengthening Rule applies first, and then by Tone Association Rule (12) and the Universal Conventions for tone association, the H and the L are associated with the string as in (14)1b. In this case, as well as all of the other cases, the solid line indicates the result of the Tone Association Rule, and the dotted lines indicate the results of the Universal Conventions (abbreviated as U.C. in (14)). In 2a, the HL melody is associated with "ame" as indicated there, and then Simplification Rule (13) applies and deletes the L tone. The derivation in 3e is the same as 2a except that "usagi" chooses the LHL melody. In 4g and 5c, the proper tone melody is chosen for each case and the tone association processes automatically derive a well-formed surface melody for each of them.

Tone Association Rule (12) and Tone Simplification Rule (13) are exactly the same as those in Osaka (see (5a) and (8) in Chapter 4). This shows that the two dialects have the same tonal rules. The differences between the two are due to (i) the difference in the applicability of the Monosyllabic Lengthening Rule; (ii) the difference in the restriction on the lexical star specification (cf. (1c) and the relevant discussion); and the differences in idiosyncratic lexical specifications.
Let us turn to the other topics in Kameyama. One of them is related to the tonal changes which occur when two independent clauses are put together. According to Hattori (1942), there are two situations where the tonal changes occur. As an illustration of the first of them, consider the following examples:

(15) a. \text{aru} + \text{toki} \rightarrow \text{aru_{\text{toki}}}

'some' 'time' 'one day'

b. \text{hasi} + \text{kure} \rightarrow \text{hasi_{kure}}

'chopsticks' 'pass(me)' 'pass me my chopsticks'

c. \text{hasi-\text{\text{n}\text{a}}} + \text{taran} \rightarrow \text{hasi-\text{n}\text{a}_{\text{taran}}}

'chopsticks' 'not enough' 'we need some more chopsticks'

d. \text{usagi-\text{\text{-o}}} + \text{kau} \rightarrow \text{usagi-\text{o}_{kau}}

'rabbit' 'keep' 'we keep a rabbit'

As illustrated in (15), if an unaccented LHL melody word is followed by a H-initial word, then the former is turned into a L contour in the surface representation. (15c) and (15d) clearly show that these two phrases consist of two different tonological domains, because if they were assumed to consist of a single domain, the surface melodies of (c) and (d) would have to be "*hasi-\text{n}\text{a}_{\text{taran}}" and "*usagi-\text{o}_{\text{kau}}" respectively.

Thus, we need a rule which lowers the final H tone of the left phrase, when the H tone is immediately followed
by a H tone in the right phrase. To handle this, I suggest that Kameyama has a Collocational H Deletion Rule, which is exactly the same as that in Osaka:

(16) The Collocational H Deletion Rule (Osaka):

\[ H \rightarrow \emptyset / \text{##L##H} \]

This rule applies to examples (15) as follows:

(17) a. aru##toki \(\rightarrow\) a'. aru##toki

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{H} & \text{L} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{L} & \text{L} \\
\end{array}
\]

b. hasi##kure \(\rightarrow\) b'. hasi##kure

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{H} & \text{L} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{L} & \text{L} \\
\end{array}
\]

c. hasi-\text{\text-
}}##taran \(\rightarrow\) c'. hasi-\text{\text-
}}##taran

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{H} & \text{L} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{L} & \text{H} \\
\end{array}
\]

d. usagi-o##kau \(\rightarrow\) d'. usagi-o##kau

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{H} & \text{L} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{L} & \text{H} \\
\end{array}
\]

As a result of the application of rule (16) to each case, the left phrase now has a free V in the phrase-final position. At this point, the Universal Tone Association Conventions force us to reassociate the L tone with the free V, because the L tone is the only tone in the left
domain in question. Thus, (17a'- d') will be turned into the well-formed surface contours in (18):

(18) a. aru#toki  
   \  \    /  /  
   L  H  L

   b. hasi#kure  
   \    /  / 
   L  H  L

   c. hasi-na#taran  
   L  H

   d. usagi-o#kau  
   L

Notice that the environment ##L to the left of the dash is necessary, because if no L precedes the H tone in question, this rule is blocked. As an illustration, consider the following examples:

(19) a. kono + hon$\rightarrow$ kono hon
    'this'  'book'  'this book'

   b. honbako-o + morau $\rightarrow$ honbako-o morau
    'book case Obj' 'be given,  'I get a book case' obtain'

In these examples, the phrase-final moras "no" and "o" are preceded only by the high toned mora(s). Thus, (16) is correctly blocked and no lowering process applies in these cases.

Likewise, the contextual specification H to the right of the dash is also necessary, because if the low-toned mora(s) follow the final high tone, the latter is not lowered. As an illustration, consider the following examples:
(20) a. \( \text{hasi-} \eta a + \text{ne} \bar{i} \Rightarrow \text{hasi-} \bar{\eta} a + \text{ne} \bar{i} \)
'chopsticks-Sub' 'no' 'there are no chopsticks'
b. \( \text{aru} + \text{as} \bar{a} \Rightarrow \text{aru} \text{ as} \bar{a} \)
'some' 'morning' 'one morning'

These examples suggest that the L on the first mora of \( '\text{ne} \bar{i} ' \) and \( '\text{as} \bar{a} ' \) prevents the lowering of the H associated with \( '\eta a ' \) and \( '\text{ru} ' \) in (20). The above discussion will be sufficient to show the necessity of the environmental specification in (16).

Let us now turn to another tonal change in this dialect. When two independent tonological domains are placed side by side, and when a low tone intervenes between the two high tones, the right-high tone is lowered and changed into L, if no special emphasis is placed on the right hand high tone. Consider the following example:

(21) a. \( \text{sono} + \text{niwatori} \Rightarrow \text{sono} \text{niwatori} \)
'that' 'chicken' 'that chicken'
b. \( \text{tama-} \bar{o} + \text{ukeru} \Rightarrow \text{tama-} \bar{o} \text{ukeru} \)
'ball-Obj' 'catch' 'catch the ball'
c. \( \text{booru-} \bar{o} + \text{ukeru} \Rightarrow \text{booru-} \bar{o} \text{ukeru} \)
'ball-Obj' 'catch' 'catch the ball'
d. \( \text{kokoni} + \text{aru} \Rightarrow \text{kokoni} \text{aru} \)
'here' 'is' 'here it is'
e. utukusii + hanataba $\rightarrow$ utukusii hanataba

'beautiful' 'bouquet' 'a beautiful bouquet'

f. ano + hdn $\rightarrow$ ano hon

'that' 'book' 'that book'

g. neko + morota $\rightarrow$ neko morota

'cat' 'was given' 'I was given a cat'

In (21), (a) and (i) show that when an unaccented LHL melody word follows any phrase (e.g. an unstressed HL melody word or another LHL melody word) the High tone of the former word gets suppressed; (b) and (c) show that when a stressed LHL melody word follows any phrase (e.g. another unstressed LHL melody word as in (b) or a stressed HL melody word as in (c)), the high tone of the former word gets suppressed; (e), (f), and (g) illustrate that if a stressed HL melody word follows the word with the surface (L)HL melody, the H tone of the former gets suppressed. I suggest that the process is formalized as follows:

\[
(22) \quad H \rightarrow \emptyset \quad / \quad H(##)_{a} L(##){}_{b} \quad \text{cord, avb}
\]

This rule deletes a H tone, if it is preceded by a L tone and the L tone is preceded in turn by another H tone. ²

Notice that there are several reasons why examples (21) are assumed to be composed of two tonological domains.
For one thing, if they were assumed to be a single domain, then, \((21g)\) would have to have the melody "nekömoro\(\text{t}\)a", not "nekömoro\(\text{t}\)a". It is clear that this is incompatible with the facts. For another thing, "sono + niwator\(\text{i}\)" would have to have the melody "sono niwator\(\text{i}\)", because the left hand element "sono" belongs to the unaccented \(FL\) melody class. This type of example could be handled by introducing a Star Assignment Rule which assigns a star to the final mora of the immediately preceding phrase, (i) if the preceding phrase is unaccented; and (ii) if the following word has the \(L\)-initial melody. This is equivalent to \((22)\) in terms of complexity, and no merit is gained by this approach.

And more seriously, the Star Assignment approach cannot explain the tone melody in \((21g)\), which is easily handled by \((22)\). On the basis of the above observations, we can safely conclude that the examples in \((21)\) consist of two different tonological domains. Thus rule \((22)\) should be introduced into the grammar.

Now notice that the rules in \((16)\) and \((22)\) must apply after Tone Simplification Rule \((13)\). To see this point, consider the following cases:

\[
\begin{align*}
(23) \hspace{1cm} (a) & \quad \frac{\text{hasi-\(\text{t}\)}}{L} \frac{\text{taran}}{H} \\
& \xrightarrow{L \ H} \emptyset \quad \xrightarrow{H \ \emptyset} \emptyset \\
(b) & \quad \frac{\text{sono}}{H} \frac{\text{hon}}{L} \\
& \xrightarrow{H \ L} \emptyset \quad \xrightarrow{H \ L} \emptyset
\end{align*}
\]
(23a and b) represent the results of the Tone Association processes. In (a), if the Simplification Rule applies first and Collocational H Deletion Rule (16) applies to its output the correct result is obtained. However, if (16) were assumed to apply before the Simplification Rule, then the SD of (16) would simply be unsatisfied. Thus, rule (16) would be blocked, resulting in the incorrect "*hasiقنja  tāran". Likewise, in (b) if the H Deletion Rule in (21) were to apply before simplification, (6) would be incorrectly turned into "*sono hon" by (22). Similarly, (a) would be incorrectly turned into "*hasiقنja  tāran" by (22). Thus, (16) and (22) should be ordered after the Tone Simplification Rule.

Another remarkable thing in the Kameyama dialect is that a geminate consonant seems to be able to have a star, as well as the syllabic nasal. For instance, according to Hattori (1960, 417 and 438), examples (24) have the surface melodies indicated below:

(24) a. kutikkan 'destroyer'
    b. yuu

It is not so surprising that the syllabic nasal receives a star, because it has characteristics very similar to vowels (i.e. both are sonorant). However, such an example as (24a) is rather surprising, because our original
assumption was that the vowels (or sonorants) can receive a star.

In this connection, Wada in "Kansai Accent on Insyô" (1959) observes that in the Kansai dialects (e.g. Kyôtô, Ōsaka, Kameyama, Wakayama, etc.) in general any mora can have a star and a H tone. However, if the mora consists of a geminate consonant, there must be intensity (or emphasis) on the mora. As an illustration, he presents the following examples:

(25) a. zi讃to 'fixedly, quietly'
    b. go拝to 'with a roar'
    c. huwahuwa拝to 'lightly'

However, it seems to me that if emphasis is placed on these examples, then the actual pronunciation will be like (26) and not like (25):

(26) a. zi讃*to
    b. go拝*to
    c. huwahuwa拝*to

If this is correct, then these examples will be accounted for by assuming that the Star Assignment Rule applies after the vowel lengthening process. That is, the star will be assigned to the vowel, and not to the geminate consonant. However, in the case of (24), no special emphasis seems to be present.
Notice here that since the underlying structure of (24a) is (27):

(27) kutiku + kan

We can preserve our original assumption that only the sonorant can receive a star, if we assume that the Star Assignment Rule and the Tone Association Rule apply before High Vowel Deletion. Thus, the derivation of (24a) will be as follows:

(28) kutiku + kan \[\xrightarrow{\text{Star Assignment}}\] kutiku* + kan

by the Compound Rule

\[\xrightarrow{\text{Tone Association}}\] kutiku* + kan \[\xrightarrow{\text{High Vowel Deletion}}\] kutik + kan \[\xrightarrow{\text{Erasure Conventions}}\]

\[\xrightarrow{\text{L H L}}\]

However, it is clear that the geminate consonant can have no physical realization of a pitch. Why, then, do the speakers of the Kameyama dialect perceive the geminate consonant as high toned? My present guess is that the H tone which was made free as a result of the application of the Erasure Principle, will be reassocaited to the vowel (a) of "kan" as in (29) by Tone Association Rule (12) and the Universal Conventions for Tone Association:
Namely, the mora "ka" which follows the geminate consonant \( [k] \) is assumed to have the falling tone. My claim is that this word-internal falling tone is responsible for making the Kameyama speakers intuitively feel that the geminate consonant \( [k] \) has a H tone.\(^5\) If this estimation is correct, then the example in (24a) will be handled within our original assumption.

Now, if the Star Assignment Rule and the Tone Association Rule apply before High Vowel Deletion, then it follows that we cannot set up the tonological component independent of the phonological component. In other words, the tonological rules must be incorporated into the phonological component. For more detailed discussion on this topic, see Haraguchi (1975).

Summarizing briefly, we have discussed the following points: (1) in the Kameyama dialect, the basic tone melodies are LHL and HL, and words are specified with respect to which of the melodies they belong to, as well as where the \( \ddagger \) occurs; (2) initial starred nouns have the HL melody, while initial starred verbs have the LHL melody; (3) H level surface melody words and \( L^H \) surface melody words are unaccented; (4) this dialect belongs to the last-H type
dialect; (5) we have introduced a couple of H Deletion Rules which apply to the two adjacent tonological domains, and discussed their ordering relations with respect to the Simplification Rule; and finally (6) we have examined examples which superficially suggest that the geminate consonant can have a *, and suggested that they are not genuine examples to showing that the * can be assigned to a geminate consonant. Based on this observation, we observed that the tonological rules must be incorporated into the phonological component.
FOOTNOTES TO CHAPTER 5

1. We are not concerned with the star assignment process of Compound Formation. * is assumed to be assigned to suitable position by different rules.

2. Notice that this is reminiscent of the downdrift process, which lowers the H tone which follows a high and low tone sequence. Though I have no argument for choosing this rule over Downdrift approach, I will tentatively accept H Deletion Rule (22), for illustrative purposes.

3. Recall also that the Universal Erasure Convention for deletion of association lines forces us to delete the association line between the H and [k]. Thus, we will have to reassociate the H tone to the neighboring V.

4. For related discussions, see Chapter 1 (esp. pp. 52ff.) The point that a voiceless sound carries no pitch has been attested by instrumental phonetic theory.

5. This claim is supported by Sugitō's (1969) Inductive Hypothesis, which is drawn from her experiment concerning the dialects of Tōkyō and Ōsaka. She shows that, in Japanese, speakers tend to hear the accent on the mora which is immediately followed by a steep fall in pitch contour. It seems that her hypothesis can be naturally incorporated in the present theory.
CHAPTER 6

THE TONE SYSTEM OF THE KÔTI DIALECT

Let us now turn to the dialect spoken in Kôti City. This dialect is famous for virtually preserving the tone system of the Bumôki, which is regarded as a record on the Middle Kyôto dialect in Muromachi Period. It thus belongs to one of the Kyôto type dialects. This implies that this dialect has two tone melodies LHL and HL, that it belongs to the last-H type and furthermore, that the Tone Association Rule is:

(1) a. Associate the H tone with the leftmost ˘ in the given domain.

b. If there is no ˘ in the domain, associate the H tone with the rightmost V.

This will be formally stated as follows.

(1)'  #\# Q V  
      |   
      H  (where Q contains no ˘.)

This much in mind, consider the following examples in (2):
(2) Kōti

I. LHL

1a. te-ŋa 'hand'
   b. (gap 1 oo-ŋa) na-ŋa 'name'

2a. umi-ŋa 'sea'
   b. (gap 2 oo-ŋa) asi-ŋa 'feet'
   c. akiri-ŋa 'autumn'

3a. usagi-ŋa 'rabbit'
   b. (gap 3 oo-ŋa) kuzira-ŋa 'whale'
   c. tarakiri-ŋa 'washtub'
   d. (gap 4 oo-ŋa) (gap 7 oo-ŋa)

4a. daidai-ŋa 'orange-color'
   b. (gap 5 oo-oo-ŋa) uguisu-ŋa 'Japanese nightingale'
   c. nadesiko-ŋa 'wild pink'
   d. osiroi-ŋa 'powder'
   e. (gap 6 oo- oo-ŋa) (akuruhi-ŋa) 'the next (rare) day'

II. HL

1o-ŋa 'door'

Since Kōti belongs to the Kyōto-type system, (i) it has no initial-accented LHL melody noun, as indicated by gaps 1, 2, 3, and 5. Furthermore, (ii) in general, there are no final-accented LHL melody nouns of at least 3 moras; hence gap 4 and gap 6. Finally, (iii) there are no final-accented HL melody nouns of at least two moras. The example "akuruhi".
in 4e is a rare exception to this generalization. We have noted above that Kôti has no initial-accented LHL melody nouns. This implies that if a noun is initial-accented, it must belong to the HL melody class. This can be confirmed by using the Compound Formation Rule as a test. Recall that we have seen above (cf. Chapter 4 and 5) that, the tone melody of a compound is determined by the left member. For example, consider the following cases:

(3) a. ɨsi 'stone' ɨsi-gaki 'stone fence'
     b. ɨni 'silk' ɨni-ito 'silk-string'

The compound in (3b) takes the LHL surface melody, because "ɨni" belongs to the LHL melody class. Thus, if "ɨsi" were to belong to the LHL melody class, the compound would have a surface melody "ɨsi-gaki". However, it is clear that this is not the case. Thus, initial accented nouns should belong to the HL melody class.

Now compare the above system of Kôti with that of Kyôto. Let me first compare the unaccented LHL nouns:

(4) Kôti Kyôto
    2a. ɨmi-ɲa ɨmi ɨmi-ɲa 'sea'
    3a. ɨsagi-ɲa ɨsagi ɨsagi-ɲa 'rabbit'
    4a. ɨdai-ɲa ɨdai ɨdai-ɲa 'orange color'

In Kôti, the H tone appears on every mora except the initial mora, while in Kyôto, the H tone appears only on the final
mora of the phrase and all the others have a L tone.
Furthermore, compare the following penultimate starred LHL melody nouns:

\[
\begin{align*}
(5) & \quad \text{Kōti} \quad \text{Kyōto} \\
& \quad \overset{\text{g}siro\text{̄i}}{\text{ powder}} \quad \overset{\text{i}ro\text{̄}gami}{\text{ color paper}}
\end{align*}
\]

In Kōti, the H tone appears from the second mora up to the starred mora, while in Kyōto, the H tone appears only on the starred mora. The most important difference between Kōti and Kyōto is, as we have seen above in (4) and (5), the difference in the surface realization of the LHL melody class. In the case of the HL melody class there is no significant difference between the two except for a systematic difference to which we will return in a moment, and some idiosyncratic differences in the position of the star. To handle the difference in the LHL melody, I would like to propose the following Raising Rule for Kōti:

\[
(6) \quad \text{The Raising Rule (Kōti)}:
\]

\[
\begin{array}{c}
V & Q \quad V \quad \rightarrow \quad V & Q \quad V \\
L & H & L & H \\
\end{array}
\]

Since the initial L tone can appear only in the LHL melody class, this rule is automatically restricted to apply only to the LHL melody class. The difference in the surface melodies of the two dialects will be explained in terms of this rule.
There are a few other differences between the two which deserves mentioning. First of all, in HL melody nouns of 3 moras, Kōti has a contrast between the initial-accented nouns like "kūzira" (whale) and the second-accented nouns like "kāgami" (mirror), but these two types of nouns are merged into the initial-accented class in Kyōto. Thus, in Kyōto, "kūzir" and "kāgami" have the same surface melody. Since this contrast is historically attested, the present-day Kyōto dialect must have undergone star shift, which moves the star one mora to the left. Whether this process is restricted to 3 mora words or not is not clear to me. In the case of four mora words, there are following correspondences:

\[
\begin{array}{ll}
\text{(7)} & \text{Kōti} & \text{Kyōto} \\
\hline
\text{a. uguisu} & \underline{\text{uguisu}} & \underline{\text{uguisu}} \\
\text{b. asagao} & \underline{\text{asagao}} & \underline{\text{asagao}}
\end{array}
\]

In (a), Kōti has an initial star, but Kyōto has a medial star, while in (b) the situation is just the opposite. The difference in the star position is, at least in part, accounted for in terms of the historical star shift, which took place in Kyōto. Secondly, compare the following final-accented nouns:
(8)  

<table>
<thead>
<tr>
<th>Kôti</th>
<th>Kyoto</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. na</td>
<td>nää</td>
</tr>
<tr>
<td>b. aki</td>
<td>aki</td>
</tr>
<tr>
<td>c. akuruhi</td>
<td>akuruhi</td>
</tr>
</tbody>
</table>

In Kôti, the final-accented nouns have a H level tone, while in Kyoto, they have an HL falling tone. (8a) shows that Kyoto has the Monosyllabic Lengthening Rule, which applies to the monosyllabic words, as indicated in (9):

(9) **Monosyllabic Lengthening Rule (Kyôto):**

\[
\emptyset \rightarrow [+\text{Seg}] / hast_{o}V_{o}^{*} / hast_{o}^{*}^{*}
\]

Here we assume that the lengthening process inserts the feature \([+\text{Seg}]\) (cf. Chapter 4, and 5), and that all the other phonological features are copied from the preceding vowel. As a consequence of this lengthening, "nää" is no longer final-accented at the time when the tone association process applies. Thus, it is irrelevant here.

Notice that the difference in (8b and c) will be explained by a difference in the Tone Simplification Rule. In Kyoto, the Tone Simplification Rule will be:

(10) **The Tone Simplification Rule (Kyôto):**

\[
V \rightarrow \emptyset / [-\text{f}] / H
\]
This rule applies only to a HL contour tone which is associated with the unstarred V, while in Kôti it applies to all cases so that the specification [-*] is deleted from (10). The above observations complete the main differences between the tonal systems in Kôti and Kyôto.

To summarize briefly, we have noted that the two dialects have the 3 major melodic differences: (i) in the case of the LHL nouns (and more generally, words), Kôti has a H tone sequence up to the starred vowel excluding the initial mora, while Kyôto has the H tone only on the starred V or on the final V, if there is no * in the domain. It is suggested that this difference be handled by introducing Raising Rule (7) in Kôti. (ii) in Kôti, there is a contrast between initial starred nouns of 3 moras and medial starred HL melody nouns of 3 moras, but in Kyôto, they are all turned into initial starred nouns. (iii) in Kôti, the Simplification Rule applies to all contour tones while in Kyôto, it applies only to contour tones associated with starless V's.

Let us return to the problem concerning Raising Rule (6). According to Shimomura (1971), among the speech of the younger generation in Kôti, the surface melody of unaccented LHL melody words such as (4) is in the process of changing from a Kôti-like melody to a Kyôto-like melody. This change will be characterized by loss of Raising Rule (6).
Notice that rule (6) is assumed to be a phonetic process rather than a phonological process. Thus the loss of (6) will not cause any radical change in the system.

In the above discussion, we have examined the tone system of the Kôti dialect, and observed the following: Since this dialect is a Kyôto-type dialect, (i) it has the basic tone melodies LHL and HL; (ii) it has Tone Association Rule (1) which associates the H tone to the final V, if the domain contains no \#; (iii) it has no initial-accented LHL melody nouns; (iv) it has no final-accented LHL melody nouns of 3 moras or more; and (v) it has no final-accented HL melody nouns of at least 2 moras.

We have also noted that there are 3 major differences between Kyôto and Kôti. What is of special importance here is that Kôti has Raising Rule (6).

Let us now examine a possible alternative analysis, which was first suggested to me by Halle. In the above analysis, we have assumed that the Kyôto-type dialect has the two basic tone melodies: LHL and HL. However, what happens if the Kôti dialect, for example, is assumed to have the basic melody HL, and the LHL melody words in (2) are assumed to have the following Initial Low Insertion Rule:
(11) The Initial Low Insertion Rule (Kôti):

\[
\frac{[\hat{v}]}{L} \rightarrow \frac{[\hat{v}]}{\#\#G}
\]

In this approach, the dialects of Kyôto, Ôsaka, Kameyama, etc. would have the following L Insertion Rule:

(12) Pre-\(\hat{v}\) Low Insertion Rule (Kyôto, etc.):

\[
\frac{V}{L} \rightarrow \frac{V}{\#\#Q\text{ }G\text{ }V}
\]

This rule inserts the L tone on the vowel which occurs to the left of the \(\hat{v}\), if the word is accented, and on the penultimate vowel, if unaccented. The difference between Kyôto and Kôti will be explained in terms of these rules.

What is interesting in this approach is that (11) predicts that in (2), the initial accented nouns have only the HL melody. Thus, in Kôti, every nouns in column I of (2) will be marked \([+\text{rule } 11]\) in the lexicon, while the initial accented nouns in (2) do not receive this rule feature. This is a very interesting alternative approach and deserves careful examination. If this were to turn out to be correct, we would be led to the conclusion that most present-day Japanese dialects have one and only one basic tone melody. However, there are some problems in this
approach: (i) it requires a rule feature, which is not necessary if we assume that there are two tone melodies in this dialect; (ii) it would predict that if a word has the initial star, then it would be [-rule 11]. However, this prediction does not hold in the case of verbs. Consider for example the following conjugational forms in Kẹṭi:

(13) Present Past Negative
a. Ẹmaru 'remain, be left' Ẹmatta Ẹmaran
b. Ẹkiri 'live' Ẹkita ?

In (a) the initial-accented verb "Ẹmaru" should belong to the HL melody class, because the negative "ẹmaran" belongs to the HL melody class. On the other hand, in (b) the initial-accented verb "Ẹkiri" should belong to the LHL melody class, because its past form clearly belongs to the LHL melody class. Thus, in this alternative approach, the initial accented verbs like (13a) would belong to [-rule 11], and the initial accented verbs like (15b) would belong to [+rule 11]. This being the case, the generalization that the initial accented words are [-rule 11] does not hold and thus the generalization should be weakened; (iii) the change in pronunciation which is taking place in the younger generation's speech would have to be accounted for in terms of a change in the Tone Association Rules (11) to (12). However, if rule (6) is
assumed, then the change will be accounted for in terms of loss of the rule. It seems to me that the latter is more plausible than the alternative solution under consideration; and (iv) rule (12) would complicate the rule system of Kyôto, Ôsaka, etc. by one rule, because if we assume the two basic tone melodies for these dialects, such a rule can be dispensed with.

On the basis of the above 4 reasons, two of which (i.e. i and ii) are admittedly weak, I would like to conclude that the approach which introduces the two tone melodies is better.
1. "Akuruhi" is obviously a compound which consists of "akuru" (next) and "hi" (day). The final star seems to be due to the Star Assignment Rule of Compound Formation. If so, then (iii), which is a constraint in the lexicon, will have no exceptions.
CHAPTER 7
THE TONE SYSTEMS OF THE DIALECTS OF MARUGAME
and TAKAMATSU

7.0. Introductory Remarks

This chapter is concerned with the two Kyoto type dialects; the Marugame dialect and the Takamatsu dialect. These two dialects are interesting in that (1) both of them have an initial lowering process, which provides crucial evidence for a tone insertion rule; and (ii) both of them have a L level surface melody for starless LHL melody words. In this respect, these dialects are different from the Osaka and Kameyama dialects, which have a L^H_1 surface melody for the same word class.

The Takamatsu dialect, which is the central topic of this chapter, is of interest in several respects. First of all it is regarded as having the secondmost complicated tone system among the Japanese dialects; Secondly, it incorporates a Flop Rule which is dependent on phonological segmental information (i.e. on the nature of the vowels);

The Flop Rule is mainly responsible for making the surface tonal system look very complicated, and as we will see below, the existence of this rule in Takamatsu crucially differentiates the Takamatsu system from the
Marugame system.

The very existence of the Flop process seems to provide a favorable piece of evidence for the autosegmental treatment of this dialect, since that process is best treated in the autosegmental theory. Furthermore, the very fact that this is dependent on the nature of the vowel seems to be remarkable, because, as far as I can see, the main concern of Western linguists (i.e. American and European) seems to be restricted to the effects of consonants on the tonological processes. What is particularly interesting here is that the Flop Rule in this dialect is partly dependent on the nature of the neighboring syllable. Thus, it provides a piece of crucial evidence to show that a rule can mention in its structural description (a) a phonological segment in a syllable S or (b) tonemes associated with a syllable S which is not mentioned in the structural change of the rule.

7.1. The Tone System of the Marugame Dialect

Let us begin with the analysis of the Marugame system. On the basis of Wada's observation, we can say that the Marugame dialect has the following surface tone melodies for nouns and the corresponding underlying structures, as indicated in (1):
Let us examine the surface tone melodies carefully in order to determine what kind of tone association rules and tone alternation rules are necessary. Consider first the unaccented words with the LHL basic tone melody. In (1), all of these words are given a L level surface melody. However, according to Wada (1958, 79), these words can have a few phonetic variations. Thus, if we take the word "suzume", we find it has the following variations depending on speakers:

(2) a. suzume b. suzu(me) c. suzu(me)

Since this is so, we can conclude that this dialect belongs to the last-H type dialect. Thus, the Tone Association Rule will have to be stated as follows:

(3) 

\[
\begin{array}{c}
\# \# \\
& V \\
H & (Q \text{ contains no } \checkmark.)
\end{array}
\]

The variant (b) can easily be introduced by Tone Simplification Rule (4):

(4) 

\[
\begin{array}{c}
V \\
\checkmark \\
\downarrow \\
H & L \\
\rightarrow \\
& V
\end{array}
\]

Thus, variant (b) poses no problem. Moreover, this rule is independently necessary for words with the HL melody, in order to introduce the H level surface melody of "tori-ga" as
shown in the following representation:

(5) \[
\text{tori-ga} \\
\rightarrow_{by(4)} \emptyset
\]

To derive the surface melody (2c), we will need, in addition to (4), the following raising rule, which seems to be restricted to unaccented words:

(6) \[
\begin{array}{c}
V \\
\downarrow \\
L \rightarrow H
\end{array} \\
\Rightarrow \\
\begin{array}{c}
V \\
\downarrow \\
L \rightarrow H
\end{array}
\]

Because of the specification \([\uparrow]\), this is applicable only to unaccented words.

On the other hand, to derive the surface melody (2a), we will need the following H Deletion Rule:

(7) \text{The H Deletion Rule:} \\
\[
\begin{array}{c}
H \\
\rightarrow \emptyset \\
\downarrow \\
\# \# \\
L \\
\downarrow \\
\# \#
\end{array}
\]

Since this rule is restricted to the unaccented words with the LHL melody, the environment in (7) must be specified. Otherwise, we would incorrectly lower the H tone assigned to the accented mora to a low tone, as illustrated in (8):
Rule (7) might, at first sight, look ad hoc to some readers. However, actually it is not ad hoc at all. Recall that in the discussion of the dialects of Osaka and Kameyama, we observed that they had a Collocational H Deletion Rule, which is reproduced here for ease of reference:

(9) The Collocational H Deletion Rule (Osaka and Kameyama):

\[
H \rightarrow \emptyset / \quad \# \# L \quad \# \# H
\]

This is a rule which deletes a H tone which is associated with the final V of an unaccented IHL melody word, when the word is followed by another word which starts with a H tone.

Rule (7) in Marugame is actually an generalized version of the Collocational H Deletion Rule. If we erase the H tone from the environment of the latter rule, we get a rule which is almost the same as rule (7):

(10) \[
H \rightarrow \emptyset / \quad \# \# L \quad \# \#
\]

Notice here that in Marugame, we cannot formulate the H Deletion Rule as in (10), because Marugame has the same
surface melody for unaccented LHL melody words and final-accented LHL melody words. Thus, to prevent (10) from applying to final accented LHL melody words, it should be formalized as in (7). Considered in this way, it is clear that rule (7) is actually a generalized version of the collocational H Deletion Rule in other dialects. Thus, rule (7) is far from an ad hoc rule. This point will become clearer in the discussion of the Takamatsu dialect. (see pp. 241ff.)

What remains to be noted in Marugame is that, in accented and unaccented words with the HL basic melody, the initial H tone can be lowered if it is followed by another H-toned mora. This process will be formally represented as follows:

(11) The Initial Lowering Rule (Marugame):

\[
\begin{array}{c}
VC_oV \\
V \rightarrow\\
H \\
\end{array}
\]

Because of this rule, second-accented words with the HL basic melody such as "asikosi (〜 asikosi)" ((Lit), limbs and hip) and "migihidari (〜 migihidari)" (right and left) become less stable. The reason we have Gap 5 in (1) will partly be related to this lowering process.

This completes the discussion of the rules necessary to derive the surface tone melodies discussed above.
The surface tone melodies of verbs and adjectives in Marugame will also be handled by the same tonological rules.

Recall that the initial lowering process (11) is a very general rule, and that it is found in a number of the present-day Japanese dialects. It should be emphasized that since this rule applies to a HL melody word in Marugame, the L tone must be introduced by the Initial Lowering Rule. Therefore, we conclude that we have to incorporate a Lowering Rule in the tonological theory. Recall that in the previous discussions of the Tōkyō dialect and a couple of other Tōkyō type dialects, we assumed that an Initial Lowering process should be incorporated into tonology.

Since such a rule is justified in the above discussion, we are able to say that the Initial Lowering analyses of Tōkyō and other Tōkyō-type dialects are based on tonologically permitted grounds, and thus they are highly feasible.

To summarize the above discussion briefly, we have observed the following two points; (i) a L level surface melody in Marugame, which is one of the important characteristics of this dialect, is best treated by introducing rule (7), which is a generalized version of the Collocational Deletion Rule in other dialects; and (ii) Marugame requires Initial Lowering Rule (11), which shows that we have to incorporate a Tone Insertion Rule into tonological theory.
7.2. The Tone System of the Takamatsu Dialect

Let us now turn to the more complex dialect: Takamatsu. As noted at the outset of this chapter, this dialect is of importance, because (i) it contains the Initial Lowering Rule, which applies only to the HL melody class; (ii) it contains a Flop Rule of the following schematic form:

\[
\begin{array}{c}
V \text{ or } Y \\
\text{H} \\
\text{L}
\end{array}
\begin{array}{c}
\text{X} \\
\text{Y}
\end{array}
\]  

(where the dotted line is the SC; and X and Y can be null)

and (iii) it tells us that tonological rules are partially ordered. (i) shows again the necessity for a lowering rule, which is essentially a Tone Insertion Rule. (ii) shows that some of the tonal rules are dependent on phonological information about a syllable which is not mentioned in the SC. It also gives us supporting evidence for the autosegmental theory. We will see that the existence of the Flop Rule in Takamatsu makes it radically different from Marugame.

First of all, let us review the facts of this dialect. According to Wada (1958), this dialect has \( n+1 \) surface tone melodies for one and two mora words; \( 2n \) surface melodies for 3-mora words; and \( 4n-6 \) surface melodies for words of at least 4 moras. If we translate his analysis using the present terminology, his analysis can be summarized as follows:
(12) Takamatsu

<table>
<thead>
<tr>
<th>LHL</th>
<th></th>
<th></th>
<th>HL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>example</td>
<td>gloss</td>
<td>analysis</td>
<td>example</td>
</tr>
<tr>
<td>1a.</td>
<td>tee</td>
<td>'hand'</td>
<td>o</td>
<td>too</td>
</tr>
<tr>
<td>b.</td>
<td>(gap 1)</td>
<td></td>
<td>*</td>
<td>hii</td>
</tr>
<tr>
<td>2a.</td>
<td>kasa</td>
<td>'umbrella'</td>
<td>oo</td>
<td>tori</td>
</tr>
<tr>
<td>b.</td>
<td>(gap 2)</td>
<td></td>
<td>*oo</td>
<td>iai</td>
</tr>
<tr>
<td>c.</td>
<td>uta</td>
<td>'song'</td>
<td>oo*</td>
<td></td>
</tr>
<tr>
<td>3a.</td>
<td>usagi</td>
<td>'rabbit'</td>
<td>ooo</td>
<td>takana</td>
</tr>
<tr>
<td>b.</td>
<td>(gap 4)</td>
<td></td>
<td>*oo</td>
<td>musume</td>
</tr>
<tr>
<td>c.</td>
<td>azuki</td>
<td>'red beans'</td>
<td>*oo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>kabuto</td>
<td>'helmet'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>(gap 6)</td>
<td></td>
<td>oo*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4a.</td>
<td>niwatori</td>
<td></td>
<td>oooo</td>
<td>hinnomaru</td>
</tr>
<tr>
<td>b.</td>
<td>(gap 8)</td>
<td></td>
<td>*oooo</td>
<td>habutae</td>
</tr>
<tr>
<td>c.</td>
<td>nadesiko</td>
<td></td>
<td>*oo0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tatibana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>murishi</td>
<td></td>
<td>*oo0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maoyo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>(gap 10)</td>
<td></td>
<td>oo0*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a.</td>
<td>nezumiiro</td>
<td></td>
<td>ooooo</td>
<td>otosimono</td>
</tr>
<tr>
<td>b.</td>
<td>(gap 12)</td>
<td></td>
<td>*oooo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>hussiawase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>kanadarai</td>
</tr>
</tbody>
</table>
I will first discuss the question of why words in (12)\textsuperscript{3c}, for example "musume" and "kokoro", belong to the same (initial-accented HL melody) class, and how the surface tone melodies are generated.

Let us begin with the first question. According to Wada, there are at least two reasons that words with a contour tone like "kokoro" have the same star analysis as "musume". For one thing, words like "kokoro" sometimes take the forms like "kokoro", even though they are usually uttered with a contour tone. For another, whether or not the contour tone appears is dependent on segmental information about the word in question. Take, for example, three mora words with an initial-star:

(13) (i) \*\*\*

\begin{itemize}
\item [a)] The vowel after \* is [-high]:
  \begin{itemize}
  \item e.g. \*\*\*\* \textit{katari} 'shape', \*\*\*\* \textit{kokoro} 'heart'
  \end{itemize}
\item [b)] The vowel after \* is [+high] and the final \*
is also [+high]:

e.g. *tanuki 'badger', momizi 'colored leaves'

(ii)  \( \ddot{\ddot{o}} \)

a) The vowel after \( \ddot{\ddot{u}} \) is [+high] but the final \( \ddot{\ddot{u}} \) is [-high]:
e.g. musume 'daughter', karuta 'cards'

b) The mora after \( \ddot{\ddot{u}} \) consists either of the
syllabic nasal \( n \), a geminate consonant \( C \), or
the second member of the cluster \( \ddot{\ddot{u}} \ddot{\ddot{u}} \):
e.g. kingyo 'gold fish', yuuhi 'the setting sun'

As illustrated in (13), whether a given word takes the surface melody \( \dddot{\ddot{o}} \) or \( \dddot{\ddot{u}} \) is dependent on phonological segmental information, and the occurrence of the two melodies is in complementary distribution. The surface melody \( \dddot{\ddot{o}} \) occurs only when either the second vowel is [-high], or the second and the third vowels are both [+high]. Elsewhere, the surface melody \( \dddot{\ddot{u}} \) occurs. On the basis of these observations, Wada correctly interpreted both the \( \dddot{\ddot{o}} \) melody and \( \dddot{\ddot{u}} \) melody as having an identical underlying structure \( \dddot{o} \).

Let us proceed next to the problem of how to generate the \( \dddot{\ddot{o}} \) melody from the underlying initial-accented structure \( \dddot{o} \). The melody under consideration is derived by two processes: the Flop Rule and the Initial Lowering Rule. The first rule will be stated formally as follows:
(14) Flop (Takamatsu):

\[
\begin{array}{c}
\begin{array}{c}
\hat{V} \\
C \\
V
\end{array}
\end{array}
\begin{array}{c}
\left< \text{+high} \right>
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\text{C}_o
\end{array}
\begin{array}{c}
\left< V \right>
\end{array}
\begin{array}{c}
\left< \text{+high} \right>
\end{array}
\]

This rule schema is an abbreviation of the following two sub-rules:

(15) a. \[
\begin{array}{c}
\begin{array}{c}
\hat{V} \\
C \\
\left[ V \right>
\end{array}
\end{array}
\begin{array}{c}
\left< \text{+high} \right>
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\text{C}_o
\end{array}
\begin{array}{c}
\left< V \right>
\end{array}
\begin{array}{c}
\left< \text{+high} \right>
\end{array}
\]

b. \[
\begin{array}{c}
\begin{array}{c}
\hat{V} \\
C \\
\left[ V \right>
\end{array}
\end{array}
\begin{array}{c}
\left< \text{-high} \right>
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\text{H}
\end{array}
\begin{array}{c}
\text{L}
\end{array}
\]

(15a) applies to the examples in (13i b); and (15b), to the examples in (13ia). Notice that in these rules, the segment immediately after \( \hat{V} \) should be \( C \) and not \( \text{C}_o \), because they do not apply to \( \text{yuuhi} \) in (13iib).

In order to derive the surface melody \( \mathcal{D}_o \), we need one more rule: Initial Lowering. This rule lowers an initial high tone to a L tone when it is followed by another high tone. Thus, the rule will be formalized as:

(16) The Initial Lowering Rule (Takamatsu):

\[
\begin{array}{c}
\begin{array}{c}
V \\
\text{C}_o \\
V
\end{array}
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\begin{array}{c}
V \\
\text{C}_o \\
V
\end{array}
\end{array}
\begin{array}{c}
\# \# \text{C}_o
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\begin{array}{c}
H \\
L
\end{array}
\end{array}
\overrightarrow{\longrightarrow}
\begin{array}{c}
\begin{array}{c}
\text{H}
\end{array}
\end{array}
\]
It goes almost without saying that rule (16) must apply after the Flop Rule (14), because otherwise the melody ोोोो would not be obtained. The reason that (14) and (16) are introduced to derive the melody in (13i), instead of introducing a single rule (17), which both flop the H tone to the following tone-bearing unit and lower the H tone originally associated with the ो:

(17)  
\[ \overset{\circ}{\overset{\circ}{\overset{\circ}{C}}}_V \overset{\circ}{\overset{\circ}{\overset{\circ}{V}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{H}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \rightarrow \overset{\circ}{\overset{\circ}{\overset{\circ}{C}}}_V \overset{\circ}{\overset{\circ}{\overset{\circ}{H}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{C}}}_H \overset{\circ}{\overset{\circ}{\overset{\circ}{V}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{H}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \overset{\circ}{\overset{\circ}{\overset{\circ}{L}}} \]

will be clear if we take into consideration examples like (18):

(18) i.a. \[ \text{tadotus} \]
\[ \text{garasudo} \]

ii.a. \[ \text{utagaruta} \]
\[ \text{monogatari} \]

In these examples, the ो retains the H tone after the application of the Flop Rule. Notice, however, that to handle the following examples in (19):

(19) i.a. \[ \text{azuki} \]
\[ \text{kabuto} \]

ii.a. \[ \text{murasaki} \]
\[ \text{mayoi} \]

We will need a lowering rule, which lowers the H tone
associated with the \( \dagger \) to a L tone, when it is preceded by a L toned V and it is followed by another H-toned V. This rule will be formalized as follows:

\[(20) \quad \frac{Q \quad C_v \quad V \quad C_v \quad V}{L \quad H \quad L \quad H} \quad \frac{Q \quad C_v \quad V \quad C_v \quad V}{\rightarrow} \quad \text{##} \quad \text{##} \quad \text{##}
\]

Now compare this rule with Initial Lowering Rule (16). These two rules are similar in that (i) both apply after Flop Rule (14); (ii) their function is to lower a H tone to a L tone and (iii) their environments partially overlap. Thus, they may be abbreviated as follows:

\[(21) \quad \text{The Lowering Rule:} \quad (Q \quad C_v \quad V \quad C_v \quad V) \quad \frac{\rightarrow}{L \quad H \quad L \quad H} \quad (Q \quad C_v \quad V \quad C_v \quad V) \quad \text{##} \quad \text{##} \quad \text{##}
\]

The first sub-rule of (21), which is equivalent to (20), applies to the underlying forms of the (b) examples in (19) and correctly lowers the H tone assigned to the \( \dagger \). Likewise, the second sub-rule of (21), which is equivalent to (16), derives the initial L tone in (18).

The above discussion is, hopefully, sufficient to show that "musume" and "kokoro" in (12)3c belong to the same class and the surface melodies are derived by the Flop Rule and the Lowering Rule. In this connection, Let us now consider "uta" and "isi" in (12) 2c and 2b.
According to Wada, the LHL melody words in 2c contains the following words:

(22) a. 也是 'song', おと 'sound', 本月 'heart',
    河川 'river', 車 'train', 華 'care',
    ト 'door'
    b. 早 'monkey', 今日 'carp', 降 'rain',
    積 'bridegroom',

In the Kyōto dialect, the words in (22a) belongs to the initial-accented class with the HL basic tone melody, while those in (22b) belong to the final-accented class with the LHL basic melody. If we examine the examples in (12) again, we will immediately notice that the zi class words, which have an initial-accent, strangely have no go melody words, even though all the other polysyllabic accented words have each two types of surface melody. This would be a strange asymmetry, if Wada's analysis in (12) were correct.

However, if we assume that the words in (22a) belong to the same class as zi in (12)2b, and that those in (22b) belong to the final-accented LHL melody class in (12)2c, then such an asymmetry disappears automatically. There is a piece of supporting evidence for the first half of this assumption. Since the evidence comes from compound formation in this dialect, let us briefly review the compound formation process.
The tone melody of the whole compound, as we have observed in a number of the Kansai dialects, is determined by the tone melody of the left member of the compound. Here, we are not concerned with the Star Placement and Star Deletion processes in compound formation. Stars are assumed to be positioned and deleted by a particular process with which we are not concerned here. Thus, compare the examples in (23) and (24):

(23)  
HL  anything  compound (HL)

a.  おとこ  +  こころ  \rightarrow  おとこ-こころ
'man' 'heart' 'men's heart'

b.  子供  +  こころ  \rightarrow  子供-こころ
'daughter'

c.  乳母  +  いちご  \rightarrow  乳母-いちご
'milk' 'strawberry' 'strawberry with milk'

(24)  

a.  子ども  +  こころ  \rightarrow  子ども-こころ
'child'

b.  あずき  +  はたפה  \rightarrow  あずき-はたفة

c.  上手  +  すがた  \rightarrow  上手-すがた

In (23), the left member of each compound belongs to the HL melody class. Thus, the surface melody of the compound belongs to the HL melody class. Similarly, in (24), the left member of each compound belongs to the LHL melody class. Thus, the surface melody of the compound belongs to the
LHL melody class.

Keeping this in mind, consider the example "**uta**" in (12) 2c (and equivalently in (22a)).

\[(25) \quad \text{uta} + \text{karuta} \rightarrow \text{uta-garuta} \]

'song' 'cards' 'poem cards'

In (25), the compound "**uta-garuta**" has the HL melody. Thus, the word "**uta**" should belong to the HL melody class. Therefore, Wada's analysis in (12)2c is incorrect and the words like "**uta**" should belong to the same class as "**opi**" in (12)2b. If this is so, the words in (22a) will all belong to the initial-accented HL melody class.

Now consider the examples in (22b). These words (especially "**sarū**" and **kōpi**) should not be treated in the same way as those in (22a) because given the Flop Rule, it is obvious that "**sarū**" and "**kōpi**" should belong to the different class than "**uta**" and "**oto**", which have the underlying structure **o**. For if the former examples were assumed to have the underlying structure **o**, then a surface contour tone would not be generated because the second vowel is [+high] in "**sarū**" and "**kōpi**". This is a remarkable prediction of the Flop Rule, and it conforms beautifully to inter-dialectal facts.

How then should we treat words like "**sarū**" and "**kōpi**"? It seems to me that they belong to the final-accented LHL
melody class, as Wada proposed, because in all the other Kyoto-type dialects, they belong to that class. This will be confirmed if the following compounds turn out to have the LHL surface melody:

\[(26) \begin{align*}
a. \text{saru} + \text{mawasi} & \rightarrow \text{saru-mawasi} \\
& \quad \text{"mankey' leader"} \\
b. \text{koi} + \text{nobori} & \rightarrow \text{koi-nobori} \\
& \quad \text{"carp' streamer"}
\end{align*} \]

Unfortunately, Wada's paper contains no relevant data, but I believe that the chances are great that they will turn out to be of the LHL melody class.\(^6\)

Up to now, we have introduced the two tone alternation rules: Flop Rule (14), and Lowering Rule (21), and ha... argued that the "uta" class words belong to the HL melody class. The former rule produces a contour tone if the mora immediately after the \(\uparrow\) has a \([-\text{high}]\) vowel, or if each of the two consecutive moras immediately after the \(\uparrow\) has a \([+\text{high}]\) vowel. The latter rule lowers a H tone to a L tone, if the H-toned mora is both preceded by a low-toned mora and followed by another high-toned mora, or if the H-toned mora is word-initial and is followed by another high-toned mora. In the discussions of these rules, we have implicitly assumed that the tone association rule in this dialect is the same as in Warugame.
At this point, let us briefly discuss the problems related to the tone association process in Takamatsu. Consider first the following words of the unaccented HL melody class:

(27) a. too o (=12.1a)  
b. tori oo (=12.2a)  
c. sakana ooo (=12.3a)  
d. himomaru oooo (=12.4a)  
e. ot\-simono ooooo (=12.5a)

We have already explained the initial L tone in (27b-e). Since these unaccented HL melody words have a last-H tone, the Tone Association Rule should be that which is used in the Last-High-Type dialects. The rule will be stated in prose as in (28) and will be formalized as in (29).

(28) a. Associate the H tone with the leftmost \# in the given domain.  
b. If there is no \# in the domain, associate the H tone with the rightmost V.

(29) \#\# Q V  
    ^      (where Q contains no \#.)

To derive the surface melodies in (28), we need the following Tone Simplification Rule, which applies only to an unaccented mora:
(30) **The Tone Simplification Rule:**

```
[−↑]  [−↑]
H  L  →  H
```

Now let us turn to the L level surface melody in (31):

(31) LHL

<table>
<thead>
<tr>
<th></th>
<th>LHL</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td><strong>tee</strong></td>
</tr>
<tr>
<td>b.</td>
<td><strong>kasa</strong></td>
</tr>
<tr>
<td>c.</td>
<td><strong>usagi</strong></td>
</tr>
<tr>
<td>d.</td>
<td><strong>niwatori</strong></td>
</tr>
<tr>
<td>e.</td>
<td><strong>nezumi-iro</strong></td>
</tr>
</tbody>
</table>

We have assumed that all of these words belong to the unaccented LHL melody class. According to 'Nada (1962), these words have also the following surface melodies, depending on speakers:

(32) a. **tee**

```
～te-lga
```

```
～te-lga
```

b. **kasa**

```
～kasa-lga
```

```
～i-nasa-ga
```

c. **usagi**

```
～usagi-lga
```

```
～usagi-lga
```

Some speakers have a H tone on the final mora; and other speakers have a LH contour tone on the final mora.
The grammar of the speakers who have a final-H melody for these words can easily be handled by applying Tone Simplification Rule (30), which was independently introduced for HL melody words. Likewise, if speakers utter these words with a final LH rising contour, then the Tone Simplification Rule remains the same as (30), but such speakers will have one more rule which forms a LH contour ton:

\[
(33) \quad \frac{V C_o[\ddagger]}{L} \rightarrow \frac{V C_o[\ddagger]}{L} / \ 
\]

This rule, which is applicable only to unaccented LHL melody words, will be ordered before the application of Lowering Rule (21) because, otherwise, (33) would apply to (27b) (i.e. "tori") and would incorrectly turn the final H tone into a LH contour tone "tori".

On the other hand, if a speaker has a L level surface melody in (31), then that speaker will have some rule which lowers the final H tone to L. I suggest that they have the following H Deletion Rule.

\[
(34) \quad \begin{array}{c}
\text{The H Deletion:} \\
H \rightarrow \emptyset / \\
\end{array} / \ 
\]

In this connection, recall that the same rule in Harugame required a more complex environmental specification as in:
(7) The H Deletion (Marugame):

\[
H \rightarrow \emptyset / \# \# \quad \bar{Q} \begin{bmatrix} -\ddagger \end{bmatrix} \quad \# \#
\]

\[
\quad \bar{L} \quad \bar{\quad} 
\]

However, in Takamatsu, (34) will automatically be blocked from applying to finally starred words, because they are found only in the LHL melody class of two moras, and they do not undergo the Tone Simplification Rule.

As observed in the discussion of (7), this H Deletion rule is a generalized version of the Collocational H Deletion Rule in Osaka and Kameyama:

The Collocational H Deletion Rule (Osaka, Kameyama):

\[
H \rightarrow \emptyset / \# \# L \quad \# \# H
\]

In Osaka and Kameyama, the H deletion rule is restricted to cases where an unaccented LHL melody phrase is followed by another phrase which starts with a H tone. In the case of Takamatsu speakers who have a L level surface melody for unaccented LHL words in (31), this rule is generalized to apply to all cases. Thus, the H Deletion Rule must have been turned into (34).

Notice also that in the case of the Takamatsu speakers who have a final H surface melody or a LH rising surface melody, as in (32), the H Deletion Rule in question does not apply when the unaccented LHL melody phrase is not followed
by any other phrase. However, if it is followed by a phrase, then the rule applies irrespective of whether or not the phrase starts with H. Thus, such speakers lowers the final H tone of "usagi-ga" (rabbit) to L as in (b) and (c):

(35) a. \text{usagi} \sim \text{usagi-ga}

b. \text{usagi} \sim \text{t*bu} \quad 'a rabbit + jumps'

c. \text{usagi-ga} \sim \text{aruku} \quad 'a rabbit walks'

Taking this observation into consideration, the Takamatsu speakers in question seem to have the following H Deletion Rule.

(36) The \text{H Deletion Rule} (for some speakers in Takamatsu):

\[ H \rightarrow \emptyset / \#L \sim \H ^T \]  

(where T is either H or L, but not null.)

Thus, we will be able to say the Takamatsu speakers who have rule (34) are more innovative than those who have rule (36).

The H Deletion Rule will be ordered before Lowering Rule (21), for the same reason that rule (33) should precede rule (21). Namely, if (34) were to be ordered after (21), then the final high tone of word "tori" would incorrectly be turned into a Low tone.

Now let us return to Tone Simplification Rule (30). Since this rule applies before (33) or (34), it automatically precedes Lowering Rule (21). Furthermore if (30) were to be
ordered after Flop Rule (14), it would incorrectly simplify the contour tone in "ught" to a H level tone as in "ught". Therefore, Simplification Rule (30) should precede Flop Rule (14).

To summarize, the above observations on the ordering of the rules will be schematically shown as follows:

(37)

\[
\text{Tone Association} \rightarrow \text{Simplification} \rightarrow \text{Flop(14)} \rightarrow (\text{Initial}) \rightarrow \text{Lowering(21)} \rightarrow \begin{cases} \text{L Flop (33)} \\ \text{or} \\ \text{H Deletion (34)} \end{cases}
\]

In (37), the rule to the left of the arrow should precede the rule to the right of it. Since there is no argument for the relative ordering of Flop (14) and L Flop (33) (or Lowering (34)), I tentatively give them in parallel.

The system of rules developed above handles all of the tone melodies in the Takamatsu dialect. To illustrate how they work, let us present some sample derivations below:
(38)

Underlying Rep.:  

1) usagi  

2) sakana  

3) *kokoro

Tone Association
(29) and Univ.
Conventions:

Simplification
(30)

(by L-Flop(33))(by H Deletion
(by Flop
(34))

(Initial)
Lowering (21)

Reassociation

Output:

speakers

without

rules(33)

and (34)
Now let us turn to the examination of Wada's (1958) and Hattori's (1973) analyses. The above system of rules clearly shows that some of the dubious analyses by Wada (1958) and Hattori (1973) are incorrect. Take just a couple of examples to illustrate the point. As the first example, consider the following. Wada proposed, for some unknown reason, that "kokoro" (heart), which has the following two surface melodies:

\[
\begin{align*}
(39) \text{a. i) } & \overline{\text{kokoro}} && \sim \text{ ii) } \overline{\text{kokoro}} \\
\text{b. i) } & \text{HL ooo} && \text{ ii) } \text{HL ooo}
\end{align*}
\]

has two analyses (bi) and (bii) for (ai) and (aii), respectively.

Let us examine Wada's analysis with ooo for \(\overline{\text{kokoro}}\). Our system predicts that "kokoro" has the surface melody \(\overline{\text{kokoro}}\). In other words, we cannot derive the surface
melody "kokoro" from the underlying structure (oo*).
Furthermore, to put this word in the second-accented HL melody class (oo*) contradicts with Wada's implicit claim that in Takamatsu, there is no second-accented HL melody class. Thus, his analysis (bi) in (39) is doubly incorrect.

This example is treated in the present analysis as having the underlying structure (39bii) for both surface melodies (39ai and ii). The only thing we have to do is to make it explicit that Flop Rule (14) applies optionally to cases like this.

As a second incorrect analysis, recall Hattori's analysis of ((i) in footnote 6 (p.260)), which claims that the examples in (i) should be regarded as belonging to the HL melody class. We argued above against his claim in light of the compound rule, and showed that words like "azuki" and "kabuto" should not belong to the HL melody class. The above-developed system of rules, too, shows that examples like "kabuto", "tatibana" and "otasan" should belong to the LHL melody class. To see this, assume counterfactually that they belong to the HL melody class, and apply the rules stated above.
As illustrated, the putative derivations of these words yield forms which are different from those found. On the other hand, if these examples are assumed to belong to the LHL melody class, we can correctly derive the surface melodies, though we will not bother with the derivations here. Thus, in light of the above system, we can also show the incorrectness of Hattori's proposal in ((i)).

7.3. Some Theoretical Implications of the Takamatsu System

In the above discussion of the Takamatsu dialect, we noted that since this dialect is a member of the Kyôto-type dialects, (i) it has basic tone melodies LHL and HL; and (ii) it has a tone association rule which associates the H tone with the leftmost $\ddagger$ of a given domain, or with the rightmost $\ddagger$ of the domain, if there is no $\ddagger$. Notice that
Takamatsu is characterized by the following facts:

(i) it has the Flop Rule of the following form:

\[
\begin{align*}
\text{Flop Rule (Takamatsu)}: & \quad \uparrow CV \\
& \downarrow \langle \text{+high} \rangle \langle C_0 V \text{+high} \rangle \\
& \quad H \quad L
\end{align*}
\]

(ii), the following Lowering rule (21) applies after Flop Rule (14):

\[
\begin{align*}
\text{The Lowering Rule (Takamatsu)}: & \quad \left( \begin{array}{c} Q \end{array} \right) C_0 V \left( \begin{array}{c} Q \end{array} \right) C_0 V \\
& \quad \left( \begin{array}{c} L \end{array} \right) \downarrow \quad \left( \begin{array}{c} Q \end{array} \right) C_0 V \left( \begin{array}{c} Q \end{array} \right) C_0 V \\
& \quad \downarrow \quad \left( \begin{array}{c} H \end{array} \right) \quad \left( \begin{array}{c} L \end{array} \right)
\end{align*}
\]

(iii) it has a Tone Simplification Rule which applies only to unaccented cases (In this respect, this dialect is similar to Kameyama); and (iv) it has three kinds of surface melodies for unaccented LHL melody nouns, depending on the speakers: a L level surface melody; a \(L_H^n\) surface melody; and a \(L_L^nL_H\) surface melody.

If we compare the system of rules in (37) with that in Marugame, we will notice that the major differences are two-fold: (a) Takamatsu has a flop rule which Marugame does not have. (b) The Lowering Rule in Takamatsu is different from that in Marugame in that in Takamatsu it applies also to the output of the Flop Rule. Otherwise, the two dialects are
amazingly similar to each other.

Let us now discuss some theoretical implications of the Takamatsu system. First, the very fact that this dialect has a contour tone and Flop Rule (14) suggests that the segmental theory of tonology, whether it is purely segmental or partially segmental (as in Leben's (1973) theory), is untenable. Furthermore, the pure supra-segmental theory would not be able to capture the fact that Flop Rule (14) is dependent on the segmental information, or at least it is not clear how it could do so, because no one has ever seriously discussed how the supra-segmental tonological level is connected to the segmental level. The autosegmental approach, which is suprasegmental in its broadest meaning, is an attempt to make clear the mechanisms which relate the two levels. Let us here focus on the problem concerning contour tones. In Japanese, and probably in most languages, the distribution of the contour tone is severely restricted. It is restricted to the following cases:

(41) **Distribution of Contour Tones in Japanese:**

a. a contour tone can appear in word-final position.

b. one can appear in word-initial position.

c. one can appear immediately after the \( \ddot{v} \).

d. one can appear when the tonal height changes.

In (41), (c) and (d) partially overlap when a language has
an accentual system, and (a), (b), (c) and (d) partially overlap, because a single mora word for instance can satisfy (41a,b) etc. Anyway, (41) seem to cover all the possible position where the contour tone can appear. Thus, for example,

(42) a. the contour tone cannot appear at the middle of a word which has a level tone. Thus, consider the following case where the word has a H-level underlying tone:

\[(i) \quad \#\# V V V V V \#\#
\]

\[H
\]

From this underlying structure, we will never derive a surface structure like (ii) which has a contour tone associated with the third V:

\[(ii) \quad \#\# V V V V V \#\#
\]

\[H \quad L \quad H
\]

b. it cannot appear two mora after the \( \check{v} \), if the mora is not word-final. Consider for example the following case:

\[(iii) \quad V \# V_1 V_2 V_3 X
\]

\[H \quad L
\]

In (iii), contour tone will never appear on \( V_2 \).
How are these distributional restrictions characterized in the segmental theory or in the purely supra-segmental theory? I have no idea. However, in our theory we can account for the severe limitation on the distribution of contour tones.

In our theory, a contour tone is permitted to appear only in one of the following cases:

(43) a. the basic tone melody of a language is either LH, HL, or LHL, and either the Tone Simplification Rule is not incorporated in the grammar or at least it is restricted to apply only to a certain case.

b. the language contains a Flop Rule of one of the following forms.

(1) \[ \begin{array}{c} V V \end{array} \hspace{1cm} (ii) \begin{array}{c} V V \end{array} \]

\[ \begin{array}{c} X___Y \end{array} \hspace{1cm} \begin{array}{c} X___Y \end{array} \]

(where T and S are different tones and X and Y can be null. The dotted line indicates the SC of the rule.)

c. a language has a tone insertion rule of one of the following forms:

(1) \[ \begin{array}{c} V \end{array} \Rightarrow \begin{array}{c} V \end{array} \]

\[ \begin{array}{c} T \end{array} \hspace{1cm} \begin{array}{c} T S \end{array} \]

\[ \begin{array}{c} ___C_o## \end{array} \]
(ii) \[
\begin{array}{c}
V \\
\Rightarrow \\
T & S & T \\
\end{array}
\] \\
\text{\#G_o---}

Rule (i) insert a tone S, which is different from T, on the word-final tone-bearing unit; and rule (ii), on the word-initial tone-bearing unit. This kind of rule is restricted to the word-initial or to the word-final position.

d. suppose that a language has a vowel deletion rule or a Glide-Formation Rule, and some other phonological rule. And assume that as a result of such a rule, the reassociation of a tone with the neighboring segment becomes necessary. In such a case, contour tone can be introduced by the reassociation process.

As an instance of (43a), consider the Kameyama dialect, which has the basic tone melodies LHL and HL. Recall that in that dialect, "saru" (monkey) belongs to the LHL and that the Tone Simplification Rule applies only to the contour tone associated with a starless V. Thus, we have a contour melody in "saru". As an instance of (43b), we have seen the Takamatsu dialect above.

As an instance of (43c), we can count the Tōkyō dialect
which has the H insertion rule which inserts a H tone at the end of an interrogative sentence:

\[(44) \quad V \rightarrow V / \underline{H} \quad \text{?}\]

(where \(T\) can be \(H\) or \(L\), and \(\text{?}\) indicates that the sentence is the interrogative sentence.)

As an instance of \((43d)\), consider the example "kusa" (grass) with the HL tone melody in the Osaka dialect. Recall that in Osaka, the high vowel \([\iota]\) in the example "kusa" is devoiced by the High Vowel Devoicing Rule. As a result of the Devoicing Rule, the vowel can no longer carry the tone (II) once associated with it. This will cause the elimination of the association line between \([\iota]\) and \(H\), as indicated in \((45c)\).

\[(45) \quad \text{(a) underlying form tone mapping} \quad \text{(b)} \]

\[\begin{array}{c}
\text{kusa} \\
\text{H} \quad \text{L}
\end{array} \rightarrow \begin{array}{c}
k^* \text{usa} \\
\text{H} \quad \text{L}
\end{array}\]

\[\text{(c) kusa Reassociation} \quad \text{(d) kusa}\]

\[\begin{array}{c}
\text{High V} \rightarrow \text{Devoicing} \\
\text{L}
\end{array} \rightarrow \begin{array}{c}
k^* \text{usa} \\
\text{H} \quad \text{L}
\end{array}\]
Thus, the H tone should be reassigned with the low-toned mora "sa" in "kysa", producing the contour tone in (45d). For a detailed discussion on this point, see Chapter 4. Notice that in our theory the restricted occurrence of contour tones is accounted for by the interaction of the basic tone melodies (and the Association Rule), the limited number of rules (i.e., the Tone Simplification Rule, the Tone Insertion Rule, the Flop Rule etc.) and the general notion of reassociation.

On the basis of the restrictions in (43), we can now predict that if a language L permits a contour tone either word-initially (as in 47a) or word-finally (as in 47b)), it is due to either (43a) or (43c) or (43d). Furthermore, if a language has a word-medial contour tone, then it is due to the Flop Rule in (43b) or the reassociation in (43d), or both.

Now let us turn to another aspect of the theoretical implications. Consider again Flop Rule (14) and Lowering Rule (21). Flop Rule (14) is very important because it refers to segmental information about a syllable which is not mentioned in the structural change; and Lowering Rule (21) is important because it inserts a tone. These rules tell us that we have to take into consideration the vowel features such as \([\text{high}]^{10}\) and that we need a tone insertion rule.
As a third theoretical implication of the Takamatsu system, consider the ordering of Tone Simplification Rule (30), and Flop Rule (14). As argued above, these two rules must apply in this order because if these rules were to be assumed to be unordered, then they could apply incorrectly in the following cases:

(46) a. \[\text{ulta}\] b. \[\text{kabuto}\] c. \[\text{koko}\]

\[
\begin{array}{ccc}
\text{L} & \text{H} & \text{L} \\
\text{L} & \text{H} & \text{L} \\
\text{L} & \text{H} & \text{L}
\end{array}
\]

with the Tone Simplification Rule erasing the contour tone in these example. Of course, if we were to place some ad hoc environmental restriction on the Simplification Rule, then the two rules could be unordered. However, it obviously complicates the Simplification Rule, and no complication of this sort is necessary if we assume that the Tone Simplification Rule precedes the Flop Rule in Takamatsu. Therefore, I prefer the ordering approach.

To summarize, we have discussed three theoretical implications of the Takamatsu system. At the same time, based chiefly on Flop Rule (14) and Lowering Rule (21) in this dialect, we have also argued that the autosegmental theory is superior to the other theories in that it can naturally handle contour tones and segmental effects on tonal processes.
FOOTNOTES TO CHAPTER 7

1. According to Wada (1958) and (1962), on which the present discussion is based, the dialect which has the closest relationship to the Takamatsu dialect is the Marugame dialect. As we will see later, the tone system of the Marugame dialect is more transparent and thus easier to handle than that of the Takamatsu dialect. Accordingly, we will first examine the tone system of the former dialect, and then go on to examine that of the latter dialect, and finally compare the two systems.

2. In (1), the circle (o) represents a mora and the triangle (∆), an enclitic. We give a gloss for each example with 1-3 moras. However, we omit glosses for 4 mora words. Furthermore, as for 5 mora words, we give only the abstract forms with the surface melodies.

3. Since this dialect is one of the Kyôto-type dialects, it has two basic tone melodies: LHL and HL. In addition to this, just like the other Kyôto-type dialects, it has the constraint:

   (i) There are no initial-accented nouns with the LHL melody

Thus, we have gaps: gap 1, gap 2, gap 4, gap 7 and gap 8. Notice that these gaps are perfectly natural, because
there is no way that the output could differ from initial-accented HL melody words, given the simplification rule which will be discussed below.

With respect to gaps 3, 5, and 6, we will need the following constraints in this dialect:

(ii) a. In the case of two and three mora words, there is no second-accented word with the HL melody.

b. In the case of two and three mora words, there is no final-accented word with the HL melody.

It should incidentally be noted that these two constraints are not restricted to nouns and that they hold for verbs and adjectives as well. Notice that gap 3 is restricted doubly by (iia) and (iib). We could, if we wanted, eliminate this double restriction by modifying the statement (iia) or (iib) a little as follows: (ii)' In the case of the two and three mora words, there are no non-initial-accented words with the HL melody. If we look at 3-mora words and shorter words, we will notice complementary distribution of melodies with respect to *: Initial star has HL, while non-initial star has LHL. For some reason, this does not hold for longer words. (I owe this observation to Halle.) Except for the gaps mentioned above, Marugame has all possible cases.

4. Takamatsu has gaps 1, 2, 4, 8, 12 and 3, 5, 9, 13 for the same reason. The first set of outputs coalesces with the
initial-accented HL melody words in 1b, 2b, 3b, 4b, and 5b, and the second set coalesces with the second-accented LHL melody words in 2c, 3c, 4c and 5c. Therefore we will need to use compound test for both cases. In Takamatsu, there are no final-starred words of at least 3 moras. It will be interesting to investigate the reason Takamatsu has such a constraint.

5. Since the glosses for these long words make the table messy, they are given separately below:

<table>
<thead>
<tr>
<th>LHL</th>
<th>HL</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a. chicken</td>
<td>National Flag of Japan</td>
</tr>
<tr>
<td>'b. (gap)</td>
<td>{ habutae (-silk) }</td>
</tr>
<tr>
<td></td>
<td>{ sweet sake</td>
</tr>
<tr>
<td>c. wild pink</td>
<td>(gap)</td>
</tr>
<tr>
<td>mandarin orange</td>
<td></td>
</tr>
<tr>
<td>d. purple</td>
<td>Tadotsu-City</td>
</tr>
<tr>
<td>stray boy</td>
<td>glazed door</td>
</tr>
<tr>
<td>e. (gap)</td>
<td>(gap)</td>
</tr>
<tr>
<td>5a. gray</td>
<td>lost article</td>
</tr>
<tr>
<td>b. 'jap)</td>
<td>{ unhappiness</td>
</tr>
<tr>
<td></td>
<td>{ wash' bowl</td>
</tr>
<tr>
<td>c. moon</td>
<td>(gap)</td>
</tr>
<tr>
<td>Ise Shrine</td>
<td></td>
</tr>
<tr>
<td>d. baby carriage</td>
<td>poem card</td>
</tr>
<tr>
<td>needle work</td>
<td>tale</td>
</tr>
</tbody>
</table>
6. In this connection, consider Hattori's alternative analysis. Corresponding to Wada's analysis in column I, Hattori proposed the analysis in column II in (i):

\[
\begin{align*}
(22b) & \text{ saru} & \text{ LHL oo} & \text{ HL oo} \\
(12)3c & \text{ azuki} & \left\{ \begin{array}{l}
\text{ kabuto}
\end{array} \right. & \text{ LHL oo} & \text{ HL oo}
\end{align*}
\]

\[
\begin{align*}
(12)4c & \text{ nadesiko} & \left\{ \begin{array}{l}
\text{ tatibana}
\end{array} \right. & \text{ LHL oooo} & \text{ HL ooo}
\end{align*}
\]

\[
\begin{align*}
(12)5c & \text{ atukissan} & \left\{ \begin{array}{l}
\text{ oisasen}
\end{array} \right. & \text{ LHL ooooo} & \text{ HL oooo}
\end{align*}
\]

The only difference between Wada's analysis and Hattori's is in the choice of the basic tone melody. The problem to decide is which of these analyses is correct. In the above discussion, I have pointed out that two mora words like "saru" in (22b) belong to the LHL melody class. Furthermore, in (24b and c), we have already seen that "azuki" and "usiro", which belong to (12)3c, must have a LHL melody, because their compounds have the LHL surface melody. Though there is no relevant data for 4 and 5 mora words in (27), I believe they also belong to the LHL melody class. If so, as far as the words
exemplified in (27) are concerned, we can safely conclude that Wada's analysis is correct.

7. Recall that we observed above that the words in (22b) belong to the final starred class.

8. (35c) will be uttered by Osaka speakers as "usagi-ga aruku" because the Collocations H Deletion Rule in Osaka is blocked.


10. We have already observed several examples which are dependent on segmental information. For some discussion, see for instance Chapter 2, where I discussed the fact that the Initial Lowering Rule in Matsue is dependent on [+high].
CHAPTER 8

THE TONE SYSTEM OF THE KAGOSHINA DIALECT

As an illustration of the third type of dialect, which is different from Tôkyô-type dialects and Kyôto-type dialects, let us consider the dialect spoken in Kagoshima City. This dialect is of importance because it tells us that there is a syllable-type dialect, as opposed to a mora-type dialect. Furthermore, this dialect has often been referred to as a typical example which has only two tonal classes: the accented class and the unaccented class. The former has a surface $L^n_o H L$ melody and the latter usually has a $L^n_o H$ melody. Thus consider the following examples:

(1) I. accented II. unaccented

a. na $\rightarrow$ na$\-ga$ 'name' na na$\-ga$ 'vegetable'
b. hana $\rightarrow$ hana$\-ga$ 'nose' hana hana$\-ga$ 'flower'
c. sakura $\sim$ sakura$\-ga$ 'cherry' usagi $\sim$ usagi$\-ga$ 'rabbit'
d. kazari$\-bi$ kaga$\-bi$-ga irogami$\-mi$ irogami$\-ga$
   'watch fire' 'color paper'

In (1), the examples of column I have a penultimate H tone, if the word (or phrase) consists of at least two syllables. Otherwise (i.e. if the word consists of a single syllable),
the H tone must be placed on the syllable. On the other hand, the examples of column II have always a final high tone. In the above observation, I used the word "syllable" instead of "mora". The reason why the word "syllable", rather than "mora", is used here will be clear if we observe the following examples:

(2) I. accented II. unaccented

a. meirei ~ meirei-ga 'order' hondai hondai-ga 'payment for book'

b. Kyuusu ~ Kyuusu-ga 'Kyūshū' kookoo ~ kookoo-ga 'filial piety'

c. kinsen ~ kinsen-ga 'money' kantan ~ kantan-ga 'simplicity'

d. agat 'rise' atumet 'gather'

e. kezatta 'decorated' aratta 'washed'

f. sagasita 'searched' yurusita 'permitted'

As illustrated in the examples in (Ia), if the final syllable and the penultimate syllable consist of a diphthong, the star is assigned on the first vowel of the penultimate syllable. Furthermore, the penultimate syllable in (Ia) and the final syllable in (IIa) become high-toned. Exactly the parallel situations are observed in case (b), where the syllable consists of a long vowel, and in case (c), where the syllable consists of a vowel and a syllabic nasal n. Examples (IIId) and (Ie) show that if the relevant syllable consists of CV and a geminate consonant, the whole syllable
has a high tone. Examples (IIf) and (IIIf) show that if the penultimate syllable contains a voiceless vowel, the H tone is assigned to the antepenultimate syllable. This suggests that segments $C[\text{-voice}]$ are not regarded as syllables in the strict sense.

These facts suggest that tone-bearing units in Kagoshima are defined as follows:

(3) Every vowel which occurs in the environment $#(XC)$

is a tone-bearing unit.$^2$

Thus, the tone-bearing units in the following hypothetical word:

(4) kaisanbuttenkankee

\[
\begin{array}{cccccccc}
\uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \\
\text{V} & \text{V} & \text{V} & \text{V} & \text{V} & \text{V}
\end{array}
\]

are the designated vowels by arrows. Recall that in the previous discussions, we have used a symbol V to represent a tone-bearing unit. I will simply follow this convention here.

There seem to be two alternative analyses for Kagoshima; one of them assumes that Kagoshima belongs to the accentual class; and the other assumes that it belongs to the non-accentual class. As we will see below, the non-accentual analysis seems to be preferable to the accentual analysis. However, I shall discuss the latter first here, because
it is much easier for me to present the argument for it. Suppose that Kagoshima belongs to the accentual class. Then, the Star Assignment Rule is formalized as follows:

\[(4) \text{ The Star Assignment Rule (Kagoshima):} \]
\[ V \rightarrow \ast / \quad (QV)Q\# \]

(where Q contains no V (=tone-bearing unit).)

This rule schema, which applies only to the accented (or marked) words, is an abbreviation of the following two rules:

\[(4)' \quad V \rightarrow \ast / \quad \begin{cases} QVQ\# & (a) \\ Q\# & (b) \end{cases} \]

Rule (a) applies, for example, to "meirei" in (2a) and assigns a star to the initial vowel; and rule (b), to "kīk" (persimmon), "san" (product), "tōo" (ten), "nā" in (1a) etc.

Now consider why we set up the Star Assignment Rule (4), instead of specifying the star on the penultimate syllable of a word in the lexicon. There are several reasons why the Star Assignment approach is to be preferred to the lexical star specification approach. The most crucial reason is that the position of star is dependent on High Vowel Bevoicing, as illustrated in (2f). The second reason is that if an enclitic like "ga" is attached, then the position of star moves one syllable to the right. The third reason
will be clear if we examine the following standardized example:

(5) a. (i)  kariru  'borrow'
 (ii)  agaru  'rise'

b. (i)  karimasu  'borrow + polite'
 (ii)  agarimasu  'rise + polite'

In (5a), the present forms of the verbs receive the * on the penultimate syllable. However, their polite forms receive the * on the penultimate vowel "ma". These facts will be automatically accounted for if we assume that the Star Assignment Rule applies to these verbs, which are classified as the accented verbs. However, if the * were assumed to be specified on "ri" and "ga" in the lexicon, we would need an ad hoc star shift rule to handle the star shift in the masu-form, which is unnecessary in the Star Assignment approach.

On the basis of these observations, we can safely conclude that if Kagoshima belongs to an accentual class, it has Star Assignment Rule (4) for accented words.

In the case of unaccented words, the star should not be assigned to the final syllable. How do we know this? Suppose, counter-factually, that the Star Assignment Rule assigned a star to the final syllable of the unaccented word "na" (vegetable) in (IIa). Then, it should have
a falling tone like the accented "na" (name). However, this is not the case. Thus, if we want to distinguish the unaccented "na" and the accented "na", we should not assign a star to unaccented words.

Now let us turn to the next topic. McCawley (1970) and (1974) claims that the accented words in (1) and (2) belong to the $L^N_{0HL}$ melody, and that the unaccented words in (1) and (2) belong to the $L^N_{0H}$ melody. This is tantamount to claiming that the tone system of the Kagoshima dialect does not require Star Assignment Rule (4). The distinction between the accented class and the unaccented class is made in terms of whether they have the $L^N_{0HL}$ melody or the $L^N_{0H}$ melody. To put this in our term, McCawley is interpreted as claiming that Kagoshima has two basic tone melodies LHL and LH, and that the words are classified in terms of these melodies. However, there is good reason to believe that we have only one basic tone melody LHL. To show this, consider the following verbs and their conjugational forms:

(6)  

I. accented LHL    II. unaccented LH

a. Present  
   kariru 'borrow'  
   hai'ru 'enter'  

b. -- + sooda  
   karirusooda  
   hai'rusooda  

'it is said that--'

c. 'it seems that'  
   karirurasii  
   hairurasii  

d. look like'  
   karisooda  
   hairisooda  

e. Past  
   karita  
   haita
Assume for the sake of argument that the examples of column I have a LHL melody and that those of column II have a LH melody. In the case of the LHL melody words, the H tone in \textit{kari}rhus\textit{sooda} present a problem. Since McCawley's system does not use the *, the predicted surface melody will be an ill-formed \textit{kari}rhus\textit{sooda}. However, in the present system, all we have to do is assume that the form "sooda" in (b) has # in front of it. Thus, the examples in (b) have the following structure:

(7) a. kariru#sooda \hspace{1cm} b. hairu#sooda

In (7a), the * is assigned to "ri" by rule (4), since "sooda" is excluded from the domain of (4). (7b) will be handled if we assume that a verb with "#sooda" undergoes rule (4b).

Furthermore, in McCawley's system, the melody "\textit{hairu}#sooda" in (6IId) would be difficult to handle. However, in our approach, we simply assume that "sooda" in (6d) belongs to the accented class. Thus, rule (4) automatically assigns the * to the initial vowel. Suppose that McCawley permitted the * in "sooda" in (6d). Then the melody would be "\textit{hairu}sooda", since it is assumed to belong to the LH melody. This is at variance with the facts.

These problems will disappear if we assume that both the accented class and the unaccented class belong to the
same basic melody LHL and that Kagoshima has the following H final tone association rule:

\[(8) \quad \#\# \, Q \quad \overline{V} \quad H \quad \text{(where } Q \text{ contains no } \overline{V}.\text{)}\]

The effect of this rule is that (i) if a tonological domain contains \(\overline{V}\), then the H tone is associated with the leftmost starred syllable and that (ii) if unaccented, the H tone is associated with the rightmost syllable. In addition to (9), we will need the following Tone Simplification Rules:

\[(9) \quad a. \quad V \quad \overrightarrow{V} \quad (\text{or} \quad \overrightarrow{L} \rightarrow \emptyset / \overline{V} ) \]

\[b. \quad \overline{V} \quad \overline{V} \quad (\text{or} \quad \overrightarrow{L} \rightarrow \emptyset / \overline{V} ) \]

Rule (10a) is necessary to handle the example like "na*" and "na" in (1a). Rule (b) is necessary to handle all of the unaccented words.

The basic melody LHL and the system of rules (8) and (9) can account for the surface melodies (6II, b and d) automatically. Needless to say, all the other examples can be handled in the present framework. These observations clearly show that the accented class and the unaccented
class should not be distinguished by introducing the two melodies.

In the above discussion, we introduced the following system of rules for Kagoshima:

(10) a. High Vowel Devoicing, which turns high vowels [i] and [u] into the voiceless h'v, vowels [t] and [n], respectively.

b. The Star Assignment Rule (4):

\[ V \rightarrow * / \quad (QV)Q# \]

(where Q contains no V (=tone-bearing units))

d. The Tone Association Rule (8):

\[ \#\# Q\ V \]

\[ H \quad (\text{where Q contains no } \not{\check{v}}.\)\]

e. The Tone Simplification Rule (9):

a. \[ \begin{array}{c}
\text{L} \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
\text{V} \\
\text{H}
\end{array} \]

b. \[ \begin{array}{c}
\text{L} \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
\text{H} \\
\text{L}
\end{array} \rightarrow \begin{array}{c}
\text{V} \\
\text{H}
\end{array} \]

or

\[ (L \rightarrow \emptyset / \quad \check{V}) \quad \text{or} \quad (L \rightarrow \emptyset / \quad \check{T}) \]

In order to see how the system of rules introduced above works, consider the following sample derivations:
(11)  a. na  b. kantan  c. sakura-ga  d. sagasita
      'name'  'simplicity' 'cherry'  'searched'

High Vowel Devoicing(10a) — — — sagasita

Star Assignment(4)  n* — sakura-ga sagasita

Tone Association(8)  na* kantan sakura-ga sagasita

            LHL  LHL  LHL  LHL

Univ. Tone Ass.
Conventions  na* kantan sakura-ga sagasita

        LHL  LHL  LHL  LHL

Tone Simplification(9)  na* kantan

         H L  L H

In (11a), the star is assigned to "na" (name) by Star Assignment Rule (4): to this output, the tone association rule applies, and assigns the H to the \( \hat{v} \); then by the universal tone association conventions, the L's are associated with "na" as indicated above; and finally, Tonic Simplification Rule (9a) applies and deletes the leftmost L. Notice that Tone Simplification Rule (9b) does not apply to "na", because it is restricted to vowels with no star.

In (11b), after the application of the tone association rule
and the universal conventions, the simplification rule (9b) applies and turns the HL contour tone into a H level tone. In (11c), the Star Assignment Rule applies and assigns the * to the penultimate syllable. The remaining tone mapping processes are straight forword, and require no comment.

What is interesting in rule (8) is that the association process is sensitive to a syllable and not a mora. This is different from most of the other Japanese dialects, since in the other cases the tone association process applies to moras. I will return to similar tone association process when we discuss the Ogachogamitsu dialect in the Kagoshima Prefecture.

Now let us turn to a non-accentual analysis. If we assume that Kagoshima has LHL as the basic tone melody, the Tone Association Rule in the non-accentual solution will be as follows:

(12) **Tone Association Rule II:**

\[
V \quad (Q \vee V) \quad Q \# \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad H \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad (\text{where } Q \text{ contains no } V.)
\]

This rule corresponds to (10b) and (10d) in the accentual solution, and it is an abbreviation of the following two sub-rules:
(13) a. V Q V Q #    b. V Q #
     H      H

Rule (13a) is a marked rule, and it should apply only to the marked class (=accentual class). In the case of one syllable words, they should not be marked with respect to (13a) for obvious reasons and all of them should undergo (13b).

However, what we called "accented" one syllable words must be marked in terms of Tone Simplification. In the non-accentual solution. We also need two Simplification Rules. One of them is exactly the same as (9a). However, since the non-accentual solution makes no use of star, the other Simplification Rule can not be formalized as in (9b). Instead, it will be formalized as follows:

(14) **Tone Simplification:**

\[ \begin{array}{c}
  \xrightarrow{\text{V}} \\
  H L \rightarrow H \\
\end{array} \]

Accented one syllable words must be marked so as not to undergo this rule. In all the other cases, words are left unmarked with respect to the Tone Simplification Rules.

It should be noted that Simplification Rules (9a) and (14) can now be collapsed into one rule schema with the help of the mirror image conventions as follows:
(15) **Tone Simplification:**

\[
\begin{array}{c}
\text{L} \\ \text{V} \\ \text{H} \\
\rightarrow \emptyset
\end{array}
\]

Therefore, the non-accentual solution requires only two rule schemas: Tone Association Rule (12) and Tone Simplification Rule (15). In terms of the number of necessary rules, the non-accentual solution is simpler and thus preferred to the accentual solution.

Recall now that in the discussion of the Tôkyô dialect we observed that adjectives (and also verbs) are of two types: accented and unaccented. In order to assign the basic tone melody in Tôkyô to adjectives (and verbs), we introduced a couple of Star Assignment Rules. In view of this, one might wonder why we should not choose the same solution in Kagoshima as that in Tôkyô. Notice, however, that in the case of Tôkyô, Tone Association Rule (8) was independently necessary in order to handle the tone association of nouns. However, in the case of Kagoshima, the situation is different: we have no reason to introduce Tone Association Rule (8). Far from it. As we have seen above, the accentual analysis is more costly than the non-accentual analysis. Therefore, in the case of Kagoshima, it is reasonable to prefer the non-accentual solution.
Finally let us make a few remarks on Compound Formation in Kagoshima. Hirayama (1936), (1960) made clear that Compound Formation in this dialect be generally stated as follows:

(12) a. If the left member of a compound belongs to the accented class, the compound as a whole receives a H tone on the penultimate syllable.

b. If the left member of a compound belongs to the unaccented class, the compound as a whole receives a H tone on the final syllable.

Consider thus the following illustrative examples of this process:

(13) a. ha + sakura $\Rightarrow$ ha-zakura
'leaf' 'cherry' 'post blossom cherry leaves (sic)'

b. isi + kak $\Rightarrow$ isi-gak
'stone' 'fence' 'stone fence'

c. yama + sakura $\Rightarrow$ yama-zakura
'mountain' 'cherry' 'wild cherry'

d. iro + siro $\Rightarrow$ iro-siro
'color' 'white' 'fair-skinned'

(a) illustrates a case where the left and right members of the compound belong to the accented class; (b) a case where the left member belongs to the accented class and the right member belongs to the unaccented class; (c) a case where
the left member is unaccented and the right member is accented; (d) a case where both of the members are accented. In (a) and (b), the compounds become accented, while in (c) and (d), they become accentless. To handle this, we will have no need to introduce a special rule for compound formation into the grammar. The only thing we have to do will be to extend the Tone Association Rule to a compound, and make it subject to rule (12).

To summarize, we have examined the accentual solution and non-accentual solution and argued that the latter is preferred. At the same time, we noted the following points:

(i) The Kagoshima dialect has two classes of words: the accented class and the unaccented class.

(ii) The accented class receives a H tone on the penultimate syllable of a polysyllabic word. Accented mono-syllabic words should be marked so as not to undergo simplification Rule (14).

(iii) This dialect cannot be accounted for in terms of the two basic melodies LHL and LH.

(iv) There is only one basic tone melody in this dialect: IH.L.

(v) Kagoshima is a syllabic language.

(vi) We need no special Compound Formation Rule.

The above discussion on Kagoshima suggests that if a language has only two types of words, it means that the language has a non-accentual system.
FOOTNOTES TO CHAPTER 8

1. Hirayama (1960) named what I call the accented class "type A words", and the unaccented class "type B words". McCawley called the former the "falling" class, and the latter the "rising" class.

2. This has been suggested to me by M. Halle (personal communication). In this connection, tone-bearing units in the dialects examined up to now have implicitly been defined as (i) every vowel which occurs in the environment ___([+seg]X)## and (ii) a syllabic nasal n which occurs in the environment ___(CX)#. These two can be stated in a general form as follows: Every  
   [son_{a}^{(+syl)}] which occurs in the environment  
   ([_+seg^{(-syl)}_{b}]X)# is a tone bearing-unit (where ~b→a).

   For a more detailed discussion, see Chapter 15 (Part II).

3. This has been suggested to me by M. Halle (personal communication).
CHAPTER 9

REMARKS ON INITIAL RAISING DIALECTS

9.0. Introductory Remarks

Present-day Japanese dialects can be divided into two classes by the criterion of whether a dialect has an initial-raising process. By the term "initial-raising", I mean every process which raises the initial portion of a given phrase. It should be noted that such a process is not restricted to raising the first vowel alone. There seems to be several variations. Some dialects raise the low-tone on the second vowel to a non-low tone, and some other dialects raise the initial low-toned sequence to a non-low toned sequence, etc. In this chapter, I am concerned with dialects with these initial-raising processes.

We have seen in the previous chapters that there are 3 types of Japanese dialects: Tôkyô-type dialects (c.f. Chapters 1, 2, and 3), Kyôto-type dialects (c.f. Chapters 4-8), and Kagoshima-type dialects (c.f. Chapter 9). The Tôkyô-type dialects are characterized by having one basic tone melody and by lexically specifying the star on a particular vowel of a noun. The Kagoshima-type dialects are characterized by having one basic tone melody and classifying of nouns into two classes. Thus, we have no need to use the star in
these dialects. The Kyôto type dialects are characterized by having two basic tone melodies. Among these three classes, the present-day Kyôto-type dialects seem to have no initial raising process. It will be very interesting to speculate about the reason why they do not have it. My best guess is that in Kyôto-type dialects, the initial-\(L\) of the LHL melody class plays an important function in distinguishing to which class a word belongs. Thus, the addition of a raising rule, which would destroy the distinction, seems to be uniformly prevented in Kyôto-type dialects.

On the other hand, some of the Tôkyô-type dialects and the Kagoshima-type dialects have a raising process. These two types of dialects are further sub-divided into two:

(i) those which have a H tone only on the starred vowel (or on a particular vowel); (ii) and those which have a high tone sequence up to the starred vowel (or on a particular vowel), excluding the initial mora. Schematically, the former dialects have the surface melody \(L_0^nH_1^nL_0^n\), while the latter have the surface melody \(L_0^1H_1^1L_0^m\), as illustrated in (1):

(1) Dialect (i) \(L_0^nH_1^mL_0^n\): HLLL, LHLL, LLLH, LLLL, etc.

Dialect (ii) \(L_0^1H_1^nL_0^m\): HLLL, LHLLL, LHHL, LHHL, etc.
And interestingly enough, dialects characterized by (i) have no initial raising process, while some of the dialects belonging to (i) can have one. Why this is so will become clear in the course of the following discussion.

In the following discussion, I will discuss (i) the Nakamura dialect (Hata-gun, Kōti Prefecture); (ii) the Ogachogamitsu dialect (Kagoshima Prefecture); (iii) a couple of Koshikizima dialects.

9.1. The Tone System of the Nakamura Dialect

Let me first discuss briefly the Nakamura dialect (Hata-gun, Kōti Prefecture) as an illustrative example of an Initial-Raising dialect of Tōkyō type. According to Wada (1962), whose analysis is credited to Doi (1958) Tosakotoba (On the Tosa Dialects), this dialect has the following surface melodies:

(2) I II III IV
a. ka-ga usu usu-ga kasumi niwatorig-a
   'mosquito' 'cow' 'chicken'
   kasumi-ga 'haze'

b. igo-ga ito-ga karasu-ga kyōodai-ga
   picture' 'string' 'crow' 'brother'

c. ___ isi-ga ti-kara-ga asagao-ga
   'stone' 'strength' 'morning glory'

d. ___ ___ azukĩ-ga karakasa-ga
   'red beans' 'umbrella'

(continued)
Note: the dotted horizontal line in (2) stands for the M-tone.

Since this dialect belongs to the Tōkyō-type, it has n+1 possible melodies for n syllable words and Tone Association Rule (3) which is identical with that in Tōkyō:

(3) The Tone Association Rule (Nakamura):

a. Associate the H tone with the leftmost ꞌ of a given domain.

b. If there is no ꞌ in the domain, associate the H tone with the rightmost V.

What is different from Tōkyō, which has the HL basic melody, is that this dialect has the LHL melody and that it has a H tone only on accented words and on the final mora of unaccented two-mora phrases. Thus, the unaccented phrases "kaʃga" in (Ia) and "uʃi" in (IIa) have a H tone on the final mora, but if an unaccented word contains 3 moras or more, as in "uʃiɡi" in (IIa) and the examples in (IIIa) and (IVa), the final mora has a mid tone. Because this dialect has the LHL basic melody and has no contour tone, as illustrated in (2), it must have a Tone Simplification Rule which simplifies HL and LH contours into a H level tone. This rule will be formally represented with the help
of the mirror image convention\(^1\) as follows:

\[(4) \text{ The Tone Simplification Rule (Nakamura):} \]

\[
\begin{array}{c}
L \rightarrow \emptyset \quad // \quad V \\
\_ \quad H
\end{array}
\]

(where // indicates that this rule schema consists of mirror-image rules.)

This rule applies, for instance, to "ka-ga" and "e-ga" as indicated in (5):

\[(5) \]

\[(a) \text{ ka-ga} \quad (b) \text{ e-ga} \quad \text{underlying representation} \]

\[
\begin{array}{c}
\text{ka-ga} \\
\_ \quad \_ \quad \_ \quad \_ \\
V \quad V \quad V \quad V \quad V \quad V \quad V \\
L \quad H \quad L \quad H \quad L \quad H \quad L \quad H
\end{array}
\]

\[
\begin{array}{c}
\text{Simplification (4)} \\
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associated with an unaccented vowel and the phrase contains at least three moras. This rule will be formally represented as follows:

(6) The H-to-M Lowering Rule (Nakamura):

\[
\begin{array}{c}
[\text{H}] \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
[\text{M}] \\
\text{M}
\end{array} / \text{VC}_o \text{VC}_o \ldots / # #
\]

This rule does not apply if the H tone is associated with a starred vowel, or if the phrase contains at most two moras, as in (5a). This rule is interesting in that it is dependent on the length of the phrase, and thus it requires the environmental specification given in (6).

Now let us turn to the final characteristic of the Nakamura dialect, namely the initial raising process. As indicated in (2), the Initial Raising Rule applies to an initial low-toned mora and turns it into a M-toned mora, when it is followed by another L-toned mora. There are two possible ways to handle this. One is to raise the initial L tone directly to a M tone by the following rule:

(7) The Initial Raising Rule (I):

\[
\begin{array}{c}
\text{VC}_o \text{V} \\
\text{L}
\end{array} / \begin{array}{c}
\text{VC}_o \text{V} \\
\text{M} \text{L}
\end{array} / # # \text{C}_o
\]
The other is to raise the initial L tone to a H tone by rule (8):

(8) **The Initial Raising Rule (II):**

\[
\begin{array}{c}
V_{C_0}V \\
\downarrow L \\
\end{array} \rightarrow \begin{array}{c}
V_{C_0}V \\
\downarrow H \\
\downarrow L \\
\end{array} #C_0
\]

and then lower the H tone by the mirror image rule (9), which is a generalized form of (6):

(9) **The H-to-M Lowering Rule (II):**

\[
\begin{array}{c}
[-\Upsilon] \\
\downarrow H \\
\end{array} \rightarrow \begin{array}{c}
[-\Upsilon] \\
\downarrow M \\
\end{array} \rightarrow V_{C_0}V_{C_0} #C_0
\]

The latter approach with rules (8) and (9) has the advantage that it captures the generalization that (a) M tone appears only when the H tone is associated with a starless V and the string contains at least three moras. On the other hand, the former approach with rule (7) has the advantage that the Initial Raising Rule (7) is natural, because it easier to start pronouncing a word from the M (=neutral) position. However, this approach is inferior to the approach with rules (8) and (9) in that the initial M tone and the final mid tone are handled in different ways. Since examples are scarce, it is dangerous to commit oneself to one solution.
However, I will tentatively choose the latter approach, which introduces (8) and (9).

In the above discussion, we have seen the following points: (i) Nakamura has the basic tone melody LHL; (ii) it has Tone Association Rule (3), which is identical with that in Tôkyô; (iii) it has Initial Raising Rule (8) (or (7)); (iv) in addition to this, it has a few Tone Alternation Rules, the morror image Tone Simplification Rule, H-to-M-Lowering Rule (9) (or (6)). If Initial Raising Rule (8) is selected, then the H-to-M Lowering Rule should be (9), but if (7) is selected then the Lowering Rule will be (6). It is interesting to note here that in Tôkyô-type dialects, the initial raising process is restricted to apply only to the first mora. In other words, as far as I know, there is no Tôkyô-type dialect which raises the first and second moras, or which raises only the second mora.² I have no idea whether such a restriction is accidental or not.

9.2. The Tone System of the Ogachogamitsu Dialect

As an example of an Initial-Raising Kagoshima-type dialect, let us consider the Ogachogamitsu dialect³ in Kagoshima Prefecture. This dialect is similar to the dialect of Kagoshima City in that it divides the words into two classes, and in that the surface tone melodies are the same as in Kagoshima, except for changes caused by
the initial raising process in Ogachogamitsu. Thus, according to Gotô (1973), this dialect has the following system:

\[(10)\]

a) \(\text{ye} \)  \(\text{ye} \text{-} \text{na} \) 'handle'  \(\text{ye} \)  \(\text{ye} \text{-} \text{na} \) 'picture'

b) \(\text{ame} \)  \(\text{ame} \text{-} \text{na} \) 'candy'  \(\text{ame} \)  \(\text{ame} \text{-} \text{na} \) 'rain'

c) \(\text{inaga} \)  \(\text{inaga} \text{-} \text{na} \) 'country'  \(\text{dōgo} \text{-} \text{na} \)  \(\text{dōgō} \text{-} \text{na} \) 'man'

In (10) and elsewhere, a dotted horizontal line over a mora indicates that the mora is mid-toned. As illustrated above, type I words have a H tone on the penultimate syllable of the given phrase, if they consist of at least two syllables. Needless to say, if a phrase consists of one syllable, that syllable gets the star. In the case of unaccented words, only the final syllable has a high tone. If the string consists of one syllable, that syllable has a high tone.

We assume that Ogachogamitsu has the following system, which is exactly the same as that in Kagoshima.

\[(11)\] The Basic Tone Melody: LHL

\[(12)\] The Tone Association Rule (Ogachogamitsu):

\[
\begin{array}{cccc}
V & Q & V & Q \\
H & # & & \\
\end{array}
\]

(where Q contains no V, where V is a tone-bearing unit.)
(13) **The Tone Simplification Rules:**

a. \[ L \to \emptyset \]

b. \[ L \to \emptyset \]

Notice that (13a) can apply to the type I words, as well as the type II words, as will be shown in (14):

(14) **Type I**

<table>
<thead>
<tr>
<th>Ye</th>
<th>Ye</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>(a)</td>
<td>(a)</td>
</tr>
<tr>
<td>[ \emptyset ]</td>
<td>[ \emptyset ]</td>
</tr>
</tbody>
</table>

(b) is not applicable

(14) **Type II**

<table>
<thead>
<tr>
<th>Ye</th>
<th>Ye</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>(b)</td>
<td>(a)</td>
</tr>
<tr>
<td>[ \emptyset ]</td>
<td>[ \emptyset ]</td>
</tr>
</tbody>
</table>

However, (13b) is only applicable to type II words, as illustrated in (14). By these rules, the circled L tones in (14) will be deleted, thus producing the correct surface melodies.

Now consider how the above system in (11)-(13) works. It will apply to examples (10c) as follows:

(15) **a. inaga b. inaga-\( \text{\-} \)c. qdogo-\( \text{\-} \)**

<table>
<thead>
<tr>
<th>Tone Association</th>
<th>L H L</th>
<th>L H L</th>
<th>L H L</th>
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</thead>
</table>
| Tone Simplification | — | — | qdogo-\( \text{\-} \)

<table>
<thead>
<tr>
<th>L</th>
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</tbody>
</table>
To derive the surface melodies in (10c) from these structures, we need an Initial Raising Rule which raises an initial L tone to a mid tone. As a first approximation, this will be formalized as follows:

(16) **The Initial Raising Rule** (Ogachogamitsu):

\[
\begin{align*}
\text{VC}_o^V \hspace{1cm} & \rightarrow \hspace{1cm} \text{VC}_o^V \\
\text{L} \hspace{1cm} & \rightarrow \hspace{1cm} \text{M} \hspace{1cm} \text{L} \\
\text{##C}_o & \rightarrow \\
\end{align*}
\]

Though some points in this process remain unclear, this approximate rule will suffice the present purposes. This rule will apply to (15b,c) and derive the correct surface melodies in (10c).

Now consider the initial raising process in the younger speakers' speech in this dialect. It applies to everything except the syllable immediately before the H-toned syllable. Thus, observe the following examples:

(17) a. cītuṣyēdā  'fell'
b. hārabuttsō  'pregnant woman' 'expectant mother'
c. kinnētəma  'mosquito larvae'

Examples (17) suggest that the Initial Raising Rule for younger speakers of this dialect will be formalized as follows:
(18) **The Initial Raising Rule for Younger Speakers**

(Ogachogamitsu):

\[
\begin{array}{c}
Q \\
L
\end{array} \rightarrow
\begin{array}{c}
Q \\
M \\
L
\end{array}
\]

(Q represents the Maximal domain of the low-toned phonological segments.)

What is interesting here is that in this sub-dialect the Initial Raising Rule raises the initial L-toned sequence excluding the L-toned syllable before the H-toned syllable.

To summarize, we have noted that the Ogachogamitsu dialect, which is almost identical to the Kagoshima dialect, has exactly the same rules except for the Initial Raising Rule (16). Finally, we have seen that the Initial Raising Rule for younger speakers in Ogachogamitsu is different from any other raising rules we have examined up to now.

Note here that the Initial Raising Rule in the Nakamura dialect (rule (7) or (8)) and those in Ogachogamitsu apply to a V only when it is followed by another low-toned unit. This very essential property of the Initial Raising Rule accounts for the fact that a dialect like (iii), which has only one initial L tone before the high toned element(s) has no initial raising process.
9.3. **On the Tone Systems of a Couple of the Koshikizima Dialects**

As a somewhat different illustration of Initial Raising dialects, let us consider a couple of the Koshikizima dialects, namely, the Main Koshikizima dialect and the Eishi (イチ) dialect. According to Kamimura (1941), these dialects belong to the so-called Two-Tone-Type system like Kagoshima. That is, the words are divided into two classes. These dialects are very similar to the Kagoshima and the Ogachogamitsu dialects expect for the fact that the former belong to the mora-type dialects while the latter two belong, as we have seen above, to the syllable-type dialects. Thus, as we will see below, the Tone Association Rule in the Koshikizima dialects is parallel to rule (12). The type I words receive the H tone of the basic LHL tone melody on the penultimate (and sometimes antepenultimate) mora. On the other hand, the type II words always get the high tone on the final mora. Since the high tone is assigned to the final mora, this dialect also belongs to what I called the last-high type dialect. Consider, first, the following data of the Main Koshikizima dialect, which are cited from Kamimura (1941):
(19) Main Koshikizima Dialect

<table>
<thead>
<tr>
<th>Type I</th>
<th>Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. a. ひ-no</td>
<td>'day-Gen'</td>
</tr>
<tr>
<td>b. ひ-ba</td>
<td>'day-Obj'</td>
</tr>
<tr>
<td>2. a. はな</td>
<td>'nose'</td>
</tr>
<tr>
<td>b. はな-ba</td>
<td>'nose+Obj'</td>
</tr>
<tr>
<td>3. a. おが</td>
<td>'woman'</td>
</tr>
<tr>
<td>b. おが-no</td>
<td>'woman+Gen'</td>
</tr>
<tr>
<td>4. a. あさざけ</td>
<td>'sweet sake'</td>
</tr>
<tr>
<td>b. あさざけ-ba</td>
<td>'sweet sake-Obj'</td>
</tr>
<tr>
<td>5. a. にぎり梅西</td>
<td>'rice-ball'</td>
</tr>
<tr>
<td>b. にぎり梅西-mo</td>
<td>'rice-ball+even'</td>
</tr>
</tbody>
</table>

As illustrated by the examples in columns I and II, the type I words have a high tone on the penultimate mora and the type II words have one on the final mora. The Tone Association Rule will, as a first approximation, be formalized as follows:

(20) \[ \text{Q V (C}_o\text{ V) } \]

The following examples in column I suggest that the contextual specification \(C_oV\) is correct:
The examples in column II suggest, however, that rule (20) should be reformulated so as to assign a H tone to the antepenultimate mora, if the penultimate mora consists of either single vowel alone or the so-called syllabic nasal. Thus, rule (20) should be modified as in (22)

\[(22) \quad \#\# Q V ((V)C_o V) \quad H\]

The Tone Simplification Rules in this dialect are exactly the same as those in Ogachogamitsu, which we have discussed above.

Now let us turn to the Initial Raising process in Koshikizima. This dialect has an initial-raising process as indicated in (20). If the high tone occurs on the third mora, then the initial mora has a M (=mid) tone, but if it occurs on the fourth mora or later, then the second mora has a M tone. These processes, which are unlike those observed on Ogachogamitsu, will be formalized into one rule schema as follows:
It should be noted that the Initial Raising Rule in this dialect is different from, that in, say, the Nakamura dialect, the Ogachogamitsu dialect, etc., in that the latter dialects raise only the initial sequence, while as we have just seen above, the former raises either the initial or the second mora, depending on the length of the word in question.

Now let us compare this dialect with the Eishi dialect, which is one of the dialects spoken on Kami-Koshikizima Island. Consider the following examples:

(24) The Eishi dialect

I. accented

1.a. same as (1a) of (19)

b. same as (1b) of (19)

2.a. same as (2a) of (19)

b. same as (2b) of (19)

3.a. same as (3a) of (19)

b. \underline{mazak} \underline{no}

4.a. \underline{mazaki} \underline{ke}

b. \underline{mazaki} \underline{te} \underline{ba}

5.a. \underline{nigi} \underline{min} \underline{sa} \underline{i}

b. \underline{nigi} \underline{min} \underline{sa} \underline{mo}

6.a. \underline{saku} \underline{ran} \underline{cho} \underline{ha} 'cherry-blossom'

II. unaccented

a. same as (1a) of (19)

b. same as (1a) of (19)

a. same as (2a) of (19)

b. \underline{hana} \underline{ba} 'flower-obj'

a. \underline{otoko}

b. \underline{otoko} \underline{fu}

a. \underline{asa} \underline{ku} \underline{ro} \underline{ma}

b. \underline{asa} \underline{ku} \underline{of} \underline{ba}

a. \underline{inab} \underline{ki} \underline{ai}

b. \underline{inab} \underline{ki} \underline{ai} \underline{mo}

a. \underline{iro} \underline{na} \underline{pi} \underline{to} \underline{mu} 'color pencil'
The comparison of (19) and (24) immediately reveals the following similarities and differences between the Main Koshikizima dialect and the Eishi dialect:

(25) a. There is no difference between the two dialects if the string contains only high and low tones (i.e. if the initial raising process is applicable.)

b. If the string undergoes Initial Raising, the Eishi dialect has a high tone on the mora on which, the Main Koshikizima dialect has the H tone, and the former has an M tone on the mora on which the latter has an H tone.

c. As indicated by the circled @ and O in rows 5 and 6, if the string contains 5 or more moras, the position of the high tone moves one mora to the right in the Eishi dialect.

Let us assume that the Tône Association Rule (22) and the other tonal rules are shared by the Eishi dialect and the Main Koshikizima dialect. Then the Initial Raising Rule in the Eishi dialect will be stated as follows:

(26) a. The third low-toned mora becomes high-toned, if the fourth mora (and the later moras, if any,) are low-toned.

b. The second low-toned mora becomes high-toned,
if the third mora is low-toned.

c. The initial low-toned mora becomes high-toned if the second mora is low-toned.

Notice that, if rule (a) applies, then rule (b) will automatically be excluded form applying to the string, and similarly if rule (b) applies, then rule (c) will automatically be excluded. Furthermore rule (c) should not be applied to the output of rule (a). Thus, these are disjunctively ordered and can be formalized in one rule schema as follows:

\[
(27) \quad (C_vC_v)C_vC_v \xrightarrow{L} (C_vC_v)C_vC_v
\]

Examples 4IIa, b and 6a in (24) will be derived with the help of these rules as follows:

\[
(28) \quad (a) \quad a \, sa \, ga \, wo \quad \xrightarrow{\text{by (27)}} \quad (a)^* \quad a \, sa \, ga \, wo
\]

\[
(b) \quad a \, sa \, ga \, wo-ba \quad \xrightarrow{\text{by (27)}} \quad (b)^* \quad a \, sa \, ga \, wo-ba
\]

\[
(c) \quad \text{sakuranohana} \quad \xrightarrow{\text{by (27)}} \quad (c)^* \quad \text{sakuranohana}
\]
In (28a, b), since "asagawo(-ba)" is a type II word, H is assigned to the final mora as indicated by the solid line, and L is assigned to the suitable moras by the Universal Conventions, as indicated by the dotted lines. The circled L's in (a) and (b) are deleted by the Simplification Rule, with which we are not concerned here.

To (28a), rule (27) applies and inserts a H on the second mora, since the third mora is low-toned. Likewise, rule (27) applies to (28b) and inserts a H on the third mora, since the fourth mora is low-toned. On the other hand, since sakuranohana in (28c) is a type I word, the H tone is assigned by rule (22) to the penult. After that assignment, the Universal Tone Association Conventions assign the L tones as indicated by the dotted lines in (28). Then rule (27) applies to this structure, and inserts a H on the third mora, since the fourth mora is low-toned. According to Kamimura (1941), the circled H in (28) can be realized as H in a deliberate pronunciation. Thus, the above derivations seem to be reasonable.

To derive the surface tone melodies indicated in (24), all we have to do is to lower the circled H tone. This lowering process will be carried out by the following downdrift process, which was discussed in Chapter 4.

(29) **Downdrift:**

The high tone is lowered, if it is preceded by
another high tone and a Low tone intervenes between the two high tones in question.

Assuming that the above derivations in the Eishi dialect are correct, we can claim that the differences between the Main Koshikizima dialect and the Eishi dialect are accounted for in terms of the differences in the tone insertion rules and of the existence of the downdrift in Eishi.

In the above observations, we have discussed the Main Koshikizima dialect and the Eishi dialect, which are interesting in that they have a somewhat different initial raising process than the initial raising dialects.

9.4. Conclusion

In this chapter, we have examined some of the Initial-Raising dialects, and noted that (i) the Kyôto-type dialects have no Initial Raising Rule; (ii) the dialects with a H tone sequence have no Initial Raising Rule; (iii) there are three sub-types among the Initial-Raising Dialects; (a) only the initial mora is raised; (b) the initial L-toned elements are all turned into M-tones except for the final low-toned syllable; and (c) depending on the length of the word in question, the mora which undergoes raising will be either the first, or the second (or even the third) mora. We observed that (ii) was due to the very nature of the Initial Raising processes.
1. See Bach (1968), Langacker (1969) for a discussion of this convention.

2. Though in the Narada dialect, the second mora is raised when the first mora contains a voiceless vowel, this seems to be an exception which is forced by fact that the voiceless vowel is, in general, unable to keep the H tone. For a more detailed discussion, see Chapter 12.

3. This dialect is a syllable-type dialect, as was the Kagoshima dialect.

4. In the following examples, a dotted horizontal line over a V indicates that the V is M (=Mid).
CHAPTER 10

REMARKS ON THE SO-CALLED ACCENTLESS DIALECTS

10.0. Introductory Remarks

Since Hattori (1932) discovered that the Sendai dialect is an unaccented system, a number of other unaccented systems have been found by Japanese linguists. Hirayama (1957) made clear that, roughly speaking, such systems spread over the North Eastern Kantō District (Ibaragi, Tochigi Prefectures), the South-Eastern Tòhoku District (Fukushima, the Southern Miyagi and Yamagata Prefectures), about a third of Kyûshû District (Miyazaki Prefecture, and part of Nagasaki, Saga, and Kumamoto Prefectures), the south-western part of Ehime Prefecture, and a part of Kôchi Prefecture in Shikoku District. Furthermore, such systems are also found in a part of the Hokuriku District, a part of Shizuoka Prefecture, and on Hatîzyô-zina Island and the islands neighboring it.

In this chapter, we will be concerned with some of the accentless systems. These systems are interesting in that even though they belong to the same non-accentual class as the tone-languages, they are different from them in several respects. For example, though each of the tone-languages has several basic tone melodies, these accentless
Japanese dialects usually have only one basic melody. Secondly, in the tone languages, tone functions to distinguish words and phrases, while in the unaccented languages, it has no distinguishing function at all. Thirdly, in the tone languages, the Tone Association Rule is either the Initial Tone Association Rule or the Final Tone Association Rule (cf. Chapter 15), while some of the accentless dialects have no language-particular Tone Association Rule at all. Others have exactly the same Tone Association Rule which is found in tone languages. Below, I discuss some of the dialects to substantiate the above remarks. The main concerns in this section will be:

(1) a. What is the basic tone melody of an accentless system?
   b. Does the system have a Tone Association Rule?
   c. What kind of Tone Alternation Rules are necessary?

10.1. The Miyakonojō Dialect

Let us begin with the most celebrated example of an unaccented system: the Miyakonojō dialect, in Miyazaki Prefecture. According to Hirayama (1943, pp.36ff.) this dialect has only one surface tone melody: $L^n_1H^1_1$. Consider the following examples:
(2) a. *kiɾga*  
    'tree, or air'  
b. *haha* *hanaraga*  
    'flower, or nose'  
c. *tamago* *tamagorwo*  
    'egg'  
d. *hana-batake* *hana-batakeɾga*  
    'flower garden'  
e. *suzusiji*  
    'cool'  

As illustrated in (2), the H tone appears on the final mora of a word, and everything else is low-toned. Furthermore, this final H tone in general, occurs in every phrase of a sentence in a careful speech. Thus, consider the following cases:

(3) a. *Kyooɾtoɾse* ## *itaɾkuʔɾdзи* ## *genkiɾde*  
    Kyōto to will-go as 'take-care of yourself'  
    ## *ʔkuɾiɾaiɾɾa* ##  
    'As I will go to Kyōto, take care of yourself well.'  

b. *Kyooɾto-e* ## *itteɾkuɾu-ɾaɾa* ## *genki-ɾde* ## *iro-ɾo* ##

In (3), (a) is an expression of the original Miyakonozyō dialect, and (b) is the corresponding standardized sentence which will be spoken by the speakers of Miyakonozyō. Each of the phrase boundaries is represented by ##.

On the basis of these observations about the surface tone melodies, let us tentatively postulate that the basic tone melody of this dialect is LH. It should be noted that
since this dialect seems to come out of the Kagoshima dialect by the loss of the Star Assignment Rule for accented words, one would expect the basic tone melody of this dialect to be LHL. However, in this work, I will tentatively choose LH as the basic melody, for illustrative purposes. Even if LHL turns out to be the correct melody, the central part of our argument will not be substantially affected.

Given the basic tone melody LH, in order to assign the basic melody to the phonological phrases, we need the following Tone Association Rule, which associates the H tone with the final mora of a phrase:

(4) **The Tone Association Rule** (Miyakonozyō):

\[
\begin{array}{c}
\text{### Q V} \\
\text{H}
\end{array}
\]

Notice here that the * is not necessary at all in this dialect. Contrary to this claim, H. Kindaichi essentially claims that the star is necessary in this dialect. His claim is based on the observation that in the following sentences:

(5) a. \( \text{efga} \text{ ### aaru} \rightarrow \text{efga} \text{ ### aru} \)
   "picture", "exist"
   or "handle"

b. \( \text{kawaefga} \text{ ### nagaruru} \rightarrow \text{kawaefga} \text{ ### nagaruru} \)
   "river", "run"
The tone melody will be realized as indicated to the right of the arrow, if uttered without any pause. However, this does not support his claim at all, because such surface melodies can be handled easily by introducing the following H Deletion Rule whose function is to delete the H tone: 1

(6) \[ H \rightarrow \emptyset / H ## L \]

Notice that after this deletion, the low tone is reassOCIated with the previously H toned mora. Thus, correct surface melodies in (5) will be obtained. One might wonder why we do not assume that the basic tone melody in Miyakonozyô is L, and that the final H tone is introduced by the following Final Raising Rule:

(7) **The Final Raising Rule:**

\[
\begin{array}{c}
Q V \\
L
\end{array} \rightarrow \begin{array}{c}
Q V \\
L H
\end{array} / ##
\]

(where Q contains no ##.)

As far as the complexity of the system is concerned, the L melody theory and the LH melody theory seem to be virtually identical. However, historically the explanation of the L melody theory would be less elegant than that of the LH melody theory. Thus, I will take the LH melody theory here, until some convincing argument against it is put forward.
To summarize, in the above discussion of the Miyakono-yō dialect, we have proposed the following system:

a. Basic Tone Melody: LH

b. The Tone Association Rule (4):

\[
\begin{array}{cccc}
\text{Q} & \text{V} \\
\text{H} \\
\end{array}
\]

c. The H Deletion Rule (6):

\[
\text{H} \rightarrow \emptyset / \text{H} \# \# \text{L}
\]

10.2. The Shimagawa Dialect, the Izumi Dialect and the Uchinoura Dialect

Let us turn to the Shimagawa Dialect, Takaoka-gun, Kōtō Prefecture, and the Izumi dialect, Kita-Uwa-gun, Ehime Prefecture. According to Ikuta (1951), the Shimagawa dialect is an accentless dialect, and it has the HL tone melody, as illustrated in (8):

(8) a. día-ga 'picture, or handle'
    b. áme-ga 'rain, or candy'
    c. ábunai 'dangerous'
    d. átumeru 'collect'

In this dialect, the initial mora always becomes high toned and all the other moras become low-toned.

If we assume that the basic tone melody of this dialect
is HL, then all we need to introduce is Tone Association Rule (9):

(9) The Tone Association Rule (Shimagawa):

\[ \text{V Q ##} \]

\[ \text{H} \]

The effect of this rule is to associate the H tone with the leftmost tone-bearing unit. Thus, this rule is different from Tone Association Rule (4) in Miyakonozyō, since the latter associates the H tone with the rightmost tone-bearing unit. What is particularly interesting is that rule (9) and rule (4) are mirror images of each other. Furthermore, this is an exact parallel to the Left-to-Right Tone Association Rule vs. the Right-to-Left Tone Association Rule in Goldsmith's framework, which are also mirror images of each other.3

Consider now the Izumi dialect. According to Ikuta (1951), this dialect, which also belongs to the unaccented class, has the following tone melodies:

(10) a. あめ  'rain, or candy'
    b. あめ-ガ  'rain, or candy'
    c. あぶない  'dangerous'
    d. すむる  'collect'

As illustrated in (10), if a domain has two moras, the high
tone occurs on the initial mora, but if the domain has three moras or more, it occurs on the second mora. Thus, the Tone Association Rule will be formalized as follows:

\[(11) \quad \#\#(C_oV)C_oV(C_oV)\]

The first rule of this rule schema applies to words with at least three moras, and associates the high tone with the second mora. Otherwise, the second rule of (11) will associate the High tone with the initial mora.

As far as the Tone Association Rule is concerned, virtually the same dialect is found in Uchinoura, Kagoshima Prefecture. According to Goto (1961, 268-93), the Uchinoura dialect has the following surface tone melodies:

\[(12) \quad a. \quad \bar{e} \quad \overline{\text{e}-\text{ga}} \quad \text{'handle, or picture'} \]
\[b. \quad \underline{\text{a}me} \quad \underline{\text{a}me-\text{ga}} \quad \text{'rain, or candy'} \]
\[c. \quad \underline{\text{u}tau} \quad \text{'sing'} \]
\[d. \quad \underline{\text{s}iri} \quad \text{'white'} \]
\[e. \quad \underline{\text{a}ma\text{zake}} \quad \text{'sweet sake'} \]

That is, if the domain consists of at least 3 moras, then the H tone is associated with the second mora. Otherwise, the H tone is associated with the initial mora. However, it should be noted that, according to Kamimura (1974, 229), one mora and two mora words are rather unstable, and if the
domain consists of two moras, the variant forms "ame" and "e-k'on" are also possible. The data given in (12) will be handled by rule (11). However, to handle the variant forms given above, the rule will be formalized as follows:

(13)

\[ \text{Condition: If the domain contains at least 3 moras, then } a \& b; \]

Otherwise, avb

If the domain contains two moras, either the rule \( C \rightarrow VC \) or \( C \rightarrow (C, V) \) will be chosen. Tone Association Rules (11) and (13) are formally the same as the Ton Association Rule for Nagasaki and Shuri (in Okinawa) both of which belong to the two tone systems:

(14) \[ \text{The difference between the dialects with (11) and those with (14) seems to stem from the fact that the dialects with the latter have two classes of words, while those with the former have only one word class. Thus, in the lexicon, Nagasaki and Shuri must mark a word to indicate which sub-rule in (14) the word undergoes while in Shimagawa and Uchinoura, no such specification is needed at all.} \]
Now consider the problem of what the basic tone melody of the Izumi dialect and the Uchinoura dialect is. If we assume that the melody is HL, then we will need the Initial Lowering Rule which lowers the tone of the initial mora, when it is followed by another H tone. On the other hand, if we assume that the melody is LHL, we need Tone Simplification Rule (15):

\[ (15) \quad L \rightarrow \emptyset \quad V \quad \Lambda \quad H \]

This rule schema, which consists of two sub-rules, will apply conjunctively to produce the correct surface melody "e" in (12a). Because of the lack of relevant data, I cannot argue for or against either of these melodies here, so, I will leave the problem open.

10.3. The Sendai Dialect, and the Uchiko (♀♂) Dialect

Finally, let us consider the Sendai dialect and the Uchiko Dialect. Nattori first discovered that the Sendai dialect is an accentless system. According to him, this dialect has the following surface melodies.

\[ (16) \quad a. \underline{ame} \quad \text{'candy, or rain'} \]
\[ b. \underline{ame}-da \quad \text{'It's raining or It is a candy'} \]
\[ c. \underline{ame}-ga... \]
\[ d. \underline{...ame}-ga... \]
When "ame" is uttered in isolation, it has a HL surface melody; when it is followed by a copula "da", it has a MHL surface melody; when "ame-ga" is followed by some other phrase, then it is realized as MHH; and when "ame-ga" is both preceded and followed by other phrases, it is realized as MHH. In general, the surface melody will be realized as follows:

(17) a. HL
b. MHL
c. MHHL
d. MHHL
...n M H^nL

How will these melodies be treated in our framework?

There are several possible approaches. However, the best approach seems to me to assume that the basic melody of this dialect is HL. If this melody is chosen we will need Tone Association Rule (18) to associate the L tone with the final tone-bearing unit:

(18) ## Q V
     | L

The mid tone which is found in the initial mora of the string will be introduced by the Initial Lowering Rule:
This rule lowers the H tone to a M tone when it is followed by another H-toned mora.

The Uchiko dialect is very similar to the Sendai dialect. According to Hirayama (1940), this dialect has the following system:

(20) a. \text{ki} \text{ki-ga} 'tree, or air'
     M M L

b. \text{ame} \text{ahi-ga} 'rain, or chandy'
     ML L M L

c. \text{sakura} \text{sakura-ga} 'cherry-tree'
     LM L LMM L

d. \text{kutibiru} \text{kutibiru-ga} 'lips'
     LMM L LM MMM L

Their surface melodies of one mora, and two mora phrases are M, and ML, respectively. If the phrase contain at least 3 moras, then the surface melody is LM\textsuperscript{3}L. Furthermore, the initial L tone is dependent on the phonological configuration; if the second mora consists only of either the syllabic nasal, or a single vowel (without a consonant), then the initial mora is realized as M. Consider thus the following cases:
I believe that this system will best be described as having the basic tone melody M. If this is correct, we will need no language-particular Tone Association Rule. The only rules that we need will be the following lowering rules:

\[(22) a. \quad V C_o V \quad \frac{\downarrow}{M} \quad \frac{\downarrow}{M} \quad \frac{\downarrow}{L} \quad / \quad \ldots#\#
\]

\[b. \quad V C V \quad \frac{\downarrow}{M} \quad \frac{\downarrow}{L} \quad \frac{\downarrow}{M} \quad / \quad \ldots#C_o-\]

Rule (22b) lowers the initial M tone to a L tone if the second mora consists of CV; and rule (22a) lowers the final M tone to a L tone if it is preceded by a M-toned mora.

Notice here that if we were to assume that the basic tone melody is ML in this dialect, we would need (i) a Tone Association Rule which associates the M tone with the penultimate mora; (ii) a Tone Simplification Rule which deletes the L from such a structure as "ki"; and Initial Lowering Rule (22a). Thus this analysis becomes more complex
than the M basic melody analysis and therefore it is lower valued than the analysis with M as the basic melody.

10.4. **Concluding Remarks**

In this chapter, we have examined several accentless languages: the Miyakonōzō dialect (Kagoshima), the Shimagawa dialect (Kōti), the Izumi dialect (Ehime), the Uchinoura dialect (Kagoshima), the Sendai dialect (Miyagi), and the Uchiko dialect (Ehime). We have discussed the facts that (i) none of these dialects require a star; and that (ii) some of them have a Tone Association Rule, while the others have no Tone Association Rule. We have assumed that the Miyakonōzō dialect has LH as the basic melody and has a Tone Association Rule which associates the H tone with the final mora; that the Shimagawa dialect has HL as the basic melody and has a Tone Association Rule which associates the H tone with the initial mora. With respect to the Izumi and Uchinoura dialects, we left open the problem whether the LHL or HL basic melody is correct, and introduced a Tone Association Rule:

\[(23) \quad \# \langle C_0 \nu \rangle C_0 \nu \langle C_0 \nu \rangle \]

Finally, we proposed different solutions to the Sendai dialect and the Uchiko dialect, which are very similar as far as surface tone melodies are concerned. I think I have
covered the central part of the accentless Japanese dialects. Examination of these dialect suggests that they are very different from the tone languages like Chinese, Igbo, Navajo, etc. even though these accentless languages will be classified as non-accentual systems. If so, the non-accentual systems have to be subclassified into two groups---those which have no contrastive tone melodies such as accentless Japanese dialects, and those which have contrastive tone melodies such as Chinese, Mende, etc.
FOOTNOTES TO CHAPTER 10

1. Recall that we have noted in our discussion of the Kameyama dialect in Chapter 5 that Kameyama has a very similar rule. There, I suggested that the H Deletion rule may have some relation to downdrift, which was discussed in Chapter 1 and Chapter 4. I believe that this is a highly plausible rule, and thus the approach which incorporates such a rule will also be highly plausible.

2. Here again, we could assume that the basic tone melody is L and that the dialect has the Initial Raising Rule of the following form:

   (i) The Initial Raising Rule:

   \[ VCY \rightarrow VCV / \text{###C} \]

   However, as far as I can see, there seems to be no argument for taking this approach over the HL melody approach. Accordingly, I will tentatively take the HL melody, because this is a commonly found melody in Japanese. For a related discussion, see the discussion in the previous section of this chapter.

3. We will return to these rules later in this work and discuss them in detail. See Chapter 15.
CHAPTER 11

THE TONE SYSTEM OF THE KUMI DIALECT

11.0. Introductory Remarks

Let me now turn to a complicated tone system of the Kumi dialect, which is spoken in a remote village of Gokamura on one of the Oki Islands in Shimane Prefecture.¹ In this chapter, I will be concerned with (i) the underlying accent system of this dialect; (ii) the basic tone melody of this dialect; (iii) the Tone Association Rule; and (iv) the tone alternation rules which are necessary to derive the surface tone melodies. After discussion of these topics, I will discuss some of the theoretical implications of the analysis which I propose.

This dialect is very interesting in a couple of respects: (i) it tells us that we need a Star Shift Rule; and (ii) it has a Tone Association Rule for unaccented words which differs from the other Tone Association Rule we have seen. As regards (i), we have already shown in Chapter 3 that Hirosaki needs a special star shift rule which applies only to final-starred nouns when they are followed by a certain class of enclitics. However, the Star Shift Rule in Kumi seems to be more general in its scope, and to have an interesting condition.
In regard to (ii), we have seen that all of the Japanese dialects discussed above have the following Tone Association Rule for unaccented words:

(1) If a given domain has no ̂, associate the H tone of a basic tone melody with the rightmost V.

On the other hand, the Tone Association Rule in Kumi seems to be a mirror image rule of (1). That is,

(2) If a given domain has no ̂, associate the H tone of a basic tone melody with the leftmost V.

If this turns out to be the case, then it will typologically be very interesting.

11.1. On the Tonal System in Kumi

Let me discuss first of all the Tone Association Rule in Kumi. To begin with, consider the following two mora nouns:

(3) | example | gloss | analysis |
--- | --- | --- | --- |
| a. eto | 'string' | oo | unaccented |
| | \textsuperscript{A} | | |
| b. kadže | 'wind' | oo | final-accented |
| | \textsuperscript{L H} | | |
| c. käwa | 'river' | oo | initial-accented |
| | \textsuperscript{H L} | | |

As illustrated in (3), two mora nouns in Kumi belong to 3 classes: unaccented as in (a); final accented as in (b) and
initial-accented as in (c). In regard to the surface melody in (a), Hattori observes that in natural speech a slight rising contour appears. On the other hand, Kindaichi's (1972) data, which are based on the observation of deliberate pronunciation, have a HL melody for the "eto" class words. Thus, the final rising contour which occurs in an unaccented word is to be regarded as phonetic in its nature. Therefore the rising contour is best treated by a phonetic rule, to which we will return.

In this connection, consider the surface melodies of the following unaccented nouns:

(4) a. tee 'hand' 1 mora
HMH

b. ícadaka 'nake' 3 moras
H LMH

c. kogatana 'knife' 4 moras
H M LMH

d. kogatana-ña 'knife + Sub' 5 moras
H M L L MH

Regardless of the length of a word, the final rising contour tone and the initial H tone are always present. Furthermore, as illustrated in (4c,d), if a string consists of at least 4 moras, then the starless string has a mid tone on the second mora. If we disregard the final contour and the M tone on the second mora of (4c), then unaccented words
in general have a $H^n_1$ contour.

I suggest that this initial $H$ tone will be treated directly as the surface realization of the $H$ tone of the basic tone melody LHL. Thus, we will need Tone Association Rule (2) for unaccented words in Kumi. If we assume that the Tone Association Rule for accented words in Kumi is:

(5) Associate the $H$ tone of the basic tone melody with the (rightmost) $\check{V}$.

Then, (5) and (2) will formally be represented as follows:

(6) **The Tone Association Rule** (Kumi):

\[
\begin{array}{c}
\check{V} & Q & \#
\end{array} \\
| H
\]

(where $Q$ is the maximal sequence of phonological segments which does not contain $\check{V}$.)

This Rule is a mirror image of the Association Rule of the other dialects. Given this Tone Association Rule, the basic tone melody LHL will be assigned to examples (3) and (4c) as follows:

(7) a. etc  b. kadże  c. kawa  d. kogatana

\[
\begin{array}{c}
\check{H} & L \\
L & H & L \\
L & H & L \\
L & H & L
\end{array}
\]

As usual, the solid line indicates the effect of Tone Association Rule (6), and the dotted lines indicate the effects of the Universal Tone Association Conventions discussed in Chapter 1. When we compare (7) and the
surface melodies in (3) and (4c), we immediately notice that the initial LH contours and the final HL contour in (7) do not appear on surface. To handle these processes, I suggest that Kumi has the following mirror image Tone Simplification Rule Schema, which simplifies LH and HL contour tones to a H level tone:

(8) The Tone Simplification Rule (Kumi):

\[ L \rightarrow \emptyset \quad /\quad V \quad /\quad H \]

This schema (8) will apply to examples (7) and turn them into (9):

(9) a. sto  b. kadze\(^\ddagger\)  c. kawa  d. kogatana

\[ \begin{array}{cccc}
& & & \\
H & L & L & H \\
\end{array} \quad \begin{array}{cccc}
& & & \\
L & H & H & L \\
\end{array} \quad \begin{array}{cccc}
& & & \\
H & L & H & L \\
\end{array} \quad \begin{array}{cccc}
& & & \\
H & L & L & H \\
\end{array} \]

In (9), (b) and (c) are identical with (3b) and (3c). Thus, no other rule should be applicable to them. (9a) and (9d) should undergo the Final Rising Contour Formation Rule, which is, as a first approximation, formalized as follows:

(10) The Final Rising Contour Formation Rule (Kumi):

\[ (V)C_{o}V \rightarrow (V)C_{o}V / \quad \#C_{o}[\ddagger] Q \quad \]

\[ L \rightarrow (L)M / \quad H \]

(Q contains no \(*\).)
This rule applies to (9a) and turns it directly into the surface melody in (3a), and it also applies to (9d), and turns it into the following structure.

(11) \( \text{kogatana} \)

\[
\begin{array}{c}
\text{H} \\
\text{L} \\
\text{MH}
\end{array}
\]

Notice that this rule applies only to unaccented words. On this account, we need the environment in (10), because otherwise, this rule would illegitimately apply to (9c) and turn it into "kawa". Now compare (11) and (4c). We will need the following L-to-M Raising Rule to produce the correct surface melody:

(12) The L-to-M Raising Rule (Kumi):

\[
\begin{array}{c}
\text{V} \\
\text{C}_0 \\
\text{V}
\end{array} 
\begin{array}{c}
\text{L} \\
\text{M} \\
\text{L}
\end{array} \rightarrow \text{V} \\
\begin{array}{c}
\text{C}_0 \\
\text{V} \\
\text{C}_0
\end{array} 
\begin{array}{c}
\text{H} \\
\text{M}
\end{array}
\]

Now consider example (4b). To derive the well-formed surface melody, the Final Rising Contour Formation Rule (10) must apply before the L-to-M Raising Rule (12), because if they were to apply in the other order, then rules (12) and (10) would produce an ill-formed structure in the following way:

(13) \( \text{†adaka} \)

\[
\begin{array}{c}
\text{H} \\
\text{L}
\end{array} \rightarrow \text{H} \\
\begin{array}{c}
\text{ML} \\
\text{H}
\end{array} \rightarrow \text{H} \\
\begin{array}{c}
\text{MM} \\
\text{L}
\end{array}
\]
Thus, if (12) were to apply before (10), we would not produce the well-formed surface melody in (4b). This shows that (10) precedes (12).

Consider next the following examples:

(14) a. kutʃibɛrɔ    b. kokonutu
    M  L  H  L    L  H  L

In (14), (b) will automatically be derived by the association of the LHL basic tone melody. Here we see that rule (12) needs environment \[ #C_0^V C_0^--- \text{H} \], because otherwise (12) would apply to (14b) and turn it into an ill-formed structure:

(15) kokonutu
    L  H  M  L

The initial M tone in (14a) requires additional comment. It should be noted here that we need no extra raising rule to handle this. All that is necessary is to place parentheses around \[ C_0^V \text{ in (12)} \]:

(16) The L-to-M Raising Rule (Kumi) (Revised):

So far, we have proposed the following tonal system for Kumi:
(17) The Tonal System for Kumi:

a. The Basic Tone Melody: LHL

b. Tone Association Rule (6):

V Q ## (where Q contains no \( \ddagger \).

\[ \text{\( R \)} \]

c. Tone Simplification Rule (8):

\[ V \rightarrow \emptyset \quad \| \quad V \quad \text{(where } \| \text{ indicates that this rule is a mirror image rule)} \]

\[ \text{\( H \)} \]

d. Final Rising Contour Formation Rule (10):

\[ (V) \ C_o V \rightarrow (L) \ C_o V \quad \text{##Q } \]

\[ (L) \text{ M H} \quad (Q \text{ contains no } \ddagger \).

e. L-to-M Raising Rule (16):

\[ V \ C_o V \rightarrow V \ C_o V \quad \text{##(C_o V) C_o} \]

\[ L \text{ M L} \]

To illustrate how this system works, consider the following sample derivations:

(18)

a. atama* 'head'  b. eto-demo 'string + even'

(1) Tone Association

\[ L \text{ H L} \]

\[ L \text{ H L} \]

(ii) Tone Simplification (8)

\[ \text{atama}^* \]

\[ L \text{ L} \]

\[ \text{eto-demo} \]

\[ H \text{ L} \]
(iii) Final Rising Contour Formation

\[ \text{eto-demo} \]
\[ \text{\( H \ L \ M \ H \)} \]

(iv) L-to-M Raising

\[ \text{ato-ma} \]
\[ \text{\( M \ L \ H \)} \]
\[ \text{\( H \ M \ LM \ H \)} \]

At level (i), Tone Association Rule (6) associates the H tone with the started V as in (a), or with the initial V as in (b), and all the rest is done by the Universal Tone Association Conventions. Then at (ii) the Tone Simplification Rule applies and simplifies the LH and HL contours to a H level tone. At level (iii), rule (10) applies only to the unaccented word in (b), and finally, at level (iv), rule (16) applies to both cases and raises the initial L and the post-H-toned L to M. As is evident, the tonal system above works very well.

11.2. On Star Shift in Kumi

Now let us turn to the next problem: What is the correct Star System in Kumi? To answer this, let us first consider what happens if the subject enclitic "\( \eta \)" and the two mora enclitic "demo" (even) are attached to the two mora nouns in (3):
<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. eto</td>
<td>eto-ŋa</td>
<td>eto-demo</td>
</tr>
<tr>
<td>ʰM̥M̥</td>
<td>H L ʰM̥</td>
<td>H M LʰM̥</td>
</tr>
<tr>
<td>b. kadže</td>
<td>kadže-ŋa</td>
<td>kadže- dém̥o</td>
</tr>
<tr>
<td>L ʰH</td>
<td>M L ʰH</td>
<td>M L H L</td>
</tr>
<tr>
<td>c. kawa</td>
<td>kawa-ŋa</td>
<td>kawa- dém̥o</td>
</tr>
<tr>
<td>ʰH L ʰL</td>
<td>L H ʰL</td>
<td>L L ʰL</td>
</tr>
</tbody>
</table>

In the case of the unaccented word "eto", nothing remarkable happens. However, in the case of the accented words "kadže" and "kawa", the star is moved one mora to the right in columns II and III. To handle these facts, I suggest that Kumi has the following Star Right Rule:

(19) **Star Right** (Kumi):

\[ V_0 C_o V \rightarrow V_0 C'_o V^2 \]

Rule (19) can handle cases (b) and (c) in columns, II and III. However, it poses one problem, because stated as in (19), the rule would apply to "kawa" in (18c) and would move the star to the final vowel as in "kawa". However, this is counter-factual. We cannot apply rule (19) to "kʰa", and move the star back one mora to the left (i.e. to the original position), when the string contains two moras.

Why? Because once "kawa" is turned into "kawa", it has the same star structure as "kadže" in (18b). Thus, the Star Left Rule would also apply to "kadže" and turn it into ill-formed
"kâ-dże". Therefore, we have to block the application of (19) to "kâ-wa" (18c). How it should be blocked? To answer this, consider the following cases:

(20)a. (i) kâa 'mosquito' (ii) kâ-ŋa (iii) ka-mâde
b. (i) kutibéro 'lips' (ii) kutibero-ŋa
c. (i) atamâ 'head' (ii) atamâ-ŋa

Examples (20a) suggest that if a string consists of two moras, the star does not move, while if it consists of 3 moras, the star moves. Examples (20b) suggest that if a string consists of four moras and it has a penultimate star, the star does not move, but that it moves, when the string consists of five moras. This is confirmed by (20c), because "atamâ-ŋa" which has a penultimate star and 4 moras does not undergo Star Right Rule (19). One of the possible approaches for handling this will be to retain (19) as it is and to place a blocking condition on the rule. If this approach is chosen, Star Right (19) will have the following blocking condition:

(??) **Blocking Condition or (19)**
If a string has a structure \((C_o V C_o V)^n C_o V C_o V##\), block the application of rule (19) to the string.

This condition will correctly cause star shift to apply to "kâ-mâde" but not to "kâ-ŋa".

There are several possible alternatives which could
handle the same data. Let me here point out the most promising approach. Suppose that Star Right (19) is restricted to apply only to words of 3 moras or more. Then, the rule will be formalized as follows:

\[(22) \text{Star Right (ii):} \quad \uparrow \mathcal{VC}_o \uparrow V \rightarrow \mathcal{VC}_o \uparrow / \langle \mathcal{VC}_o \rangle_a - \langle \mathcal{VC}_o \rangle_b \quad \text{condition: avb}\]

The Condition in (22) will make this rule apply only to words of at least 3 moras. Thus, we can correctly block Star Shift from applying to "kawa" in (18c), and (20ai, and aii).

Now assume that rule (20) applies to all the other cases. Then, we expect that (20bi) and (20cii) will have a final star, but actually they have a penultimate star. Under the present assumption, we will need the Star Left Rule, which shifts the final star of a word of 4 moras or more:

\[(23) \text{Star Left (Kumi):} \quad \mathcal{VC}_o \uparrow \rightarrow \uparrow \mathcal{VC}_o \uparrow / \mathcal{VC}_o \mathcal{VC}_o \quad \text{##} \]

This rule will move the star back to the penultimate mora in the cases of (20bi) and (20cii).

The first approach with rule (19) plus blocking condition (21) and the second approach with rules (22) and (23) are almost equivalent as far as the data given by Hattori (which contain 1 to 4 mora words) except for a certain
difference which will be discussed later. However, their predictions are markedly different for words of at least 5 moras. The second approach predicts, for example that words of 5 and 6 moras have no surface final star because every final star is shifted one mora to the left by rule (23). However, the first approach predicts that 5 mora words can have final star, while 6 mora words will have no final star. Which of these turns out to be the case will depend on the facts. In any case, it is clear that we need at least one star shift process.

11.3. On Gaps in 3 and 4 Mora Words

The above developed system handles all of the one and two mora words correctly. However, in regard to 3 and 4 mora words, there are a couple of gaps which require comment. First of all, consider the following cases of 3 mora words:

(24) Example | Gloss | Analysis
---|---|---
a. >baka >baka-ŋa | 'naked' | ooo
    H LMH | H M L M
b. atamā(ŋa) | 'head' | ooo*
    M L H (L)
c. kokoro(ŋa) | 'heart' | ooo*
    L H L (L)
d. (gap) | — | (*oo)
    H L L(L)
Contrary to our expectation, 3-mora words have only 3 tonal classes, and not 4. No 3-mora words belong to the initial starred class in (d). 4-mora words also have a gap.

Consider the following 4-mora words:

<table>
<thead>
<tr>
<th>Example</th>
<th>Gloss</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kogatana 'kogatana-ŋa</td>
<td>'knife'</td>
<td>0000</td>
</tr>
<tr>
<td></td>
<td>H M L M H</td>
<td>H M L L M H</td>
</tr>
<tr>
<td>b. kutibero kutibero-ŋa</td>
<td>'lips'</td>
<td>*0</td>
</tr>
<tr>
<td></td>
<td>M L H L</td>
<td>M L L H L</td>
</tr>
<tr>
<td>c. boonjire (ŋa)</td>
<td>'stick'</td>
<td>000*</td>
</tr>
<tr>
<td></td>
<td>M L H L</td>
<td>(L)</td>
</tr>
<tr>
<td>d. kokonotu (ŋa)</td>
<td>'nine'</td>
<td>0000</td>
</tr>
<tr>
<td></td>
<td>L H L L</td>
<td>(L)</td>
</tr>
<tr>
<td>e. (gap)</td>
<td></td>
<td>(0000)</td>
</tr>
<tr>
<td></td>
<td>H L L L</td>
<td>(L)</td>
</tr>
</tbody>
</table>

Here again we have 4 tonal classes for 4-mora words, and not 5 tonal classes. Furthermore, if we place the star on the surface high-toned vowel of a word, then we will have two penultimate starred classes. If the analyses in (25c) and (25d) are correct, then (25b) should be analyzed as belonging to the final-starred class, because otherwise we would not account for the difference in "ŋa"-phrases in (25b) and (25c). But if the final star analysis of (25b) is correct, then the approach with Star Right (19) and blocking condition (21) does not hold, because the approach would not be able to
handle the penultimate star of "kutibero" in (25b), unless another star shift rule is added to the framework.

However, examination of (25) shows that 4 mora words also have a strange gap. Namely, there are no initial-starred words. Why do no 3 and 4 mora words belong to the initial-starred class? Recalling Star Right Rule (19) plus (21) (or (22) plus (23)), we see that they open a way to analyze the examples in (24) and (25) as follows:

(26)  I. 3 mora words       II. 4 mora words
  a. ōadaka     ooo            a. kogatana     oooo
  b. atama      *oo            b. kutibero     *oo*
  c. kokoro     *oo             c. boonjire    *oo*
  d. (gap)      (ooo*)         d. kokonotu    *oooo
    e.           (ooo*)

All of the 3-mora words in (24) are analyzed as having an underlying star one mora to the left of the surface high toned mora, and likewise, the four mora words in (25c and d) are analyzed in the same way. Thus, "kutibero" will be analyzed as belonging to the penultimate starred class. If this analysis is correct, then the approach with rule (19) plus blocking condition (21) will be saved as far as this example is concerned. In the discussion of section 11.2, we implicitly assumed that the analyses in (26) are correct.

Now let us discuss the gaps found in (26). As indicated
in (26), even though the underlying specification (26) filled the gaps found in (24d) and (25e), it introduced new gaps. (26) now has no final starred words, as indicated in (26Id) and (26IIf). Though the data available at present have no example which fills the gaps in (26Id) and (26IIf), there is a chance, as Hattori speculated, that these gaps can be filled. That is, the words which "belong to the "atama"-type in (24b) could be divided into two classes: an underlying penultimate-starred class like (26Ib) and a final-starred class like (26Id), if the differences posited in III turn out to be correct:

(27)  

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. kemori</td>
<td>kemori-ŋa  (kemori-demo)</td>
<td></td>
</tr>
<tr>
<td>M L H</td>
<td>M L H L</td>
<td>M L L H L</td>
</tr>
<tr>
<td>b. atama</td>
<td>atama-ŋa  (atama-demo)</td>
<td></td>
</tr>
<tr>
<td>M L H</td>
<td>M L H L</td>
<td>M L H L L</td>
</tr>
</tbody>
</table>

At present, (I) and (II) in (27) have been confirmed to be correct, but (III) has not yet been checked. Since the "kemori" and "atama" type words belong to the different oral classes in most of the San'in and Kansai dialects, we should not be surprised to find that there is a difference predicted in the parenthesized examples (III).

If the facts turn out to be as in (27), then we could fill the gap, because (27) will be analyzed as having the
following underlying star specifications:

(28) \[
\begin{array}{cccc}
& I & II & III \\
\hline
a. kemori & \ast & \ast(o) & \ast(oo) \\
\hline
b. atama & \ast & \ast(o) & \ast(oo) \\
\end{array}
\]

At the same time, we could now argue that the Analysis in (26I) is correct, because if the "atama"-type words are analyzed as in (28b), then the "kokoro"-type words in (24c) must have the initial star in the underlying structure. 4

Likewise, if we can find four mora words fitting the following paradigms:

(29) \[
\begin{array}{cccc}
& I & II & III \\
\hline
a. \ast & \ast-ja & \ast-de\text{mo} \\
\hline
b. \ast & \ast-ja & \ast-de\text{mo} \\
\end{array}
\]

Then we will be able to fill the gap in (26IIe), because (29a) would have to be analyzed as a final-starred class in underlying structure. It should be noted that a "demo" phrase (or more generally a phrase with a two mora enclitic) plays a crucial role in deciding to which class a word belongs, the final-starred class or the penultimate starred class. Thus, "kutibero" in (25b) should also be tested by using the "demo"-phrase test. I expect that a more systematic investigation of the Kumi dialect will fill the gaps which happen to be found in (26Id) and (26IIId).
Now suppose that the gap in (26IIe) is filled. In another word, suppose that a word which belongs to paradigm (29a) is found. Then, as I mentioned above, it will force us to prefer the analysis with Star Right (22) plus Star Left (23) to the approach with Star Right (19) plus blocking condition (21), because the latter analysis would need one additional rule.

11.4. **Summary**

The above discussion has been based on the following facts in Kumi:
### The Kumi dialect

<table>
<thead>
<tr>
<th>III</th>
<th>IV</th>
<th>II</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.  ſadaka ſadaka-ŋa</td>
<td>kogatana~</td>
<td>eto eto-ŋa~</td>
<td>tee~</td>
</tr>
<tr>
<td>HLMH</td>
<td>HMLMH</td>
<td>HLMHM</td>
<td>HMH</td>
</tr>
<tr>
<td></td>
<td>kogatana-ŋa</td>
<td>eto-demo</td>
<td>te-ŋa~</td>
</tr>
<tr>
<td>HMLLMH</td>
<td>HMLMH</td>
<td>HMLMH</td>
<td>HMH</td>
</tr>
<tr>
<td></td>
<td>'naked'</td>
<td>'knife'</td>
<td>'string'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.  atama(-ŋa)</td>
<td>kutjibero</td>
<td>kadže*</td>
<td>ka*</td>
</tr>
<tr>
<td>{MLH (L) 'head'</td>
<td>M LHL</td>
<td>L H</td>
<td>HL</td>
</tr>
<tr>
<td>kemori(-ŋa)</td>
<td>kutjibero-ŋa</td>
<td>kadže-ŋa</td>
<td>kadže-demo</td>
</tr>
<tr>
<td>M LH (L)</td>
<td>MLLLL</td>
<td>MLLLH</td>
<td>HLLL</td>
</tr>
<tr>
<td></td>
<td>'smoke'</td>
<td>'lips'</td>
<td>'wind'</td>
</tr>
<tr>
<td>c.  kokoro(-ŋa)</td>
<td>boonjire(-ŋa)</td>
<td>kawa kawa-ŋa</td>
<td>kawa-demo</td>
</tr>
<tr>
<td>LHLL (L)</td>
<td>MLHLL (L)</td>
<td>HL LLL</td>
<td>HLLL</td>
</tr>
<tr>
<td></td>
<td>'heart'</td>
<td>'stick'</td>
<td>'river'</td>
</tr>
<tr>
<td>d.  no</td>
<td>kokonotu(-ŋa)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*oo(-o)</td>
<td>LHL L (L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HLLL L</td>
<td>'nine'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.  no</td>
<td>*oo(-o)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HLLLL (L)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

333
notes: (i) * stands for the bilabial fricative.
(ii) "na" 'Sub'; "demo" 'even'
(iii) monosyllabic words "te" and "ka" undergo lengthening when they occur in isolation (cf. Ia, and Ib).

The data in (30) have been analyzed as having the following underlying Star System:

(31) The Star System in Kumi:

<table>
<thead>
<tr>
<th></th>
<th>III</th>
<th>IV</th>
<th>II</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ooo</td>
<td>oooo</td>
<td>oo</td>
<td>o</td>
</tr>
<tr>
<td>b.</td>
<td>(?ooo)</td>
<td>(?oooo)</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>*</td>
<td>ooo</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>d.</td>
<td>*</td>
<td>oooo</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>e.</td>
<td>-</td>
<td>oooo</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In (31), I enclosed IIIb and IVb by parentheses and placed a question mark to the left of the analyzed forms, because the existence of real examples has not yet been attested, even though our theory predicts their existence.

I discussed two plausible ways of moving the star to the surface high-toned mora: (i) the approach with Star Right (19) and Blocking condition (21), and (ii) the approach with Star Right (22) and Star Left (23). As we have seen, these two make empirically different predictions, and if IVb in (31), for instance, is filled, then the latter
approach will be preferred. Furthermore, if it turns out that five mora words have no final surface star, then the second approach will be shown to be correct.

In addition to this underlying star system and the star shift rules, I proposed the system of tonal rules in (17).

11.5. Some Theoretical Implications

(i) In the above discussion of the tone system of the Kumi dialect, I assumed that the basic tone melody in Kumi is LHL. If the LHL melody and Universal Tone Association Conventions are given, then it follows that Kumi has no high toned sequence, because it has no raising rule which produces a high toned sequence. This is, as we have seen above, is correct. In addition to this, as far as I can check, there seems to be no alternative solution which is simpler than the present system. Thus, it seems to me that the LHL melody is the correct tone melody for Kumi.

(ii) In section 12.1. I proposed the following rule as the Tone Association Rule in Kumi:

\[ V \Box \Box \]

(where Q contains no \( \ddagger \).)

This rule is extremely interesting because it realizes a logically possible case. As we have seen in the previous chapters, most of the Japanese dialects have the following
Tone Association Rule:

(33)  

\[ \begin{align*}
\text{Q} & \quad \text{(where Q contains no $\hat{\ddagger}$.)}
\end{align*} \]

Rule (33) states that if a string has no $\hat{\ddagger}$, then the $H$ tone is associated with the rightmost $V$. If a natural language has this rule, then we expect that some language will have a tone association rule which associates the $H$ tone of the basic tone melody with the leftmost $V$, if a given string has no $\hat{\ddagger}$. Rule (32) in Kumi shows that our expectation is correct. Thus, rule (32) has very important implications. In the above discussions, I called a dialect with rule (33) or a variant of it the Last-\(H\) type dialect. Let me call a dialect like Kumi, which has rule (32) or a variant of it, an Initial-\(H\) type dialect. In the next chapter, we will examine one more dialect which belongs to this class.

(iii) In section 11.1, we saw that Kumi has the L-to-M Raising Rule, one of the functions of which is to raise, the initial L tone to a M tone if the second mora is also low-toned. That Kumi has this rule shows that this dialect belongs to the Initial Raising type, which was discussed in Chapter 9.

(iv) The tone system in Kumi is also important in that it incorporates Star Shift Rule(s). In Chapter 3, we saw that the Hirosaki dialect has a special Star Shift Rule.
However, the Star Shift Rule in Kumi is more general and the conditions on it (or its environment) are very interesting. Recall that I have suggested that chances are great that Kumi will turn out to have two star shift rules. If this is confirmed by a future investigation, Kumi will be an interesting case which has a Star Left Rule and a Star Right Rule.\(^5\)

11.6. **Comparison of the Autosegmental Description and Hattori's Prosodic Description**

In the preceding discussion, we have seen that autosegmental analysis of the Kumi dialect and its theoretical implications. Before going on to the autosegmental analysis of the next dialect, I would like to make a brief comparison of our analysis and Hattori's very interesting prosodic analysis (or the accent nucleus analysis).

In his paper (1973), Hattori proposed the following underlying analysis for the data presented above in (30). In his framework, he assumes three levels of representations: a morphophonemic prosodic representation, a phonemic prosodic representation, and a surface phonetic representation.

The surface phonetic representation is essentially the same as the surface tone melody informally represented in (30). As the mophophonemic prosodic representation, he proposes the following analysis for (30), by using the prosodeme \(\downarrow\) (Low-high accent nucleus):
(34) **Morphophonemic Prosodic Representations:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1a.</td>
<td>/o/</td>
<td>/o-ŋa/</td>
</tr>
<tr>
<td>1b.</td>
<td>/oŋ/</td>
<td>/oŋ-ŋa/</td>
</tr>
<tr>
<td>2a.</td>
<td>/oo/</td>
<td>/oo-ŋa/</td>
</tr>
<tr>
<td>2b.</td>
<td>/ooŋ/</td>
<td>/ooŋ-ŋa/</td>
</tr>
<tr>
<td>2c.</td>
<td>/o̞o/</td>
<td>/o̞o-ŋa/</td>
</tr>
<tr>
<td>3a.</td>
<td>/oo̞o/</td>
<td>/oo̞o-ŋa/</td>
</tr>
<tr>
<td>3b.</td>
<td>/oo̞oŋ/</td>
<td>/oo̞oŋ-ŋa/</td>
</tr>
<tr>
<td>3c.</td>
<td>/o̞oo/</td>
<td>/o̞oo-ŋa/</td>
</tr>
<tr>
<td>4a.</td>
<td>/oo̞oo/</td>
<td>/oo̞oo-ŋa/</td>
</tr>
<tr>
<td>4b.</td>
<td>/oo̞o̞o/</td>
<td>/oo̞o̞o-ŋa/</td>
</tr>
<tr>
<td>4c.</td>
<td>/oo̞oo̞o/</td>
<td>/oo̞oo̞o-ŋa/</td>
</tr>
<tr>
<td>4d.</td>
<td>/o̞oo̞o̞o/</td>
<td>/o̞oo̞o̞o-ŋa/</td>
</tr>
</tbody>
</table>

In (34), a circle stands for a mora, and the numerals 1, 2, 3, and 4 mean that a noun consists of 1 mora, 2 moras, 3 moras, and 4 moras, respectively. The \( \_ \) mark (Low-high accent nucleus) can usually be translated into our LH basic tone melody (or LHL basic melody), tone association, and star (=accent). That is to say, the marker \( \_ \) in his framework has the functions of the basic tone melody, the location of the star, and the tone association rule.

Examination of (34) reveals that Hattori's system has no final-accented 3 and 4 mora words. However, as noted above, he speculated that final accented words would be found in a future investigation. Though he did not mention the
gap in the 4 mora words, it is clear that his system predicts the existence of words filling the gap.

(34) is a set of morphophonemic prosodic representations for the examples in (30). He also proposes a system of rules which applies to the accented words in (34) and turns the representations into the following phonemic prosodic representations:

(35) **Phonemic Prosodic Representations:**

1a. the same as (34.1a)

1b. /o '/ /o' -n a/ /o-de'lmo/

2a. the same as (34.2a)

2b. /oo '/ /oo-n a'/ /oo-de'llmo/

2c. /o'/ /oo -n a/ /oo -de'llmo/

3a. the same as (34.3a)

3b. /ooo '/ /oooo-n a/

3c. /oo' / /oo-o-n a/

4a. the same as (34.4a)

4b. /oo'o '/ /oo'o-o-n a/

4c. /oo'o'/ /oo'o-o-n a/

4d. /oo' oo/ /oo' oo-n a/

If we compare (34) and (35), we immediately notice that (i) in cases where the string contains at most two moras, then,
the \[\downarrow\] marker is turned into \[\uparrow\], keeping the position of \[\uparrow\] the same as that of \[\downarrow\]. (ii) In cases where the string contains three or more moras, \[\downarrow\] is turned into \[\uparrow\] and the position of \[\uparrow\] is moved one mora to the right. (iii) In the case of /oo`o\[\uparrow\]`, which is derived from /oo`o\[\downarrow\]` in (34.4b), the marker \[\uparrow\] is moved one mora to the left, as indicated in (35.4b). These observations suggest that, though he did not state the rules in a general form, Hattori virtually proposed the following rules:

(36) a. If the string consists of at most two moras, then change \[\downarrow\] into \[\uparrow\], keeping its position the same.

b. If the string consists of three or more moras, then change \[\downarrow\] into \[\uparrow\], and move the positions of \[\uparrow\] one mora to the right.

c. If the string consists of four or more moras, and it has final accent, then move \[\uparrow\] one mora to the left.

Notice that these rules are very similar to our Star Shift Rules stated in (19), (22), (23). The differences between the description in an autosegmental analysis and that in Hattori's theory are three-fold: (i) In Hattori's system the marker \[\downarrow\] is turned into \[\uparrow\], which means, if stated in our terminology, that the melody LH is turned into HL.
On the other hand, our theory does not in general permit such a change in tone melody. (ii) In Hattori's theory, three levels of representations are assumed, but in our theory, two levels of representations (the level of the underlying tone melody and the level of the surface tone melody) are assumed to be necessary. (iii) In Hattori's theory, the accent markers \( \_ \) and \( \wedge \) have the functions of the basic tone melody + the position of the star + the tone association rule. In our theory, these three are separated.

In addition to these marks, the accent marker \( \_ \) (Low-High) which is used in Hattori's description of the Kameyama dialect has functions of both the basic tone melody and the tone mapping rule, but it is different from the other accent markers in that it does not play the role of the star. He also uses a few more accent markers which we are not concerned with here. These observations seem to suggest that his system is less constrained than our autosegmental theory and less explicit than our theory.
FOOTNOTES TO CHAPTER 11

1. The present discussion is mainly based on the surface phonetic data and its tonological description in Hattori (1973, section 4.5.2). It is partly based on the data in H. Kindaichi (1972).

2. Recall that the 

   tone Association Rule (6) is sensitive to the rightmost star in the domain. Thus, we could formulate (19) as follows:

   $\uparrow C_o \ V \quad \rightarrow \quad V \ C_o \ \uparrow$

   However, I will formalize the rule as in (19), for ease of discussion. Notice that in (19), I tentatively assume that each enclitic is preceded by a morpheme boundary (+). If it turns out to be preceded by a word boundary (#), then the rule will be stated as in:

   $\uparrow (#) \ C_o \ V \quad \rightarrow \quad V \ (#) \ C_o \ \uparrow$

   In any case, the central part of the following discussion will not be affected.

3. We will return to the related point later.

4. If this turns out to be right, the tone system in Kumi will look very similar to Kansai (e.g., Osaka) dialects. The approximate correspondences between Kumi and Kansai seem to be as follows:
<table>
<thead>
<tr>
<th>Kansai</th>
<th>Kumi</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>atama</strong></td>
<td><strong>underlying</strong> (000)</td>
</tr>
<tr>
<td>kemuri</td>
<td><strong>000</strong></td>
</tr>
<tr>
<td>kokoro</td>
<td><strong>00</strong></td>
</tr>
<tr>
<td>hadaka</td>
<td><strong>00</strong> (LHL)</td>
</tr>
</tbody>
</table>

What is interesting here is that the unaccented HL melody class in Kansai seems to correspond to the final-accented class in Kumi, and that the unaccented LHL melody class in Kansai seems to correspond to the unaccented class in Kumi. Systematic investigation of correspondences between the Kumi dialect and the Kansai dialects (e.g., Osaka, Kyôto), and the San'in dialects (e.g., Matsue (Tôkyô-typ.)) should reveal some interesting facts.

History tells us that Kyôto has a certain relation with Oki Islands in the days of old. In particular, a number of Emperors and aristocrats were sent to the Islands mainly as political prisoners. It is likely that their Kyôto dialect affected the speech of the Islands.

5. In the above discussion, I presented no argument against several likely alternative solutions without Star Shift, because, as far as I could check, most of them simply do not work and some others become more compli-
cated than the Star Shift solution. The interested reader may attempt to grapple with the data in (30).
CHAPTER 12

THE TONE SYSTEM OF THE NARADA DIALECT

12.1. Introductory Remarks

This chapter is concerned with an examination of the Narada dialect which is spoken by about 230 inhabitants in an isolated mountain village of Yamanashi Prefecture. Since the dialect was first brought to light by Mochizuki (1951), it has long attracted linguists' attention because of its unique phonological and tonological characteristics. From the point of view of the present study, the most interesting thing in this dialect is that it has a surface melody which is entirely different from those of the surrounding dialects, all of which belong to what is generally called the Tôkyô-type tonological system. That is, it constitutes a dialectal island. Up to now, a number of linguists have tried to account for the tonological phenomena in this dialect and most of them have ended by proposing different phonological analyses. As far as I know, there are three interesting analyses: Hirayama (1957:264-82), Hattori (1973) and Okuda (1971).

In the following discussion, I will first present our autosegmental analysis, discussing mainly (i) what the basic tonological melody of the Narada dialect is; (ii) what the tone association rule is; (iii) how the surface tone melodies
are derived; and (iv) what the theoretical implications of the autosegmental analysis are. Finally, I will critically review the previous analyses mentioned above and discuss them.

12.2. The Autosegmental Analysis of the Narada Dialect

The Narada dialect is of interest in several respects: (i) it is an Initial-“H” type dialect; (ii) it has an initial raising process; (iii) it has a Star Shift Rule; and (iv) it has a H Deletion Rule, which deletes the second H tone when it is immediately preceded by another H tone.

This dialect, according to Inagaki’s (1957) laborious work, has n+1 tonal classes for n mora nouns. Thus, 3 mora nouns have 4 tonal classes, as indicated in (1).

(1) Narada  

<table>
<thead>
<tr>
<th>Narada</th>
<th>Tôkyôô</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. arare (ga)</td>
<td>arare (ga)</td>
</tr>
<tr>
<td>b. kagami (ga)</td>
<td>kagami (ga)</td>
</tr>
<tr>
<td>c. kabuto (ga)</td>
<td>kabuto (ga)</td>
</tr>
<tr>
<td>d. kokoro (ga)</td>
<td>kokoro (ga)</td>
</tr>
</tbody>
</table>

If we compare these nouns with the corresponding nouns in Tôkyôô, we will notice the following:

(2)a. In Narada, the position of the rightmost high tone is moved one mora to the right.

b. Narada has no high tone sequences.

c. In Narada, if the second mora has a low tone, then the first mora has a high tone.
Furthermore, in regard to the examples in (1b) and (1d), Inagaki observed that the initial H tone can be M, and sometimes L. In general, if an initial H tone is followed by another H tone within the same domain, its phonetic value is usually M, and sometimes L. However, (1a) and "kagami" in (1b) have always a H tone. This observation suggests that the initial high tone in (1a) and that of "kagami" in (1b) are different from the H tone in (1d) and that of "kagami-ga" in (1b).

On the basis of the observations in (2a), I would like to propose the following underlying star system, which is the same as Okuda's (1971) proposal:

(3) The Underlying Star System (Narada):

a. arara starless
b. kagami final-starred
c. *kabuto initial-starred
d. kokoro. medial-starred

The occurrence of an initial H tone followed by a L toned mora will be handled by introducing the following optional Initial Raising Rule:

(4) Initial Raising (Narada):

\[
\begin{array}{c}
V \quad C_0 \quad V \\
L \quad \rightarrow \quad \ \ | \quad | \\
H \quad L \\
\end{array}
\]

Furthermore, on the basis of (2b), I suggest that Narada has
LHL as the basic tone melody.

Now consider how this basic melody is assigned to the examples in (1). As far as I can see, there are two alternative solutions. One of them assumes that Narada has the following Star Shift Rule:

(5) **The Star Shift Rule (Narada):**

\[ \hat{v} (C_o V) \rightarrow V (C_o \hat{v}) \]

This rule states: if a starred V is followed by another V, then move the star to the V; otherwise, delete the star. Thus, if this rule applies to (3), we will have the following forms:

(6) a. arare

b. Kagami

c. kabuto

d. kokoro

In (6), the final starred "kagami" is turned into a starless word like (6a).

To this structure, Tone Association Rule (7) or the formalized version (7)' applies:

(7) **The Tone Association Rule (Narada):**

a. Associate the H tone of the basic tone melody with the leftmost starred V.

b. If a domain has no \( \hat{v} \), then associate the H tone with the leftmost V.
Notice that (7)' is an abbreviated schema of the following two sub-rules:

(8a) \[ \#\# Q \uparrow \]

(8b) \[ \#\# Q \downarrow \]

(8a) associates the H tone with the leftmost \( \uparrow \), and (8b) associates it with the leftmost \( \downarrow \). Tone Association Rule (7) assigns the basic tone melody LHL to the examples in (6), as indicated by the solid line (9):

\[
\begin{align*}
\text{(9) a. arare} & \quad \text{b. kagem} \quad \text{c. kabuto} \quad \text{d. kokoro} \\
\text{L H L} & \quad \text{L H L} & \quad \text{L H L} & \quad \text{L H L}
\end{align*}
\]

In (9), the dotted lines again indicate the effects of the Universal Tone Association Conventions.

To derive the surface melodies in (1) from (9), we will have to apply two rules. One of them is a Tone Association Rule which simplifies LH and HL contours to a H level tone.

(10) The Tone Simplification Rule (Narada):

\[
\begin{align*}
\text{L} & \quad \rightarrow \emptyset \\
\text{H} & \quad \rightarrow \left( \begin{array}{c} \text{or} \\
\text{V} \\
\left[ \begin{array}{c}
\text{L} \\
\text{H}
\end{array} \right] \Rightarrow \text{V}
\end{array} \right)
\end{align*}
\]
This is a mirror image process, which applies to a LH contour or a HL contour. The other rule is Initial Raising Rule (4), which applies to (9d) and turns the initial L tone optionally into a H (or M) tone. In this way, we can produce the surface melodies in (1).

Now consider the surface melody of "kagami-ga" in (1b). The Star Shift Rule applies to this phrase and moves the star onto the enclitic "ga" as indicated at level (i) in (11).

(i) Star Shift  kagami-ga
(ii) Tone Association  kagami-ga

(iii) Tone Simplification

(iv) Initial Raising

output

After the association of tone, the tonal rules developed above apply and derive the correct surface melody. Recall that Star Shift Rule (5) turns the final-starred word "kagami" into a starless string "kagami" which is exactly the same as the originally starless word "arare". Thus, we can understand why these two have exactly the same surface
melody. Furthermore, rule (5) turns the string "kagami-\* \-ga" into a final starred string "kagami-\* \-ga", which has a different structure from "arare-\( \bar{g} \)a". Thus, we can also understand the difference in their surface melodies.

Let us return to examples in (1a) and (1b). In the above analysis, I assumed, based on inter-dialectal considerations, that "\( \bar{a} \)rare (\( \bar{g} \)a)" is starless and "kagami\( \bar{g} \)a\( \bar{g} \)a", is final-starred. I will now justify the claim that "arare (\( \bar{g} \)a)" is starless. Consider the following data.

(12)a. \[
\text{\( \bar{a} \)rare-kara}
\]
\[
\text{\( \bar{a} \)rare-made}
\]
\[
\text{kabuto-kara}
\]
\[
\text{kabuto-made}
\]

In (12), (b) has the same surface melody as "kagami-\( \bar{g} \)a" in (1b). Thus, if it is correct to analyze "kagami-\( \bar{g} \)a" as penult-starred, then "arare-made" should also have penult-starred. If so, "made" must have an underlying star on the initial V. On the other hand, the L tone on "kara" (from) in (12a) suggests that it is unaccented. Now consider (12c) and (12d). Their underlying representations will be:

(13) a. /k\*\*buto-kara/  \[\text{\( \bar{g} \)}
\]
b. /k\*\*buto-m\*\*ade/

To these representations, Star Shift Rule (5) applies and derives the following:

(14) a. kabuto-kara  \[\text{\( \bar{g} \)}
b. kabuto-made\]

The Tone Association Rule developed above associates the H tone with the leftmost star. Thus, our system correctly derives the surface melodies in (12c) and (12d). Now assume
that "arare" had an initial star. Then, "arare-made" would have the underlying structure /arare-made/. Given this structure, our system predicts either that the phrase has the melody "arare-made" (if the star shift rule is blocked) or (ii) that the surface melody is "arare-made" if the star shift rule applies to the phrase. It is clear that these are all incorrect. This argument shows that "arare" cannot have a star.

Consider next one-mora words in Narada:

(15) a. 'handle'  
     H L

One-mora words fall into two tonal classes: accented and unaccented. Both of them have a HL falling contour. To derive this falling contour, there are two initially possible solutions. One of them is to assume that Tone Simplification Rule (10) be interpreted as a disjunctively ordered set of rules:

(16) a. L ----> \emptyset / Y

b. L ----> \emptyset / Y

That is, (16a) should precede (16b), and once (16a) is applied to a domain, then (16b) should be blocked.

To determine whether or not this solution works, consider
the following facts:

(17) a. sita 'below' b. sita c. sita-ga
d. kutibiru 'lips' e. kutibiru-ga
d'. kutibiru e'. kutibiru-ga
f. hikari 'light' g. hikari-ga

In (17a), if the high vowel [i] is not devoiced, the starlow word "sita" has a HL surface melody as in (a). However, if the [i] is devoiced, then the second mora has a H tone, and the third mora, if any, has a L tone. Likewise, in (17d), the High Vowel Devoicing Rule is optional, and "kutibiru (ga)" has variant surface melodies as indicated in (17d). Here again, if the initial vowel is devoiced, the H tone is shifted to the second mora. In (17f), "hikari" obligatorily undergoes High Vowel Devoicing. Thus, the initial H tone always occurs on the second mora. As we have already discussed, with respect to the Tōkyō dialect, this will be handled in our theory by applying the High Vowel Devoicing Rule after the Initial Raising Rule as follows:

(18) a. sita b. kutibiru-ga c. hikari
Star Shift
Tone Association

Tone
Simplification

(continued)
In (18), Star Shift applies to the starred words in (b) and (c). Then, the Tone Association Rule and the Universal Tone Association Convention map the basic tone melody on each word, and the Tone Simplification Rule and the Initial Raising Rule apply. After these tonal processes, High Vowel Devoicing applies and devoices the initial high vowels [i] and [u]. As a result of Devoicing, the Universal Erasure Convention for association lines, which was discussed in Chapter 1, erases the association line between the devoiced vowel and the initial H tone. Thus, the H tone is unbound. At this stage, the Universal Tone Association Conventions force us to reassociate the unbound tone with the second L-toned V, because that is the only V to which the unbound H tone can be reassociated. Finally, we will need another Tone Simplifi-
cation Rule, in order to simplify the contour tone in each example. The rule will be formalized as follows:

(19) The Tone Simplification Rule II (Narada):

\[
\begin{array}{c}
\text{\(V\)} \\
\text{\(H\)} \\
\text{\(L\)} \\
\end{array} \rightarrow \begin{array}{c}
\text{\(V\)} \\
\text{\(H\)} \\
\text{\(L\)} \\
\end{array} / \text{\(V\ C_o\)}
\]

This rule will apply to each example and simplifies the HL contour tone to a \(H\) level tone. The environmental specification \(VC_o\) is necessary, because without the environment, rule (19) would incorrectly apply to examples (15) and simplify them to a \(H\) level tone.

The first solution discussed above is based on the two assumptions: (i) the Tone Simplification Rule (10) is an abbreviation of a disjunctively ordered set of rules; (ii) rule (10) precedes High Vowel Devoicing. However, this solution introduces two HL contour tone simplification rules (10) and (19), which is awkward at best.

It should be noted here that there is no crucial evidence which compels us to order rule (10) before High Vowel Devoicing. If we assume that all of the Tone Simplification Rules follow High Vowel Devoicing and Reassociation, we can formalize the Tone Simplification Rules as follows:

(20) The Tone Simplification Rule (Revised):

\[
\text{\(L \rightarrow \emptyset / \begin{array}{c}
\text{\(V\)} \\
\text{\(H\)} \\
\end{array} (\text{or} \begin{array}{c}
\text{\(V\)} \\
\text{\(H\)} \\
\text{\(L\)} \\
\text{\(H\)} \\
\end{array} \rightarrow \text{\(V\)})}
\]
(20a) is identical with (16a) and (20b) is identical with (19). However, rules (20) do not have the redundancy which was found in the system with rule (10) and (19). Furthermore, rules (20) apply after Reassociation, which is more plausible than having rule (10) apply before High Vowel Devoicing and rule (19) apply after Reassociation.

The derivations in this alternative solution are as follows:

(21)  

<table>
<thead>
<tr>
<th>a. sita</th>
<th>b. kutibiru-ga*</th>
<th>c. hikari*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star Shift</td>
<td>kutibiru-ga*</td>
<td>hikari</td>
</tr>
<tr>
<td>Tone Association</td>
<td>sita</td>
<td>kutibiru-ga*</td>
</tr>
<tr>
<td>Initial Raising</td>
<td>kutibiru-ga*</td>
<td></td>
</tr>
<tr>
<td>High Vowel Devoicing</td>
<td>sita</td>
<td>kutibiru-ga*</td>
</tr>
<tr>
<td>Reassociation</td>
<td>sita</td>
<td>kutibiru-ga*</td>
</tr>
<tr>
<td>Tone Simplification (20a,b)</td>
<td>sita</td>
<td>kutibiru-ga*</td>
</tr>
</tbody>
</table>
As may be seen, this solution is parallel with that in Tôkyô. Rule (20b) is the same as the Simplification Rule in Tôkyô, if we leave the environment out of consideration. Furthermore, rule (20a) in Narada is an almost automatic consequence of setting up a LHL basic tone melody for Narada. In view of the fact that the Narada system evolved from the Tôkyô-type system, this solution seems to be better than the first solution illustrated in the derivations in (19).

It should be noted that the derivations in (21) give a reason for the fact that as a result of High Vowel Devoicing, the initial H tone is shifted onto the second V, and not onto the third, or \( n \)th V. Suppose, for the sake of argument, that the free H tones were to be reassociated with the third V as in (22):

\[
\text{(22) a. } \textit{kytibiru-ga} \\
\text{H} \quad \text{H}
\]

\[
\text{b. } \textit{hikari} \\
\text{L} \quad \text{H}
\]

Such associations violate the convention which prohibits the crossing of lines. Thus, the free H tone cannot be reassociated with the third V. The only V with which the free H tone can be reassociated is the second V. This is one of the interesting consequences of the Universal Conventions. (For related discussion, see Chapter 1.)

Finally, notice that this dialect can have no H tone sequences, with a few minor unsystematic exceptions.\textsuperscript{2}
This constraint seems not to be restricted to inside a single tonological domain, but to be extended to two adjacent tonological domains. As illustrations of this point, compare the following two cases:

(23) i) a. \( \mathbf{u}_\text{si-ga} \) 'cow + Sub'
   b. \( \mathbf{naku} \) 'moo'
   c. \( \mathbf{u}_\text{si-ga naku} \) 'a cow moos'

ii) a. \( \mathbf{h}_\text{nu-ga} \) 'dog + Sub'
   b. \( \mathbf{naku} \) 'bark'
   c. \( \mathbf{h}_\text{nu-ga naku} \) 'a dog barks'
   d. \( \mathbf{h}_\text{nu-ga naku} \)

The verb "naku", which has a HL surface melody when it occurs in isolation, takes a HL surface melody, when the preceding tonological domain ends with \( \_ \) (see 23ic), while it takes LL melody, otherwise. Thus, (23iic) is ill-formed and the correct surface melody should be as in (23iid).

To handle this lowering process, I suggest that Narada has the following H Deletion Rule:

(24) **The H Deletion Rule** (Narada):

\[
\text{H} \longrightarrow \emptyset / \text{H} \#\# \\
\]

This rule applies to the following structure:

(25) \( \mathbf{##inu-ga##naku##} \) 'a dog barks.'

\[
\begin{array}{ccc}
\text{H} & \text{L} & \text{H} \\
\text{H} & \text{L} & \text{H} \\
\end{array}
\]

and deletes the H tone associated with the verb "naku" (bark):
(26) \#\#inu-ga\#\#naku\#
   H L H L

Here, the Universal Tone Association Conventions force us to reassociate the L tone to the initial mora of "naku", because the tonal domain which is marked by word boundaries (\#\#) has only one tone L. Thus, we get the following correct surface melody:

(27) \#\#inu-ga\#\#naku\#
   H L H L

Notice that this H Deletion also applies to the H tone introduced by Initial Raising. Consider the following case:

(28) /atama-ga\#\#ookii/ 'his head is big'
   H L H H L H

In this example, the high-tone associated with the initial mora of "ookii" is introduced by the Initial Raising Rule. (24) applies to the output of this Raising Rule and correctly derive the surface low tone.

To summarize, we have proposed the following tone system of the Narada dialect:

(29) **The Tone System of the Narada Dialect**:

a. The Basic Tone Melody : LHL

b. Star Shift (5): \(\uparrow (C_o \downarrow V) \longrightarrow V (C_o \downarrow \uparrow)\)
c. **Tone Association Rule (7):**

\[
\begin{array}{c}
\ V \ \\
\ \downarrow \\
\ H
\end{array}
\]

(\text{where } Q \text{ contains no } \tilde{q})

d. **The Initial Raising Rule:**

\[
\begin{array}{ccc}
V & C_o & V \\
\ \downarrow & \mid & \mid \\
L & H & L
\end{array}
\rightarrow
\begin{array}{ccc}
\emptyset & C_o & - \\
\ \mid & \mid & \\big/ C_o
\end{array}
\]

e. **The High Vowel Devoicing Rule:**

\[
\text{[+high]} \rightarrow \text{[-voice] } / \text{[-voice] } \rightarrow \text{[-voice] }
\]

f. **Tone Simplification Rule (20):**

(a) \( L \rightarrow \emptyset \)

or \( \begin{array}{c}
\ V \\
\ \downarrow \\
\ H
\end{array} \rightarrow \begin{array}{c}
\ V \\
\ \downarrow \\
\ H
\end{array} \)

(b) \( \begin{array}{c}
V(C_o V) \\
\ \downarrow \\
H L
\end{array} \rightarrow \begin{array}{c}
V(C_o V) \\
\ \downarrow \\
H L
\end{array} / V C_o
\)

g. **H Deletion Rule (24):**

\( H \rightarrow \emptyset \)

The basic tone melody LHL and the Universal Tone Association Conventions will automatically account for the fact that Narada has no H tone sequences (cf. footnote 2). **Tone Association Rule (7)** associates the H tone with the initial V of a starless word. Thus, this is another instance of the Initial-H type dialect discussed in the preceding chapter. The High Vowel Devoicing Rule is ordered after the Initial Raising Rule and before Tone Simplification Rule (20).
The H Deletion Rule is ordered at least after the Initial Raising Rule. Recall that in the discussions of Ôsaka, Kameyama, etc., we have observed a Collocational H Deletion Rule of the following form:

\[(30) \ H \longrightarrow \emptyset / \ #\# \ L \ #\# \ H\]

Rule (24), which is almost a mirror image of (30), seems to be found in several Japanese dialects.

12.3. **On Some Alternative Analyses**

In the preceding section, we have proposed a tonal system which incorporates Star Shift, the LHIL melody and the Tone Association Rule (7)'. However, there seem to be several feasible alternative tonal systems.

As the first alternative, assume that Narada has no Star Shift Rule. Then, the Tone Association Rule will have to be formalized as follows:

\[(31) \ #\# (Q V') C_O \ V \]

\[H \ (\text{where } Q \text{ contains no } V')\]

The effects of this rule are (i) to associate the H tone with the V which immediately follows the V', or (ii) if there is no such V, to associate the H tone with the initial V. This makes it possible to exclude the star shift rule from the Narada system. As far as I can see, all the other rules remain the same. Thus, this approach will be slightly simpler than the system in (29). However, it seems to me
that the Tone Association Rule (31) is slightly less natural in that the association process does not start from the starred V. Otherwise, the two systems seem to be almost equivalent. As I have no crucial evidence for or against either of these two systems, I will leave the matter open here for the moment. I will return to this later in Chapter 15.

Consider now what will happen if we assume that the basic tone melody is L. Then, we will need no language-particular Tone Association Rule, because the Universal Tone Association Conventions discussed in Chapter 1 automatically assign the L tone to a given string. Furthermore we need no Tone Simplification Rule. Instead, this approach requires the following H Insertion Rule, which inserts a H tone on the starred V:

$$(32) \begin{array}{c}
\text{Q} \uparrow \text{R} \\
\text{L} \\
\text{Q} \uparrow \text{R}
\end{array} \quad (\text{where Q and R are maximal sequence of phonological segments, and Q contains no V.})$$

Furthermore, to handle the contour tone of monosyllabic words, we will need a Contour Formation Rule which applies only to monosyllabic words:

$$\begin{array}{c}
\text{V} \\
\text{L} \\
\text{V}
\end{array} \quad / \#\# C_o \quad \#\#$$

This should precede (32) for obvious reasons. The rest of
the system will remain the same as in (29). Though this system works and it is almost equivalent in terms of complexity, it seems to be less interesting because the system with the L melody and (32) does not account for the fact that this dialect has no H tone sequence. On the other hand, in the system with the LHL melody, the fact that Narada has no H tone sequence is an automatic consequence of having LHL as the basic melody. Thus, I prefer the LHL melody theory to the L melody theory.

Needless to say, there are a few other alternatives. However, I will not discuss them here, because as far as I have been able to check them, they are either more complicated or less elegant or at best notational variants of the above-mentioned solutions.

12.4. Remarks on Previous Analyses

Let us now discuss the major 3 analyses proposed by Hirayama (1957), Hattori (1973), and Okuda (1971). The first two analyses are made within the tradition of Japanese linguistic description, and the third analysis is made within the framework of pre-SPE generative phonology. More specifically, Okuda's analysis is based on the framework used by McCawley (1968). I will discuss the three analyses in the order given.
12.4.1. Hirayama's Ghost Accent Analysis

Using the terminology of the present theoretical framework, Hirayama's analysis can be stated essentially as follows: the basic tone melody of this dialect is HL, and each word has one accent mark (*). What is unique in his analysis is that he proposed what I name here * Ghost Accent (=post accent) which is analogous to the notion of floating tones in tone languages. Thus, take three mora words of Narada. His underlying analyses of the words are as follows:

(34) Nouns

(a) hail əraɾe (ga) /əɾare/
(b) mirror kagaɾi (ga) /kagami /
(c) heart kokoro (ga) /kokoro/
(d) helmet kabu (ga) /kabuto/

Verbs

(e) throw sutɛ-ru /sutɛ-ru/
    away

(f) move ugok-u /ugok-/
(g) red əkai /əkai/
(h) white siro /siro/

Note: (i) * stands for an abstract accent marker.
(ii) Forms enclosed by // represent the underlying form of each word.
(iii) the basic tone melody is HL.

The ghost accent in (b) is realized on the enclitic which
follows a noun. It disappears, however, when the word with
the accent occurs in isolation in a tonological domain.
Hirayama's analysis seems to be implicitly based on the
following principle:

(35) Hirayama's implicit principle for determining the
Underlying Accent:
If the surface tone melody has only one H tone,
assign the underlying accent on the mora where the
H tone occurs. If it has two H tones, put the under-
lying accent on the rightmost H-toned mora.

It is clear that this is an analysis which is fairly
close to the surface tone melody. Though this analysis is
very interesting and suggestive, it can be shown to be in-
correct. In particular, as we have already seen, it is:
mistake to analyze (34), or more generally, words with an
initial high tone, which correspond to those of the accentless
class in Kôfu, as having an initial accent in Narada.

To see why it is incorrect, consider the following
examples:

(36) a. candy  ame kara  ame made
 a'. /ame kara/  /ame made/

b. rain  ame kara  ame made
 b'. /ame* kara/  /ame made* /

Hirayama's implicit principle (35) would force us to set up
the underlying structure of "made" (even) as /me/made/, since otherwise we would not be able to account for the high tone on the final mora of "made" in (a).

Now compare the phrase "ame-made" in (b) and its underlying representation (b)'. We immediately notice that the Narada dialect, like other Japanese dialects, has the leftmost accent prevailing principle, which says that if there are two or more accents within the same tonological domain, the left-most accent wins and all the other accents are ignored. Because of this principle, the correct surface tone melody LHLL will be obtained for "ame-made" (even rain) in (b).

Now if "ame" (candy) in (a) has an underlying accent like /ame/, then /ame-made/ in (a') will be assigned the ill-formed surface melody "ame-made" (even candy) instead of the well-formed "ame made" in (a). However, if "ame" (candy) in (a) is assumed to be accentless (/ame/) then the surface melody "ame made" (even candy) will be directly introduced from /ame made/, by introducing only one independently-needed rule which makes the initial mora high.

In addition to this, Okuda provided two more arguments to suggest that the examples like (34a) and (36a) are unaccented in the underlying structure. Here I will mention only one of them. Both Inagaki (1957) and Hirayama (1957) pointed out that in the speech of the younger Narada speakers, non-initial high tone is moved one mora to the right if the
shift is possible. Consider the following examples:

(37) Tone Melody: Older Generation younger Generation

   a. \( \text{koomori}\text{-}ga \) 'bat+Sub' \( \Rightarrow \text{koomori}\text{-}ga \)
   b. \( \text{tebukuro} \) 'glove' \( \Rightarrow \text{tebukuro} \)

In (b), the non-initial high tone is simply shifted one mora to the right. On the other hand, in (a), not only is the non-initial high tone shifted one mora to the right, but at the same time the initial mora is also raised. As I mentioned above, this shift occurs only when a non-initial high tone is followed by at least one mora. For example, compare the following cases:

(38) Older Generation Younger Generation

   a. \( \text{inoti} \) 'life+Sub' \( \Rightarrow \text{inoti} \)
   b. \( \text{inoti}\text{-}ga \) 'life+Sub' \( \Rightarrow \text{inoti}\text{-}ga \)

In (a), where "inoti" is uttered in isolation, no shift takes place. However, in (b), where the subject enclitic follows the noun, the high-tone shift is applicable which moves a high tone on the accented syllable one mora to the right. In this instance, it moves the high tone from "ti" to "ga" in the speech of the younger generation. In the high tone shift rule is a correct generalization, then we naturally expect the initial high tone in (34a) and (36a), which is analyzed to be initial-accented by Hirayama, to move. However, this expectation is wrong, and the initial high tone in (34a) and (36a) remains as it is.
Faced with this fact, we have two possibilities: either the generalization is wrong and it should be restricted to a non-initial high tone with an underlying accent marker, or Hirayama's analysis in which "āme" (candy) and "ārare" (hail) in (7a) and (5a) have an underlying initial accent is wrong. Since we already have independent evidence to show that the latter is the case, and since we have no evidence to show that the generalization about the high tone shift should be restricted to non-initial high tones in an ad hoc fashion, the correct choice seems to be to modify Hirayama's accent analysis, and to preserve the generalization in its broadest form.

Since initial-high-toned nouns have been proved to be unaccented, Hirayama's analysis now has the following formal classes:

(39) *Hirayama's analysis:

<table>
<thead>
<tr>
<th>Tone Melody</th>
<th>No accent</th>
<th>1st accent</th>
<th>2nd accent</th>
<th>3rd accent</th>
<th>ghost accent</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>(3h)</td>
<td>X</td>
<td>(34c)</td>
<td>(34d)</td>
<td>(34b)</td>
</tr>
</tbody>
</table>

Examination of (39) immediately reveals that his analysis has a strange gap (no initial-accented nouns) and that it has a strange ghost accent. If we were to admit the notion of ghost accent, then the theory would permit there to be some
language which has 5 tonal classes for 3 mora nouns. As far as I know, if a language has only one basic tone melody, it can have at most 4 tonal classes for 3 mora nouns, and never 5 tonal classes. Thus, the ghost accent theory makes a wrong prediction. Furthermore, Hirayama's analysis (39) cannot account for the fact that Narada has no initial-accented nouns.

These observations should be sufficient to show that even admitting that his ideas are interesting, Hirayama's analysis cannot be accepted in its entirety.

12.4.2. Hattori's Two Melody Analysis

In his extremely interesting paper, Hattori (1973) proposed an interesting alternative analysis. The interesting point of his analysis, if translated into the terminology of the present framework, will be in (i) the rejection of Hirayama's notion of ghost accents and (ii) the introduction of the two basic tone melodies for the Narada dialect: HL and LH.

According to his system, the three mora words in (34) of the Narada dialect are essentially analyzed as follows:

(40) Nouns

a. hail あられ (ga) /arare/ unaccented with the HL melody

b. mirror かがみ (ga) /kagami/ final-accented with the LH melody
The crux of his analysis is the introduction of the LH melody for the (b) type nouns, which are analyzed by Hirayama as having ghost accents. The analyses of (c) and (d) are the same as Hirayama, which suggests that Hattori's analysis is also made at a level fairly near the surface. The other difference between Hirayama and Hattori is that the latter correctly regards the (a) type nouns as unaccented. Though Hattori does not mention the analyses of verbs and adjectives, he would analyze the (e) type verbs and the (g) type adjectives as unaccented and the (f) type verbs and the (h) type adjectives as final-accented. Furthermore, it is fairly clear that he would claim that all present forms of verbs and adjectives have the tone melody HL. Schematically, Hattori's analysis will be summarized as follows:

<table>
<thead>
<tr>
<th>Case</th>
<th>Noun</th>
<th>Medial-Accented</th>
<th>Final-Accented</th>
<th>Unaccented</th>
</tr>
</thead>
<tbody>
<tr>
<td>c.</td>
<td>kabuto (ga)</td>
<td>/kabuto/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>kokoro (ga)</td>
<td>/kokoro/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>sute-ru</td>
<td>/sute-ru/</td>
<td></td>
<td>Unaccented with the HL melody</td>
</tr>
<tr>
<td>f.</td>
<td>ugoku</td>
<td>/ugoku/</td>
<td></td>
<td>Final-accented with the HL melody</td>
</tr>
<tr>
<td>g.</td>
<td>akai</td>
<td>/akai/</td>
<td></td>
<td>Unaccented with the HL melody</td>
</tr>
<tr>
<td>h.</td>
<td>siroi</td>
<td>/siroi/</td>
<td></td>
<td>Final-accented with the HL melody</td>
</tr>
</tbody>
</table>
(41) Nouns of three moras

<table>
<thead>
<tr>
<th>Tone melody</th>
<th>no accent</th>
<th>1st accent</th>
<th>2nd accent</th>
<th>3rd accent</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>(a)</td>
<td>X</td>
<td>(c)</td>
<td>(d)</td>
</tr>
<tr>
<td>LH</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(b)</td>
</tr>
</tbody>
</table>

Examination of (41) immediately shows that there are strange gaps in his analysis: (i) there are no initial accented nouns with a HL melody; (ii) there are no unaccented, initial-accented, or medial-accented nouns with the LH melody. In other words, the LH melody is possible only when a noun has the final star. The weakest point of his analysis is the fact that these gaps cannot be accounted for.

Furthermore, there are a couple of controversial points in his analysis: First of all, this is a rather clumsy accent system, and the very clumsiness suggests that there must be some important generalization missing. Secondly, in Hattori's accent system with two melodies, it would be difficult to explain the relation between the Narada dialect and its surrounding dialects (e.g. the Kofu dialect) in a natural fashion.

On the basis of these observations, I conclude that Hattori's two melody analysis for the Narada dialect can safely be excluded from the candidates for possible analyses of this dialect.
12.4.3. Okuda’s Generative Analysis

Now let us examine Okuda’s generative analysis, which is made essentially by applying McGawley’s (1968) framework. Quite differently from the previous two analyses, Okuda paid the necessary attention to the correspondence relation between the Narada dialect and the Tôkyô (or Kôfu) dialect, which was pointed out by Inagaki (1957) and Hirayama (1957). Thus, he assumed that the two dialects have essentially the same underlying accent. His analysis of the three mora words is:

(42) Nouns

| a. hail | arare (ga) | /arare/ | unaccented |
| b. mirror | kagami (ga) | /kagami/ | final-accented |
| c. helmet | kabuto (ga) | /kabuto/ | initial-accented |
| d. heart | kokoro (ga) | /kokoro/ | medial-accented |

Verbs

| e. throw | sute-ru | /sute-ru/ | unaccented |
| f. move | ugok-u | /ugok-u/ | penult-accented |

Adjectives

| g. red | akai | /akai/ | unaccented |
| h. white | siroi | /siroi/ | penult-accented |

Thus, his underlying accent system has a very neat form:

(43) | 0 accented | 1st accented | 2nd accented | 3rd accented |
| (a) | (c) | (d) | (b) |
In this respect, Okuda's analysis is exactly the same as our analysis proposed in section 12.2. With regards to the underlying accent of the (f) type verbs and the (h) type adjectives, he actually assumes that they have an underlying antepenultimate accent and that it is moved to the penultimate mora in the case of present forms. However, since that choice is irrelevant for purposes of the present discussion, I will assign the underlying accent to the penultimate mora for ease of exposition. He explicitly proposed the following three Pitch Actualization Rules:

(44) **Okuda's Pitch Actualization Rules:**

a. **Low Pitch Assignment:** Make everything in a tonological phrase (marked by %) low-pitched. This is formalized as in: \[ X \% ----> L_1 \]

b. **High Pitch Assignment:** (i) Make the L after [+acc] high-pitched. (ii) Make the initial L high-pitched if the second mora is L. This process is optional if the tonological domain contains another H. These two processes are formalized as in:

\[ L ----> H / \left\{ \begin{array}{l}
[+Acc] \\
\% L X
\end{array} \right\} \]

(ii) optional when X contains an H.

c. **Pitch Adjustment:**

X becomes L if it is immediately preceded by another H. This is formalized as in:
This system is almost self-explanatory. Thus, I will only present some sample derivations of his system:

(45)  a. /kabuto-ga/  b. /arare-ga/

Low Assignment  L L L L  L L L L

H Assignment (i)  H  

(ii)  

Pitch Adjustment  

output  kabuto-ga  arare-ga

c. /inu-ga% naku/  d. /usi-ga% naku/

Low Assignment  L L L L  L L L L

H Assignment (i)  H  

(ii)  H  H  H  H

Pitch Adjustment  L  

output  inu-ga  naku  usi-ga  naku

The derivations in (c) and (d) suggest that the Pitch Adjustment in (44c) applies across the tonological domains. Thus, the formula in (14c) should be modified. Okuda's system of rules is interesting, but he has no discussion of why L is assigned first to all moras. Furthermore, his rule (14bii) incorrectly predicts that if a one-mora noun occurs in isolation, it becomes L. Since this is clearly incorrect, his rule (b) should be reformulated so as to handle the falling tone of these words.
As we have seen above, though Okuda's analysis is far more superior to the other analyses, we must regretfully say that it has some deficiency in its system, which should be duly modified.

Examination of Okuda's analysis will suggest that, if it is duly modified, this analysis will be equivalent essentially to the L melody theory discussed in section 12.3. If so, we should choose the LHL melody theory proposed in section 12.2 or 12.3 for the reason discussed in section 12.3.

12.5. Concluding Remarks

In the above discussion, I have first proposed an autosegmental analysis, and made clear that this dialect has the following characteristics:

(i) The basic tone melody of this dialect is LHL.
(ii) This dialect belongs to the H-Initial type.
(iii) It also belongs to the Initial-Raising type.
(iv) It contains a synchronic Star Shift Rule.

Recall that characteristics (i), (ii'), (iii), and (iv) are also shared by the hami dialect. Thus, these two dialects which are very different in their surface melodies can be classified into the same class. Then I discussed briefly a couple of plausible alternative analyses. And finally, I examined the three major previous analyses: Hirayama's
ghost accent analysis, Hattori's two melody analysis, and Okuda's generative analysis. I argued that all of them are insufficient in some respects, though their ideas are very interesting and sometimes correct.
FOOTNOTES TO CHAPTER 12

1. We will examine an alternative solution with no Star Shift, in section 12.3.

2. In Nakagawa (1957) reports that there are only three words which can sometimes be pronounced with two H's occurring in sequence. Namely, "kita" (north) can be pronounced as in "kita" as well as "kita", "sanka" can sometimes be pronounced as LHH when "ga" (sub) is attached as in "sanka-ga", and "murasaki" can also be pronounced as LHHL as in "murasaki".

3. Recall that this is incorporated into our Tone Association Rule (?').

4. This fact will be handled in our star shift theory by introducing the following Star Shift Rule for younger speakers:

   (i) **The Star Shift Rule (for Younger Speakers)**

   (Narada): 

   \[ \checkmark \left( (C_o V) C_o V \right) \quad \rightarrow \quad V \left( (C_o V) C_o \checkmark \right) \]

   The same fact will be handled in the alternative theory without incorporating star by introducing the following Tone Association Rule for younger speakers:

   (ii) \[ \# \left( Q \checkmark (C_o V) \right) C_o V \]

   In any case, this fact can easily be handled in the present framework.
CHAPTER 13
SUMMARY OF RULES

13.0. Introduction

Up to now, I have constantly asked what tonal system a dialect D has? In particular, I have, implicitly or explicitly, asked the following questions:

(i) What is the underlying star system of D?
(ii) What are the basic tone melodies of D?
(iii) What is a Tone Association Rule for D?
(iv) What Tone Alternation Rules are necessary to derive surface melodies?
(v) What kind of star rules does D have?

In each chapter, I have tried to answer these questions, assuming two universal conventions.

In this chapter, I restate these conventions first in section 13.1. Then, in section 13.2, I attempt to classify Japanese dialects in terms of the basic tone melodies, the number of tonal classes, tonal rules, etc. Finally, in section 13.3, I present a summary of rules with brief comment. List (21) contains most of the information concerning what dialect has what melodies and what rules discussed above.

Before going on to our main concern, some comment on notational conventions seems to be in order.
In the previous discussions we used a symbol \( V \) to represent a tone-bearing unit. To indicate the SC of a rule, we used a dotted line as follows:

\[
(1) \quad \#\# Q \quad V \\
\quad H
\]

In (1) \( Q \) is a unique variable which is the maximal sequence of a phonological string. We have basically followed Halle and Vergnaud's conventions on unique variables (which are represented by \( Q, P, R, \) etc.) and on general variables (which are represented by \( X, Y, Z, \) etc.). If a \( Q \) and a word boundary \( (#) \) are placed half way between \( V \) and a tone \( (T) \) as follows:

\[
(2) \quad \#\# Q \\
\quad H
\]

\( Q \) is interpreted as covering the maximal sequence of both phonological and tonological segments.

On the other hand, if a solid line is drawn between \( V \) and \( T \) in a tonal process, the solid line shows that \( V \) and \( T \) are associated with each other (or are bound by each other). The double slant \( (//) \) in a tonal process shows that the process is an abbreviation of two mirror image processes. Thus, consider the following case:

\[
(3) \quad ^{\#} C_{0} \quad V \\
\quad T_{2} \quad T_{1} \quad (//)
\]
is an abbreviation of the following two processes:

\[ \begin{align*}
(4)a. & \quad \# C_0 \overset{V}{\rightarrow} \# \\
& \quad T_2 \quad T_1 \\
(4)b. & \quad V \overset{C_0}{\rightarrow} \# \\
& \quad T_1 \quad T_2
\end{align*} \]

In other respects, we follow the notational convention for the use of symbols which is now familiar from Chomsky-Halle (1968).

13.1. Universal Conventions

In the previous chapters, we discussed the following two universal conventions:

(5) Universal Tone Association Conventions (=6 in Chapter 1):

(i) All tones should be associated with at least one tone-bearing unit, and conversely, all tone-bearing units should be associated with at least one tone in the tone melody.

b. No association lines should cross.

(ii) To guarantee (i), perform the following process:

a. If a domain contains only one free tone, or if it contains only one free tone to the right (or left) of a bound tone, the free tone should be associated with every free tone-bearing unit, or every free tone-bearing unit on the same side of the bound tone. I.e.,
(\(V\))^{P}_{T_1}^{T_2} \quad (where \(P\) is the maximal sequence of free tone-bearing units, and \(T_2\) is a free tone.)

b. If a domain contains no \(V\) to the right (or left) of a bound \(V\), and if it contains at least one free tone, the free tone should be associated with the bound tone-bearing unit. I.e.,

\[ V \quad (where \(Q\) is the maximal sequence of free tones.)

\[ T_1 \]

\[ Q \]

c. If a domain contains at least one \(V\) to the right (or left) of a bound tone and if there is no free tone, associate the bound tone with the remaining tone-bearing units. I.e.,

\[ R \quad V \quad (where \(R\) is the maximal sequence of free tone-bearing units.)

\[ T \]

(6) Erasure Conventions for Association Lines:

If a tone-bearing unit \(V\) is turned into an element which cannot carry a tone by some phonological process (such as Devoicing Rules, Deletions, Glide Formation, etc.), the association line drawn between a tone and the element in question will be erased automatically.
It should be noted that convention (5iia) is modified in Part II so as to incorporate the one-to-one correspondences between tonal segments and tone-bearing units in the formula.

13.2. **Typology of Japanese Dialects**

Japanese dialects are classified into two systems: accentual and non-accentual. The accentual system characterizes a language which has a star specification in the lexicon or which assigns a star on a particular V by a general rule. The accentual system in Japanese is divided into two types: Tōkyō type and Kansai type. The non-accentual system characterizes a language which makes no use of a star. The latter system contains the so-called tone languages and accentless dialects in Japanese. The latter are also divided into two types:

(7)a. **Accentual System** Dialects discussed above

i) Tōkyō-type: Tōkyō, Nagoya, Matsue, Kōfu, Hirosaki, Nākamura (Kōti Prefecture), etc.

ii) Kansai-type (or Kyōto-type): Kyōto, Ōsaka, Kōti, Kameyama, Marugame, Takamatsu, etc.

b. **Non-accentual System**

i) Kagoshima type (or Two-Accent type): Kagoshima, Ogachogamitsu, Koshikizima dialects, Shuri, etc.

ii) **Miyakonozyō-type (or Accentless-type)**: Miyakonozyō,
Sendai, Shimagawa, Izumi, Uchinoura, Uchiko, etc.

Tôkyô-type dialect is characterized by one basic tone melody and \( n+1 \) tonal classes for \( n \) mora nouns. Kansai-type dialect is characterized by two basic tone melodies. Kagoshima-type dialect is characterized by one basic tone melody and two tonal classes. Finally, Miyakonozyô-type dialect is characterized by one basic tone melody and one tonal class. In other words, the last type dialect has no tonal contrast.

Secondly, we can classify Japanese dialect in terms of the criterion of what kind of basic tone melodies a dialect has.

(8)a. \textbf{HL melody}: Tôkyô, Nagoya, Matsue, Kôfu, (Shimago, Shimamagawa, Sendai) etc.

b. \textbf{LHL melody}: Hirosaki, Kumi, Narada, Nakamura, (Kagoshima, Koshikizima, Ogachogamitsu), etc.

c. \textbf{LH melody}: (Miyakonozyô)

d. \textbf{H melody}: (Uchiko, Yamato, etc.)

e. \textbf{HL and LHL melody}: Kyôto, Ōsaka, Kameyama, Kôti, Takamatsu, Marugame, etc.

f. \textbf{HL, LHL, and LH melody}: the Old Kyôto dialect.

In (8), the dialects enclosed by parentheses are non-accentual dialects. What requires comment in the above table is
the Old Kyōto dialect. According to a number of investigations by Japanese linguists, this dialect had three tonal classes. In our theory, this dialect is interpreted as having had 3 basic tone melodies.¹ As far as I know, this is the most complicated accentual system. There seems to be no accentual system with 4 basic tone melodies or more. On the other hand, non-accentual dialects in Japanese have only one basic tone melody. These dialects are markedly different from the other non-accentual systems such as Chinese, Mende, etc., because the latter have at least 4 tone melodies. Though there seem to be some 2-melody non-accentual systems (mainly of verbs), I know of no non-accentual system with 3 basic tone melodies.

Thirdly, we can classify accentual dialects into 3 types in terms of whether or not a dialect has unaccented words and if it has, where the H tone of a basic tone melody is assigned:

(9)a. Last-H type: Tōkyō, Ōsaka, Kameyama, etc.
    b. Initial-H type: Kumi, Narada.
    c. All-Accent type: Hukuoka.

As far as I know, there are two dialects in Japanese which associate the H tone with the initial V of a word: Kumi and Narada. Some of the Slavic languages seem to belong to this class (cf. Halle (1971), Haraguchi (1975)). In Japanese, Hukuoka has no accentless nouns. Thus, I classify it as the
all-accent type. English seems to belong to this class (See Goldsmith (1974b)). It is interesting to note that most of the Japanese dialects belong to the Last-\text{-}H type.

Fourthly, we can classify dialects into two types in terms of an Initial Raising Rule. If a dialect has this rule, it is an Initial Raising dialect, and if it has not, it is a non-initial raising dialect:

(10)\text{a. Initial Raising Dialects:}
Nakamura, Ogachogamitsu, Main Koshikizima,
Eishi, Narada, Kumi, etc.

b. Non-Initial Raising Dialects:
Tōkyō, Ōsaka, Kagoshima, all Initial Lowering Dialects, etc.

Fifthly, if a dialect has an Initial Lowering Rule, it is an Initial Lowering dialect and if not, it is a Non-Initial Lowering dialect:

(11) Initial Lowering Dialects:
Tōkyō, Nagoya, Matsue, Takamatsu, Marugame, etc.
Non-Initial Lowering Dialects:
Ōsaka, Kameyama, Kagoshima, all Initial Raising Dialects, etc.

We could classify dialects according to other tonal rules, but we will not do so here. Instead, we turn now to a summary of tonal rules.
13.3. **Summary of Tonal Rules**

The Tone Association Rules discussed above are as follows:

(12) **Tone Association Rules:**

a. ␣괴 Q V (Tôkyô, Ôsaka, etc.)

b. ␣괴 Q V (Hukuoka)

   H (where Q contains no ꦅ.)

c. V ( Q V ) Q ꦅ (Kagoshima)

   H (where Q contains no ꦅ.)

d. ␣괴 Q V ( ( V ) ꦥ V ) (Koshikizima)

   H

e. V Q ꦥ (Kumi)

   H (where Q contains no ꦅ.)

f. (i) ␣괴 (Q ꦥ) ꦥ V or (ii) ␣괴 ꦥ ꦥ (Narada)

   H H (where Q contains (where Q contains no ꦅ.)

   no ꦅ.)

g. ␣괴 Q V (Miyakonozyô)

h. ␣괴 ꦥ ꦥ V (Izumi)
Most accentual systems in Japanese have Tone Association Rule (12a). The only difference between (12a) and Tone Association Rule (12g) for Miyakonojō is that though (12a) needs a negative condition of Q. (12g) has no condition on Q. As mentioned above, Hukuoka has no accentless nouns. Thus, I assume here that Hukuoka has Tone Association Rule (12b). In regard to (12c), it should be noted that the negative condition is that Q contains no tone-bearing unit (i.e., V). Since Kagoshima is a non-accentual system, the negative condition cannot mention V. Since Narada has two alternative analyses, I restated the two association rules in (12f). If we choose an analysis with Tone Association Rule (12fi) for Narada, we will have to choose the following tone association rule for younger speakers in Narada:

\[(12)j. \#\# (Q \tilde{V} (C_o V)) C_o V\]

Now let us consider rule (12h). There are several non-accentual systems that have Tone Association Rule (12h), though I discussed only a few dialects in the preceding chapters. Finally, it should be noted that the Tone Association Rules in (12g) and (12i) can be formalized as follows:
(12) (i) where $Q$ is the maximal sequence of both phonological and tonological segments; (ii) where $T$ is a tone.

The Tone Simplification Rules discussed above are summarized as follows:

(13)a. (i) $V (C_o V) \rightarrow V (C_o V)_{(Tokyo)}^3$

(ii) $L \rightarrow \emptyset / / \emptyset$

(b) $V \rightarrow V (Nagoya)$

c. $[-\uparrow] \Rightarrow [-\uparrow]$ (Hirosaki, Osaka, Kameyama)

d. $\Rightarrow$ (Hirosaki, Osaka, Kameyama)

e. $L \rightarrow \emptyset / / V$

(Nakamura)

f. $V (C_o V) \rightarrow V (C_o V) / V C_o$

(Narada)
(13a) and (13f) are equivalent except for the different environmental specifications. In (13d), I tentatively placed a star on the V, because in Hirosaki and in other dialects, an initial V always has a star when a LH contour tone is assigned to the V. However, the * in (13d) is dispensable and if we take this option, (13d) is identical with (13g).

Let us turn to the Initial Lowering Rules discussed in the previous chapters. Though Tōkyō has several versions of Initial Lowering, depending on speakers, I will present the simplest one only:

\[(14)a.\] 
\[
\begin{array}{c}
V \\
H
\end{array} \rightarrow \begin{array}{c}
\text{C}_o \text{V} \\
\text{L}
\end{array} \quad \begin{array}{c}
\text{V} \\
\text{L}
\end{array} \quad \begin{array}{c}
\text{C}_o \text{V} \\
\text{H}
\end{array} \quad /\quad \text{[+pause]} \quad \text{C}_o \quad /\ \\
\begin{array}{c}
\text{Tōkyō}
\end{array}
\]

\[b.\] 
\[
\begin{array}{c}
V \text{ (CV) CV} \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
\text{V (CV) CV} \\
\text{L}
\end{array} \quad /\quad \text{[+high]} \quad \text{C}_o \quad /\ \\
\begin{array}{c}
\text{Nagoya}
\end{array}
\]

\[c.\] 
\[
\begin{array}{c}
V \text{ Q CV} \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
\text{V Q CV} \\
\text{L}
\end{array} \quad /\quad \text{[+high]} \quad \text{C}_o \quad /\ \\
\begin{array}{c}
\text{Matsue}
\end{array}
\]

\[(\text{where Q= (C} [V]^{n})_{o}\text{)}\]

\[d.\] 
\[
\begin{array}{c}
V \\
\text{H}
\end{array} \rightarrow \begin{array}{c}
\text{V} \\
\text{L}
\end{array} \quad \begin{array}{c}
\text{C}_o \text{V} \\
\text{H}
\end{array} \quad /\quad \text{[+high]} \quad \text{C}_o \quad /\ \\
\begin{array}{c}
\text{Marugame}
\end{array}
\]
Since I have no relevant phonetic data in the Marugame dialect, I tentatively formalized the initial rule in Marugame as in (14d). Rule (14e) in Takamatsu is an abbreviation of Initial Lowering Rule (14d) and another Lowering Rule, which applies to the output of the Flop Rule.

Examination of the Initial Lowering Rules in (14) suggests that the process will be formalized simply as the L (or M in Sendai) Insertion which inserts L tone to the left of the leftmost H toned V.

\[(14)' \]
\[\begin{array}{c}
\text{## Q} \\
V & C & V \\
| & | & | \\
L & H & \\
\end{array}\]

(where Q contains no H.)

If this alternative is chosen, the rest of the process covered by the Initial Lowering Rules in (14) can be handled by expanding the Tone Simplification Rule and by introducing the H-to-L Lowering Rule in some dialects. If this is correct,
we will be able to say that every Initial Lowering dialect has formally the same insertion rule (14). Now let us go on to the Initial Raising Rules. We discussed the following:

(15)a. \[ \begin{array}{c}
V C_o V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
V C_o V \\
\downarrow \\
H \\
L \\
\end{array} \\
\quad / \quad \# \# C \\
\quad (Nakamura) \\
\]

b. \[ \begin{array}{c}
V C_o V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
V C_o V \\
\downarrow \\
M \\
L \\
\end{array} \\
\quad / \quad \# \# C \\
\quad (Ogachogamitsu) \\
\]

c. \[ \begin{array}{c}
Q V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
Q V \\
\downarrow \\
M \\
L \\
\end{array} \\
\quad / \quad \# \# \\
\quad (Ogachogamitsu, Younger Speakers) \\
\]

d. \[ \begin{array}{c}
(C_o V) C_o V C_o V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
(C_o V) C_o V C_o V \\
\downarrow \\
M \\
L \\
\end{array} \\
\quad / \quad \# \# \\
\quad (Main Koshikizima) \\
\]

e. \[ \begin{array}{c}
(C_o V (C_o V)) C_o V C_o V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
(C(V (C_o V)) C_o V C_o V \\
\downarrow \\
L \\
\end{array} \\
\quad / \quad \# \# \\
\quad (Eishi-Koshikizima) \\
\]

f. \[ \begin{array}{c}
V C_o V \\
\downarrow \\
L \\
\end{array} \quad \rightarrow \quad \begin{array}{c}
V C_o V \\
\downarrow \\
M \\
L \\
\end{array} \\
\quad / \quad \# \# (C_o V) C_o \\
\quad (Kumi) \\
\]

Since (15e) is too complicated, it should be duly modified.
I suspect that the correct rule will turn out to be:

\[(15)g. \quad \begin{array}{c}
\begin{array}{c}
Q \cdot C \cdot V \cdot C \cdot V \cdot L
\end{array}
\end{array} \rightarrow \begin{array}{c}
\begin{array}{c}
Q \cdot C \cdot V \cdot C \cdot V \cdot L \cdot H \cdot L
\end{array}
\end{array} \quad / \quad \#\# \quad \end{array}\]

Rule (15f) is an abbreviation of the Initial Raising Rule and the L-to-L Raising Rule.

Before going on to other types of tonal rules, let us review other Lowering and Raising Rules:

\[(16)a. \quad \textbf{Downdrift:} \quad \begin{array}{c}
\begin{array}{c}
\text{(Tokyo)}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(ii)}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Tokyo)}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Nakamura)}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Kameyama)}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Koti)}
\end{array}
\end{array} \end{array}

b. \quad \textbf{H-to-L Lowering:}

\[
\begin{array}{c}
\begin{array}{c}
\text{[-\#]} \\
\text{[-\#]}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
H \quad M
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{// VC \cdot VC \cdots \#\#}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Nakamura)}
\end{array}
\end{array} \end{array}

c. \quad \textbf{H Deletion:} \quad (=? \text{ Downdrift})

\[
\begin{array}{c}
\begin{array}{c}
\text{H} \quad \rightarrow \quad \#\#
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{H} \quad (\#\#)_a \quad \text{L} \quad (\#\#)_b
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{avb}
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Kameyama)}
\end{array}
\end{array} \end{array}

d. \quad \textbf{Raising:}

\[
\begin{array}{c}
\begin{array}{c}
\text{V} \quad Q
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{L} \quad \rightarrow \quad \#\# \quad C
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{L} \quad H
\end{array}
\end{array} \end{array}

\begin{array}{c}
\begin{array}{c}
\text{(Koti)}
\end{array}
\end{array} \end{array}
e. Final Rising Contour Formation:

\[
(V)_C_0 V \rightarrow (V)_C_0 V \quad / \quad \#\# Q \_
\]

\(Q\) contains no \(\ddot{v}\).

(Kumi)

f. H-to-M Lowering:

\[
\begin{array}{c}
V \\
H
\end{array} \rightarrow \begin{array}{c}
V \\
M
\end{array} \quad / \quad \#\# C_0 \quad Q \quad V \\
\begin{array}{c}
L \\
H
\end{array} \quad (Narada)
\]

g. Lowering:

\[
\begin{array}{c}
V \\
M
\end{array} \rightarrow \begin{array}{c}
V \\
M
\end{array} \quad / \quad \#\# \\
\begin{array}{c}
L \\
M
\end{array} \quad (Uchiko)
\]

(16f') is not discussed in chapter 12 above but it is assumed there.

Among the processes which were traditionally treated as Lowering, the following processes are formalized as

(Collocational) \(H\) Deletion:

(17)a. Collocational \(H\) Deletion:

\[
H \rightarrow \emptyset \quad / \quad \#\# L \quad \#\# H
\]

(\(\hat{O}saka, Kameyama\))

b. \(H\) Deletion:

\[
\begin{array}{c}
H \\
L
\end{array} \rightarrow \emptyset \quad / \quad \#\# Q \quad \left[\ddot{v}\right] \quad \#\# \\
L \quad (Marugame)\]
c. (i) **H Deletion**:

\[ H \longrightarrow \emptyset / \# \# L \_ \_ \_ \_ \]  

(Takamatsu)

(ii) \[ H \longrightarrow \emptyset / \# \# L \_ \_ \_ \_ T \]  

(Takamatsu, For some speaker)

d. **H Deletion**:

\[ H \longrightarrow \emptyset / \# \# \_ \_ \_ \]  

(Narada)

e. **H Deletion**:

\[ H \longrightarrow \emptyset / \# \# L \_ \_ \_ \]  

(Miyakonozyo)

It is interesting to note that H Deletion seems to be restricted to a dialect which has LH L as a basic tone melody. In Japanese, I have not yet found a L Deletion Rule, although it is one of the logically possible rules.

Now turn to the Flop Rules. We discussed several types:

(18a) \[ \text{Flop}: \]

\[ V C([\_V]) C V \]

\[ L \_ \_ \_ \_ \_ H \]  

(Tókyó)

b. \[ \text{Flop}: \]

\[ \hat{V} + \text{high} + C \_ V \]

\[ H \_ \_ \_ \_ \_ L \]  

(Matsue)

c. \[ \text{Flop}: \]

\[ V [\_\text{seg} \_ \] CV \]

\[ H \_ \_ \_ \_ \_ L \]  

(Ôsaka)
Let us turn to various star rules. They are divided into three types: Star Assignment Rules, Star Deletion Rules, and Star Shift Rules:

(19a. Star Assignment for "o"-Phrases in Women's Speech:

\[ V \longrightarrow * / \quad \#\# \, o \quad + \quad C_o \quad \] (Tókyô)

b. De-Starring of "No"-Phrases:

\[ V \longrightarrow \quad V / \quad V C_o \quad ([+seg]) + \quad no \quad \#\# \quad (Tókyô) \]

c. Star Assignment:

(51) \[ V \longrightarrow * / \quad \{ q \quad \{ ku-wa \quad \{ kat-ta \quad \{ kere-ba \} \} \} \} \] Adj

(52) \[ V \longrightarrow * / \quad \{ \quad \{ i \} \} \] Adj

\[ \{ C_o V \quad {}_{\text{stem}} + \quad Q \} \] Adj (a)

(d. Star Shift:

\[ [+\text{high}] \quad + \quad C_o \quad V \longrightarrow [+\text{high}] \quad + \quad C_o \quad \] (Matsue)

(See footnote 6)
e. Star Shift: (Hirosaki)
\[ \tilde{\tilde{v}} \mathcal{C}_o \# \mathcal{C}_o \mathcal{V} \longrightarrow \mathcal{V} \mathcal{C}_o \# \mathcal{C}_o \tilde{\tilde{v}} / \# \# \mathcal{X} \quad \mathcal{Y} \# \# \]

f. De-Starring of "no"-Phrases: (Osaka)
\[ \mathcal{V} \longrightarrow ^* / \quad \mathcal{Q} + \text{no} \# \# \]
(This rule applies only to HL melody words.)

g. Star Assignment: (Osaka)
\[ \mathcal{V} \longrightarrow \emptyset / \# \# \mathcal{Q} \quad \{- \frac{\mathcal{M}_o}{\mathcal{A}} \} \quad \{- \text{etc.} \} \]

h. Star Assignment for the Past Forms: (Osaka)
\[ \mathcal{V} \longrightarrow ^* / \quad (\mathcal{C} \, \mathcal{V}) \, \mathcal{(C)} \cdot \text{ta} \# \# \]

i. Star Assignment for Adjectives: (Osaka)
(i) \[ \mathcal{V} \longrightarrow ^* / \quad \mathcal{C}_o \mathcal{V} \mathcal{C}_o \mathcal{V} \# \}_{\text{Adj \{Present \}}}
\]
(ii) \[ \mathcal{V} \longrightarrow ^* / \quad + \, \mathcal{K}_a \quad \{ \mathcal{t} + \{ \text{ta} \, \text{tara} \} \} \# \#
\quad \{ \text{rō} \}
\]

j. Star Right: (Kumi)
\[ \tilde{\tilde{v}} \mathcal{C}_o \mathcal{V} \longrightarrow \mathcal{V} \mathcal{C}_o \tilde{\tilde{v}} / \langle \mathcal{V} \mathcal{C}_o \rangle_\mathcal{A} - \langle \mathcal{C}_o \mathcal{V} \rangle_\mathcal{Y} \]

k. Star Left: (Kumi)
\[ \mathcal{V} \mathcal{C}_o \tilde{\tilde{v}} \longrightarrow \tilde{\tilde{v}} \mathcal{C}_o \mathcal{V} / \mathcal{V} \mathcal{C}_o \mathcal{V} \mathcal{C}_o \quad \# \# \]

l. Star Shift:
\[ \tilde{\tilde{v}} (\mathcal{C}_o \mathcal{V}) \longrightarrow \mathcal{V} (\mathcal{C}_o \tilde{\tilde{v}}) \]

m. Star Shift for Younger Speakers: (urarada)
\[ \tilde{\tilde{v}} ((\mathcal{C}_o \mathcal{V}) \mathcal{C}_o \mathcal{V}) \longrightarrow \mathcal{V} (\mathcal{(C}_o \mathcal{V}) \mathcal{C}_o \tilde{\tilde{v}}) \]
As we saw in Chapter 11,(19j) had a few alternative formulations. I will repeat the most promising one here. The Star-Shift Rules in (19l) and (19m) are necessary if we assume that the tone association rule in Narada is (12fii). Otherwise, they lose their raison d'être.

Finally, let us summarize phonological rules and

Compound Formation discussed above:

(20)a. **High Vowel Devoicing:** (Tokyo)

\[
\left[ +\text{high} \right] \rightarrow \left[ -\text{voice} \right] / \left[ -C \right] \quad \left[ -C \right]
\]

b. **Komosyllabic Lengthening:** (Osaka)

\[
\emptyset \rightarrow \left[ +\text{seg} \right] / \# \# C_o V \quad \# \#
\]

c. **Compound Formation:** (Osaka)

a) selection of melody (See chapter 4)

b) Star Assignment (See chapter 4)

d. **i-Insertion:** (Most Japanese)

\[
\emptyset \rightarrow i / \{ g \} + \text{ ta}
\]

e. **Velar Deletion:** (Most Japanese)

\[
\{ k \} \rightarrow \emptyset / \# + i \left( +\text{ta} \right) \#
\]

f. **Compound Rule:** (Kagoshima)

no special rule is necessary.

The above discussion covers the central set of the rules discussed in the previous chapters.
In the list below an alphabet is enclosed by ( ).

indicates that even though the rule is not discussed in this work, it is assumed in the discussion of the previous chapters.

"?" indicates that either relevant rules are not discussed in the documents I could check, or that I did not discuss those rules in this work.
<table>
<thead>
<tr>
<th>No.</th>
<th>Place</th>
<th>Basic tone</th>
<th>Tone Melody</th>
<th>Tone Association (12)</th>
<th>Tone simplif. (13)</th>
<th>Initial Lowering (14)</th>
<th>Initial Raising (15)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tōkyō</td>
<td>HL</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Nagoya</td>
<td>HL</td>
<td>(a)</td>
<td>(b)</td>
<td>b</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Matsue</td>
<td>HL</td>
<td>(a)</td>
<td>(b)</td>
<td>c</td>
<td>no rule</td>
<td></td>
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<tr>
<td>4.</td>
<td>Hirosaki</td>
<td>LHL</td>
<td>a</td>
<td>c,d</td>
<td>no rule</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Nakamura</td>
<td>LHL</td>
<td>a</td>
<td>e</td>
<td>no rule</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Hukuoka</td>
<td>LHL</td>
<td>(b)</td>
<td>e</td>
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<td>no rule</td>
<td></td>
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<tr>
<td>7.</td>
<td>Osaka</td>
<td>HL , LHL</td>
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<td>c,d</td>
<td>no rule</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Kameyama</td>
<td>HL , LHL</td>
<td>a</td>
<td>c,d</td>
<td>no rule</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Kōti</td>
<td>HL , LHL</td>
<td>a</td>
<td>b</td>
<td>no rule</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Marugame</td>
<td>HL , LHL</td>
<td>a</td>
<td>b</td>
<td>d</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Takanawasu</td>
<td>HL , LHL</td>
<td>a</td>
<td>c,(d)</td>
<td>e</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Kagoshima</td>
<td>LHL</td>
<td>c</td>
<td>e</td>
<td>no rule</td>
<td>no rule</td>
<td></td>
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<tr>
<td>13.</td>
<td>Ogachogahimitsu</td>
<td>LHL</td>
<td>c</td>
<td>e</td>
<td>no rule</td>
<td>b,c</td>
<td></td>
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<tr>
<td>14.</td>
<td>Koshikizima</td>
<td>LHL</td>
<td>d</td>
<td>(e)</td>
<td>no rule</td>
<td>d,e</td>
<td></td>
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<tr>
<td>15.</td>
<td>Kumi</td>
<td>LiL</td>
<td>e</td>
<td>e</td>
<td>no rule</td>
<td>f</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Narada</td>
<td>LHL</td>
<td>fi or f'il</td>
<td>f,g</td>
<td>f</td>
<td>no rule a</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Miyakonozyo</td>
<td>LiL</td>
<td>g=j</td>
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<td>no rule</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Sendai</td>
<td>HL</td>
<td>i=j</td>
<td>?</td>
<td>d</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Izumi</td>
<td>?LHL or HL</td>
<td>g</td>
<td>e or d</td>
<td>d</td>
<td>no rule</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Uchiko</td>
<td>LiL</td>
<td>no rule</td>
<td>no rule</td>
<td>g</td>
<td>no rule</td>
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(continued)
<table>
<thead>
<tr>
<th></th>
<th>Lowering or Raising</th>
<th>(Colloccational) H Deletion (17)</th>
<th>Flop (18)</th>
<th>Star rules (19)</th>
<th>Phonological rules (20)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>ai aii</td>
<td>no rule</td>
<td>a</td>
<td>a, b, c</td>
<td>a</td>
</tr>
<tr>
<td>2.</td>
<td>?</td>
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<td>?</td>
<td>?</td>
<td>?</td>
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<tr>
<td>3.</td>
<td>?</td>
<td>no rule</td>
<td>b or d</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>4.</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>e</td>
<td>?</td>
</tr>
<tr>
<td>5.</td>
<td>b</td>
<td>no rule</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>7.</td>
<td>aii</td>
<td>a</td>
<td>c</td>
<td>f-i</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td>8.</td>
<td>c</td>
<td>a</td>
<td>?</td>
<td>?</td>
<td>b</td>
</tr>
<tr>
<td>9.</td>
<td>d</td>
<td>no rule</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>10.</td>
<td>?</td>
<td>b</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>11.</td>
<td>?</td>
<td>c</td>
<td>i, e</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>12.</td>
<td>?</td>
<td>?</td>
<td>?</td>
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<td>?</td>
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<tr>
<td>13.</td>
<td>?</td>
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<td>?</td>
<td>no rule</td>
<td>a</td>
</tr>
<tr>
<td>14.</td>
<td>aii (Eishi)</td>
<td>no rule</td>
<td>?</td>
<td>no rule</td>
<td>?</td>
</tr>
<tr>
<td>15.</td>
<td>e</td>
<td>no rule</td>
<td>?</td>
<td>j, k</td>
<td>?</td>
</tr>
<tr>
<td>16.</td>
<td>(f)</td>
<td>d</td>
<td>?</td>
<td>1 anim a</td>
<td>a</td>
</tr>
<tr>
<td>17.</td>
<td>?</td>
<td>e</td>
<td>?</td>
<td>no rule</td>
<td>?</td>
</tr>
<tr>
<td>18.</td>
<td>?</td>
<td>no rule</td>
<td>no rule</td>
<td>no rule</td>
<td>?</td>
</tr>
<tr>
<td>19.</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>no rule</td>
<td>?</td>
</tr>
<tr>
<td>20.</td>
<td>g</td>
<td>no rule</td>
<td>no rule</td>
<td>no rule</td>
<td>?</td>
</tr>
</tbody>
</table>
FOOTNOTES TO CHAPTER 13

1. As an illustration, consider the following 3-mora words in the Old Kyôto dialect:

   (i) HL
   
   a. \underline{hatat\text{\textsuperscript{i}}} "shape"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}
   
   b. \underline{\text{\textsuperscript{g}ap \text{\textsuperscript{2}} \text{\textsuperscript{0}} \text{\textsuperscript{2}}} \hspace{1cm} (\text{\textsuperscript{2}} \text{\textsuperscript{2}} \text{\textsuperscript{2}})
   
   c. \underline{azuki} "red beans"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{2}} \text{\textsuperscript{2}}
   
   d. \underline{hatat\text{\textsuperscript{i}}} "20 years old"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}

   (ii) LH

   a. \underline{atama} "head"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}
   
   b. \underline{inoti} "life"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{2}}
   
   c. \underline{usagi} "rabbit"  \hspace{1cm} \text{\textsuperscript{2}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}
   
   d. \underline{siwori} "aster"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}

   (iii) LHL

   a. \underline{\text{\textsuperscript{g}ap \text{\textsuperscript{2}} \text{\textsuperscript{0}} \text{\textsuperscript{0}} \text{\textsuperscript{0}}} \hspace{1cm} (\text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}})
   
   b. \underline{hitoe} "single"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{2}}
   
   c. \underline{kabuto} "helmet"  \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{2}} \text{\textsuperscript{3}}
   
   d. \underline{\text{\textsuperscript{g}eyami} "epidemic" \hspace{1cm} \text{\textsuperscript{3}} \text{\textsuperscript{3}} \text{\textsuperscript{3}}

Since (i)-(iii) have 10 different tonal classes, a two melody analysis which can distinguish at most 8 tonal classes cannot hold. Thus, a three melody analysis is needed.

2. We will return to this problem later in Chapter 15.

3. Note that the rules in (a) are slightly modified versions of (20)** and (65) in Chapter 1. In (13a), \text{\textsuperscript{0}} indicates
that no phrase follows the boundaries (##).

4. In Chapter 3, I tentatively suggested two ways of formalizing Tone Simplification. Version (13c) is superior to the other version (i.e.,  \[ \begin{array}{c} \downarrow \\ \beta (i) \end{array} \] ), because

\[ \alpha \beta (i) \alpha \]

(13c) makes it possible for us to say that Hiroasaki has the same Tone Simplification Rules as Osaka and Kameyama. In Chapter 4 and 5, we formulated the Tone Simplification Rule in Osaka and Kameyama as \[ \begin{array}{c} \downarrow \\ L \end{array} \] or

\[ \begin{array}{c} \downarrow \\ H \end{array} \]

alternatively \[ \begin{array}{c} \downarrow \\ V \end{array} \] . All of these are equivalent to (12c).

5. Goldsmith has suggested to me that [+pause] will be replaced more generally by an intonational boundary ($$). If it is possible to systematically replace [+pause] by $$, we should modify the environment in the obvious way.

6. If this is correct, Matsue has no rule (19d), and if (19c) is correct, it has no rule (13d).
Part II

INTRODUCTION

In Part I, I was mainly concerned with the application of the autosegmental theory to the actual description of Japanese dialects. In this part, I will turn to some of the theoretical considerations of tonology. First of all, I will briefly examine the major tonological theories which have been proposed for the description of Japanese. Then I will examine Goldsmith's proposal and propose some modifications of Tone Association Rules and of the Universal Tone Association Conventions. I will also discuss the problem of what unit bears a star and a tone. And finally, I will discuss what kind of languages the Universal Tone Association Conventions predict as impossible.
CHAPTER 14

ON THREE TONOLOGICAL THEORIES

14.0. Introductory Remarks

While we have attempted the autosegmental analyses of a number of Japanese dialects in the preceding chapters of Part I, we have also examined some alternative analyses. In this chapter, I will examine Hattori's theory, McCawley's boundary accent theory, and Shibatani's Surface Phonetic Constraint theory. Since we have already discussed the former two theories with a fair amount of detail, some of the arguments in this chapter will overlap previous arguments.

14.1. Hattori's Prosodic Analysis

Hattori's prosodic theory is very interesting and fairly similar to our autosegmental theory. However, there seem to be some differences.

In his system, Hattori sets up 3 significant levels of representations: a morpho-prosodic level, a prosodic level, and a surface phonetic level. Since he gives no arguments for setting up 3 levels of representations, nor any discussion on the nature of the mechanisms which relate these 3 levels, we cannot evaluate his claim well. However, as far as we have observed in Chapter 11, there seems to be no justification for setting up a level of morpho-prosodemes.
In Hattori's theory, the following 3 prosodemes and one distinctive feature are proposed:

(1a) "┐" HL kernel (=prosodeme)  
    b. "┌" LH kernel (=prosodeme)  
    c. "├" LH kernel (=prosodeme)  
    d. "└" L-beginning feature

(1a) corresponds to our HL basic tone melody in some dialects and to the LHL tone melody in other dialects. It should be noted that the symbol "┐" also serves the function of the * and the following tone association rule:

(2) ### Q V
    H

To put this another way, the "┐" marker carries 3 functions, which are divided into three notions in our theory. Similarly, the "┌" kernel corresponds to our LH basic tone melody, the star, and Association Rule (2). On the other hand, the "├" kernel corresponds to our LH basic tone melody, the star, and the following tone association rule:

(7) ### Q V
    L

The "└" feature corresponds to our LHL basic tone melody when it occurs in isolation, and to Tone Association Rule (2). However, this feature does not function as the *. The "└" feature is restricted to occur only in word-initial position.
If this feature and the "\textcircled{1}" kernel occur together as in "\textcircled{1}oo\textcircled{o}", these two correspond to our LH\textsubscript{3} basic tone melody, the star(on the third mora in this case), and Tone Association Rule (2). However, whether or not (1d) can co-occur with (1b) or (1c) is not clear to me. I suspect, however, that Hattori would not allow the co-occurrence of (1\textsubscript{p}) and (1b), even though in Shit\textsuperscript{\textcopyright}ta's prosodic theory, which is a version of Hattori's prosodic theory, (1a) and (1b) are permitted to co-occur. Note that if our interpretation of Hattori's theory is correct, the co-occurrence of (1a) and (1b) would mean that a word could have two stars and two H tones. Since this is awkward, I suspect that Hattori would not permit such a co-occurrence.

Hattori's theory is crucially different from our theory in that his theory does not distinguish a level of tone melody and a level of phonological representation. Thus, in his theory, the lexicon of the T\textsuperscript{\textcopyright}ky\textsuperscript{o} dialect has the following specifications:

(4)a. \textit{Inoti} b. \textit{koko\textsuperscript{ro}} c. \textit{atama\textsuperscript{l}} d. \textit{miyako}

'life' 'heart' 'head' 'cap. city'

(4) shows that the melody, as well as the star and Tone Association Rule (2), is specified for each word in the lexicon. On the other hand, in our theory, (4) has the following star specifications in the lexicon:

(5)a. \textit{Inoti} b. \textit{kokoro} c. \textit{atama\textsuperscript{*}} d. \textit{miyako}
The tone melody HL is assigned to each word later by Tone Association Rule (2). What is important is that in our theory the tone melody consists also of segments and the tonal and phonological levels retain independence all through the derivation. On the other hand, in Hattori's theory, "7", which he claims is different from the sequence of tonemes, seems to be placed on the syllable. He claims that these prosodemes constitute a part of the form (or configuration) of a word. If Hattori literally means what he claims, his theory would have no independent level of prosodeme. If this is so, his theory is different from our theory which assumes dual structure.

We have observed the difference between our theory and Hattori's in actual analyses in chapters 11 and 12; and we have already shown that his theory permits analyses which our theory does not permit. On the basis of this, we can conclude that his theory is different from ours in that his theory is less constrained. (For discussion, see chapters 11 and 12.)

What is unclear to me is the prediction of Hattori's theory. In particular, it is not clear what is excluded from the list of possible tonal systems in his theory. In the next chapter, we will discuss the problem of what tone systems are excluded in our theory.

The above observations, together with the observations in Part I, suggest that Hattori's theory is less constrained,
and thus permits which are analyses unacceptable in our theory. Furthermore, Hattori's theory is less explicit and does not distinguish what is distinguished in an interesting way in our theory. Thus, it is concluded that Hattori's theory is less adequate.

14.2. **McCawley's Boundary Accent Theory**

In his interesting book (1968), McCawley proposed a boundary accent theory, which claims that accent markers are placed on the syllable boundary and not on the syllable. If this were to turn out to be correct, it would automatically deny our claim that the star (=accent marker) should be placed on the [+syl] segment (or in some cases on the [+son] segment). Thus, his theory deserves careful examination.

McCawley's basic argument for placing an accent marker on the syllable boundary is that if the accent is placed on a boundary, it can explain why Tōkyō dialect has $n+1$ tonal classes for $n$ syllable words, for $n$ syllable words have $n+1$ syllable boundaries, whatever they might mean. All we have to do is to interpret the unaccented words as having a preaccent. Thus, in McCawley's theory, the examples in (4) have the following structures:

(6)a. i'noti  b. koko'ro  c. atama'  d. 'miyako

Note: in McCawley's theory, the accent marker is represented by (').
However, this argument is not correct. Recall that the Osaka dialect had two tonal classes: the H-starting words (i.e., HL melody words) and the L-starting words (i.e., LHL melody words). Since McCawley uses preaccent for L-starting accentless words (e.g., usa[gi]), H-starting accentless words (e.g., sakura) should not have preaccent. Thus, such words should have no accent marker. Since this is so, McCawley’s boundary accent theory predicts that n syllable words in Tōkyō can in principle have n+2 tonal classes (i.e., accented words such as (6) and words without any accent marker). This prediction is incorrect, and contradicts the facts on which his argument is based. Thus, his boundary accent theory loses its foundation.

McCawley provides no other direct evidence to show that an accent marker should be placed on the syllable boundary. Whenever he argues for his boundary accent theory, he only argues for the notion of preaccent. However, recall that in chapter 4, we have already shown that preaccent theory makes wrong predictions. Thus, McCawley’s particular notion of preaccent does not hold.

Furthermore, as we showed in Chapter 1 (cf. [Excursus]), in actual practice, McCawley’s claim that the accent marker should be placed on a syllable boundary is violated by his own analysis. Therefore, McCawley’s boundary accent theory is not viable, and thus poses no counter-evidence to our
claim that the star should be placed on a particular syllabic segment (or a sonorant segment in some cases).

14.3. Shibatani's Surface Phonetic Constraint Theory

Shibatani (1972) proposed, based essentially on McCawley's framework (1968), what he called "Surface Phonetic Constraint (SPC)" theory for Tôkyô Japanese. Since his theory follows McCawley in that he places an abstract accent marker on a boundary, and since we have shown that McCawley's boundary accent theory is untenable (in Chapter 1 of Part I and in the previous section), Shibatani's theory loses its ground. However, we will not question this point, for the sake of argument, and examine the validity of his SPC theory.

He proposed two SPC's for Tôkyô Japanese. One of them is approximately stated as follows:

(7) **SPC for Pitch Shapes of Minor Phrases:**

If a minor phrase (=the smallest tonal domain in the present theory) consists of at least two moras, the pitch height of the initial mora and that of the second mora must disagree in the specification of the feature [+L].

This constraint claims that Tôkyô has no initial tonal sequences such as Hî and LL. However, this does not reflect the phonetic facts in Tôkyô Japanese. In Chapter 1 of Part I, we observed that an initial HH sequence can occur depending on phonological configuration, position where in a sentence
it occurs, and style of speech. Consider, for example, the following case:

(8) \( \text{to-} o \quad \text{\# akeru} \)
    "door' 'open' 'I open the door.'
"to-o" and "akeru" constitute two minor phrases. However, the initial and the second moras of "akeru" have the same pitch height in normal speech. 

Furthermore, the initial LL sequence can appear in a certain intonation. For example, in the so-called "peevesh intonation" uttered by a child, we have the following intonation:

(9) \( \text{boku-n\#tili kae-\#undai} \)
    'my' 'house' 'want to go' 'I want to go home.'
The SPC would incorrectly rule out (3) and (9) as ill-formed. Thus, Shibatani's SPC theory does not hold.

Shibatani proposed another "SPC for pitch shapes of major phrases", which are a sequence of minor phrases:

(10) If there is a sequence of minor phrases, the \([-L]\) toned moras in the leftmost minor phrase have \([+H]\) and all the other \([-L]\) toned moras in the other minor phrases are converted to a mid tone.

This predicts that (8) has a surface melody \(LH^{\#\#\#}HM\), which is not the case. Furthermore, as we have observed in Chapter 1 of Part I, (10) seems to be based on an inaccurate observation of surface melodies. Thus, I conclude that (10)
does not hold, either. In our theory, we have already suggested that the lowering process in question is handled by the notion of downdrift (Chapter 1 of Part I).

In sum, we have examined adequacies of a few tonological theories and have briefly made critical comment on them. As we have seen above, none of these theories are adequate. Therefore, we can safely conclude that none of them can be genuine alternatives to the autosegmental theory.
1. It seems that the "\textup{\textdagger}" kernel corresponds also to our LHL basic tone melody, the star, and the Association Rule in (2). For some discussion, see chapters 11 and 12.

2. For a related discussion, see chapter 1.

3. In our theory, the surface melody in example (8) is derived as follows:

(i) underlying representation: \[ \texttt{to-o} \quad \texttt{\#\# \ akeru} \]

(ii) Tone Association (dotted lines indicate the effects of the Universal Tone Association Conventions.)

(iii) Initial Lowering:

(iv) Tone Simplification:

output \[ \texttt{to-o} \quad \texttt{\#\# \ akeru} \]

At level (iii), Initial Lowering is blocked from applying to the initial \textupsquare of "akeru" (open), because [+pause] does not precede the verb "akeru" in (3).

4. In order to handle the peevish intonation, we assume
a special tone melody LHL for this intonation. In addition to this, we assume that this melody is assigned to given domains by the Final Association Rule (which is discussed in the next chapter) as indicated by the solid lines in (i) (Recall that this rule is already introduced in section 13.3 of Chapter 13):

(i) $\text{bo}$k-$\text{c}$hii $\text{k}$a$c$-undai

\[ \begin{array}{c|c|c}
  \text{L} & \text{H} & \text{L} \\
  \text{L} & \text{H} & \text{L} \\
\end{array} \]

Then, the Universal Tone Association Conventions, which will be revised in the next chapter, assign the remaining tones to tone-bearing units as indicated by the dotted lines. It should be noted that this special tone melody is assigned to a phrase by ignoring the lexically specified star. Since we are mainly concerned with tone association in basic tone melodies, we will not discuss the problem here, but it is remarkable that the association processes which are independently introduced for basic tone melodies seem to be extended to special tone melodies.
CHAPTER 15

ON TONE ASSOCIATION PROCESSES

15.0. Introductory Remarks

In a series of enlightening papers (1974a, b, and c), (1975 a, and b), John Goldsmith has proposed what he terms "an autosegmental theory" of tonology. To review briefly, this theory assumes that the phonological structure consists of two levels: a phonological level and a tonal level, as illustrated in (1):

(1) C V C V C V C V C V .... phonological level

L H L .... tonal level

These two levels are independent through all derivations and both consist of segments. In a natural language, these dual levels are connected in a systematic way under certain constraints. In order to relate these two levels, Goldsmith has proposed a mechanism to associate the tonal level with the phonological level. The mechanism consists of two parts: (i) a small set of language-particular tone association rules and (ii) Well-Formedness Conditions. In regard to (i), we will examine Goldsmith's particular proposals below. In regard to (ii), the following two conditions are proposed:

(2) Well-Formedness Conditions for Tone Association (WFC):

(a) Every tone should be connected with at least
one phonological tone-bearing unit, and vice versa.

(b) Association lines should not cross.

Both of these have been accepted and assumed in the preceding analyses in Part I. In particular, [FC (2) has been incorporated into the Universal Tone Association Conventions discussed in Chapter 1.

However, our ideas on the language-particular Tone Association Rules and the Universal Tone Association Conventions are different from Goldsmith's to a certain degree. Furthermore, our ideas on the use of star are also different. These differences will be made clear in the ensuing discussion. In the course of the discussion, arguments will be given for our proposed revisions.

15.1. Language-Particular Tone Association Processes

We will first focus our attention on the problem of formalizing the language-particular Tone Association Rules. Goldsmith has proposed the following 3 rules: (i) a Left-to-Right Association Rule, (ii) a Right-to-Left Association Rule, and (iii) a *-to-* Association Rule. Left-to-Right Association Rule (i) assigns the leftmost tone to the leftmost V, the second tone to the second V, ..., and nth tone to the nth V, as far as the one-to-one correspondences between tones and V's are possible. Given the dual structure such as (i), Left-to-Right Association Rule (i) associates
the tone melody LHL as follows:

(3) \[
\begin{array}{cccccccc}
V & V & C & V & C & V & C & V \\
L & H & L & & & & & \\
\end{array}
\]

On the other hand, Right-to-Left Association Rule (ii) is a mirror image of rule (i). Thus, given the dual structure (1), rule (ii) produces the following associated structure:

(4) \[
\begin{array}{cccccccc}
C & V & C & V & C & V & C & V \\
L & R & L & & & & & \\
\end{array}
\]

We will not discuss rule (iii) here, but return to it later.

Goldsmith has proposed that rules (i) and (ii) are formalized with general variables like X and Y. Thus, rule (i) is formally stated as in (5):

(5) **The Left-to-Right Tone Association Rule:**

\[
\begin{array}{c}
# X \uparrow \\
\mathcal{V} \\
\end{array}
\]

On the other hand, rule (ii) is formally stated as in (6):

(6) **The Right-to-Left Tone Association Rule:**

\[
\begin{array}{c}
Y \\
X \uparrow \\
\end{array}
\]

Partly because these rules are stated in this way, and partly because the universal tone association processes are not clearly stated, it was necessary for Goldsmith to introduce the checking-off mechanism\(^1\) in order to guarantee the desired one-to-one tone associations.
Let us now examine whether or not these two Tone Association Rules are motivated. I will first discuss the Left-to-Right Tone Association Rule and propose an alternative rule. Goldsmith (1975c) proposed the Left-to-Right Tone Association Rule in (5) for the Mende language, based on Leben's extremely interesting thesis (Leben (1973)). This rule applies, for instance, to the following Mende words and associates the tones with tone-bearing units as indicated by the solid lines:

\[
\begin{array}{cccc}
\text{a. } \text{nikilì} & \text{b. } \text{mba} & \text{c. } \text{pele} & \text{d. } \text{kenya} \\
\text{L H L} & \text{L H} & \text{H} & \text{H L}
\end{array}
\]

'groundnut' 'rice' 'house' 'uncle'

After the application of rule (5), the Universal Conventions associate the H tone in (b) and (c) with a suitable tone-bearing unit, as indicated by the dotted line in cases (c) and (c). However, it seems to me that this tone association rule is both too strong and redundant, because the Left-to-Right Association Rule does what the WFC can do. In (d), for instance, there is no need to associate the L tone with the final vowel by rule (5), since the Universal Conventions will automatically apply to this toneme and associate it with the final vowel. Similarly, (7a) will be derived by the WFC (which draws the minimal association lines), if we connect the leftmost tone with the leftmost V. If so, what
we have to do by a language-particular tone association rule is only to associate the leftmost tone with the leftmost tone-bearing unit. (This was suggested to me by Halle). This process can easily be staed with the help of the Q Variable:

(8) The Initial Tone Association Rule:

\[
\begin{array}{c}
\text{V} \\
\text{Q} \\
\text{T}
\end{array}
\]  

(where Q is interpreted as the maximal sequence of segments of both of the phonological and tonal strings.  

Rule (8) associates the basic tone melodies in (7) as in (9):

(9)a. níkílí b. mbà c. pelé d. kónyà

\[
\begin{array}{c}
\text{L} \\
\text{H} \\
\text{L}
\end{array}
\quad
\begin{array}{c}
\text{H} \\
\text{L}
\end{array}
\quad
\begin{array}{c}
\text{H} \\
\text{L}
\end{array}
\quad
\begin{array}{c}
\text{H} \\
\text{L}
\end{array}
\]

It can easily be seen that the Universal Conventions account for the correct output given '9) as input.

Notice here that since Right-to-Left Tone Association Rule (6) is a mirror image of rule (5), we can easily formalize the rule as follows:

(10) The Final Tone Association Rule:

\[
\begin{array}{c}
\text{V} \\
\text{Q} \\
\text{T}
\end{array}
\]  

This rule applies to the following strings:

(11) a. CVCVCVCV  

\[
\begin{array}{c}
\text{L} \\
\text{H} \\
\text{L}
\end{array}
\]

b. CVCVCVCV  

\[
\begin{array}{c}
\text{T}_1 \\
\text{T}_2 \\
\text{T}_3 \\
\text{T}_4
\end{array}
\]

(where \(T_i\) is a tone.)
and associates the L tone and $T_4$ with the final tone-bearing
unit of each case.

In this connection, consider the tone association in
Kikuyu:

(12) $\#\#CVCCVCCVCCV\#$

According to A. Myers' (19) description, in Kikuyu, the
first tone is associated with the second $V$; the second tone,
with the third $V$; ...; $n^{th}$ tone with the $(n+1)^{th}$ $V$, if there
is any. To handle this case, I suggest that the language-
particular tone association rule for Kikuyu will be stated
as follows:

(13) The Tone Association Rule (Kikuyu):

\[
\begin{array}{c}
V \quad C \quad O \quad V \\
\quad \quad \quad Q \# \\
\quad \quad \quad T
\end{array}
\]

(where Q is as in (8).)

Namely, rule (13) associates the leftmost tone with the
second tone-bearing unit, as indicated by the solid associ-
ation line in (12).

It should be noted that though the difference between
the rules (5) and (6) proposed by Goldsmith and the revised
rules in (8) and (10) might strike some reader as insignificant,
the revised rules entail an entirely different claim than
the corresponding rules in (5) and (6). That is, the
revised rules claim that what is particular to a language
is the connection of just one tone with one V, and that the
remaining one-to-one connections are handled by the Universal
Conventions. In other words, we are claiming that language-
particular tone association rules are constrained so as to
draw just one tone association line between a specific tone
and a specific V. On the other hand, rules (5) and (6)
claim that one-to-one connections should be handled by a
language-particular process.

This brings about completely different predictions
regarding possible tonal associations. Since Goldsmith places
no restrictions on possible tone association rules, his
theory would predict the existence of the following
natural language:

(14) The first tone is associated with the first and
second V's; the second tone with the third and
fourth V's; ... ; and the n-th tone with the (2n-1)-th
and 2n-th V's, if any.

This rule would be stated within Goldsmith's framework with
the help of the general variables as follows:

(15) \[ \begin{array}{ccc}
  & V & C_0 \backslash V \\
\# & X & \downarrow \nonumber \\
& & T
\end{array} \]

However, our constraint on language-particular tone
association rules, together with the Universal Tone
Association Conventions which will be discussed immediately below, exclude the existence of language (14). We could enumerate a number of differences in predictability of the two theories. However, I hope the illustration above is sufficient to show the difference under consideration.

15.2. The Universal Tone Association Conventions

Now let us turn to the problem of how to associate the remaining tones with tone-bearing units. On the basis of the examination of a number of languages, I would like to revise a part of the Universal Tone Association Conventions discussed in Chapter 1 as follows:

(16) The Universal Tone Association Conventions:

(1) (same as (6i) in Chapter 1 or (2) in this chapter.)

(ii)a. Mirror Image Free Tone Association:

\[
\begin{array}{c}
\text{R} \\
\left( \begin{array}{c}
\text{V} \\
\text{T}_1 \\
\text{T}_Q \\
\text{T}_n \\
\text{C}_0 \ 	ext{V}\end{array} \right)
\end{array}
\]

(where R is the maximal sequence of phonological segments; T is the maximal paired unit of \( C_0 V \) and T, excluding \( T_n \); the dotted lines indicate the SC.)

In (16), there seems to be no particular problem in (i), because (i) is the same as (6i) in Chapter 1, or (2) in this chapter. In order to understand what is meant by (iia), let us first review (6iia) in chapter 1, which is reproduced.
here for ease of reference:

(17) (611a in Ch. 1)

If a domain contains only one free tone, or if it contains only one free tone to the right (or left) of a bound tone, the free tone should be associated with every free tone-bearing unit, or every free tone-bearing unit on the same side of the bound tone. I.e.,

\[
\begin{pmatrix}
V \\
T_1 \\
T_2
\end{pmatrix}^P
\]

(where \(P\) is the maximal sequence of free tone-bearing units, and \(T_2\) is a free tone.)

Recall that (17) is a mirror image process and that it is an abbreviation of the following processes:

(18a)

\[
\begin{array}{c}
V & P \\
T_1 & T_2
\end{array}
\begin{array}{c}
& V \\
& T_2
\end{array}
\begin{array}{c}
& P \\
& T_1
\end{array}
\]

(18a) applies for instance to the following cases:

(19a)

\[
\begin{array}{c}
C & V & C & V & C & V & C & V \\
T_1 & & & & & & & T_2
\end{array}
\begin{array}{c}
& C & V & C & V & C & V & C & V \\
& T_1 & & & & & & & T_2
\end{array}
\begin{array}{c}
& & & C & V & C & V & C & V \\
& & & T_1 & & & & & T_3
\end{array}
\]

and associates \(T_2\) to every free \(V\) as indicated by the dotted lines. (18b) applies, for instance, to the following cases:

(20a)

\[
\begin{array}{c}
C & V & C & V & C & V & C & V \\
T_2 & & & & & & & T_1
\end{array}
\begin{array}{c}
& C & V & C & V & C & V & C & V \\
& T_2 & & & & & & & T_1
\end{array}
\begin{array}{c}
& & & C & V & C & V & C & V \\
& & & T_2 & & & & & T_1
\end{array}
\]
The effects of (18b) are indicated again by the dotted lines. (18c) also applies to the following case in which the given domain has only one tone and no bound tone-bearing unit:

\[(21) \quad CVCCVCVCV\]

If we compare (16iia) and (17), the only difference between the two is the incorporation of \((C_0 V)_{TQ}\) into (16iia). This means that convention (16iia) is an abbreviation of (18) and the following processes:

\[(22)\begin{align*}
\text{a.} & \quad V \left( \begin{array}{c}
C_0 \vspace{1em} \vspace{1em} V \\
\vspace{1em} \vspace{1em} \vspace{1em} T_1 \\
T_Q T_n & \\
\end{array} \right) R \\
\text{b.} & \quad R \left( \begin{array}{c}
C_0 \vspace{1em} \vspace{1em} V \\
\vspace{1em} \vspace{1em} \vspace{1em} T_n \vspace{1em} T_Q T_1 \\
\end{array} \right) V
\end{align*}\]

(22a) says: if there are free tones and free tone-bearing units to the right of the bound tone, associate the tones and the tone-bearing units in a one-to-one fashion, and associate the rightmost tone with every remaining free tone-bearing unit. (22b) is a mirror image of (22a). We will show the effects of these conventions by using schematic examples. Convention (22a) applies, for instance, to the following cases:

\[(23)\begin{align*}
\text{a.} & \quad CVCCVCVCVCV \\
& \quad T_1 T_2 T_3 T_4 \\
\text{b.} & \quad CVCCVCVCVCV \\
& \quad L H L
\end{align*}\]
and converts these structures to the following structures in which the dotted lines indicate the effects of (22a).

(24)a.

\[ \begin{array}{ccccccccc}
& & C & V & C & V & C & V & C \\
T_1 & T_2 & T_3 & T_4 & L & H & L & & \\
& & R & & & & R & & \\
\end{array} \]

In (24a), the proper analysis of \((C_0 V)\) is a pair \((C V C V)\).

\[ \begin{array}{cccc}
T_Q & T_2 & T_3 \\
\end{array} \]

R is the rightmost C V C V C V sequence, and \(T_n\) is \(T_4\). In (24b), \((C_0 V)\) is a pair \((C V)\), R is the rightmost C V C V C V sequence, and \(T_n\) is \(L\).

Likewise, convention (22b) applies to the following situations: Convention (iia) applies for example to (11a and b), and associates the free tones with the free V's as follows:

(11)a'.

\[ \begin{array}{ccccccccc}
& & C & V & C & V & C & V & V \\
L & H & L & & & & & & \\
T_n & & & & & & & & \\
\end{array} \]

R

In (11a'), for instance, the proper analysis is that \(P=\emptyset\); \(T_1\) is the L tone associated with the final V; \(Q=1\); and \(T_n=L\) and
R is the leftmost CVCV sequence. Thus, the H tone is associated with the penultimate V and the free L tone is associated with the leftmost CVCV sequence, as indicated by the dotted lines.

Hopefully, the above observations give some idea of what is meant by Convention (16iia), or in particular, by the addition of (22a) and (22b) to the convention. Conventions (22) are intended to incorporate the one-to-one association processes observed by Goldsmith into the Universal Tone Association Conventions. As we will see below, this slight modification of the Universal Tone Association Convention (i.e., 16iia) brings about significant consequences.

Let us briefly review the effects of conventions (16iib) and (16iic). Convention (16iib) applies to the following cases:

\[(25)\]
\[
\begin{array}{cccc}
\text{a.} & \#\#C & V & b. & \#\#C & V & c. & V & \#\# & d. & V & C_o & \#\#
\end{array}
\]
\[
\begin{array}{cccc}
A & B & T & A_T & T & A & T & A & B & T
\end{array}
\]

and associates A (and J) with the V as indicated by the dotted lines.

Convention (iic) applies to the following cases:

\[(26)\]
\[
\begin{array}{cccc}
\text{a.} & \#^\#P & V & C & V & C & V & b. & V & C & V & C & V & P^\#\#
\end{array}
\]
\[
\begin{array}{cccc}
T & \end{array}
\]

and associates the tone T with the V's, as indicated by the dotted lines.
All of these conventions apply to (9) and associate suitable tones with suitable tone-bearing units as indicated by the dotted lines in (27).

(27)a. \[ \text{nikili} \quad \text{b. mba} \quad \text{c. pele} \quad \text{d. kenyà} \]

\[
\begin{array}{cccc}
\text{L} & \text{H} & \text{L} \\
\text{L} & \text{H} & \text{H} & \text{H} & \text{L} \\
\end{array}
\]

by (iia) by (iib) by (iic) by (iia)

Likewise, (12) will be turned into (12)'

(12)' \[ \#\text{CVCVCVCVCVCV} \]

\[ \begin{array}{c}
\text{T} \\
\text{T} \\
\text{T} \\
\text{T} \\
\text{P} \quad \text{T}_1 \quad \text{Q} \quad \text{T}_n
\end{array} \]

In (12)', Convention (iic) also applies and associates the leftmost T with the free V's as indicated by the double solid line in (12)'

Thus, if the Universal Tone Association Conventions are defined as in (16), rules (5) and (6), which were stated with the help of general variables, are simply stated as in (8) and (10). The Tone Association Rule in Kikuyu will be stated as in (13). On the basis of these observations, we can now claim that language-particular tone association rules will draw just one association line, and everything else will be handled by (16), which performs the association processes so as to satisfy the Well-Formedness Conditions in (16i).
15.3. The $*-to-T$ Association Rule

At the outset of section 15.1, we noted that Goldsmith proposed a $*-to-T$ Association Rule for accentual systems. In Goldsmith's system, the star ($*$) is placed not only on a particular $V$ of a phonological string, but also on a particular $T$ of a tone melody as follows:

\[(28) \quad \text{C V C V C $\hat{*}$ C V C V C V}
\]

\[\text{L H L}\]

In order to associate the tone melody LHL to the CVCVCVCVCVCV sequence, Goldsmith proposed the following $*-to-T$ Association Rule:

\[(29) \quad \text{Associate the $\hat{*}$ with the $\hat{V}$. I.e.,}
\]

\[\begin{array}{c}
\hat{V} \\
\hat{T}
\end{array}\]

If this rule applies to (28), we have the following structure:

\[(30) \quad \text{C V C V C $\hat{*}$ C V C V}
\]

\[\text{L H L}\]

The Universal Tone Association Conventions convert this structure to the following structure in which the L tones are associated with the free tones as indicated by the dotted association lines:

\[(31) \quad \text{C V C V C $\hat{*}$ C V C V}
\]

\[\text{L H L}\]
Note that Goldsmith allows Left-to-Right Association Rule (5) and Right-to-Left Association Rule (6) to apply to (28). We have already argued against rule (5) and (6), which entails that these derivations are impossible. However, let us assume, for the sake of argument, that rules (5) and (6) are permitted as possible rules. Then, these rules would produce the following structures:

(32)a. Left-to-Right Association by Rule (5):

\[
\begin{array}{cccccccc}
C & V & C & V & C & V & C & V \\
L & H & L & & & & & \\
\end{array}
\]

b. Right-to-Left Association by Rule (6):

\[
\begin{array}{cccccccc}
C & V & C & V & C & V & C & V \\
L & H & L & & & & & \\
\end{array}
\]

Readers who are not familiar with Goldsmith's paper (1974c) might wonder why rules (5) and (6) produce the structure in (32). Here is the trick. Goldsmith also proposed the following conventions on star:

(33) Conventions on star:

a. "When the well-formedness condition demands a spreading of tones to vowels and there is a potential ambiguity as to whether to spread a starred or unstarred toneme, always spread the un-starred toneme."

b. The "**" on the toneme demands a particular
modification of tone association processes: If a starless \( V \) is associated with \( \hat{T} \) or conversely if starless \( T \) is associated with \( \hat{V} \), continue to associate the \( \hat{T} \) and \( \hat{V} \) with the \( V \) and \( T \), respectively, until the \( \hat{T} \) and \( \hat{V} \) are associated with the \( \hat{V} \) and \( \hat{T} \), respectively.

(33a) was proposed, for example, to handle the following cases in which the \( \hat{T} \) is associated with the \( \hat{V} \):

\[
(34) \quad C V C \hat{V} C V C V
\]

\[
L \quad \hat{H} \quad L
\]

Recall that Goldsmith's WFC's are simply stated as in (2). Given this WFC's, we could spread the tones for example as follows:

\[
(35a) \quad C V C \hat{V} C V C V \quad (35b) \quad C V C \hat{V} C V C V
\]

\[
L \quad \hat{H} \quad L \quad L \quad \hat{H} \quad L \quad L
\]

However, (35a, and b) are not legitimate tone spreadings. In order to obtain the desired structure as in (36):

\[
(36) \quad C V C \hat{V} C V C V
\]

\[
L \quad \hat{H} \quad L
\]

Goldsmith introduced (33a). However, if the Universal Tone Association Conventions are stated as in (16), then (36) is automatically derived, and (35) are automatically excluded. Thus, (33a) is no longer required.
Now consider (33b). Given this Convention, the derivations in (32) will be understandable. That is, in (32a), the Left-to-Right Association Rule associates the leftmost tone L with the leftmost V, then the second tone H with the second V. Since the second tone H has a star, it is also associated with the third V, which happens to have a star. Thus, the spreading of H stops. Then, the third tone L is associated with the fourth tone. It goes almost without saying that the remaining free V's in (32) should be associated with the third tone by the Universal Conventions for tone association.

A mirror image situation is observed in (32b). In this case, the H tone is associated with the penultimate and antepenultimate V's and finally with the \(~\) by Convention (33c).

However, given convention (33b), we would not be able to tell whether the Left-to-Right Association Rule (5) or the *-to-*T Association Rule (29) applies to an accentual language which has HL as the basic tone melody. Consider the following case:

(37) C V C V C \(~\) V

\(\hat{H} \quad L\)

Both rule (5) and rule (29), together with the Universal Conventions, can derive the correct surface melody (38):

(38) C V C V C \(~\) V C V

\(\hat{H} \quad L\)
Thus, Goldsmith's theory could not choose the unique tone association rule for this language.

Furthermore, consider a hypothetical language which has the basic tone melody LHL* and the Left-to-Right Tone Association Rule (5). In this language, the following phonological strings:

(39)a. \[
\begin{array}{ccc}
  \text{L} & \text{H} & \text{L} \\
  \text{V} & \text{V} & \text{V}^* \text{V} \\
\end{array}
\]

(39)b. \[
\begin{array}{ccc}
  \text{L} & \text{H} & \text{L} \\
  \text{V} & \text{V} & \text{V} \text{V} \\
\end{array}
\]

would receive the melody as indicated in (39). Notice that in (39a) the star on a V plays no significant role, because the same contour could result if there were no * and just a Left-to-Right Association Rule. Since Goldsmith's theory has no motivated restriction on the possible positions of star, his theory predicts that there are some language with cases (39). However, our present theory predicts, correctly I believe, that there is no such language. If this is correct, then our theory will be adequate than Goldsmith's. 4

At the same time, we can conclude that Goldsmith's conventions on star are unmotivated and cause difficulties. Therefore, conventions on star will have to be abandoned. Once this option is taken, Goldsmith would not be able to give a unique tone mapping to the following LHL melody noun "kabuto" in Osaka with the subject enclitic "ga":

(40) \[
\begin{array}{ccc}
  \text{L} & \text{H} & \text{L} \\
  \text{ka} & \text{bu} & \text{to} + \text{ga} \\
\end{array}
\]
Goldsmith's Well-Formedness Condition (2), which should be interpreted "to add or delete association lines in a minimal way (generally by minimizing the number of line additions or deletions) (Goldsmith 1975a)", would not be able to associate the melody in a unique way, because we could draw the minimal number of lines in two ways:

\[(41)a. \quad \text{ka bu to} + \text{ga} \quad \text{b. ka bu to} + \text{ga}\]

\[\text{L} \quad \text{H} \quad \text{L} \quad \text{L} \quad \text{H} \quad \text{L}\]

However, our Universal Tone Association Conventions (16) uniquely derive the desired melody in (41a). In this respect, the two theories are different.

15.4. On Starred Melody

In the previous section, we assumed that the star should be placed on a melody, and presented arguments against Goldsmith's proposal. Let us now consider whether there is any argument for placing the star on the melody. In the descriptions of the tone systems of Japanese dialects, I have, following Halle's suggestion, restricted placement of a star (=abstract accent marker) to a certain phonological segment.

As Halle suggested, we can provide an argument for placing a star on a phonological segment. Recall that we saw a number of dialects (e.g., Osaka, Kameyama, Hirosaki, etc.) in which the Tone Simplification Rule is dependent on the existence of a star. Furthermore, in Marugame, the H Deletion
Rule was shown to be dependent on the existence of a star. (For some discussion, see Chapter 7.) These facts show clearly that placement of a star on a phonological segment is independently motivated.

However, as far as I could verify, there seems to be no evidence in Japanese to show that the star must also be placed on a particular tone of a basic tonal melody, because everything is handled without introducing a star on the melody. To my knowledge, there seems to be no evidence to conclusively show this in other languages, either, because there is no evidence to show that the specification of a star is needed in some tonal rules other than the tone association rules. Thus, to place the star on the tone of a basic tone melody is unmotivated at present.

What is worse, Goldsmith's theory would have serious problems, if we were to place a star on a tone. To see this point, let us examine Goldsmith's proposal on the Osaka dialect. He proposed that the basic tone melodies of Osaka are *HL, and L*HL, and its Tone Association Rule is *-to-T Association Rule (29).

As we have seen in Chapter 4 (Part I), Osaka has unaccented words. To assign the tone melodies to these words, Goldsmith proposed the following Star Assignment Rule for unaccented words:

(42) Assign the * to the final vowel of unaccented words.
However, recall that we have already argued against this star assignment approach in section 4.1.7. (Part I). Similarly, our descriptions in Part I suggest that in a number of Japanese dialects (e.g., Kameyama, Kumi, Tôkyô, etc.) we cannot place a star on a particular \( V \) of unaccented words. Thus, we cannot introduce rule (42) to place a star on unaccented words in Ôsaka and other Japanese.

This brings about a serious problem in Goldsmith's framework. That is, the basic tone melody cannot be assigned to an unaccented word. In this connection, he himself claims as follows: (i) There is a language with a starred melody (e.g., LHL, HL, etc.), and starred words. In this case, the Tone Association Rule can be either the *-to-\( \hat{I} \) Association Rule or the Left-to-Right (or Right-to-Left) Association Rule. (ii) There is also a language with a starless melody (e.g., HL, L, etc.), which has only starless words. Tone languages and accentless dialects in Japanese belong to this class. However, he claims that (iii) there is no language with a starred melody, which has starless words only; and (iv) there is no language with a starless melody, which has starred words. Considering this, suppose that Goldsmith modified his theory to reflect the fact in Ôsaka (and other Japanese dialects). Suppose in particular that he reformulated rule (1) in line with our proposal as follows:

\[
(43) \quad \#\# Q \quad \hat{V} \quad (\text{where } Q \text{ contains no } \hat{V}.)
\]
This reformulation of the association rule in Osaka can solve the problem pointed out above. However, if this is chosen, it opens a new problem. That is, Goldsmith's theory would now predict the existence of a language with a starred tone melody, which has starless words only. Since this contradicts his claim stated in (iii), it would be impossible to introduce rule (43) in his theory. It seems to me that the very difficulty stems from the decision to place a star on a particular vowel of a tone melody. As we have shown in Part I, if we do not place a star on a tone melody, the difficulty under consideration disappears.

This is not the whole story. Recall that in the discussion of the Narada dialect, we proposed two alternative analyses. One of them introduces a star shift rule:

(43) $\hat{v} (C_v V) \rightarrow V (C_v \hat{v})$

and a Tone Association Rule:

(44)a. $## Q ^{(\hat{v})} \quad (\text{where } Q \text{ contains no } \hat{v} )$

\hline

The alternative analysis introduces the following Tone Association Rule:

(44)b. $## (Q \hat{v}) C_v V$

We noted that though the analysis with (44b) is simpler than
the analysis with (3) and (44a), rule (44b) seems less natural than (44a) in that the association process does not start from \( \hat{v} \). However, in the above discussion, we introduced rule (13):

(13) **The Tone Association Rule (Kikuyu):**

\[
\begin{array}{c}
V \quad G_0 \quad V \\
\vdots \\
Q \#\# \quad \text{(where } Q \text{ is the maximal sequence of both phonological and tonal segments).}
\end{array}
\]

Once this kind of rule is allowed, a rule like (44b) should also be allowed. Thus, the analysis of Narada with rule (44b) should be preferred, since the analysis is simpler than the analysis with star shift. If this is correct, this contradicts Goldsmith's claim examined above, because he does not permit a rule like (44b).

Furthermore, recall also that in the above discussion, we have proposed that language-particular Tone Association Rules are (i) the Initial Tone Association Rule (8), (ii) The Final Tone Association Rule (10), and (iii) The *-Tone Association Rule, or some variants of one of these rules (like rule (13) for Kikuyu). If, rules (8) and (10) are introduced instead of (5) and (6), there is a very interesting empirical consequence. Namely, if an accentual system A contains unaccented words, our theory predicts that the tone association rule for them will be (8) or (10), or its
variant. As we have seen in the discussions of the various
dialects of Japanese, the prediction is correct. For example,
in the case of Tôkyô Japanese, the tone association rule
consists of the following two sub-rules:

(45) The Tone Association Rule (Tôkyô):

a. Associate the H tone of the basic tone melody
   with the leftmost ⸢ of the given domain.

b. If there is no ⸢, associate the H tone with the
   rightmost V.

This was formalized as in:

(46)' # # Q V
   ------------
     H (where Q contains no ⸢.)

What is particularly interesting here is that (46b) is very
similar to (and functionally identical with) the Final Tone
Association Rule (10). The only difference between the two
is that in (10), the tone which is associated with the final
V is the Rightmost tone and not necessarily a H tone.

This is a very interesting consequence of restricting
the language-particular rules to the three kinds of rules
we have so far discussed. On the basis of these observations,
we can safely conclude that a star should not be placed on
a tone melody. Furthermore, once the Universal Tone
Association Conventions are formally defined as in (16), then
we will no longer need the conventions on star nor the
checking-off mechanism, which Goldsmith claims to be necessary for his conception of the autosegmental theory.

15.5. On Star-Bearing Phonological Units and Tone-Bearing Units

In the above discussion, we have shown that tone does not contain a star. Let us now consider what phonological elements can bear a star. As noted in the analysis of Japanese dialects (cf. for example chapter 1 and 4), star-bearing units differ from dialect to dialect. Similarly, tone-bearing units also differ from dialect to dialect. Thus, star-bearing units and tone-bearing units appear not to be universal. In other words, what bears tone or a star is determined by each language. Furthermore, tone-bearing units cannot always be star-bearing units. These two do not necessarily coincide with each other. In this section, we will briefly discuss these points.

In the discussion of the Tôkyô dialect (Chapter 1), we observed that Tôkyô has no contrast between the melodies in (a) and (b):

\[(47)a. (i) \overline{CVVV} \quad (ii) \overline{CVVVN} \quad b. (i) \*\overline{CVVV} \quad (ii) \*\overline{CVVVN} \quad \*\overline{CVVV} \quad \*\overline{CVVVN} \]

(where N is a syllabic nasal)

This suggests that in Tôkyô, star-bearing units are defined as follows:
(48) In Tôkyô, star-bearing units are V's which occur in the environment X#C__. (where X is a general variable)\(^5\)

Thus, given the following word in Tôkyô, the Star can in principle be placed on one of the arrowed V's:

\[(49) \quad \text{\[<\text{VCVNCVVCV}>\]}
\]

It cannot be placed in other positions.

However, we have noted that tone-bearing units in Tôkyô are moras. This means that tone-bearing units in Tôkyô are defined as follows:

\[(50) \quad \text{Every } [\text{+son } [\langle \text{+syl}\rangle_a] \text{ which occurs in the environment}
\]

\[\text{[+seg } [\langle \text{-syl}\rangle_b] X \text{# is a tone-bearing unit.}
\]

\[(\text{Cond.: } \sim b \longrightarrow a)\]

(50) says that a tone-bearing unit in Tôkyô is either (i)

\[\begin{array}{c}
\text{[+son} \\
\text{[+syl]} \\
\text{[+seg]} \\
\text{X} \text{##}
\end{array},
\]

(ii) \[\begin{array}{c}
\text{[+son} \\
\text{[+seg]} \\
\text{X} \text{##}
\end{array},
\]

(iii) \[\begin{array}{c}
\text{[+son} \\
\text{[+syl]} \\
\text{##}
\end{array}.
\]

or \[\text{[+son]} \text{##}.\] Recall that in Japanese the segment [+son] which can occur in front of C or ## is the syllabic nasal n, if the segment is non-syllabic. Thus, (i) and (ii) mean (i)' \[\begin{array}{c}
\text{[V} \\
\text{or V}
\end{array} \text{X} \text{##}.
\]

(ii)' \[\begin{array}{c}
\text{n} \\
\text{C X} \text{##}.
\end{array}
\]
Similarly, (iii) and (iv) mean (iii)'\( \left[ \begin{array}{c}
V \\
\end{array} \right] \# \# \) and (iv)'\( \left[ \begin{array}{c}
N \\
\end{array} \right] \# \# \). In Tōkyō, the tone-bearing units in (49) are every arrowed segments:

\begin{align*}
&\text{(51)}\quad CVCCVVNVCVVV \\
&\quad \uparrow \uparrow \uparrow \uparrow \uparrow \uparrow \uparrow \\
&\quad \text{Tone-bearing units}
\end{align*}

Now consider the Ōsaka dialect. Tone-bearing units in Ōsaka are defined in the same way as (50). However, star-bearing units in Ōsaka cannot be defined as in (48). Star-bearing units in Ōsaka are defined in the same way as tone-bearing units as follows:

\begin{align*}
&\text{(52)}\quad \text{A star-bearing unit is a } \left[ \begin{array}{c}
+\text{son} \\
\langle +\text{syl} \rangle_a \\
\end{array} \right] \text{ which occurs in the environment } \left[ \begin{array}{c}
+\text{seg} \\
\langle -\text{syl} \rangle_b \\
\end{array} \right] X \# . \\
&\quad \text{(Cond.} \quad \sim b \rightarrow a )
\end{align*}

Note that (52) is exactly parallel to (50). For a related discussion, see Chapter 4 in Part I.

In this connection, we observed that in Kagoshima, tone-bearing units are defined in a way parallel to (48). Thus, they are defined as follows:

\begin{align*}
&\text{(53)}\quad \text{In Kagoshima (i.e., in a syllable-type dialect), a tone-bearing unit is every V which occurs in the environment } \# X C .
\end{align*}
As we observed in Chapter 9, Kagoshima has no star, because it belongs to a non-accentual system.

To summarize the above discussion, we have observed the following possibilities:

(54) Star-bearing units | Tone-bearing units

(a) (b)
(ii) Ōsak. (b) (b)
(iii) Kago-
shima
(iv) Mora-type Non-accentual system
(v) Syllable-type accentual system
(vi) ?Impossible (c) (a)

(where (a) is a V in the environment \( \# X C \)__, and (b) is a \( \left[ +\text{son} \right] \) in the environment \( \left[ +\text{syl}\right]_a \) )

\( \left[ +\text{seg} \right] X \) \# (Cond.: \( \sim b \rightarrow a \).)

In addition to the above-mentioned cases (i.e., i-iii), it is logically possible to have a syllable-type accentual system and mora-type non-accentual system. At present, I have no clear instance of syllable-type accentual systems. However, as for mora-type non-accentual systems, most of the accentless one-melody dialects in Japanese (cf. Chapter 11) belong
to this type.

Finally, it should be noted that if a star-bearing
unit is defined by (54b), it seems to be logically impossible
that a tone-bearing unit is defined by (54a). 7

The above observations suggest that (i) tone-bearing
units and star-bearing units do not necessarily coincide
with each other and that (ii) tone-bearing units and star-
bearing units are determined language by language.

15.6. On the Predictions of the Universal Tone Association
Conventions

Now let us turn to the problem of what kind of tonal
system the Universal Conventions proposed above exclude.
To put this in another way, what do they claim never occurs? 8
The Universal Convention (161ia) predicts, correctly I
believe, that there is no natural language such that:

(55)a. the 1st tone is associated with the 1st and 2nd
tone-bearing units; the 2nd tone, with the 3rd
and 4th tone-bearing units; the 3rd tone, with
the 5th and 6th tone-bearing units; ... ; and
the n th tone, with the (2n-1)th and 2nth tone-
bearing units.

b. the 1st tone is associated with the 1st and 2nd
tone-bearing units; the 2nd tone, with the 3rd
tone-bearing unit; the 3rd tone, with the 4th
and 5th tone-bearing units; the 4th tone, with the 6th tone-bearing unit; ... ; (2n-1)th tone, with the (3n-2)th and (3n-1)th tone-bearing units; and 2nth tone with the 3nth tone-bearing unit.

Schematically, (a) is a language with the following tonal configuration:

\[
(56) \begin{array}{cccc}
V & V & V & V \\
T_1 & T_2 & T_3 & T_4 \\
\end{array} 
\]

(b) is a language with the following tonal configuration:

\[
(57) \begin{array}{cccc}
V & V & V & V \\
T & T & T & T \\
\end{array} 
\]

Notice that these two hypothetical languages are formally simple and conceptually very natural. However, no linguists have ever reported the existence of a language which has one of these tonal characteristics. Given the Universal Conventions (16iia), we can correctly explain the non-existence of a system like these. However, without the Universal Conventions under consideration, we have no explanation for the fact that languages (55a) and (55b) are excluded from the list of possible natural tonal systems.\(^9\)

To mention another case, the Universal Tone Association Conventions exclude the following language:
(58a) the 1st tone is associated with the 1st tone-bearing unit; the 2nd and 3rd tones, with the 3rd and 2nd tone-bearing units respectively;

... : n th tone, with the n th tone bearing unit; and the (n+1) th and (n+2) th tone, with the (n+2) th and (n+1) th tone-bearing units, respectively.

This is a hypothetical language with the following tonal configuration:

(59) V V V V V V V ...
    I X I X I ...
    T T T T T T T ...

The Universal Conventions (16iia) and (16i) which prohibit the crossing of lines, predict that there is no language with tonal configuration (59). We can easily think of formally simple but impossible tonal systems of this sort. Finally let's add some more impossible systems:

(60a) A (2n-1) th V has always a L tone, and a 2n th V has always a HL contour tone.

b. Every V except the first has a contour tone.

These hypothetical systems would respectively have the following tonal configurations:

(61a) (i) V V V V V V V ...
     I / / / / / ...
     LHL L HLLHL ...

(ii) V V V V V V ...
     \ / \ / \ / ...
     L H L HLL ...

b.(i) \[
\begin{array}{cccccc}
\text{T} & \text{A} & \text{B} & \text{C} & \text{D} & \text{E} \\
\text{F} & \text{G} & \text{H} & \text{I} & \text{J} & \text{K} \\
\end{array}
\] (where T and A-J are tones and A≠3; C≠D; E≠F; G≠H; I≠J.)

(ii) \[
\begin{array}{cccccc}
\text{T} & \text{A} & \text{C} & \text{B} & \text{A} & \text{B} \\
\text{C} & \text{B} & \text{C} & \text{A} & \text{B} & \text{C} \\
\end{array}
\] (where A≠B≠C.)

(60b) could have infinite variants and (60c) could have a few variants, and if the locution "HL" is prased from "the HL contour tone" in (60a) it would also have infinite variants. None of these are permitted as well-formed tone associations by the Universal Conventions proposed in this work.

Let us now consider an initially possible alternative to convention (16iiia). Suppose, for the sake of argument, that instead of the formal process (16iiia), we introduced the following principle.

(62a). The minimal number of association lines should be drawn. 10

However, this system would permit, for example, (56),(57),and (61bi) as possible natural languages. Furthermore, in a situation such as:

(63) \[
\begin{array}{cccccc}
\text{T} & \text{T} & \text{T} & \text{T} & \text{T} \\
\text{V} & \text{V} & \text{V} & \text{V} & \text{V} \\
\end{array}
\]

we cannot draw association lines in a unique way. There are several possible ways to draw minimal association lines. To take just a few cases, we can observe the following:
Thus, the minimal association line theory cannot be adequate, because it cannot guarantee the unique determination of association lines. The above observation show that Universal Convention (16) correctly exclude infinitely many impossible languages. Since a major goal for linguistic theory is the definition of the notion of possible natural language, the Universal Conventions discussed above defines the form of possible natural languages very narrowly. Thus, I conclude that Universal Conventions (16) are basically on the right track.

In this chapter, we attempted to argue against Goldsmith's particular proposals for tone association convention mechanisms and justify our alternative proposals. Since our proposals seem to make correct predictions, it seems that the proposed modifications are on the right track.
FOOTNOTES TO CHAPTER 15

1. We are not concerned with the details of the checking-off mechanism here. For detailed discussion, see Goldsmith (1974c).

2. Notice that this is a natural extension of the use of Q variables. Alternatively, we could formalize the rule as follows:

\[(i) \quad \# Q \quad V \quad \text{ (where } Q \text{ contains no } V \text{ nor } T. \quad \text{I.e., } Q \neq \ldots V \text{ nor } T \ldots)\]

However, (i) seems to me inferior to (8), because the former requires a negative condition, while the latter needs no such condition.

3. It seems that every language has (at least) one Tone Association Rule, except for some accentless dialects in Japanese discussed in chapter 10.

4. I owe this argument to M. Halle. It should be noted that the force of this argument is limited, because if we assume that this language has a constraint to the effect that the star can appear only on the first or the second V, then this argument does not hold.

5. Note that in a word like "inoti", it is generally agreed that a glottal stop (?) precedes the initial vowel [i]. Here, we simply follow this tradition.

6. As noted at the outset of this section, other languages may have a slightly different definition of the tone-
bearing units or star-bearing units than these two.

7. Suppose that we were to be given the following structures in which the tone-bearing units are arrowed V's:

   (i) C V C V C V N C V V C V
       \   \   \   \           \   \   \   \   

   (ii) C V V C V C V C V
        \   \   \   \   \   \   \   \   

In (i), the star is on the N which is not a tone-bearing unit, and in (ii), it is on the third V which is a tone-bearing unit. Supposing that the association starts from the starred elements, it would be impossible to state a tone association rule which covers both (i) and (ii).

8. I am grateful to Ross and Kiparsky for directing my attention to this area.

9. Recall that we have observed above that Goldsmith's theory would tolerate languages (55). In this respect the present autosegmental theory is different from his.

10. The minimal number of association lines is determined mechanically. Suppose that a string has n V and m T. If n > m, the minimal number of association lines is n; if n < m, the minimal number of association lines is m. I am grateful to N. Clements and Kiparsky for suggesting this alternative.
CONCLUSION

In Part I, we have outlined the basic notions of the autosegmental theory and applied the theory to the descriptions of Japanese dialects. In addition, we discussed the theoretical implications of each of the systems, and tried to argue that autosegmental theory is more adequate than other theories available at present.

In Part II, I first surveyed a few competing theories of Japanese tonology and tried to show that they are inadequate. Then, after a brief review of Goldsmith's claim, I proposed a reformulation of tone association rules and the Universal Tone Association Conventions. The proposed Tone Association Conventions claim that tones are associated with V's in a one-to-one fashion, as long as the one-to-one correspondence is possible. This is different from the correspondence relation of a poem with a melody in music.

At the outset of this work, we saw that language and music are common in that (i) both must conform to the temporal linearity constraint which prohibits a crossed connection, and that (ii) every poem and every tone-bearing unit must be associated with at least one melodic part and a tone, respectively.

However, the major similarity between music and language ends here. Thus, in the case of music, there is a melody
without a poem. However, in the case of language, a tone melody which is not associated with any-tone-bearing unit is impossible.\footnote{In other words, every tone melody must be associated with at least one phonological segment and vice versa.} In addition to this, the correspondence in music need not be one-to-one. On the other hand, in the case of natural language, it should be one-to-one at a deeper level, when the one-to-one association is possible. In these respects, the constraint on the correspondence of a phonological level and tonal level in language is more strict than that of a melody and a poem in music.

In this work, I proposed that language-particular tone association rules draw only one association line. This entails that among the tone association processes, what is particular to a language is a specification of the starting point of tone association. Everything else is claimed to be a universal process. As far as I can see, this is the most constrained notion of language-particular tone association rules, and it makes certain interesting predictions for the possible tonal systems.

On the other hand, in this work, I could not find an interesting constraint on possible tone alternation rules. Among the tone alternation rules, we have included insertion, deletion (simplification), Flop, lowering, and raising.
However, there seems to be no tonal metathesis rule. In this respect, tonology and music seem to share a characteristic. If this turns out to be the case, this will be one of the differences between tonological rules and phonological rules.

Furthermore, there seems to be no system which contains a rule which turns a L tone into a H tone and a rule which turns the H tone introduced from the L tone into a L tone. Though several unlikely rules come to mind, they seem to me premature at this stage in my investigation.

In spite of these unsolved problems, I hope that my attempt will mark a step forward in our understanding of tonal processes of natural language.
FOOTNOTE TO CONCLUSION

1. Note that this does not deny the notion of floating tone. Even the floating tone should be associated with a tone-bearing unit at some point in the derivations.
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The author was born in Zenranandô, Chôsen, Japan, on August 26, 1943. After the war, his family went back to Hokkaidô, and he lived at a mountain village in Kamikawa-gun, Hokkaido during his youth. He graduated from Asahikawa Higashi High School in March, 1962, and then attended Tôhoku University. He met a number of good friends and excellent professors there and graduated in March, 1966, with a major in English Linguistics. While he was writing his thesis for Bachelor's degree, he experienced a great pleasure in engaging in creative activity. Thus, he decided to attend the Graduate School of Tôhoku University to study English Linguistics. He studied linguistic theories under the guidance of Professors M. Yasui and T. Kuwahara, and obtained Master's degree in March 1968, and was a Ph.D. candidate for two years after that.

He started his career as Z yposhu (the lowest rank in professorship in Japan) in the Department of English Linguistics, Tôhoku University in April, 1970, and stayed there for two years. He was married in March, 1971 in Sendai and he is now the father of a daughter and a son. He then went to Ôsaka in April 1972, and taught at the Ôsaka Shiritsu (Municipal) University as Kôshi (= assistant professor in the U.S.) for one year and a half.
He was granted a fellowship from the Japanese Society for the Promotion of Science (JSFS) to study linguistics at the Department of Linguistics, M.I.T. Under the supports from the JSFS and from M.I.T. (research assistantship, June-August, 1975), he attended M.I.T. from September, 1973 to August, 1975. During his stay at M.I.T., he tremendously enjoyed studying linguistics, and learned a lot about the greatness of human-beings as well as about linguistics from M. Halle and other faculty members and also from his friends.

He helped Prof. M. Yasui compile Kenkyūsha's Dictionary of New Linguistics (1971) and wrote some sections of the dictionary; his short article "Dragging Reconsidered" (1973) appeared in Linguistic Inquiry (Vol. 4, No. 1); and a number of his articles and reviews (mainly in Japanese) have been published.